NOT ANOTHER ACRONYM: A CRITICAL

ANALYSIS OF NFPA STANDARDS FOR SMALL TO

MEDIUM-SIZED FIRE DEPARTMENTS

By

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Abstract: The purpose of this study was to construct a framework of NFPAs to assist fire administrators in their daily implementation of policy and procedures. The central researcher question was *Can a framework be created to assist newly tenured fire chiefs in understanding what specific NFPA standards are needed in each division of a fire department?* Through the use of the interpretivist paradigm and a Qualitative method approach the purpose of the study was achieved. Within the Qualitative approach an inductive system of logic was used. The Delphi method which is qualitative in nature created the appropriate design of the study. The Delphi method was useful because experts were required to give their opinions on NFPA standards. It is subjective in nature, which follows the interpretivist paradigm. Semi-structured interviews were used to interview 6 participants. Purposive and snowball sampling were used in the selection of participants. The participants were experts in the understanding and use of NFPA standards. Synchronous online interviews (virtual face to face interviews) were completed via Zoom technology. A content analysis allowed for trending themes, concepts, categories, and keywords once interviews were completed. Descriptive, Interpretative, and theoretical validity were used in the study. The 3 areas of validity demonstrated what themes, concepts, categories, and keywords were used, which assisted with the conclusion and connection of the study's aim, objectives, and Central Research Question (CRQ). The study found there were 6 overarching themes. The themes included (Administrative NFPA standards), (Adopting NFPA standards), (Static NFPA standards), (Divisions), (Culture), (Comparing Small to medium sized fire departments to larger departments). Utilizing 4 of the 6 themes the researcher created a framework of 15 NFPA's that could be useful to newly tenured fire chiefs in small to medium sized fire departments. The themes of culture and adopting NFPA standards require soft skills from the fire chief to gently implement the standards to the department's specifications. Through the use of researcher tools, the author created a framework to assist fire administrators in their daily implementation of policy and procedures. Also, the 33% theory originated out of the analysis. The theory falls under organizational theory.

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CHAPTER I

INTRODUCTION

1.1 Introduction to the Study

Fire organizations are families. Personnel eat, sleep, and cook in fire stations and live with each other for 24 to 48 hours at a time. Fire organizations are also steeped in tradition. Men and women from all walks of life come to the profession with a common goal: to help others in need. Often fire professionals have prior careers—teachers, attorneys, actors, plumbers, carpenters, and electricians, to name a few. Despite such a wide array of backgrounds and experiences, the fire service tends to be considered a paramilitary organization (post-military) where many military ideals flow (Halvorson 2010) This perspective is from the experiences of the author who was in the fire service for 10 years.

Factors like co-habiting for an extended period of time and strong traditions that have lasted for hundreds of years, fire department rules have evolved, and those rules dictate how personnel view their organization, how they prepare for possible issues on the job, and what the expectations are in given situations. The rules in fire organizations are called standard operating procedures (SOPs) and policies. They explain in a chronological order what is expected of personnel in different situations and what is acceptable or not acceptable in the organization. The ideals of SOPs, policies, and standards are at the foundation of the fire service. Policies and procedures are created by the organization's leadership.

Policies and procedures may be created from the experiences and backgrounds of leadership personnel. When that is the case, policies may be skewed from the bias and perspective of the person writing them. Other policies and procedures are written to follow standards, but where do these standards come from, and who creates them?

1.1.1 Introduction to the National Fire Protection Agency

The National Fire Protection Agency (NFPA) is a nonprofit organization that attempts to eliminate death, injury, property, and economic loss created by fire or other related hazards (Dungan, 2016). The NFPA Articles of Organization explain further:

> *The purposes of the corporation NFPA (hereinafter referred to as the Association) shall be to promote the science and improve the methods of fire protection and prevention, electrical safety and other related safety goals; to obtain and circulate information and promote education and research on these subjects and to secure the cooperation of its members and the public in establishing proper safeguards against loss of life and property.* (Dungan, 2016)

The NFPA collects and distributes information while developing and sharing knowledge. The primary method that the Association uses to distribute its knowledge is by the consensus standards process. Standards are defined as "a wide variety of technical works that prescribe rules, guidelines, best practices, specification, test methods, design or installation procedures, and the like. The size, scope, and subject matter of standards vary widely, ranging from lengthy model building or electrical codes to narrowly scoped test methods or product specification" (Dungan, 2016 P. 1). The standards are developed by following established processes and procedures. Most standards are associated with health and safety.

In some states, NFPA standards are adopted into law; therefore, the standards must use legal language. In these cases, documents establish societal norms and expectations. The standards have a minimum requirement: they must be technical, organizational, social, economic, and accurate (Dungan, 2016). With these requirements, the documents may be difficult to codify (Dungan, 2016). These requirements are evaluated by a technical committee that decides how the document should serve the user (Dungan, 2016) (https://www.nfpa.org/Codes-and-Standards/Standards-development-process/How-the-process-works).

1.1.2 Practitioner to Researcher

At the beginning of this study, the researcher was a practitioner in the fire service. The researcher and fellow firefighters observed a gap between the use of NFPA standards and the fire organization we worked for. Many policies in the organization were not updated. Some were over 20 years old and they did not follow the most up-to-date standards in the fire industry. Thus, this study presents an opportunity to help not only his fire organization but the fire service in general. The researcher engaged other departments on the standards they used and discovered it was a similar story to his organization. NFPA standards were used when personnel were being certificated and for equipment, specifically apparatus due to safety requirements. However, many other standards were viewed as too difficult to implement, or the cost of implementation was too high. Accordingly, this study aim is to construct a framework of NFPAs to assist fire administrators in their daily implementation of policy and procedures.

1.1.2.1 Education

In January of 2017, the author enrolled in the Fire and Emergency Management graduate framework at Oklahoma State University while working full-time at his fire organization. While working through the framework, the author found research and education in the fire service were often viewed as taboo unless you were a chief officer. This view pushed the author to search for

further gaps in fire organizations. This is where the author observed the gap in the understanding of NFPA standards and the fire industry.

1.1.3 Background

With a practitioner background and an educational understanding of research design and methodology, the author began the deep dive into why NFPA standards were not utilized consistently in the fire service (as confirmed by the researcher through six interviews). The gap between NFPA standards and fire organizations is primarily in Occupational Safety and Health Administration (OSHA) states. OSHA does not require fire organizations to implement NFPA standards to law. Often due to financial cost and a lack of resources, fire organizations use bits and pieces of the standards. What has been forgotten is, if the standards were implemented, organizations would run more efficiently and effectively, which would likely reduce operational costs. If a state entity requires higher standards than OSHA requirements, the gap is closed. The closing of the gap will be explained later in the study. An example of a state entity that implements NFPA standards to the law is Labor and Industry (L&I) in Washington State.

CHAPTER II

INFORMATION PROCESSING

2.1 Purpose of the Literature Review

The purpose of this chapter is to provide the theoretical rationale for the study (information processing) and set the research question. Whilst, also determining the way in which the interviewed experts (fire chiefs) process information, how they view specific NFPA standards, why they the standards are important, and if the culture and trust of personnel in the fire service dictate the way they attempt to implement policy and procedures using NFPA standards.

To stay within the scope of the study the SMART Principles were used. SMART principles are Specific, Measurable, Attainable, Relevant, and Time-based (Pybus, 2020). The measurable principles were used discreetly due to the nature of qualitative research. The SMART principles also assisted with the efficiency and effectiveness of the study and the final product.

The study was specific in focusing on small to medium sized fire departments and what NFPA's were likely needed for those departments. Small to medium is defined as departments of less than 10 fire stations and less than 200,000 population within the jurisdiction. Measurements were used when finds of themes, categories and concepts met saturation. 6 experts were needed to meet saturation.

The study was attainable through the use of technology (Zoom for interviews), participants with a level of expertise and willingness to be open about past experiences and lessons learned by each participant, and the research tools that were available for the study (the philosophy used, system of logic, Atlas TI software) just to name a few. This study should be relevant to departments and fire administrations that are in OSHA states that may use NFPA to an extent but have not done a thorough assessment into how NFPA's could help their department to become more efficient and effective. This study was cross sectional and was a snapshot of subjective viewpoints. The study took approximately 7 months to complete.

Multiple databases were used, including Google Scholar, ScienceDirect, Scopus, and JSTOR. A narrative review was used because of the study's primary focus: to make sense, communicate, and deliver subjective storytelling of the research with themes of information processing (IP). IP assists with understanding and/or analyzing how participants' perspectives may be similar or different and why they believe specific standards are considered important, and why some are not.

2.1.1. Definitions of Information Processing

The definitions of IP vary widely given the literature has evolved from the 1950s to the present. Early IP literature understood IP as consisting of a number of cognitive processes and memories (Simon & Newell, 1958). The cognitive process has two levels: elementary processes and complex processes (Simon, 1979). Elementary processes include scanning lists in one's memory, comparing simple symbols, and retrieving from one's memory. Complex processes include problem-solving and concept acquisition (Simon, 1979). Depending on the sequencing, elementary processes can create a successful resolution to complex processes if they are similar in nature. Much like building blocks, IP models provide descriptions of specific stages or steps through which processing is accomplished.

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Memories come from an individual's background, training, abilities, and experiences. Memories may exist at different levels of activation in the brain. The activation level will determine the number of memories and the availability of the content within the memory (Simon, 1979).

In the same vein, perceptions, memorizing, and thinking are blurred, which creates a loss of information to process. Simon (1971) also considered IP as processes that go inside the mind and towards particular properties of human memory. These properties are capacity, speed, and the organization of the mind (Simon & Newell, 1971).

2.2 Five Principles

This section focuses on the five principles that explain the different stages of IP. All of the models are integrated into the way participants process information. Participants may fall into one model more so than another; however, the models do have similar principles and general scope (Massero & Cowan 1993). As with many organizations, there are different areas or divisions. Leaders may use different models to work with personnel in different divisions and process information in a different capacity to understand the needs of personnel.

The five principles were created in 1986 establishing the foundation for IP. They were viewed as how information was modified (Massero & Cowan, 1993). The five principles comprise information description, recursive decomposition, flow continuity, flow dynamics, and physical embodiment (Massero & Cowan, 1993). Information description states mental processing and environment are explicated by the types and amount of information. Recursive decomposition is also known as hierarchical decomposition (Massero & Cowan, 1993). Hierarchical decomposition is similar to an organization that has a hierarchical structure or follows the Incident Command System (ICS). The first step of processing breaks down into sub-steps; for example, a memory steps down to acquisition, acquisition steps down to retention, and

these steps then continue down into other sub-steps. Flow continuity is the transmission of information. Flow dynamics is the amount of time the processing takes. Information processing is not instantaneous. If a task is complex or in-depth, processing will take even longer. The final principle is physical embodiment (Massero & Cowan, 1993). This principle assumes IP happens in a physical system. The physical system places information in representations. The operation of the physical system then changes the representations to processes (Massero & Cowan, 1993).

2.3 Four Models

Individuals process information differently; therefore, this study reviews four models of IP. This study pinpoints these four models because of the type of expert interviewed. Each expert selected is part of a paramilitary fire service organization. The models focus on motivation, decision-making, conflict, and policy—all of which are components of leadership in the fire service. Each expert may use a different model as they process information. Examples are used and come from the researcher, who is considered an expert in standards and policy due to his background in the fire service.

2.3.1 The Affective Infusion Model

The Affective Infusion Model states processing choices are decided by the task, the person, and the situation (Forges & George, 2001). The focus is to understand the mood effects on organizational behaviors. The features of tasks include familiarity and complexity; the person looks to motivational goals, cognitive capacity, and personal relevance (Forges & George, 2001). Lastly, the situation requires accuracy, social norms, and expectations. Because of standards, policies, and procedures in the fire service, this study argues that motivated processing is often at play for individuals. Motivated processing is where a preexisting goal involves highly predetermined and directed information-search patterns that require little generative, constructive

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processing, limiting the scope of mood infusion (Forges & George, 2001). For example, an

NFPA standard is used, it becomes policy in the fire department, personnel conform to the policy,

frustration and ambivalence may occur after the policy is implemented, but it is still followed.

Motivated processing also occurs when individuals adopt a highly targeted, selective thinking

style and work in hierarchical environments (Forges & George, 2001), much like the fire service.

Hierarchical environments reduce the risk of trusting incidentally primed affective information

and impose a strong motivational influence on employees (Forges & George, 2001). Forges &

Vargas (1998) state that motivation processing is dominated by a cognitive perspective. Feelings

are viewed as the consequence of goal achievement and performance. Individuals' preexisting

goals will dominate their information-search strategies, judgments, and behaviors (Forges &

George, 2001; Forges & Vargas, 1998). An adage in the fire service is, "We are all cut from the

same cloth." The researcher understands this statement to mean most personnel in the fire service

have similar values, ethics, and a mind set to help others.

2.3.2 Rational Planning

Decision-making is extremely important in the fire service. Decisions made at the

strategic level filter down to personnel. Personnel use the decisions made for fire ground

operations and prevention codes or dies and having the correct tools to make a decision is

important. IP theory is used to inquire if rational planning practices add to strategic-decision

quality in public organizations. Rational Planning focuses on strategic goals and insights into an

organizational environment.   One assumption is that Rational Planning gives an opposing

perspective to political or nonrational decision-making. Rational planning is a theoretical

framework of strategic management (George & Desmidt, 2018). A rational approach is used for

strategic formulation through strategic planning and strategy implementation (George & Desmidt,

2018; Poister, Pitts, & Edwards, 2010). Strategic-decision quality introduces information into

decision-making. Decision-makers give a backbone to strategic-decision quality by exchanging

information (communication) during the decision-making process (George & Desmidt, 2018).

The exchanging of information creates informed and qualitative strategic decisions because each

decision-maker holds a specific piece of the decision-making problem. Rational planning in an

operations sense is performance management, performance measurement, and strategic planning

(George & Desmidt, 2018). Policies and procedures are strategic, but they require performance

measurements from employees; therefore, rational planning is an appropriate method when

creating policies and procedures from standards due to the requirements for performance

measures.

2.3.3 Task Conflict

IP is useful in identifying group process variables applicable to decision-making (Olsen,

Parayitam, & Yongjian, 2007). Decision-making differs between humans. Some primary factors

which lead to differences in decision-making are behavior and environment (Kelly & O'Connell

2015). These factors do not stand alone. Other neutral mechanisms assist in human decision-

making (Kelly & O'Connell, 2015).

Task conflict is a variable defined as a disagreement about particular issues, such as

differences of judgment about a decision or choices of alternative policies (Olsen et al., 2007).

This concept may prove helpful in bringing together multiple fire chiefs from different areas of

the United States and encouraging them to view NFPA standards in a different light. An example

would be a fire chief from Washington who follows the standards because they have been

adopted into law by the L&I organization, whereas a fire chief in Missouri is not required to

follow the standards to an exact measure because they have not been adopted into law. Task

conflict would assist fire chiefs in understanding why an NFPA standard would be useful in other

ways than originally believed: "Task conflict provides an understanding of the task issues and a

commitment to the decision but will also produce a higher quality decision" (Olsen et al., 2007).

