Determining Core Emergency Scene Operational Standards

for Eastside Fire & Rescue

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that the appropriate credit is given where I have used the language, ideas, expressions or writings of another.

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Abstract

Eastside Fire & Rescue (EF&R) has not established standards for core emergency scene operations. This lack of standards causes inconsistencies and conflicting expectations in service delivery. The purpose of this Applied Research Project (ARP) is to provide recommendations that could assist in establishing standards for core emergency scene operations. Procedures included a literature review, a survey which was distributed to King County Washington, Zone One Fire Chiefs, field testing and collection and analysis of data. The survey was conducted to analyze and address this problem. The Descriptive Method of research was utilized in this project. Essential research questions are: (1) Which core emergency scene operational standards should be considered at ER&R? (2) What core emergency scene operational standards exist in the industry which may be a model for ER&R to consider? (3) What core emergency scene operational standards have been adopted locally by other fire departments? (4) What are the current times required to perform certain core emergency scene operations at EF&R? (5) What time standard should EF&R adopt for core emergency scene operations? Research and survey results produced models and recommendations for EF&R to consider. Standards for 10 core emergency scene operations were developed with each given an expected time for completion. Those 10 operations are 5" manifold reverse, set up Ladder 73 for roof ventilation, set up Ladder 73 for elevated master stream, 1 ¾" pre-connect attack, 2 ½" pre-connect attack, set up ground ladder to second floor, 2 ½" supply wyed to 1 ¾" attack line, set up the 50' boom for elevated master stream, and set up rescue tool for extrication operation. Ten additional recommendations were provided to guide development, implementation, and evaluation of core emergency scene operational standards.

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INTRODUCTION

Gaining and maintaining the confidence of external and internal customers is of paramount importance to the success of any public supported agency. One of the best ways to achieve confidence is to set standards, train to the expectations, and then measure for compliance. Through the establishment of standards there is a sense of control and assurance that the needs of all involved can be satisfied. The problem is that Eastside Fire & Rescue (EF&R) has not established standards for core emergency scene operations. The lack of standards causes inconsistencies and conflicting expectations in service delivery.

The purpose of this Applied Research Project (ARP) is to provide recommendations that could assist EF&R in establishing standards for core emergency scene operations. This ARP titled "Determining Core Emergency Scene Performance Standards for Eastside Fire & Rescue" utilized the Descriptive Method of research. The following questions constitute the foundation for this ARP.

1. Which core emergency scene operational standards should be considered at EF&R?
2. What core emergency scene operational standards exist in the industry which may be a model for EF&R to consider?
3. What core emergency scene operational standards have been adopted locally by other fire departments?
4. What are the current times required to perform certain core emergency scene operations at EF&R?

5. What time standard should EF&R adopt for core emergency scene operations?

BACKGROUND AND SIGNIFICANCE

EF&R is a consolidated fire department located in the eastern portion of King County, Washington, 13 miles east of Seattle. Interstate 90 runs east and west through the middle of the Agency's service area.

The *Agreement for Joint Operation of Fire and Emergency Medical Service* established EF&R (Eastside Fire & Rescue, 1908) in 1999. This document formed a partnership among three adjoining cities and two fire districts. This agreement combined fire, medical, and rescue services under one administration protecting the cities of Issaquah, North Bend, and Sammamish, along with the unincorporated areas within King County Fire District 10 (to include the City of Carnation through annexation into King County Fire District 10) and Fire District 38.

In May of 2007, the partners of EF&R entered into another seven-year agreement to maintain the partnership that was established in 1999. The *Eastside Fire & Rescue Interlocal Agreement* extended the partnership of EF&R (Eastside Fire & Rescue, 2007) in 2007 to a least 2014.

Within EF&R's service area there are rural farmlands, residential communities, master-planned developments, urban and commercial centers, along with light industrial facilities. Costco Corporation is headquartered in Issaquah. Microsoft, Boeing, and other international ventures have operations based in Issaquah as well.