2.3.4 The Aggregative Model

The aggregative model uses long-term memory and short-term memory for problem-solving and concept attainment (Simon, 1979). Memory likely has levels of activation, and the levels determine the access to specific memory content (Simon, 1979). Concept attainment is used when implementing policy from standards. Short- and long-term memory is used as well. NFPA standards are ingrained in personnel throughout their careers (long-term memory). Often personnel may not know where the information comes from while training or during fire operation. They are from NFPA standards that are either loosely followed or have been adopted by law.

Simon (1979) states that two questions must be assessed as experts process information. First, how is the knowledge accessed and organized by experts? And second, how much knowledge does an expert have in the focus area?

In this literature review, models and variables were used to understand information processing and how individuals understand concepts, make decisions, utilize memory while making decisions, strategic and performance management, and how organizations may attempt to suppress information processing by motivation. When an individual processes information, they use the information for decision-making. Outside variables (task conflict) may alter the decision-making. The decisions made by each expert will be different as a result of the way in which they have processed information, task conflict, concept attainment, memories, experiences, perceptions, and biases. Some variables may push experts to change their decision once they have processed more information (Simon 1979).

2.4 Central Research Question and Aim

Information processing will be an integral part of this study. Participants utilize their background, experiences, events, and bias to decide what is best for a fire department. The way

they process the information of prior experiences defines how fire chiefs view NFPA standards and how NFPA can help a fire department to be more efficient and effective. Through the processing of information from prior experiences with fire chiefs, the researcher came up with the central research question and aim of the study. The central research question is: *Can a framework be created to assist newly tenured fire chiefs in understanding what specific NFPA standards are needed in each division of a fire department?* The aim of the study is to construct a framework of NFPAs to assist fire administrators in their daily implementation of policy and procedures.

CHAPTER III

RESEARCH METHOD AND METHODOLOGY

3.1 Introduction

NFPA standards have long been a part of the fire service. However, depending on state laws or a department's requirements, NFPA standards are either followed exactly as they were written, are used to an extent, or are not used at all. This variability constitutes a need for research to increase our knowledge and understanding of the use of NFPA standards in the fire service. With knowledge and understanding, enhancement of all divisions of the fire service could be achieved.

This chapter builds upon the central research question. A discussion and defense of the philosophy, ontology and epistemology, research design, data collection, and analysis methods is provided. In addition, a practical application of these methods is defined.

3.1.1. Origins of the Research

The study identifies gaps and questions dealing with NFPA standards that could help fire administrators in their daily implementation of policy and procedures. The origins of this study come from the author's experience as a practitioner in the fire service.

The author's experience spans over 9 years in the fire service in two different agencies in two significantly different states, Washington and Oklahoma. These states differ in topography, language, and NFPA standard requirements. NFPA standards were a large part of standard practice at one organization while somewhat important at the other. This depended on whether the state followed OSHA guidelines or state-specific guidelines. After training with the initial department, graduate-level education (Master of Science), and inquiries. The author determined that NFPA standards were a central difference. The author's experiences and academic insights contributed to the development of a vital perspective and awareness of a wide range of theories, and their relation to how standards are utilized in the fire service. The author ensured that these lived experiences would help the study but not unduly influence or create a bias as the experiences were grounded in the relevant literature (McAleavy, 2016).

3.1.2 Aim and Objectives

The study aim: "This study aims to construct a framework of NFPAs to assist fire administrators in their daily implementation of policy and procedures."

Five objectives were utilized to support the aim:

1) Develop a literature review focusing on how fire personnel process information from their experiences and background.

2) Produce visual and language data capturing subject matter experts' views on NFPA standards and how they implement them into policy and procedures.

3) Identify themes, patterns, and concepts.

4) Compare and contrast findings and decipher similarities and differences from regions (South, Midwest, Northwest, and West) of the United States.

5) Develop charts and qualitative learning tools to understand what is required for NFPA standards to be implemented into policy.

3.1.3 Formulating the Primary Research Question

The initial idea of this study was to create a blueprint of NFPA standards for a newly tenured fire chief. Therefore, the central research question (CRQ) is:

Can a framework be created to assist newly tenured fire chiefs in understanding what specific NFPA standards are needed in each division of a fire department?

The initial CRQ evolved from discussions with fellow practitioners. Is it possible that, "these NFPA standards are needed to streamline processes in fire departments?" This was the origin of the study. These discussions lead to the CRQ. McAleavy (2016) quotes Van de Ven (2007): "the formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill." This quote explains the importance of problem formulation before the research design. Van de Ven's (2007) argues that "problem formulation play[s] a crucial role in grounding the subject of [the] problem in reality, and directly affects how theory building, research design, and problem solving task[s] are performed; yet researchers often overlook or pay little attention to problem formulation." The following four points demonstrate why problem formulation is crucial to this study:

1. Recognizing and situating the problem.
2. Gathering information to establish the problem.
3. Diagnosing the information to find out the symptoms and characteristics of the problem.
4. Deciding what actions or questions to pursue to answer the research problem (McAleavy, 2016).

3.1.4 Supplemental Research Questions

The CRQ is supported by three supplemental questions which ensure the stated aim was achieved:

1. How flexible must the framework be to adjust to each fire department?
2. What are the differences between (United States) OSHA and non-OSHA states, and how does that affect the framework?
3. To what extent do state entities (beyond OSHA) create law which requires fire departments to follow the exact specifications of the NFPA standards?

3.2 Philosophy of Research

3.2.1 The Four Philosophies

Research philosophy is the "theory of reality; an idea of knowledge and being" (Bhaskar, 1989). There are four main research philosophies: positivism, critical realism, pragmatism, and interpretivism. This chapter discusses these four, including their ontology and epistemology. The contrast of views will position this study within the appropriate philosophical domain which determines how social research should be conducted (McAleavy, 2016).

3.2.1.1 Positivism

Positivism is referred to as the scientific approach. Reality exists objectively and externally (Bryman & Bell 2015). Data gathering occurs from observing the phenomena directly or measuring the phenomena using surveys and other instruments (Bryman & Bell, 2015). Often positivists use cause and effect; that is, this happens, therefore this will happen. The researcher must test theories and provide material to develop and create law (Bryman & Bell, 2015). Deductive or inductive reasoning may be used, depending

on variables, principles, or the process of generalization. The ontology and epistemology of positivism assume the external world is independent of human knowledge. It also assumes one can rid oneself of bias (Bryman & Bell, 2015).

3.2.1.2 Critical Realism

Critical realism shares two perspectives with positivism. First, sciences (natural and social) should apply the same approach as positivism to the data collection and explanation. Second, reality is separate from human knowledge (Bryman & Bell, 2015). Relationships are at the core of critical realism which indicates that political relationships, conflict, and language are important factors. The ontology and epistemology indicate knowledge is contingent upon history (Bryman & Bell 2015). Without the critique of history, knowledge will not be developed (Bryman & Bell, 2015).

3.2.1.3 Pragmatism

Pragmatism can be defined as "what works." It may not mean what is considered true or absolute (Bryman & Bell 2015). The ontology and epistemology state that if it works well, it must be true. This philosophy favors a mixed approach of quantitative and qualitative methods (Bryman & Bell, 2015). With pragmatism knowledge and science are viewed in a practical way.

3.2.1.4 Interpretivism

The last philosophy is interpretivism. Interpretivism was adopted for this study. Interpretivism follows of the *Verstehen* approach. *Verstehen* is a German word meaning 'to understand or interpret,' as in to understand behavior (Bryman & Bell 2015). Interpretivism seeks empathetic behavior (Bryman & Bell, 2015). For interpretivism to work, social scientists must grasp the subjective meaning of social action. The questions

of 'how' and 'why' of social action must be answered; this includes understanding the processes whereby things happen (Bryman & Bell, 2015). The ontology states reality is created by human action. Also, reality does not exist independently (Bryman & Bell 2015). Human knowledge—more specifically, an individual's knowledge—is reality, and there is no *real world* beyond it (Bryman & Bell, 2015). Epistemology is the antithesis of positivism. It is incredulous of objectivity. Interpretivism attempts to understand the meaning of people and includes the interpretation of text. McAleavy (2016, p. 115) uses Livesey's (2012, p. 5) three key principles that ground the paradigm of interpretivism:

1. The social world is seen to be produced and reproduced on a daily basis by people going about their lives.
2. People actively, if not always consciously or deliberately, create their world.
3. The social world is understood by different people in different situations in different ways.

Qualitative data is needed and, to retrieve the appropriate amount of qualitative data (rich and extensive) required, it is essential to be sensitive to and understanding of human subjects (Bryman & Bell, 2015). Trust must be created between researchers and subjects. The trust will then lend itself to the study. Subjects' past emotional events, background, experiences, and perceptions are required (Bryman & Bell, 2015).

3.2.3 Why Interpretivism?

This study creates a framework of NFPA standards to implement policy and procedures. The author found a gap in the use of NFPA standards and the explicit following of the standards (or the lack thereof) in the fire service. A deeper understanding of this gap needed to be filled by lived experiences, biases, and

perspectives of the expert practitioners (fire chiefs) using the interpretivist paradigm. The researcher analyzed the realities and knowledge of the experts. The responses were interpreted by using content analysis, to determine why the experts chose specific NFPA standards and to pinpoint how their emotional events, experiences, background, perceptions, and biases affected their decision-making.

3.3 Qualitative Method Approach

Qualitative research often begins with a broad and diverse outline of a concept (Bryman & Bell, 2015; Yin, 2011). For most researchers, there is an emphasis on theory coming about from the collection and analysis of data. This is considered an inductive approach. Bryman et al. (2019) state that qualitative research is the study of "meaning:" "It is only through qualitative research that the world can be studied through the eyes of the people who are studied" (p. 560). Yin (2011) explains this further by introducing five features:

1. Studying the meaning of people's lives under real-world conditions;

2. Representing the views and perspectives of the people in a study (experts);

3. Covering the contextual conditions within which people live;

4. Contributing insights into existing and emerging concepts that may help to explain human social behavior; and

5. Striving to use multiple sources of evidence rather than relying on a single source alone.

Discussions concerning reliability and validity can enhance qualitative research. One such conclusion found by researchers is that the meanings of validity and reliability need to be altered. Validity is a term heavily used in quantitative research. Validity is

often the utmost measurement in quantitative research. What is often lost to quantitative researchers is that measurement is not a major preoccupation in qualitative research, and therefore validity has limited application to qualitative studies (Bryman & Bell, 2015). Respondent validation is often used in qualitative research. This is where the researcher contacts the participants of the study and provides his/her account of the findings. The concept is useful because researchers wish to ensure their findings are in line with the experiences and perspectives of the participants (Bryman & Bell, 2015).

Respondent validation was used in this study. Most new researchers, like this author, come to the conclusion that nothing is going to come out of the research, and there is nothing to say for the findings (Bryman & Bell, 2015). Respondent validation contributed with the findings. To achieve respondent validation (Maxwell 2002) 4 points of validity were used. The points are,

1. Descriptive validity: qualitative study foundations.

2. Interpretative validity: which is where transparency of subjective inferences is clarified via charting.

3. Theoretical validity: which is where systematic construction builds on observable evidence (data) illustrating the links and relationships that build theory.

4. Generalizability: is used mostly in the quantitative sense; however, some qualitative uses are possible.

3.3.1 System of Logic

Deductive and inductive logic are the two distinct systems which bring together the relationship between research and theory. In this study both were used.

3.3.1.1 Deductive Logic

Deductive reasoning states that an argument is valid only if the conclusion follows necessarily from the premise (Kurbel, 2017). Or, in other words, theory is already established; it is then tested to see if it is true. In the deductive sense the NFPA standards are written, and therefore the data is available.

3.3.1.2 Inductive Logic

Inductive logic explores the emphasis on theory coming about from the collection and analysis of data (Bryman & Bell, 2015). In the inductive sense there is a lack of theory and construct for a framework. It costs money for fire departments to access NFPA standards. No framework has been created in OSHA states to specifically assist fire service divisions in helping them recognize which NFPA standards would be most useful to them or to provide a general scope of NFPA standards that could help a fire chief. Inductive logic allows for the collection and analysis of data from experts in the field (fire chiefs). Through their expertise, a framework could be developed then be implemented.

3.4 Data Collection Method

For the study to be successful, an inclusive plan to investigate the CRQ is required. This includes appropriate methods of data analysis, interpretation, the position of the philosophy, and the ontology and epistemology (McAleavy, 2016). The method selection is critical to the research design. Walsh and Wigens (2003) argue that the methodology should "outline how the researcher went about the research study. The goal is to describe the data sources, the data collection tools which were used, and the procedures that were undertaken to collect the data."

Following the philosophy of interpretivism, this study utilizes the typical Delphi method, which is qualitative in nature and is utilized in some graduate student's research projects (Skulmoski 2007) (Donahoe & Needham, 2008). A content analysis was used to detect and review themes, concepts, and categories of all interviews (University of Leicester (n.d.)) (Neundorf 2011).

3.4.1 The Delphi Method

The Delphi method was developed by Olaf Helmer and Norman Dalkey for the RAND Corporation in 1953 (Donahoe & Needham, 2008). The Delphi method has evolved through multiple eras, including the Secrecy era, which was characterized by military intelligence and consensus (Donahoe & Needham, 2008). It determined reliable consensus judgment regarding Post-World War II weapons' requirements (Donahoe & Needham, 2008). Today's era is the Continuity and Refinement era (1980 to present). The Continuity and Refinement era focuses on the progress of complex social issues; in particular, progress includes areas such as response behavior and the role of experts in Delphi studies. The Delphi technique continues to be applied in government planning, information systems research, education, corporate management, health care, marketing, and environment management (Donahoe & Needham, 2008). A key goal for the Delphi technique was to create a method that included a voice for the practitioner and academic (Borden et al., 2017).

The Delphi method is particularly useful to this study because experts were required to give their opinions and beliefs on a subject. The study is subjective in nature, which follows the interpretivist paradigm. This affords participants a feeling of being a part of a prestigious or important group (Skulmoski, 2007). Experts are often diverse individuals; thus, the Delphi Method can use homogeneous or heterogeneous groups (Skulmoski, 2007). Homogeneous is

defined as being of a similar kind or alike, while heterogeneous is defined as consisting of dissimilar or diverse ingredients or constituents (Merriam-Webster, 2010). The profile of individuals may be defined by age, nationality, knowledge, expertise, qualifications, occupation, location, or position. These profiles may further differentiate between two applications of the method (Day & Bobeva, 2005). The Delphi method also affords the opportunity to be a part of a study that may create new theories or frameworks in a subject that has not been evaluated or where there is a gap in research (Day & Bobeva 2005). Lastly, a Delphi study may increase the visibly of individuals within their organization or globally in their respective fields of study (Okoli et al., 2004).

3.4.2 Selection of Experts

Selecting a panel of experts is considered the most important aspect of the methodology because the findings are drawn from the expert's opinions, perceptions, background, and bias (Skulmoski, 2007). The Delphi method has a wide range of recommendations for the number of experts required in studies. In Gustafson, Shukla, Delbecq, and Walster (1973), four experts were used. In 1999, Nambisan et al. used six experts; Wynekoop and Walz (2000) used nine. In other studies, seven participants are a suitable minimum number (Day & Bobeva, 2005), while Hartman and Baldwin (1995) used 62. Table 1 provides more insight into the number of experts used in past Delphi studies.

Table 1. Use of experts in past Delphi studies

Table 1: Delphi Method Diversity - Published Research

Non IS/IT Study	Delphi Focus	Rounds	Sample Size
Gustafson, Shukla, Delbecq, & Walster (1973)	Estimate almanac events to investigate Delphi accuracy.	2	4
Hartman & Baldwin (1995)	Validate research outcomes.	1	62
Czinkota & Ronkainen (1997)	Impact analysis of changes to the International business environment.	3	34
Kuo & Yu (1999)	Identify national park selection criteria.	1	28
Nambisan et al.(1999)	Develop a taxonomy of organizational mechanisms.	3	6
Lam, Petri, & Smith (2000)	Develop rules for a ceramic casting process.	3	3
Roberson, Collins, & Oreg (2005)	Examine and explain how recruitment message specificity influences job seeker attraction to organizations.	2	171

IS/IT Study	Delphi Focus	Rounds	Sample Size
Niederman, Brancheau, & Wetherbe, (1991)	Survey senior IS executives to determine the most critical IS issues for the 1990s.	3	114, 126 & 104
Duncan (1995)	Identify and rank the critical elements of IS infrastructure flexibility.	2	21
Brancheau, Janz, & Wetherbe (1996)	Survey SIM members to determine the most critical IS issues for the near future.	3	78, 87 & 76
Nambisan et al. (1999)	Develop a taxonomy of knowledge creation mechanisms.	3	11
Scott (2000)	Rank technology management issues in new product development projects	3	20
Wynekoop & Walz (2000)	Rank the most important characteristics of high performing IT personnel.	3	9
R. Schmidt, Lyytinen, Keil, & Cule (2001)	Identify and rank software development project risks: an international comparative study.	3	Finland: 13, 13, & 13 Hong Kong: 11, 11 & 9 USA 21, 21 & 9
Keil, Tiwana, & Bush (2002)	Rank software development project risks.	3	15, 15 & 10
Brungs & Jamieson (2005)	Identify and rank computer forensics legal issues.	3	11

The definition and what constitute an expert is determined by the researcher (Roberts & Kovacich, 2018). In this study, an expert must hav achieved the rank of a fire chief over a division or a whole fire department. This rank indicates the expert is in charge of a particular unit that often requires NFPA standards to function. Second, they

must have had at least 10 years in the fire service. This is a sufficient amount of time for

the expert to have the requisite experience, background, emotional events, perceptions,

and bias in and from the fire service. Third, officers of this rank have a background in

the implementation of NFPA standards to policy and procedures. That history is vital to

the study considering the CRQ. Lastly, the fire chiefs should have transitioned through

more than one fire department in their career. The transition through one or more fire

departments contributes to the diversification of the expert in understanding the needs

and expectations of different organizations. 4 experts were selected. 2 more were added

through the snowball technique. The researcher achieved saturation at 6. Their locations

were heterogeneous, ranging from the Pacific Northwest, West, Midwest, and the South.

All followed the definition of expert except one. That expert remained with his original

department. The researcher found this expert suitable because of his level of expertise in

integrating NFPA standards into policy and procedure. This unique qualification

overrode the need for him to meet the standard of diversification.

Choosing the right expert is important because the Delphi process requires a high degree

of buy in. The expert must have knowledge and experience with the subject and good

communication skills (Roberts & Kovacich, 2018). In some cases, the expert must answer the

same question more than once. A study may be a relatively long process, possibly be a few

months. These problems intensify in social sciences due to time constraints and the Covid-19

global pandemic (Landeta, 2006).

Three kinds of experts exist: subjective, mandated, and objective experts. The subjective

expert holds a deep unproven knowledge or hands-on experience. Mandated experts have a

professional responsibility. Objective experts analyze without prior bias (Donahoe et al., 2008).

Experts in this study fall into the subjective and mandated categories. All contributed their

knowledge and experience while maintaining their professional responsibility to the fire service.

Table 2 gives a brief description and examples of the different kinds of experts.

Table 2. Categories of experts

Evolving definitions of Expert and Expertise   Traditional definitions of Expert and Expertise

Subjective Closeness   **Mandated Closeness**   **Objective Closeness**

Eg. The Tourism Stakeholder (host community members, tourists, etc.)   Eg. The Tourism Manager / Consultant / Policy Maker   Eg. The Tourism Researcher

Adapted from Needham and de Loë, 1990

3.5 Surveys or Interviews

Different kinds of social science research favor different procedures. Also, data collection for qualitative research has distinctive characteristics and challenges (Yin, 2011, p. 129). The potential data collection methods for qualitative data are interviewing and conversing, observing, collecting and examining, and feeling (Yin, 2011). This study utilized two methods of data collection: surveys, which are a part of the collecting and examining method; and interviews.

3.5.1 Questionnaire Survey

As the study took shape, the researcher undertook a pilot study with three participants. A survey method was chosen because of the method's simplicity, the time-based nature of the study, the relative ease of distribution, data accuracy, and its common

use for collecting data (Denscombe, 2010, p. 170; McAleavy, 2016) Written communication devices with plenty of space for feedback of facts and with open-ended questions are needed for a qualitative questionnaire (Van Dijk, 1990).

The pilot survey was distributed using Qualtrics via the Oklahoma State University research system. The survey included eight open-ended questions with an unlimited word count available to the participants. The eight questions covered themes that would push the participants to give extensive feedback on NFPA standards in the fire service and positive or negative views of NFPA standards by fire service personnel. The unlimited word count was needed for participants to feel comfortable to explain what they believed was important about NFPA standards in the fire service. Once the surveys from the pilot study were reviewed and analyzed, the researcher realized interviews would be the appropriate data collection tool. The survey was quickly disregarded. The researcher concluded that questionnaire surveys were lacking in rich data because the researcher could not interact with participants. Second, the ability to inquire about the participants' backgrounds, emotional events, perceptions, experiences, and biases was limited or non-existent. Third, in the survey process joint construction of meaning was missing. The ability to connect information with secondary questions would not occur. Finally, the researcher realized, questions can create bias in the findings toward the researcher, and, in turn, the way in which the respondent perceives the question (Denscombe, 2010).

3.5.2 Interviews: Structured, Unstructured, or Semi-Structured

"An interview is a social interaction with the interviewer and interviewee sharing in constructing a story and its meaning; both are participants in the meaning-making process" (Holstein & Gubrium, 1995, p. 8). Interviews also take many forms. Some view

interviews as structured or qualitative interviews (Yin, 2011). Some view interviews in three dimensions: structured, unstructured, or semi-structured (Ravitch & Carl, 2020). They may take the form of mailed or self-administered questionnaires, telephone surveys, or face-to-face verbal interchanges (McAleavy, 2016). In the day and age of COVID-19 and due to technological advances, interviews could take the form of face-to-face, verbal interchanges in a virtual setting (e.g., Zoom, Microsoft Teams, or Skype). The face-to-face verbal interchange in a virtual setting was selected for the following reasons: First, the heterogeneous locations of the experts; second, the virtual setting allowed for the data capture needed while allowing the researcher to observe experts' body language and facial expressions; and third, the method embraced the interpretivist paradigm while achieving the study's aim and objectives. The face-to-face verbal interchange in a virtual setting was the best form to use to gather data for the CRQ.

3.5.2.1 Structured Interviews

Structured interviews have a fundamental outline. All interviewees are asked the same questions. Probing and follow-up are limited (Ravitch & Carl, 2020). A formal questionnaire is created and lists every question that is asked. The researcher becomes the interviewer. The researcher also adopts the same behavior for each interview with no bias presented (Yin, 2011). Often structured interviews favor closed questions, which limits the ability to appreciate experiences, emotional events, perceptions, and biases across a participant's life (Yin, 2011).

3.5.2.2 Unstructured Interviews

Unstructured interviews could be considered more of a dialogue than an interview with the questions being completely open-ended. In unstructured interviews,

there is a completely inductive approach with no pre-specified protocols. The questions

cover broad topics of interest (Ravitch & Carl, 2020).

3.5.2.3 Semi-Structured Interviews

Semi-structured interviews are a mix of both structured and unstructured. The

researcher has a list of somewhat specific topics that are to be covered. This list is called

an interview guide, but the interviewee has a great deal of latitude in how they reply

(Bryman & Bell, 2015). The questions may vary and deviate from the outline depending

on what direction the interview may go, and if the interviewer picks up on things the

interviewee says (Bryman & Bell, 2015). The researcher may ask follow-up questions

which are customized and unique to the conversation. The path of the follow-up

questions is co-constructed to dive further into the understanding of the topic (Ravitch &

Carl, 2020).   In semi-structured and unstructured interviews, the process must be

flexible. A strong emphasis is placed on how the interviewer frames and understands the

problem. Also, what the interviewee views as important comes from their background,

experiences, and perceptions (Bryman & Bell, 2015, p. 436).

Either an unstructured or a semi-structured interview approach would be useful

in this study. However, the semi-structured approach was preferred due to the needs of

the study. McAleavy (2016 P.128) states, "The semi-structured approach is a technique

often used to collect qualitative data by organizing the interview in a way that allows

participants the time and scope to talk about their opinions on a particular subject." The

researcher chose this approach because of the flexibility of the process and the

opportunity to use open ended questions. He anticipated that listening to the interviewee

and understanding his experiences would help create a positive rapport between the

interviewer and interviewee. He decided semi-structured interviews would generate rich

data from interviewees while maintaining the parameters of the interview and focus on the topic.

3.6 Interview Questions

3.6.1 Creating the Questions

After the initial pilot surveys and the interview pilot study utilizing the semi-structured interviews, the researcher created eight open-ended questions (see Appendix 1). The questions adopted a thematic approach, which began broadly and narrowed to specifics towards the latter part of the interview. The broad questions focused on experience and background. This created a rapport with the interviewee which enabled the researcher to effectively probe, clarify meanings and follow-up interviewee comments (Chrzanaowska 2002). In the latter questions, themes of NFPA standards, culture, and small fire departments were interrogated. The questions were designed to see if culture size of fire departments, and possibly other factors affected the adoption of NFPA standards.

3.7 Data Capture Method

3.7.1 Primary Data Capture Method

The primary data capture method was through synchronous online interviews (virtual face-to-face) via the application Zoom. Synchronous online interviews are where communication takes place in real-time, and the questions are answered immediately by the interviewee. The Zoom application allowed for real-time interviews which could be recorded for ease of transcription. For qualitative interviewing, most researchers have broadly positive experiences (Bryman & Bell, 2015, pp. 451–452).

There are several advantages to synchronous virtual interviews: 1) more flexibility than face-to-face interviewing with possible last-minute adjustments; 2) time and cost savings, 3) convenience of being interviewed over Zoom may encourage experts to participate when in other cases they may decline, 4) there are fewer concerns of safety (specifically in the COVID-19 era), 5) there is little evidence that the interviewer's ability to secure rapport is reduced compared to in-person interviews (Bryman & Bell, 2015, p. 453).

Some limitations for synchronous virtual interviews include possible fluctuations or loss of internet connection, which could make speech difficult to understand, creating difficulties for transcription. Respondents may also be affected by visual cues, such as gender, age, or ethnicity. Bryman and Bell (2015) suggest that interviewees are more likely to skip out of a synchronous interview over an in-person interview.

Specifically, for the researcher, virtual, face-to-face interviews were used because the global COVID-19 pandemic prohibited travel. Second, the interviewees were heterogeneous in the locations in which they worked. To meet face-to-face with each expert would have placed a high financial burden on the researcher which was beyond the available resources. Only in one interview did the internet connection fail. In this instance, the researcher called the expert and finished the interview over the phone with the secondary data capture method.

3.7.2 Secondary Data Capture Method

As a cost-effective and reliable second option, the researcher used a Sony ICD-BX112 voice recorder. The recorder was used and deemed effective in the pilot study. The secondary device was used in all interviews as a backup. It was only needed when the internet dropped in the latter half of one interview. The recordings were held in a safe in

the researcher's home. Once all data was collected and transcribed the researcher deleted the recordings from the recorder.

3.8 Sample Frame Design

Sampling is the decision the researcher makes in relation to where and from whom they gather the data. The researcher needs to analyze data in order to answer their research question (Ravitch & Carl, 2020, p. 81). Also, the basic principle of sample-frame design is that the researcher can gather representative data and produce accurate and reliable results without surveying every expert in the field of study (McAleavy, 2016). Before explaining the sample frames, a site was selected, and participant selection was defined. When defining the participant selection, Ravitch and Carl (2020, p. 83) recommend the researcher answer three questions:

1. Who do I need to include?
2. What individuals or types of individuals are particularly knowledgeable about the topic?
3. What specific experiences, roles, perspectives, occupations, and or sets of relationships do I seek to explore, and who can help me?

The answers to these questions align with the researcher's definition of an 'expert.' First, the individual must be a fire chief over a division or a whole fire department. This shows the expert is in charge of a particular unit that often needs NFPA standards to function. Second, they must have at least 10 years in the fire service as 10 years is a sufficient amount of time for the expert to have the experience, background, emotional events, perceptions, and bias in and from the fire service. Third, they must have a background in the implementation of NFPA standards to policy and procedures. This is vital to the study considering the CRQ. Lastly, they should have transitioned

from more than one department in their career. The transition from over one or more fire departments assists with the diversification of the expert in understanding the needs and expectations of different organizations.

3.8.1 Sample Frame: Purposive

This study utilized purposive and snowball sampling. Purposive sampling is where "Individuals are purposively chosen to participate in a research study for a specific reason that stems from the core constructs and context of the research question" (Ravitch & Carl, 2020, p. 84). Purposive sampling is the primary sampling for qualitative research, and it is non-probable (Ravitch & Carl, 2020).

Four experts were brought into the study by purposive sampling. The researcher was acquainted with the individuals from prior classes in the fire service or from higher education classes; therefore, the researcher knew they exceeded the requirements for the study. Once the first four interviews were completed, the researcher recognized the study was close, but had not yet achieved saturation due to common themes, concepts and categories in all interviews. Therefore, snowball sampling was initiated by asking the interviewees to nominate other suitably qualified candidates to ensure saturation.