According to the latest information available through the *Eastside Fire & Rescue Agency Assessment* as provided by *Emergency Services Consulting, Inc.* (Emergency Services Consulting, Inc., 2006) 106,542 people reside in the service area that encompasses approximately 200 square miles. The department consists of 120 career firefighters and

approximately 70 volunteers. In addition to the firefighters, there are 24 staff and administrative personnel. Eastside Fire & Rescue provides emergency medical, fire, and rescue services from 16 facilities. According to data received from the *Eastside Emergency Communications Center* (Eastside Emergency Communications Center, 2008) as outlined in the *Activity Report for 2007: Eastside Fire & Rescue,* EF&R responded to 8696 alarms in 2007.

Eastside Fire & Rescue's *On-Duty and Staffing of Career Combat Personnel Policy #2401* (Eastside Fire & Rescue, 2005) established a minimum daily staffing of 28 career firefighters. These personnel operate out of nine facilities. There are a minimum of three firefighters on duty at all times at each station. The *Labor Agreement-Firefighters* (King County Fire District 10, 2007) between King County Fire District 10 and the International Association of Firefighters (IAFF) Local 2878 places the emergency response work force on a rotating 24-hour schedule using three shifts of employees.

The problem is that Eastside Fire & Rescue (EF&R) has not established standards for core emergency scene operations. The lack of standards causes inconsistencies and conflicting expectations in service delivery. Prior to the establishment of FR&R, some of the former independent service providers had written core emergency scene operation standards that varied in detail and uniformity. None of the independent providers had standards that identified a time period for which core emergency scene operations were expected to be completed. Although having an established set of standards for core emergency operations was considered important by the EF&R Fire Administration and Training Division, the agency had focused little time in the past nine years in working towards these ends.

When EF&R was formed in 1999, the Joint Apprenticeship Training Committee (JATC) Program, as instituted in King County Fire District 10, survived the consolidation of the independent fire departments. The JATC Program remained as the process to develop firefighters from apprentice to journeyman status within a three-year period.
This action was taken as a means to bring uniformity in training and accountability at the scene through the establishment of individual firefighter performance standards.
Company level core emergency scene operation standards were not included in this program.

Since there are no established standards for core emergency scene operations, officers set individual company training expectations and reacted to emergency situations on an incident by incident basis. The lack of standards produces an inconsistent pattern
of what will transpire at the emergency scene and how long an operation may take to complete.

Since the formation of EF&R, the Agency has centered its energy on merging policies, securing appropriate funding for operations, and perfecting its consolidated governance model. Maintaining current service levels, along with upgrading apparatus and facilities, has been a high priority as well. Creating a stable funding model, while exploring other consolidating opportunities with agencies neighboring EF&R, has been a major goal in 2006 and 2007.

Over the past two years, the EF&R Board of Directors has called for benchmarking in all areas of operation along with the identification of best practices with the underlying drive for continuous improvement. The Fire Administration embraced the direction of the Directors and began a top to bottom review of areas in the department where benchmarking as a component of standard setting would be most effective.

The retirement of the tenured EF&R Deputy Chief of Operations in March of 2007, combined with the decision to delay filling the vacancy, caused a different set of eyes to revisit

the matter of core emergency scene operation standards for responders. A newly hired Deputy Chief of Services assumed the additional role of Operations. As an employee who did not rise through the ranks at EF&R, the new Deputy Chief revived the discussion about having established core emergency scene operation standards for responders.

Without the establishment of core emergency scene operation standards which are periodically reviewed and analyzed, the current problem is expected to continue. It is likely that this problem will contribute to increased liability risk for the Agency, frustrate employees, and compromise the ability of the fire administration and elected officials to accurately and objectively assess the need for future improvements designed to better serve EF&R communities. The potential for injury or death among responders and citizens will remain unchanged due to the lack of standards.

The purpose of this ARP is to provide recommendations that could assist EF&R in establishing standards for certain core emergency scene operations. Most important to the research and establishment of standards for core emergency scene operations is to have customer confidence in the planning, implementation, and execution of capabilities by EF&R. The absence of standards for core emergency scene operations provides an opportunity for the fire administration to set direction and develop objective accountability. Desired results would include the development and implementation of the best possible standards for core emergency scene operations.

This ARP addresses the concern over a specific operational aspects of the service delivery at EF&R which lacks standards for core emergency scene operations. The findings of this research have the potential to set standards for core emergency scene operations and thereby reduce the loss of civilian lives in all age groups.

Through a well researched and properly implemented set of standard core emergency scene operations, all operational objectives of the ARP criteria (Federal Emergency Management Agency, 2004) will be achieved. Those objectives include a reduction in the loss of lives in all age groups and in the firefighting ranks. In addition, this ARP should "promote within communities, planning let by the fire service which responds appropriately to emerging issues" (p.3). Likewise, the United States Fire Administration, (USFA) mission's "commitment to excellence" (United States Fire Administration, 2005) is demonstrated through an ARP of this type (p.1).

LITERATURE REVIEW

To gain an understanding of what others have learned and/or implemented in regard to the establishment of standards for core emergency scene operations, a literature review was undertaken. Existing standards, research and outcomes, along with a general review of what others have done in the industry regarding this subject, were identified.

Question Number One: "Which core emergency scene operational standards should be considered at EF&R?"

Jeffrey Saver (2005), a doctor and professor of neurology at the University of California, while conducting stroke research for the American Heart Association (AHA) found that each minute the brain is oxygen deprived there is a loss of 1.9 million brain cells. His findings published in the *American Heart Association Rapid Access Journal Report* concluded that the human brain when not supplied with adequate levels of oxygen experience brain cell death within four minutes. Saver determined a brain that is deprived oxygen for more than six minutes would most likely suffer irreversible damage. While he noted that strokes are highly treatable, the chances of positive outcomes rapidly decrease if there is not timely intervention by medical

professionals.

Saver estimated that the introduction of tPA (tissue plasminogen activator) within three hours of a stroke reduces long-term disabilities. He also noted that simple aspirin and blood clot thinners can play a big role in halting damage or buying time until surgical intervention takes place. Saver emphasized rapid recognition, rapid assessment, access to critical care, and proper treatment as the best means to limit damage caused by stroke.

Research by the American Heart Association (American Heart Association, 2006) concluded that where cardio pulmonary resuscitation (CPR) training of citizens is widely provided and received, combined with a rapid service delivery system, the save rate of those suffering a heart attack is in excess of 30%. In the report, *American Heart Association: Cardio Pulmonary Resuscitation Statistics,* Seattle, Washington, was among such cities that had achieved such success, while cities like New York, New York, where the opposite factors prevailed had only been able to post success rates of less than 2%.

The AHA found that early CPR and defibrillation (within three to five minutes) plus early advanced care may result in greater than 50% or higher long-term survival rate for those who had a witnessed heart attack. Bystander CPR buys the time needed for emergency crews to arrive. Early bystander CPR is less helpful if responders with defibrillators do not arrive and administer care within 8 to 12 minutes after a witnessed collapse. The AHA recommends that methods to provide life-sustaining oxygen along with defibrillation must occur within four to six minutes in order to optimize the survivability of a patient.

David Pan (1998), writing for *The King County Journal,* looked at the lessons learned by field medics regarding immediate stabilization and rapid transport of severely wounded soldiers during the Korean and Viet Nam Wars. His research stated that the term "Golden Hour" now

widely used by the emergency medical profession to determine probable outcomes of patients, originated from the experience of those treating severely injured soldiers. Pan saw the golden hour as the period of opportunity related to an injured person's long-term outlook. He concluded that the positive results for a patient primarily depended on the ability to quickly assess a victim's condition, remove the injured persons from the field, and rapidly deliver the individual to a properly equipped specialist. He looked at the golden hour as a standard for the medical profession to adopt and implement.

The *Eastside Fire & Rescue-Standards of Cover-2006* was commissioned by the EF&R Board of Directors through *Emergency Services Consulting, Inc.* (Emergency Services Consulting Inc., 2006) in 2006. The document addressed issues such as community risk, baseline performance objectives, station location, staffing patterns, workload, unit utilization, resource procurement, and strategic planning. The document did not speak to how core emergency scene operations will unfold or the time expected to initiate operations. The document focused on the expectation of the agency to arrive atthe scene with varying numbers of responders and apparatus for certain types of incidents.