3.8.2 Sample Frame: Snowball

Snowball sampling is a form of convenience sampling. It is where a cohort or friend of a participant of a study makes contact with other relevant people (Bryman et al., 2019, p. 395). It is common to use purposive sampling and then follow it up with a snowball sample (Marzano & Scott, 2009). Two of the experts in the study were sourced via snowball sampling. One was from the same department as another purposive participant but oversaw a different division, and the other was a head fire chief of a small

department in a suburb of Oklahoma City. This participant had been in the same position as a purposive participant before he became a head fire chief.

3.8.3 Sample Size

The sample size of six was sufficient once the interviews were complete. The researcher was close to data saturation at four participants, but once the final two interviews were complete, data saturation was achieved, and the redundancy of themes was consistent. Marshall (1984) states theoretical saturation and the needs of the research question should inform the use of multiple sampling approaches.

3.9 The Interview Procedure

An interview in its most basic form is an interviewer asking questions and the interviewee answering them. Hearing this basic definition of interviewing, it does not seem to be an appropriate method to collect data. However, with the semi-structured approach, the interview is a mix of the definition and a conversation (McAleavy, 2016). This is why the research design included an in-depth interview style using conversation within a semi-structured format. Again, the semi-structured format allows for flexibility, open-ended questions, understanding, and listening to the experiences of the interviewee.

3.9.1 The Interview Locations

Voght (2012, p. 157) explains that the researcher must "decide if the interview location is a variable or a constant. They must think about the contexts in which people will be willing to be interviewed." The researcher used his home for the virtual face-to-face interviews via the Zoom application. The interviewees' sites ranged from their home offices, in their work vehicles, or their work offices. This allowed for the interviewee to be comfortable in a location they knew for the interview.

3.9.2 Building a Rapport

The researcher had previously established rapport with the four initial experts. Most of them were acquainted with the researcher through prior higher education classes at Oklahoma State University. Other participants knew the researcher from prior work experiences. Two of the participants did not know the researcher but were work associates with other participants. Thanks to the recommendations from the other participants, these two individuals came into the interview with an open mind. Secondly, the researcher explained his background and expertise in the fire service at the beginning of the interviews. Third, the researcher explained he was doing their interview to learn from the experiences and backgrounds of the interviewees. This allowed for an open dialogue to commence and enhanced rapport.

3.9.3 Pilot Interview

A pilot interview was executed to validate the administration, question sequence, and process of the interview, as well as to make sure success was likely.

A fire captain from a small town in Oklahoma was the participant. The individual had a strong proficiency in NFPA standards, much like the experts in the study. The individual was in graduate school with the researcher and has been published by the International Public Safety Association for mass shooter exercises. During the pilot, the researcher sought feedback and found limitations and weaknesses in the way interview questions were written and how to ask appropriate follow up questions. The researcher remedied the interview questions by following recommendations from fellow graduate students and Oklahoma State University Professors. The researcher utilized resources available in mainstream media to improve his follow up questions and process. When the researcher changed careers, he learned about "the method of 5 whys." This

method provided the researcher other ways to construct follow up questions for participants (Marquis 2009).

3.10 Analysis Methods

Analysis provides a means to break data into parts in order to inspect and understand data. For a study to be defensible, strategies for data collection are required, as are strategies for analysis. The strategies for analyzing the data make sure the research outcomes are credible (McAleavy, 2016). These strategies should be in agreement with the research philosophy, aim, objectives, and CRQ.

3.10.1 Transcription

The researcher utilized a transcription company in California to transcribe each interview. The company was used because the study was on a short timeline. The use of virtual face-to-face interviews allowed the researcher the financial resources to use the transcription service. For data security to be achieved the researcher kept all transcripts on his computer. Access was password protected. The computer was locked in the researcher's home at all time.

3.10.2 Content Analysis

There is a multitude of ways to analyze data, including discourse analysis, narrative analysis, rhetorical analysis, and content analysis, among others. The latter formed the data analysis strategy for this study.

Content analysis "is a research tool used to determine the presence of certain words, themes, or concepts within some qualitative data" (Columbia University, 2019). Content analysis can be used in qualitative or quantitative research. The strategy allows the researcher to analyze the presence, meanings, and relationships of words, codes

categories, concepts, themes, and overarching themes (Columbia University, 2019). The

process of content analysis is strenuous. The researcher goes over the data multiple times

to ensure they have done a thorough job. The University of Leicester (n.d.) created a 10-

step process for content analysis, which was used in this research. It entails:

> "1) Copy and read through the transcript: make brief notes in the margin when interesting or relevant information is found
>
> 2) Go through the notes made in the margins and list the different types of information found
>
> 3) Read through the list and categories each item in a way that offers a description of what it is about
>
> 4) Identify if the categories can be linked any way and list them as major categories (or themes) and / or minor categories (or themes)
>
> 5) Compare and contrast the various major and minor categories
>
> 6) If there is more than one transcript, repeat the first five stages again for each transcript
>
> 7) When you have done the above with all the transcripts, collect all the categories or themes and examine each in detail and consider if it fits and its relevance
>
> 8) Once all the transcript data is categorized into minor and major categories/themes, review in order to ensure that the information is categorized as it should be
>
> 9) Review all the categories and ascertain whether some categories can be merged or if some need to be sub-categorized
>
> 10) Return to the original transcripts and ensure that all the information that needs to be categorized has been so."
>
> The researcher applied this 10-step process throughout the analysis process.

3.10.3 Validity vs. Generalizability

3.10.3.1 Validity

Validity is often used in quantitative research. It can also be used in qualitative

research. Maxwell (2002) has four points to validate qualitative research. They are:

1. Descriptive validity: qualitative study foundations.

2. Interpretative validity: which is where transparency of subjective inferences is clarified via charting.

3. Theoretical validity: which is where systematic construction builds on observable evidence (data) illustrating the links and relationships that build theory.

4. Generalizability: is used mostly in the quantitative sense; however, some qualitative uses are possible.

Interpretive, descriptive and theoretical validity was used in the study. Interpretive validity grounds itself in the language of people who rely on their own words and concepts. It is inherently a matter of illation from the words and actions of people who are studied in that particular situation (Maxwell, 2002). Charting through the software Atlas TI shows the theoretical and interpretative validity by subjective inferences of themes, concepts, phrases, and keywords, which assist with the conclusion and connection of the study's aim, objectives, and CRQ. Descriptive validity was used through the detailed methodology which contains description of the data collection and analysis process. Lastly, theoretical validity was found in the creation of the 33% theory by utilizing the observable evidence in one of the interviews.

3.10.3.2 Generalizability

Often researchers attempt to find validity in generalizability. This is likely due to the positivist perspective. Generalizability refers to "the extent to which one can extend the account of a particular situation or population to other persons, times, or settings than those directly studied" (Maxwell, 2002). Given the study utilized an interpretivist approach whereby

participants gave a cross-sectional view of their opinions, experiences, emotional events, perspectives, and biases, the findings are not generalizable.

3.10.4 Visual Data

Visual data were used because of two factors. First, the researcher is a visual learner and utilized visual data to set up themes, categories, and concepts using Atlas TI, and then implemented the data from Atlas TI into charts in Microsoft word. These charts give a visual representation of how the researcher analyzed the data and how the framework can be set up for fire chiefs in an incident command system (ICS)/hierarchical template. The researcher utilized this template because the ICS/hierarchical template will be easy for fire personnel to understand because the ICS/hierarchical template is a standard practice in the fire service due to its paramilitary origins.

3.11 Ethical Considerations

Research ethics are defined as guidelines for the responsible conduct of research (CUHK, 2020). The ethical considerations for this study followed compliance with Oklahoma State University's Institutional Research Board (IRB). The IRB is "an institutional body established to protect the rights and welfare of human research subjects recruited to participate in research activities conducted under auspices of the institution with which it is affiliated" (Office of University Research Compliance, 2020).

For the protection of the researcher and the participants, ethics must be considered while doing research—especially if the material is sensitive in nature by societal standards. Denscombe (2010) states, "social researchers are expected to approach their task in an ethical manner; on moral grounds, this expectation stems from the belief that the public should be protected from researchers who might be tempted to use any means available to advance the state of knowledge on a given topic."

Four principles were used to stay within ethical bounds. These overlap in some ways and include:

1) Whether there is harm to participants.

2) Whether there is a lack of informed consent.

3) Whether there is an invasion of privacy.

4) Whether deception is involved (Diener & Crandall, 1978, cited in Bryman et al., 2019).

Ethical information and considerations were sent out and communicated to all participants. Before interviews were performed, the participants were required to sign all material, which included informed consent, confidentiality and anonymity, and data security. The interview questions were sent along with the above material to the participants to allow them to see and understand what the researcher was asking. Also, it allowed for the participants to research specific NFPA standards that would be needed for a different division.

The briefing note provided to participants consisted of the project title, the interview purpose, and the scope of the project (see Appendix 2). It also included what data would be used for the development of a master's thesis. The data-capture policy and policy statement were the final sections of the briefing note. The policy explained the material would be locked in a key-locked filing cabinet in the researcher's home, and the researcher assured the interviewees that data gathered during the research process would be handled in accordance with the university's Data Protection Policy. The consent form consisted of the project title, statement of ethical appropriateness, the researcher's information from Oklahoma State University, and signature requirements from the researcher and interviewee (see Appendix 3).

CHAPTER IV

RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the study. It is organized to follow the theory and methodology, as presented in chapters II and III. To explain the findings, the central and supporting research questions, aim, and objectives are reviewed. The results came from an inductive reasoning approach and the analysis of six interviews. The evaluation consisted of a content analysis, which uncovered the overt themes, themes, categories, concepts, and sub-concepts.

4.2 Aim and Objectives

The study aim: "This study aims to construct a framework of NFPAs to assist fire administrators in their daily implementation of policy and procedures." Through appropriate methodology and findings, the aim was achieved.

Five objectives were utilized to support the aim:

1) Develop a literature review focusing on how fire personnel process information from their experiences and background.

2) Produce visual and language data capturing subject matter experts' views on NFPA standards and how they implement them into policy and procedures.

3) Identify themes, patterns, and concepts.

4) Compare and contrast findings and decipher similarities and differences from regions (South, Midwest, Northwest, and West) of the United States.

5) Develop charts and qualitative learning tools to understand what is required for NFPA standards to be implemented into policy.

4.3 Central Research Question and Supporting Research Questions

The CRQ was: Can a framework be created to assist newly tenured fire chiefs in understanding what specific NFPA standards are needed in each division of a fire department and find out which ones should be implemented into policy?

Three sub-research questions were created to dive further into the CRQ:

1. How flexible must the framework be to adjust to each fire department?

2. What are the differences between (United States) OSHA and non-OSHA states, and how does that affect the framework?

3. To what extent do state entities (beyond OSHA) create law which requires fire departments to follow the exact specifications of the NFPA standards?

4.4 Interview Findings

4.4.1 Visual Data

Visual data were used because of two factors. First, the researcher is a visual learner and utilized visual data to set up themes, categories, and concepts using Atlas TI, and then implemented the data from Atlas TI into charts in Microsoft word. These charts give a visual representation of how the researcher analyzed the data and how the framework can be set up for fire chiefs in an incident command system (ICS)/hierarchical template. The researcher utilized this template because the ICS/hierarchical template will be easy for fire personnel to understand because the ICS/hierarchical template is a standard practice in the fire service due to its paramilitary origins. Also, objectives 2 and 5 are achieved by the use of these visual graphs. The graphs are broken down into six key themes: Administrative NFPA standards, adopting NFPA standards, static NFPA standards, divisions, and culture. The data are explained in further detail in the linguistic section. Second, visual data has become more powerful in the social sciences, allowing researchers to engage with the visual domain (McAleavy, 2016).

4.4.2 Visual Graphs

4.4.2.1 Administrative NFPA Standards

Figure 1 displays the administrative relationships that exist when considering the NFPA standards.
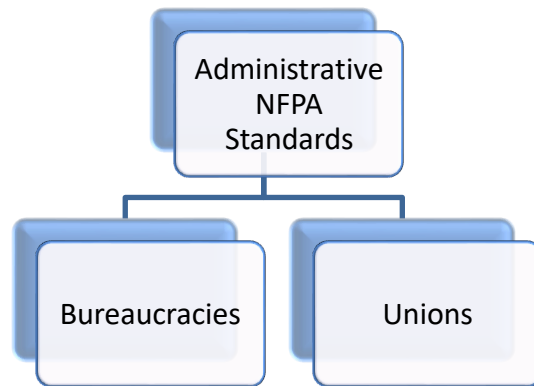
Figure 1. Administrative relationships

4.4.2.2 Adopting NFPA Standards

Figure 2 illustrates the levels involved in adopting NFPA standards to SOPs.
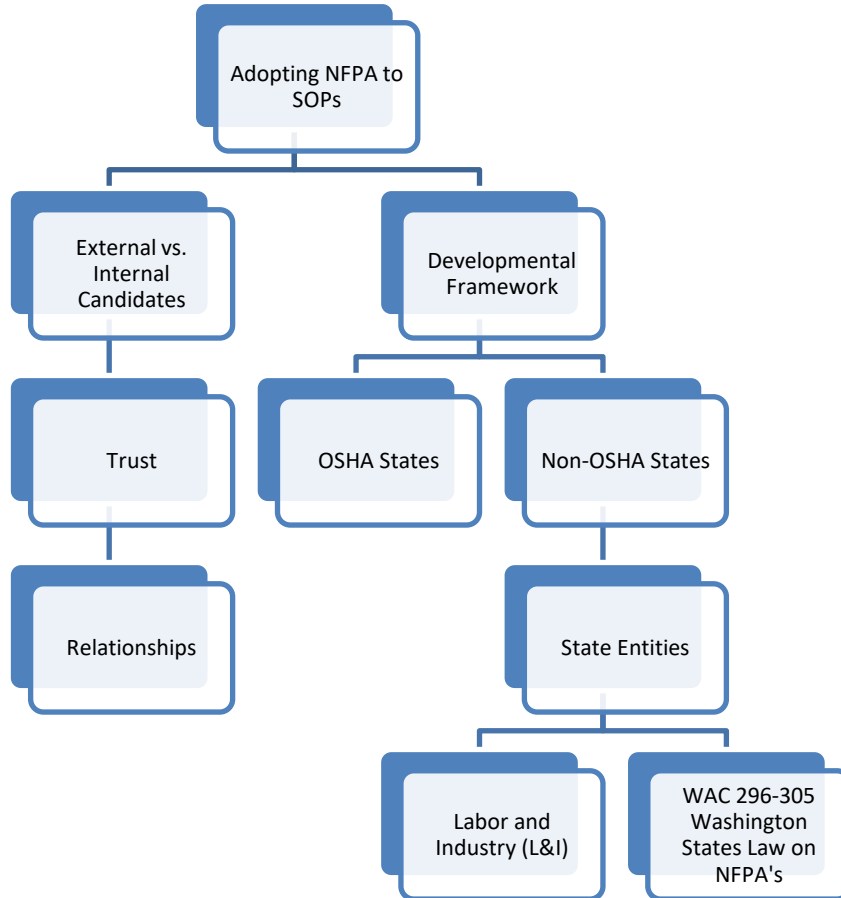
Figure 2. NFPA adoption to SOPs levels

4.4.2.3 Static NFPA Standards

Figure 3 illustrates the static NFPA groupings.
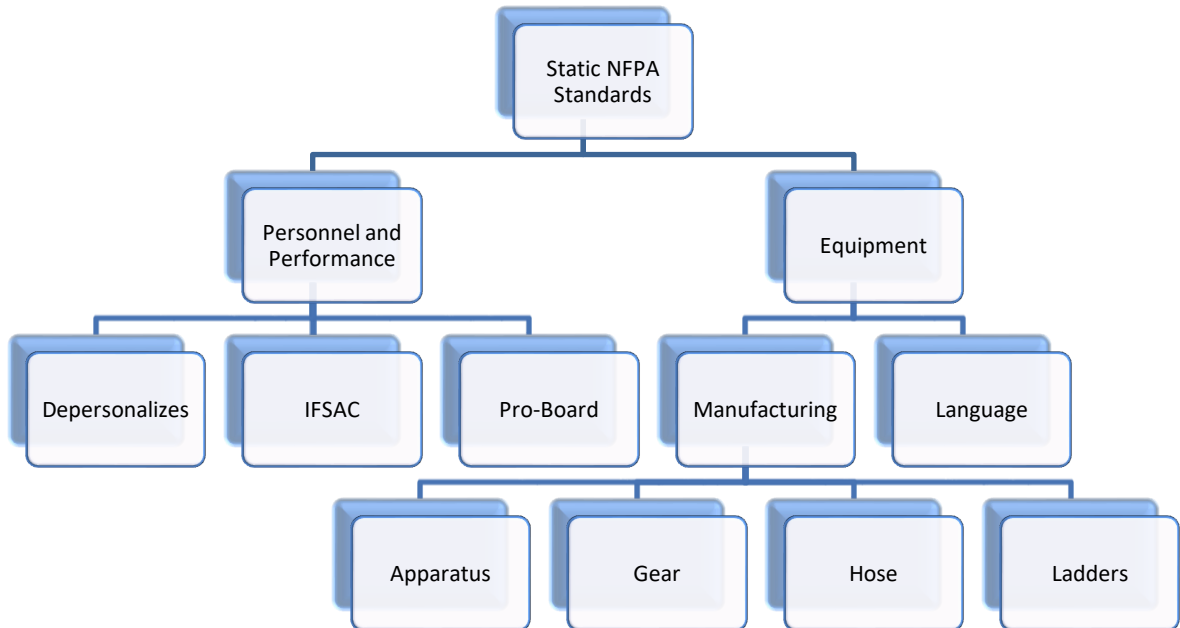
Note: IFSAC = International Fire Service Accreditation Congress.

Figure 3. NFPA standard groupings

4.4.2.4 Divisions

Figure 4 illustrates the different divisions depending on department size present in the fire services.
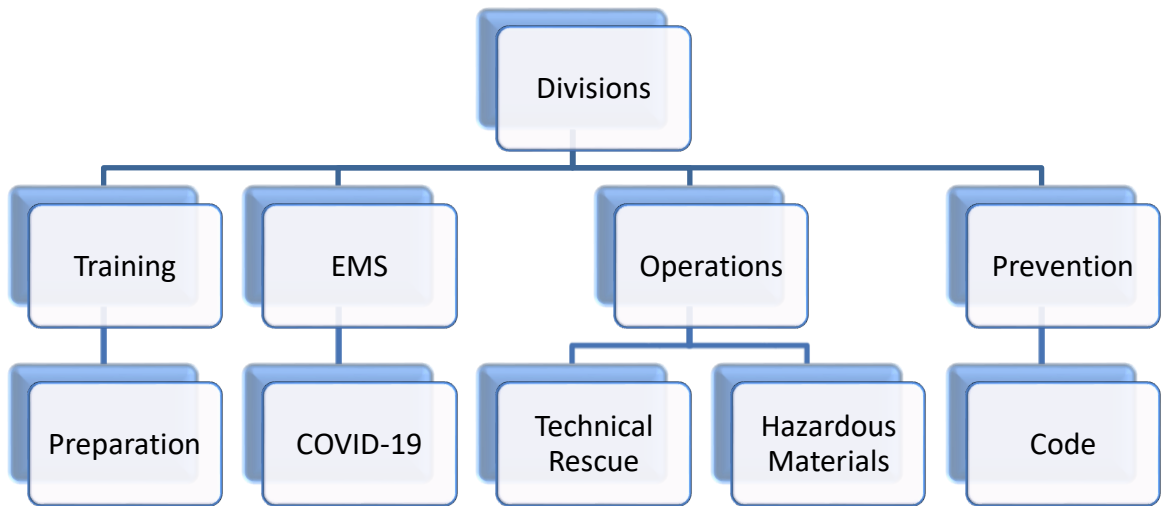
Figure 4. Fire service divisions

4.4.2.5 Culture

Figure 5 illustrates the themes included in the culture theme.
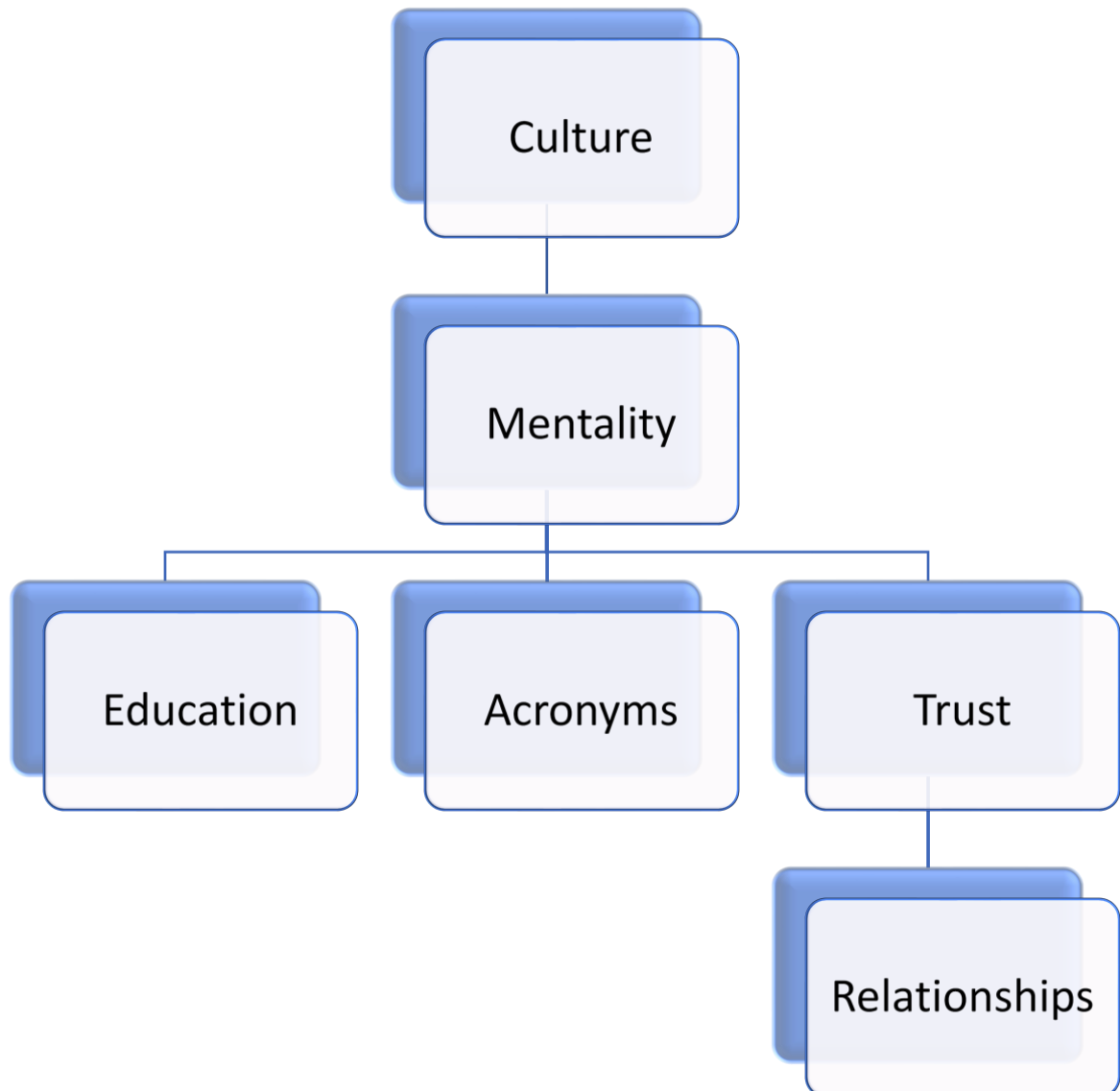
Figure 5. Culture themes

4.5 Linguistic Findings

4.5.1 Content Analysis

The six interview transcripts contained rich and thick qualitative data. A total of 30,000 words were analyzed, three sweeps per transcript, to identify the themes, categories, and concepts. As noted in Chapter III, the researcher utilized the 10-step process for content analysis recommended by the University of Leicester (n.d.):

"1) Copy and read through the transcript: make brief notes in the margin when interesting or relevant information is found

2) Go through the notes made in the margins and list the different types of information found

3) Read through the list and categorize each item in a way that offers a description of what it is about

4) Identify if the categories can be linked any way and list them as major categories (or themes) and / or minor categories (or themes)

5) Compare and contrast the various major and minor categories

6) If there is more than one transcript, repeat the first five stages again for each transcript

7) When you have done the above with all the transcripts, collect all the categories or themes and examine each in detail and consider if it fits and its relevance

8) Once all the transcript data is categorised into minor and major categories/themes, review in order to ensure that the information is categorised as it should be

9) Review all the categories and ascertain whether some categories can be merged or if some need to be sub-categorised

10) Return to the original transcripts and ensure that all the information that needs to be categorised has been so."

Nuendorf's (2011) Content Analysis Checklist was used and answered:

Content Analysis Checklist (Nuendorf, 2011)

1. Theory:

Has the role of theory been explicated fully? Is theory tested directly by the study? Or,

does some theory about message sources or message impacts on receivers motivate and guide the

investigation?

2. Scope:

What is the scope of the data collection? Is it limited to message content, or are source and/or receiver variables also measured?

3. Past Research and Measurement:

Has past research on the topic been fully reviewed? If previously developed coding schemes are available for use, have they been considered for adoption or revision? Have other standard measures (e.g., a self-report scale for gender roles) been considered for adaptation?

4. Population:

What exactly is the defined population of messages that will be examined?

5. Immersion:

Have the researchers immersed themselves in the message pool? What concepts have been derived from this immersion?

6. Human Coding vs. CATA:

Will human coding and/or computer coding (CATA) be utilized?

In response to the checklist above, the following guided the current research:

- Question 1 of the checklist: The framework was created by the way experts processed information from their backgrounds, events, and perceptions. This was the guiding tool of the study.
- Question 2 of the checklist: The scope was limited to the transcription content.
- Question 3 of the checklist: Process information theory was reviewed thoroughly. However, no previous coding schemes were used.
- Questions 4, 5, and 6 of the checklists: Question 4 is answered in the graphs above, and question 5 is answered below. Human coding was utilized.

The experts in the study are coded from P1 to P6. Their positions and the states in which they work are included, but names have not been used to follow the Oklahoma State University IRB policy for research.

Table 3. Participant details

Code	Position	Location
P1	Training Chief	Oklahoma
P2	Fire Chief	Oklahoma
P3	Assistant Chief of Emergency Medical Services and Development	Washington
P4	Fire Chief	Missouri
P5	Assistant Chief of Emergency Medical Services	California
P6	Division Chief of Operations and Training	Washington

4.5.2 Content Analysis Themes

      The content analysis process identified six themes which were then broken down into overt themes, themes, categories, and concepts. Themes included Administrative NFPA standards, Adopting NFPA standards, State NFPA standards, Divisions, Culture, and Small to Medium sized fire departments compared to larger departments. Saturation was achieved by the sixth interview where themes, categories, and concepts were consistent throughout all interviews.

4.5.2.1 Theme 1: Administrative NFPA Standards

      Administrative NFPA standards are those that all participants believed needed to be reviewed for issues involving justifying personnel needs to political entities, response times, wellness, and safety. They are used across the board in a department. The most frequently mentioned NPFA standards were 1710 and 1500. These standards were referenced over 40 times. One participant stated, "you can pull up 1710, and to see what you're, [what] the standard is and that's how you might be able to go argue with city governance to say 'hey, I need more people' or why. When you can show them 1710, sometimes it has a lot more teeth." The Administrative NFPA standards can give substance to particular needs a fire chief may have and help when working with other entities, such as city governments and unions (which are subcategories to administrative NFPA standards). Table 4 provides a selection of participant quotes related to the NFPA standards.

Table 4. Administrative NFPA quotes

Participant	Descriptive quote
P4	1710 I'm dealing with a political subdivision, a political body that I'm trying to communicate information to.
P4	The one that I'm using currently, again 1710, simply because we're developing our strategic plan and we're using that as one of the guidelines for station location and staffing study.
P2	… just start right there with 1500 is probably a big one that you got to make sure you're following along with.
P3	1500, which is the Safety, Health, and Wellness Framework, which is definitely referenced in 296-305 WAC. Very, very important.
P1	1710 is the operational expectations of a career organization deployment. That is basically what we need to be following.
P1	NFPA-type information, those categories. When you come to truly evaluating your organization, that the metric is in 1710 measurements. That's where your response time, your turnout time, all those types of things [are].
P5	The low-hanging fruit stuff really is what we focus on. The bigger ones, 1710,1500, a little bit more challenging for a larger agency. When you talk about four-person staffing for a small agency, this is simply not a possibility.
P4	I currently have an apparatus that is staffed with two people. That goes against— see, I don't want to quote this standard—1710 probably says something about it.

4.5.2.2 Theme 2: Adopting NFPA Standards into Standards Operating Procedures

Adopting NFPA standards into SOPs were divided into two concepts: developmental frameworks and external versus internal fire chiefs. Developmental frameworks must first be defined by a fire chief. For example, a department creates a technical rescue framework; that technical rescue framework must follow specific NFPA standards that are written for technical rescue. Second, a department must know if they are in an OSHA state or a non-OSHA state. If the state is not under OSHA guidelines, what are their requirements when it comes to NFPA standards becoming policy, and what state entities enforce the standards into policy?

Washington State is a non-OSHA state. They have the department of Labor and

Industries (L&I), which is a state department that oversees firefighter safety and health standards.

They follow the *Washington Industrial Safety and Health Act* (WISHA) of 1973. L&I have more

stringent requirements than OSHA. L&I utilizes WAC 296-305, which are documents that tell

fire departments what is required for each framework within a department. If a department has a

technical rescue framework, they must follow the WAC 296-305 by law. The requirements come

from NFPA standards, and L&I then implement the standards into WAC 296-305 and the

requirements for each framework become law. An example is provided below.

WAC 296-305-05101 Technical rescue general requirements:

(1) The following sections apply to fire departments that choose to operate for any type of technical rescue operations addressed in WAC 296-305-05113 at the following levels: • Operations level. This level represents the capability of organizations to respond to technical rescue incidents and to identify hazards, use equipment, and apply limited techniques specified in this rule to support and participate in technical rescue incidents. • Technician level. This level represents the capability of organizations to respond to technical rescue incidents, to identify hazards, use equipment, and apply advanced techniques specified in this rule necessary to coordinate, perform, and supervise technical rescue incidents. Note: Awareness level represents the minimum capability of organizations that provide response to technical rescue incidents or discover technical rescue situations during emergency scene operations and takes no offensive action. This level requires no written procedures.

(2) Members must not operate at a level that exceeds the identified level of capability established in subsection (1) of this section.

(3) Basic life support must be provided by the fire department at technical rescue incidents.

(4) Fire departments must meet all requirements in this section, along with all relevant requirements in the specific technical rescue sections, before operating at the operations or technician level at a technical rescue incident.

(5) Fire departments choosing to not respond to technical rescue emergencies will ensure their employees can recognize when a technical rescue situation is present and what to do in those cases.
[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, and 49.17.060. WSR 18-22-116, § 296-305-05101, filed 11/6/18, effective 12/7/18. Statutory

Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060 and 29 C.F.R. 1910.156, Fire brigades. WSR 13-05-070, § 296-305-05101, filed 2/19/13, effective 1/1/14.] (https://app.leg.wa.gov/wac/default.aspx?cite=296-305-05101&pdf=true)

In comparison, in OSHA states, departments are not required to follow NFPA standards by law. They can implement the standard; however, they are not required to. Often OSHA state fire departments use standards to an extent, but not fully.

The other category under the theme adopting NFPA standards to SOPs comprised understanding how an external (hired from another agency) fire chief may implement policy compared to an internal (hired from within the organization) fire chief and what factors dictate buy-in to the policy. Those factors included trust and relationship-building on the fire chief's part. Table 5 provides a selection of quotes related to adopting NFPA standards into SOPs.

Table 5. Quotes related to adopting NPFA standards into SOPs

Participant	Descriptive quote
P5	[What] Might have been helpful is specifically taking portions of the NFPA because I think that what's also hard is when you're looking at globally, the entire NFPA standard, I think a lot of agencies go, "Well, hey, we want to leave it as a standard because we want to use 80% of this document, it's fantastic, but 20% just simply doesn't apply to us."
P4	I think the external administrator has to use them [NFPA standards] as an evaluation tool. For example, an instance 1500. I wouldn't say, I've done a formal NFPA 1500 compliance health and safety—they had a health and safety committee. The chief was making for about a year; hence, a lot of those things just went away. It's critical for me that I, as an outsider, pick up the backstory on why things exist or don't exist and what's the gap between how things are today and what is recommended for best practices for tomorrow?
P6	I think if the new administrator is internal, you're probably not going to see quite a change with the new administrator because they probably were involved in a lot of the decisions that were made, the policies that were adopted. They probably had some say and that was partly their direction unless they saw it as something that was deficient in the previous administration. Internally, I don't see that affecting which standards are adopted. External, definitely. If you think about a smaller, medium-sized fire department, and this happens to a lot of

Participant	Descriptive quote
	departments in the northwest, firefighters will go get hired in California, work their way up, become a chief officer. They'll retire out of the California system and move north. They're going to have a very different outlook on what NFPA standards are adopted and which ones are utilized and the direction that goes. It may be very, very different than an internal candidate that's already been within
P6	Idaho is an OSHA state. I don't believe OSHA has adopted a lot of these that I mentioned. They may have one or two, but I don't think they've adopted. I don't know. I'm trying to think of [the] city of Coeur d'Alene and Northern lakes and those department[s]. I'm not sure I know enough about those departments to say if they're like us or not. I know a lot of them have tech rescue frameworks, and I'm guessing they're probably using those NFPA's standards as a reference; I don't know if they're complying with them 100%.
P2	Well, I think it just really determines what you do in your fire department. If you don't have a hazmat team, if you don't have a swift water team, if you don't have a burn building, you may not need some of those standards, but whatever you do, you need to make sure that you're doing it the best that you can. We cannot live 100% to these standards.
P3	Most of those standards have a direct nexus to WAC 296-305, which, as you're well aware of, [are] the safety standards for firefighters in Washington State. That's our industry-specific standard law in the state that we have to follow. Since those NPFA standards, for the most part, are all referenced in 296-305. Those are, I shouldn't say, doubly important because obviously the NFPA standard is the standard of daily practice for our industry that you have to be in compliance until something bad happens. In this case, here though, in 296-305, it's very, very specific. Some of them reference the entire standard or portions, chapters, sites within those standards, and how to incorporate those into 296-305. That is why I chose those standards.
P2	As you come in, you got to be really soft with that, I think, I don't think you can just come in and act like you know it all because if you act like you know it all, then they're going to prove that you don't. You have to be very subtle in your salesmanship of, "This is why the decisions are being made. It's not because of what I think. it's because of what I've read or what someone else has said," is the biggest thing. Now, internally, you could just say status quo, or that guy, that internal administrator can say, "We've been doing it wrong for a long time."

Participant	Descriptive quote
P3	"Listen, this is to make us more efficient, more effective, to be in compliance with what is normalized for our industry, *et cetera*." I think all those things would need to be definitely built on trust.

4.5.2.3 Theme 3: Static NFPA Standards

Throughout the analysis, the researcher noted that trends fell into the theme of static NFPA standards. The researcher defined these standards as static due to their static nature. One participant described static NFPA standards as "low-hanging fruit," insinuating static NFPA standards are easy to implement into a fire department. Static standards are those related to personnel or equipment. These standards must be followed in career departments and policies are written to follow them. These standards need to be used because of personnel safety and manufacturers' equipment requirements. An example of a personnel NFPA standard would be NFPA 1001: Standard for Fire Fighter Professional Qualifications. These standards are utilized by accreditation systems, including the International Fire Service Accreditation Congress (IFSAC) and Pro-Board. These accreditation systems are known throughout the United States as testing entities to receive certifications in the fire service.

Equipment must follow these static standards exactly when it comes to fire apparatus or fire clothing. These standards require significant testing on equipment. An example is NFPA 1911. This NFPA standard defines what is required for inspection, maintenance, testing, and retirement of in-service automotive fire apparatus. The purpose of the standard is to provide requirements for an inspection, maintenance, and testing framework that will ensure that in-service fire apparatus is serviced and maintained to keep them in safe operating condition and ready for response at all times. All participants

stated equipment and personnel NFPA standards are used in their departments. Table 6

provides quotes provided by participants in relation to NPFA personnel and equipment

standards.

Table 6. Static NPFA standard quotes—personnel and equipment

Participant	Descriptive quote
P1	That's where I would start for my SOPs, my standard operating procedures. The positional standards would fall under job descriptions. The equipment would fall under policies, so compartmentalizing those. Position standards would be your firefighter requirements, your fire officer requirements, all the way up to your department health and safety officer, infectious disease control. There are positional ones. I will say organizationally, those are really important to job descriptions and performance evaluations and standards like that. You have then your equipment NFPA standards. When you take on the role of a chief, you would certainly want to know is my apparatus spec meeting NFPA standards? Within that, it also has accountability on your equipment, how frequently things should be tested, evaluated, and replaced. I think that's a great place to start with your needs assessment. Your needs assessment on your infrastructure is a really important thing. when it comes to vehicle replacement, hose replacement, air pack, inspections, these are critical pieces of equipment and infrastructure that you need to have on a calendar and schedule and those types of things.
P4	We developed task books for firefighters, engineers, officers. We referenced the professional competencies 1001, 1002, and 1026 as those.
P6	Well, it has through Instructor 1 and Instructor 2 through IFSAC testing, so I guess it technically has. It doesn't have the rule of law, but it is the standard for the states. 1021 is the same one with the officer. Then the last one I had was 472, which is hazmat that is adopted and incorporated into state law here. Critically important to us to make sure our folks are trained to that standard.
P2	I'm huge on 1582 and decontamination of 1584, just rehab of firefighters just making sure we're taking care of them there. Then, when you become a chief, you're over everything.
P5	The low-hanging fruit ones, and again, forgive me, you might want to do some researches, look at what are the correlating numbers, but for servicing ladders, fire extinguishers, our pumps and accessories or our

Participant	Descriptive quote
	fire apparatus and what we utilize to spec out an engine and what we use for annual testing, I'm trying to think any of our fire equipment complements. I'm trying to think about what they are here, but anything having to do with equipment. It's for us to be able to look at NFPA standard for ladders, complements of ladders that we should carry on an engine bus or truck, and then also, our annual servicing and maintenance of ladders. That's very easy for us to do. It'd be very difficult for me to create a policy from the ground up as far as what we should be adhering to for ladders. It's easy to look at the NFPA standard and go, "Well, this is our guidance right here." Most of our policies and procedures have been pulled from those standards.
P2	NFPA, 1932, it talks about testing the ladder. You have to do things to test the ladders and it may cost you 5,000 bucks to test every ladder in your fire department but you'd better spend that 5,000 bucks because if somebody falls off of that ladder, it's going to cost you a lot more than 5,000 bucks. Now, if you don't have 5,000 bucks, you can't test them, but we have that money. I have to be able to justify it. Just like testing a hose 1962 or 1462. It doesn't cost anything to test hose because we do it ourselves. You better test it then.
P1	It's funny because apparatus spec is a huge part of our organization. It's a major investment; it's a 20-year investment, you want to get it right. It's a big deal.
P3	I'm sorry, 1852 which is SCBA [self-contained breathing apparatus]. A very important standard for us. 1911, which is specifically to the inspection, maintenance, and testing, and when we put our apparatus and vehicles out of service for its service life is NFPA 1911. Definitely, something that we utilize operationally, but also with our fleet maintenance facility here at the fire department is very important. NFPA 1914, which is for our aerial devices. We have two of those. Making sure that we are following the standard for testing of those and maintenance. Then last but not least, and again, this just to me the overarching really, really important ones. 1932 which is for our ground ladders.

4.5.2.4 Theme 4: Divisions

The researcher devised a chart that included all divisions of a small to medium-sized fire department specific to this study as seen in Figure 4. In some cases, there may

be more divisions than the researcher explains. However, every expert who was interviewed had an organization (fire department) which followed the division chart. The organization was divided into four divisions: training, operations, prevention, and emergency medical services (EMS). The training division had a sub-category of preparation—all training NFPA standards correlate with preparing personnel for situations on the fire ground. The operations division was divided into subcategories of technical rescue and hazardous materials. The focus of operations was to touch on specific areas of the division where standards could be helpful to the fire chief if the organization had those frameworks.

Technically, most static NFPA standards fall under the operations division of a fire department. The static NFPA standards were viewed as ingrained in the culture of career fire departments regardless of whether the operations divisions understand the standards or not; hence, the phrase "low-hanging fruit" from multiple experts. These standards are followed without question because there could be a political and financial backlash if they are not followed.

The experts explained that, in most cases, the prevention division followed codes. Codes are found in the International Building Code and International Fire Code manuals. These manuals are extremely specific, and community lawmakers adopt these codes into laws for their buildings and fire requirements in their communities. Few NFPA standards are used by the prevention division depending on the context. The context is explained in the next section.

The EMS division, much like prevention, follows strict medical guidelines created by the medical director. A medical director is a doctor who oversees an organization; that organization could be a fire department or an ambulance service. The

guidelines give specific parameters to personnel's scope of work depending on their level of medical expertise—EMT (emergency medical technician) to paramedic—but for a fire organization, two NFPA standards help guide the medical direction.

Tables 7 to 10 provide a selection of quotes from each fire service division.

Table 7. Training division quotes

Participant	Training quotes
P6	1403 of the live-fire requirements are critical. That's a really good NFPA standard. I think it's well-written. It is pretty detailed and intricate, but I think it's important so that we can provide a safe training environment, learning environment for firefighters. Whether it's acquired structure or a burn tower or some other type of live-fire froth, that NFPA standard's pretty comprehensive.
P3	1403, which is live-fire training, not only due to our training center in our class A fire building but also for acquired structures. 1403 is very, very important**.**
P1	It defines operations and training and if we train well, we will operate well. I think if we really get 1410 correct as far as implementation in the department, then the outcome will be the performance in 1710. With that, at the end of 1410, they even provide you with 14 multi-company drills. Those expectations of how you execute a drill. I speak frequently with training chiefs, not so many department chiefs, but training chiefs will often ask me, "I just got promoted. Where do I start?" I direct them to that document because it is—if you did not have any training policies or procedures you could put your letterhead on top of that and be ready to go.
P1	1410, which is the training framework related one, that one's on my desk. Say I write up a training bulletin or just an informational email, I'll consult that for proper language. I'll be like, well, especially coming into a new organization because I don't know what the institutional terms are for certain things.

Table 8. Operations division quotes

Participant	Operations quotes
P6	1006 and 1670, which are the technical rescue NFPA standards, again, the State of Washington adopted those two, and we have a tech rescue team, and I just got done redoing our tech rescue SOP that was a way out of date and needed some updating. I converse myself in that one. I think that's really important too because it breaks it out by discipline.
P3	On the tech rescue side, NFPA 1006, although that's not my division. We do have to provide training to meet 1006. That's an important standard for us here. Then going back to the tech rescue side, 1670, which is operations and training for tech rescue,
P1	If we're going to do an extrication or a technical rescue, I know which ones to reference towards.
P6	Then the last one I had was 472, which is hazmat that is adopted and incorporated into state law here. Critically important to us to make sure our folks are trained to that standard.

Table 9. Prevention division quotes

Participant	Prevention quotes
P5	The remaining fire codes, I believe that we've adopted [a] uniform fire code for a fire marshal.
P4	We've adopted the ICC [International Code Council] codes. However, we do reference 5000 in a lot of our discussions that we have. We have a lot of building permits and a lot of planning reviews, so we use the 5000 as a, I wouldn't as enforcement, but more as referenced material.
P2	I've never been in the prevention division. It's important that I understand 1030, 1031, 1035. I don't understand them but whenever they tell me something, a lot of times they'll bring me those standards and say, this is why we're doing this.
P1	I think the common denominator is the same thing with building codes. There's lots of local building codes for all these different organizations but as far as fire code, we chose the International Building Code so that there was a level up from trying to enforce all these different localities. That takes work. It takes legislation and even at the local level and commitment. I know that it's not much different in my fire marshal's office. He has the investigations one on his desk. He has the International Building Code on his desk. He has those reference manuals.

Table 10. EMS division quotes

Participant	EMS quotes
P5	Because I have EMS, I do not look at a lot of NFPA standards. We have so many layers of requirements from what we call Cal EMSA [California Emergency Medical Services Authority] and the County of San Diego, that states the protocols we have to have in place in order for us to operate an ALS [Advanced Life Support] unit. For instance, we have a couple ambulances, and there's so much information in there that I trust that they derive, pulled out some national standards to create those. I don't have the latitude to be able to circumvent those. Those have to be my foundation that I operate under.
P1	Firebase EMS people they work very well in protocols and EMT knows it's, protocols, paramedics, know their protocols, they don't feel micromanaged. They know their roles, responsibilities, they have decision-making trees; it's all evidence-based. Any paramedic would say they're happy they have medical direction. 99.99% of the time they operate independently without it, but when they need it, they could, they can pick up the phone and call. I think the structure is a proof-in-concept in the sense that a medical director, one doctor, may have thousands of paramedics and EMTs working underneath them, but it's because they have such explicit expectations through protocol. It's a good system and a good practice.
P3	NFPA 450, which is the Guide for Emergency Services and Systems because that really does focus on our EMS delivery side, which is about 80% of our business model.
P6	We'll start [with] 1582, which is the medical requirements. The reason why I think that's important to small to medium-sized departments, our department has adopted that we follow that. Our doctor uses, or occupational doctor uses, that to determine eligibility to continue working or to work for the department based on that. I think that's important because small to medium-sized departments don't have the internal expertise to really come up and know what those medical requirements.

4.5.2.5 Theme 5: Culture

The culture theme focused on the culture within the fire service and how it could help or hinder the implementation of policies regardless of the value the policies could bring to the organization. Participants explained that individuals' mentality within a fire organization has a lot to do with the culture. In one case, a participant explained the '33% theory'. The first 33% of firefighters would adapt to a culture change, often without question; for example, they would adapt to new policy implementation or a new training exercise. The second 33% of firefighters would question the culture change but would likely accept it once they identify that the culture shift could help the organization. The last 33% would not adapt to the culture change; these individuals are stuck in their ways and would not adapt no matter what the positive changes to the organization were.

The concept of mentality was divided into two subcategories: relationships and acronyms. Relationships had a sub-category of trust—if a positive relationship was established, then trust would be created.

The sub-category of acronyms explains a particular alternative use of the NFPA acronym in the fire service, which directly correlates to the mentality of individuals in how they view NFPA standards and how difficult it could be to implement these standards into policy and gain their acceptance. In some circles, the NFPA is defined as *Not for Practical Application*. The researcher perceived this alternative use as a negative connotation of the NFPA standards. Therefore, if the negative connotation is to be corrected, culture and mentality must adapt and change within the organization and among its individuals. A possible starting point is to validate and provide positive information about the NFPA standards and how they could help—and not hinder—the

organization. Tables 11 to 13 provide quotes relating to the cultural themes raised by

participants.

Table 11. Quotes relating to the mentality theme

Participant	Mentality quotes
P2	The department is divided into three pieces. It doesn't matter where you work, in my opinion. You got the guys that I'm going to tell them, "Hey, I want you to go run through that wall." "Yes, sir," and they'll go run through the wall. Then you got 30% of the guys that are going to go, "I don't know if I'll run through that wall. What's the wall made of? Do I have a tool? Do I have to?" Then you have 30% of the guys who go, "I ain't running through the wall." All I'm thinking about is change of behavior and making guys better. The 30% that are going to run through that wall, if you can coach them up and encourage them and they trust you, they might pull that second 30% with them. If we worry about the 30% that don't trust us and would just decide that we're going to spend all of our time on them, then you're going to lose that first 30% that's already with you.
P3	I'm the fire chief, and we have not been supportive of utilizing NFPA standards, one could argue two things.

We're going to continue with the status quo; we'll not utilize them because we've institutionalized that they're not important or, the flip side of that is, now that it's ultimately on me as the fire chief, and if something goes bad, I know it's going to be used against me if we're not following it. That all of a sudden, I could now then become a very avid supporter of an NFPA standard, because it's ultimately, excuse me, my ass that's on a line. |
| P4 | A lot of firefighters, their identities is [sic] grounded on how they operate on the fire ground. As we start developing professional development frameworks and pulling in some standards like that, it could be something that I want to slowly introduce. |
| P6 | You've got firefighters that have been working for 20, 30 years that know nothing else except that they wear the air pack when they're fighting fire, but as soon as they're in the overhaul, pack comes off, and they're breathing in the crud. |

Table 12. Quotes relating to the relationship and trust theme

Participant	Relationship and trust quotes
P5	If you can couple a good idea with trust, obviously, it's going to have a way more significant potential of moving forward versus not because if you don't have some faith from your personnel, there's likely going to be attempts to undermine you, there just won't be wholehearted adoption. Trust plays a significant role in the acceptance, I believe, of a new policy and how fast it can be implemented. I could get away with some of that in my organization now because you established these relationships, and these people hopefully trust you, and they know that you've been up through the ranks, and you're making decisions based on the best interest of their personnel.
P5	Trust is probably the biggest factor, and if we're able to execute these endless policies and procedures. I think that you have to build some validity as a leader and answer the question of why are we doing this? Why? I find that firefighters don't like the, "Well, this is just because this is the way it says." If a leader is able to build trust and competence and explain the practical application, that it enhances our operational effectiveness, our tactical readiness, our safety operation, whatever we're trying to achieve.
P6	Absolutely because there are certain personnel that you probably trust a little more because of their experience or whatever to implement the new policy or procedure. I think that's important; you need to be able to involve your subject-matter experts.
P3	I think this is more from the perspective of NFPA, the use of NFPA's standards not being institutionalized in an organization where all of a sudden, you're going to be utilizing them, or a new standard. I think number one is, there's a lot of trust that has to be developed over them. This challenge with some of this, though, is, I can see, I can envision in a lot of cases where implementing the standard before the trust is established is going to be really, really important, especially in the labor environment. I think educating and training the personnel on what the standards actually are, how we utilize them, why they're important to the department and the community, is an important part of building that trust.
P1	It's just the information. Leadership, practice, organization is both human and human interaction, emotion, and information. I think that no matter how good NFPA standards are, if they don't believe the person who's selling it, then it's not going to fly.

Table 13. Quotes relating to the acronym theme

Participant	Acronym quotes
P4	Some firefighters, they see NFPA as a mandate, or as the term around this area is NFPA stands for 'not for practical application.' That's the running joke
P1	It's funny, I'm sure you've heard it, the NFPA, the negative connotation of the acronym is 'not for practical application,' so when I show people that it is very applicable and practical and important and a good source, then they become trusting of it and they become trusting of the direction that I want to take it. Basically, it's a reinforcement; it's the same as an NFPA guy would probably be trying to somehow win you over with trust and things, whereas I get to have to build up the information with your source.

4.5.2.6 Theme 6: Small to Medium-Sized Fire Departments Compared to Large Departments

In theme six, when comparing small to medium-sized departments with larger departments, two sub-themes emerged. The two sub-themes were consistent throughout the interviews. The participants perceived that larger departments had more resources and financial backing, but smaller departments needed NFPA standard implementation because often the standards were not used in policy or in any other capacity within the organization.

The definition of small to medium-sized fire departments includes organizations that have less than 10 fire stations within their jurisdiction. This definition was adopted within this study. The urban areas in this study totaled less than 200,000 people, and personnel staffing totaled less than 250 personnel in the organization throughout all divisions. Tables 14 and 15 provide quotes reflecting the sub-themes for theme six.

Table 14. Financial quotes

Participant	Financial quotes
P5	We recognize that they are setting the standard for best case scenario, best practice, but we have to balance that with what is practical for our agency. Why we choose certain NFPAs and not the other is because, I'll be honest, Matt, a lot of it comes down to cost. It's a balancing of cost and then being realistic about what we can implement. Also, we have a lot of small agencies that have very strong mutual agencies. I would say we're very consistent with them, is that we don't have the ability, and they're probably in the same boat, where they're not looking at the NFPA manual on a daily basis and saying, "What does this standard say?" As a guiding principle because they understand that some of its cost-prohibitive.
P6	NFPAs restrain your operations a bit because if you've adopted the standard, you're going to be held to that. In smaller to medium-sized departments, frankly, have a harder time complying with NFPA standards because a lot of times, the standards have a significant cost to implement, whether it's personnel costs or equipment,
P2	We cannot live 100% to these standards. We just said, "I can't. I don't have the money to." If there's things within the standard that I can do that are free, I better do them or I may get in trouble.
P3	I want to be able to validate and give merit to why we need to spend some money on something and tying those back to NFPA standards can be a very compelling reason why we would want to do that.
P1	The equivalent ones are probably just as critical if not more so to an organizational-level chief because they'll influence budgeting and capital funds. Also, apparatus spec is a huge part of our organization. It's a major investment; it's a 20-year investment—you want to get it right. It's a big deal.

Table 15. Resources quotes

Participant	Resources quotes
P5	When you talk about four-person staffing in 1710 for a small agency, this is simply not a possibility. It's a non-starter in this city. It's a non-starter in most cities. There are smaller agencies because adding this one person becomes such a significant percentage increase, that it really is, again, is because there's not a whole lot of political favor.
P4	I guess one of the questions have I ever been, as a fire chief, am I in conflict with an NFPA standard or a recommendation and an operational guideline? How do I navigate that? For example, I currently have an apparatus that is staffed with two people. That goes against—see, I don't want to quote this standard—1710 probably says something about it, 1500 probably says something about it, but there's probably some standard that says that's not acceptable maybe. How do I navigate around that?
P2	Go to 1410, which you're talking about how fast someone should be able to do something. You put a company out there of two people instead of four people, we're probably not going to go do it as fast. As long as you can justify the fact that you have requested more personnel for 1710 and been denied. I think that's all you can do. Also, I think the fact that people don't have access to them [NFPA standards].
P3	Everything is viewed from a small organization's perspective as one more thing they have to do. I have to meet or achieve one more thing. Usually doing that, people see [NFPA standards] as burdensome.
P1	I think the local agencies, they will just silo themselves and I think that it's really important that they use NFPA guidance because they don't have the resources of experience and access and those types of things that these other places will.

CHAPTER V

CONCLUSION

5.1 Introduction

As the creation of this framework evolved, interview participants spoke about many different NFPA standards, but many of the standards were spoken about repeatedly. So much so that trends were found as well as the specific NFPA standards that must be used in small to medium-sized fire departments.

Often what is lost on personnel in the fire service is the fact that the NFPA is a nonprofit organization that attempts to eliminate death, injury, property, and economic loss created by fire or other related hazards (Dungan, 2016).

This study aimed to: "This study aims to construct a framework of NFPAs to assist fire administrators in their daily implementation of policy and procedures."

Reflecting on the research outcomes, the study's aim, objectives as well as the CRQ and supporting research questions were achieved. It can be concluded, though, that for the framework to be successful, leadership must identify what current frameworks are within their organization or what frameworks they may need to implement in the future. For example, if a small to medium-sized fire department has a technical rescue framework, there are particular NFPA standards that should be implemented for the framework to work efficiently. The framework proposed in this thesis touches on all NFPA standards needed for fire organizations and sub-frameworks within small to medium-sized fire organizations. The needs of the organization were established through analysis of the interviews. All participants were a part of small to medium-sized fire departments; some had more sub-frameworks than others, but this framework allows for flexibility within each organization. The framework should have the capacity to be adjusted as needed by leadership following an analysis of what sub-frameworks are currently in their organization.

5.2 The Framework

The framework is built on NFPA standards in the areas of administration, equipment, job descriptions, divisions, and specialized sub-frameworks within the organization. To clarify, equipment and job descriptions fall under the operations division of the fire service. The researcher found it best to reference these NFPA standards to specific categories. All experts clarified these NFPAs were under specific categories, not under the operations division. This is due to the substantial number of NFPA standards under each category.

5.2.1 Administrative NFPA Standards

The relevant administrative NFPAs were 1710: The Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, and 1500: Standard on Fire Department

Occupational Safety, Health, and Wellness Framework. NFPA 1710 was stated in every interview as an essential standard for any department. It gives departments backing for resource needs and specifies requirements for effective and efficient organizational deployment of fire suppression, emergency medical operations, and special operations. This includes the sub-frameworks explained later in the discussion. NFPA 1500 was referenced due to the needs and compliance of safety, health, and wellness for all personnel in the organization, which was important to every participant.

5.2.2 Equipment NFPA standards

Equipment NFPA standards were referenced multiple times in every interview. The researcher has paraphrased the participants by stating: "If the equipment does not work, personnel cannot do their jobs." The researcher determined that in small to medium-sized career departments, equipment NFPA standards are embedded within fire organizations. Equipment standards are followed closely so that personnel can perform duties to the standard that is expected. This standard is explained in most job description sections per Standard Operating Procedures of a department and allows personnel to get to and from emergency incidents. The first set of NFPA standards within the framework specifically focuses on fire apparatus (vehicles) and the need for the apparatus to function properly: NFPA 1901: Standard for Automotive Fire Apparatus; NFPA 1911: Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles; and NFPA 1914: Standard for Testing Fire Department Aerial Devices. NFPA 1914 is a standard that is only needed if a department has an aerial apparatus. The need for that apparatus is dependent on the size of buildings within a particular jurisdiction and if insurance within the jurisdiction recommends the need for the apparatus. Other equipment NFPA standards within the framework consist of: NFPA 1852: Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA), which was highly recommended to keep personnel safe during fire suppression operations; NFPA 1932: Standard

on Use, Maintenance, and Service Testing In-Service Fire Department Ground Ladders, which was highly recommended due to the needs of personnel on the fire ground; and NFPA 1962: Standard for Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances, which was referenced in every interview. There was a consensus that annual hose inspection carried out by department personnel is critical readiness for the suppression of fires.

5.2.3 Personnel NFPA Standards

Personnel NFPA standards are utilized by accreditation systems, including IFSAC and Pro-Board. These accreditation systems are known throughout the United States as testing entities that provide certifications in the fire service. In most cases, small to medium-sized fire departments require personnel to have these certifications to complete fire academy training at the beginning of the person's career in the fire service and to promote and enhance understanding of different areas of the service. Personnel NFPA standards within the framework consist of NFPA 1001: Standard for Fire Fighter Professional Qualifications; this NFPA standard is the standard that identifies the minimum job performance requirements for career and volunteer firefighters who work primarily in structural firefighting. This standard is utilized as firefighters test for their Firefighter 1 and Firefighter 2 IFSAC or Pro-Board certifications, which are often done in a fire academy. NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications, was referenced often by experts; this standard identifies requirements for personnel who drive and operate fire apparatus, which is the next level of promotional opportunity beyond firefighters. NFPA 1021: Standard for Fire Officer Professional Qualifications, was also referenced in the same vein as 1002. NFPA 1021 identifies job performance requirements for a fire officer, which is the next promotional opportunity after a driver/operator.

5.2.4 Divisions

This particular area explains the divisions of training and prevention. The training area correlates with personnel NFPA standards and administrative NFPA standards. The prevention division has a focus on codes.

The training division had two NFPA standards that were highly recommended in the interviews. NFPA 1041: Standard for Fire and Emergency Services Instructor Professional Qualifications identifies the job performance requirements for fire service instructors. Often this NFPA is required for personnel within the training division of the fire service, considering they instruct personnel in operations, prevention, and emergency medical services. NFPA 1410: Standard on Training for Emergency Scene Operations, is a subset of 1710. It covers training for personnel by measuring performance for initial fire suppression and in rescue procedures. To become proficient in NFPA 1710, personnel must be trained to 1410 standards. One interview participant stated, "It defines operations and training, and if we train well, we will operate well. I think if we really get 1410 correct as far as implementation in the department, then the outcome will be the performance in 1710. It even provides you with 14 multi-company drills."

Throughout the interviews, participants mentioned the prevention division; however, only one NPFA standard was mentioned. In most situations, the prevention division focuses on *the International Building Code* manual or the *International Fire Code* manual. These manuals have codes that touch all facets of building construction and fire requirements within buildings. NFPA 101: Life Safety Code is the NFPA code referenced for the prevention division, which helps meet the modern challenges of helping protect people from fire and related hazards (https://catalog.nfpa.org).

5.2.5 Specialized Sub-Frameworks

Depending on the size and resources available, some small to medium-sized fire departments have specialized frameworks. These frameworks include technical rescue and hazardous materials. If a fire department has these frameworks, NFPA standards need to be used for guidance of the framework. For technical rescue, NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents identifies and establishes the levels of functional capability for efficiently and effectively conducting operations requiring technical rescue and rescue incidents while minimizing threats to rescuers (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1670). For a hazardous materials framework, NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents is the relevant standard, which identifies the minimum levels of competence required by responders to emergencies involving hazardous materials (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=472). These NFPA standards are the foundation to the sub-frameworks.

5.2.6 The Framework in Practice

The framework explained above is a template for leaders in small to medium-sized fire organizations. For the framework to be successful, it must be considered a living document. Davis and Alexander (2015 P.1) explains the importance of living documents by stating "an emergency plan needs to be a living document that is periodically adapted to changing circumstances and that provides a guide to the protocols, procedures, and division of responsibilities." This framework is not an emergency plan, but it helps fire departments to be prepared for many kinds of issues that

may be faced in emergency situations. Not every small to medium-sized career fire organization will need all of these NFPAs in their framework. Some standards will be dropped, and others may be added depending on the needs of the organization. This framework is more of a process than an outcome, especially as the framework will need to be updated over time as circumstances change (Davis & Alexander, 2015). This framework allows for a baseline or blueprint of standards. The standards need to be reviewed and utilized by all personnel within the organization.

Table 16 provides an overview of all of the base standards identified in the research and recommended for inclusion in the framework.

Table 16. Summary of the recommended framework of NPFA standards

Category	Relevant NFPA standard
Administrative	NFPA 1710: The Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments NFPA 1500: Standard on Fire Department Occupational Safety, Health, and Wellness Framework
Equipment	NFPA 1901: Standard for Automotive Fire Apparatus NFPA 1914: Standard for Testing Fire Department Aerial Apparatus NFPA 1852: Standard on Selection, Care and Maintenance of Self-Contained Breathing Apparatus (SCBA) NPFA 1911: Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles NPFA 1962: Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances
Personnel	NFPA 1001: Standard for Fire Fighter Professional Qualification NPFA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications

	NFPA 1021: Standard for Fire Officer Professional Qualifications
	NFPA 1041: Standard for Fire and Emergency Services Instructor Professional Qualifications
Division	NFPA 1410: Standard on Training for Emergency Scene Operations
Framework Specific	NFPA 1670: Standard on Operation and Training for Technical Rescue Incidents
	NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents
	NFPA 1006: Standard for Technical Rescue Personnel Professional Qualifications

5.3 Culture

For the framework to be implemented appropriately, there must be cultural acceptance within an organization. This cultural acceptance must come from leadership. Pollock (2013) found that "Leadership was seen as an essential factor in avoiding organizational failure." By creating an appropriate organizational culture, where the framework takes precedence over blame, leaders can instill the ethos necessary to enhance the framework (Pollock, 2013). The first priority for a successful culture is leadership, and a key task for leadership is the communication of goals and objectives (Pollock, 2013). With buy-in from leadership, the framework will create transparency and objectives can be set for the organization using NFPA standards.

Cultural acceptance takes an adaptation of thinking. Often in fire service organizations, the NFPA standards are seen as useless. One interview participant explains that viewpoint:

As I build trust, I have to come in and create changes based on needs and
not on mandates. Some firefighters, they see NFPA as a mandate, or as
the term is, NFPA standards are "not for practical application." That's
the running joke.

A goal once the framework is implemented is to promote how the framework can be helpful to the organization and how the framework will help to make the organization more efficient and effective.

5.4 The 33% Theory

The 33% theory arose from the analysis of trust and culture within the fire service. The theory is an analysis of fire service personnel behaviors. The theory directly correlates to the implementation of the framework because, for the framework to work, personnel must believe in it. A fire organization is divided into three behavioral mentalities: the first 33% are willing to do what is necessary to learn and adapt to new ideas and changing fire science; the second 33% are personnel who are skeptical of change and new ideas, but if the ideas are proven to be helpful to them and the organization, they will buy into the framework; and the final 33% of personnel are not open to change and do what is necessary to maintain the status quo.

The researcher found the 33% theory important to the implementation of the framework that was created in this study because if leadership and 66% of the organization are willing to accept the NFPA framework, the likelihood of the framework succeeding is high; however, the trust and cultural adaption of NFPA standards must be accepted.

5.5 Limitations

Limitations are characteristics of a design or methodology that determine the interpretation of the findings by the researcher. They are also the constraints that exist within the design of the study or the method used (Price, James, & Murnan, 2004, pp. 66-67). The limitations in this study include the use of the methodology and the limited geographical locations of experts in the United States.

The Delphi method, in most cases, requires two to three rounds of interviews. The rounds are dependent on the research goals and are required to verify results (Skulmoski, 2007). However, some studies only require one round of interviewing (see Hartman & Baldwin, 1995; Kuo & Yu, 1999). Considering the researcher created an extensive and adaptable framework and the time constraints were limited by the academic calendar, the second and third rounds of interviewing were unwarranted.

The second limitation was the restricted number of geographical locations where experts lived and worked, as well as the sample size. The study covered the South, Midwest, West, and Pacific Northwest of the centennial United States, and six participants were interviewed. One could argue the limited locales of the participants could minimize the validity of the study, or the study did not reach a conclusive worldly view for the framework. Also, the small sample size may not give conclusive evidence of the framework's validity. Although Patton (2005) postulates that no specific rules apply for the sample size in qualitative phenomenological studies. According to Patton, "Sample size depends on what you want to know, the purpose of the inquiry, what's at stake, what will be useful, what will have credibility, and what can be done with available time and resources" Also, for qualitative studies, understanding is a more fundamental

concept than validity (Maxwell, 2002). Saturation was achieved for the framework after the sixth interview. The standards used in the framework were a part of every interview, with participants either stating the NFPA number directly or insinuating the standard by the area of the organization the interviewee was speaking of. Lastly, most of the participants came from the operational side of the fire service, and, therefore, the framework is standards-heavy in relation to the operational division. No participants were a part of a prevention division; however, in most cases, personnel start their careers in the operational side of the fire service and gain their initial foundation from that division. Often prevention positions are promotional opportunities for personnel, and they move into other divisions as they garner further experience within the organization.

5.6 Future Research

Future research possibilities were identified in this initial study. Much of the future research opportunities focus on the root causes of why NFPAs are not utilized in their full capacity. This takes into account that all participants who were working in OSHA states were not required to enforce NFPA standards. This root cause was troubling on two fronts. First, NFPA standards are an attempt to help fire organizations work more efficiently and effectively. Dependent on leadership, fire organizations in OSHA states use standards to some extent. However, depending on resources and cost, standards may not be used at all. This creates a liability for the organization and the communities the organization serves. Second, without the implementation of standards, organizations are working shorthanded and are not following guidelines that should be followed as per industry standard. Often personal experience and bias overshadows standards, thus diminishing the effectiveness and efficiency of standard's usage. Future research on how OSHA states could use, implement, and hold organizations accountable to these standards should be evaluated and analyzed. Additional research could also

assess the L&I agency for Washington State. The agency has created a framework of NFPA standards that fire organizations must follow by law. This framework could be reviewed by researchers to see if OSHA states could implement the same guidance as L&I in Washington. Lastly, in future research, personnel from a prevention division should be interviewed to garner a greater amount of feedback for the prevention portion of the framework.

5.7 Reflections of the Study

Early in my career in the fire service, I knew the fire/emergency management graduate framework was something I wanted to pursue. A mentor recommended I wait until I had five years of experience in the profession before starting the framework. I followed that recommendation and began my journey at Oklahoma State University in my sixth year in the fire service. When I began this framework, I believed I would be in the fire service for the rest of my career. As I sit here and write this reflection, I am no longer in the fire service and have transitioned into a new career. I know the FEMP graduate framework is why I have moved on from the fire service. This framework expanded my thinking in so many ways that I cannot count them all, but what I will say is, I am a better person, son, husband, writer, and leader due to all the challenges this framework presented me. This thesis initially came about from a dinner conversation about how the organization I worked for at the time needed updated policies and procedures and how NFPA standards are the basis for those policies and procedures. The thesis ebbed and flowed, ranging from what methodology I would use to what tools were needed for this study to be successful. This study taught me all good things are a process. It takes time to achieve difficult goals and that is okay.

I want to thank every professor who helped me along the way. I deeply appreciate relationships I have built with my fellow students. The opportunities this framework gave me will stay with me for the rest of my life.

Matthew Burns, December 2020

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APPENDICES

Appendix 1: Interview Questions

Interview Questions

1. **Please give an overview of your background and experiences related to the fire service.**

2. **Which NFPAs do you consider to be the most important in establishing administrative policies and procedures for a small to medium size fire department?**

3. **Can you please explain why you chose those NFPAs?**

4. **Of the NFPAs you chose, how often do you use these NFPAs in your current role? Do you think these NFPAs are used less often or more often in a small to medium size fire department?**

5. **How has the global pandemic affected your implementation of NFPA's and policy and procedures?**

6. **How might the difference between hiring an internal or external administrator influence the direction in which the department adopts standards?**

7. **Does trust play a role in the execution of the standards, policy's, and procedures and to what extent?**

8. **What do you think I should have asked you about that I haven't?**

Appendix 2: Interview Briefing Note

INTERVIEW BRIEFING NOTE
• **PROJECT TITLE:** *"Not Another Acronym: A Critical Analysis of NFPA's for Small to Medium-sized Fire Departments"*
• **INTERVIEW PURPOSE:** *The purpose of the interview is to gather data on participant's views, experiences, and opinions of National Fire Protection Agency (NFPA) standards and how they help with the implementation of policy and procedures.*
• **SCOPE OF THE PROJECT** *This project is a national comparative study, involving fire service practitioners from the United States of America. Collected data will be analysed to produce the study's research outcomes. This data will be used to inform the development of a master's Thesis and other research-informed publications that may include Journal Papers etc in order to progress our understanding of National Fire Protection Agency (NFPA) standards.*
• **DATA CAPTURE:** **Methods:** electronic and phone voice recording, recorded video conferencing (e.g. Zoom and Skype), handwritten notes and auto / manual transcription. • **DATA PROTECTION POLICY** a) **Electronic and Phone Recordings:** will be stored on a secure password encrypted server and stored in a key locked filing cabinet in the interviewer's study within his home (Interviewer access only) b) **Transcripts and Hand-Written Notes:** will be stored in a key locked filing cabinet in the interviews study within his home (interviewer access only) c) **Recorded Video Conferencing:** will be stored on the interviewer's computer and a separate hard drive for backup. The computer and hard drive will be locked in a key-pad safe within the interviewer's home. d) **Processed Data:** analysed data that is not attributable to individuals or specific organizations will form part of the final thesis and may also be published in various forms at a later date.

Appendix 3: Interview Consent Form

OKLAHOMA STATE
UNIVERSITY

INTERVIEW CONSENT FORM
☐ *PROJECT TITLE:* *"Not Another Acronym: A Critical Analysis of NFPA's for Small to Medium-sized Fire Departments"*

☐ *STATEMENT:*
 	
The undersigned hereby consent to participate in an interview for the express purpose of contributing to the master's Thesis field research program of the interviewer listed below. This statement confirms that the interview will adopt an ethically appropriate manner that will do no harm to the participant, the respective organizations, society or the interviewer and will conform to the policies listed below:
 	
      a) Interview Data Capture Policy
      b) Data Protection Assurance
      c) Right to Withdraw Policy

☐ *INTERVIEWER:*
 	
      a) Name: Matthew Burns
      b) University: Oklahoma State University
      c) Program: Masters in Fire and Emergency Management
      d) Student Number: A10658543
 	
☐ *SIGNATURE:*
 	
☐ *DATE:*

☐ *INTERVIEWEE:*
 	
      a) Name:
      b) Organization:
 	
☐ *SIGNATURE:*
 	
☐ *DATE:*

Appendix 4: IRB Approval Letter

Oklahoma State University Institutional Review Board

Date:	12/11/2020
Application Number:	IRB-20-554
Proposal Title:	NOT ANOTHER ACRONYM: A CRITICAL ANALYSIS OF NFPA STANDARDS FOR SMALL TO MEDIUM SIZED FIRE DEPARTMENTS
Principal Investigator:	Matt Burns
Co-Investigator(s):	
Faculty Adviser:	Tony McAleavy
Project Coordinator:	
Research Assistant(s):	
Processed as:	Exempt
Exempt Category:	

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which <u>continuing review is not required.</u> As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:
1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

VITA

MATTHEW BURNS

Candidate for the Degree of

Master of Science

Thesis: NOT ANOTHER ACRONYM: A CRITICAL ANALYSIS OF NFPA'S FOR SMALL TO MEDIUM-SIZED FIRE DEPARTMENTS

Major Field: Fire and Emergency Management

Education:

Completed the requirements for the Master of Science in Fire and Emergency Management Administration at Oklahoma State University, Stillwater, Oklahoma in December 2020.

Completed the requirements for the Bachelor of Arts in History at Southwestern Oklahoma State University, Weatherford, Oklahoma in 2007.

Experience:

9 years as a Professional Firefighter, Planning Officer for Oklahoma State University, Program Analyst for the United States Army

Professional Memberships:

International Association of Emergency Managers
Golden Key International Honor Society