The *Standards of Apprenticeship Agreement* was adopted by the *Joint Apprenticeship Training Committee* (JATC)-*Eastside Fire & Rescue* (Joint Apprenticeship Training Committee, 1996) in April of 1996. The program is approved and managed by the Washington State Apprenticeship and Training Council and registered with Washington State Labor and Industries as a means to certify proficiencies in firefighters. The State does not require fire departments to adopt the program which is offered to both career and volunteer organizations. As of January 2008, only 20 of more than 300 fire departments in the State had applied for and received recognition into the program.

A component of the JATC Program includes training to a standard set of emergency scene operations. The program does not evaluate crew performance, rather focusing on individual skills. None of task assignments outlined in the JATC standards has an assigned time for expected completion. The JATC Program can be modified to include a more holistic approach to the setting of standards by which the ability of a crew to perform an operation would be measured. Since the program is supervised and managed by the State, modifications of the current criteria require application and approval from the governing body of the JATC.

The Chief Officers of EF&R met in the summer of 2007 to begin a dialogue regarding the establishment of core emergency scene operations standards. Minutes of EF&R Chief's Officers June 21, 2007 Meeting Minutes (Eastside Fire & Rescue, 2007) indicated that there was general support for the establishment of standards. In attendance were Battalion Chief Tryon (B-Shift), Deputy Chief of Operations Griffin, Deputy Chief of Planning Collins, and Chief of Department Soptich. Battalion Chiefs McDaniel (A-Shift) and McMahan (C-Shift) were unable to attend. The work of that group lead to the identification of ten operations that the Chiefs desired to have standards developed for the department. All operations focused on fire ground related activities.

Michael Wieder (2000) writing for *Fire Protection Publications*, offered 11 evolutions for consideration in the training manual, *The Sourcebook for Fire Company Training Evolutions*. Wieder stresses that standards are not set to provide instruction on new skills, but to have crews demonstrate proficiencies on tasks they should have already mastered. He urged that local standards be aligned with those standards set by the NFPA whenever possible. Wieder recognized that in order for an agency to establish standards there is a need to limit variables, run tests several times, and have expectations for success clearly identified.

None of the operations suggested by Wieder have a time expectation assigned, though he recommends that one be identified according to local abilities and conditions. He emphasized safety as the primary and most important element in establishing standards, though he also recognized the purpose of the skill demonstration was to determine how long an operation would take to accomplish. Wieder recognized that in order for an agency to establish standards there is a need to limit variables, run tests several times, and have expectations for success clearly identified.

Question Number Two: "What core emergency scene operational standards exist in the industry which may be a model for EF&R to consider?"

The National Fire Protection Association (NFPA) offers recommendations for Authorities Having Jurisdiction (AHJ) to consider regarding core emergency scene operations. Recommendations contained in NFPA 1410, *Standard on Training for Initial Emergency Scene Operations* (National Fire Protection Association, 2000) speak specifically to emergency scene operations related to the delivery of water to the fire, and the setting of ladders. A total of 14 evolutions are outlined in NFPA 1410. The evolutions center on the acquisition of water from a hydrant or draft and then discharging the same to other engines, fire protection systems, attack lines, and monitors or aerials. Later versions of the standard expanded the scope of operations to include truck company evolutions focusing on ventilation, rescue, and forcible entry.

Prior to assigning a maximum completion time to each operation, the NFPA conducted extensive field testing as a means to validate the recommendations. The approach of the NFPA in formulating recommendations was not to take the best times recorded when testing against the standard, but to select those times reasonably achieved with best efforts of organization and training. Origins of NFPA 1410 date back to 1966 where delegates meeting in Chicago, Illinois,

first approved NFPA 197, adopting the *Standards on Initial Fire Attack* (National Fire Protection Association, 1966).

Numerous operations are identified as part of the NFPA 1410 recommendation with each even assigned a suggested time element as a completion target. Examples of some recommended core emergency scene operation standards include a forward hose lay using two engines, a reverse hose lay with one engine using a wye adapter, a drafting operation using two engines, and a portable water supply tank using one engine and one water supply apparatus. A recommendation related to an amount of time that should be allotted for each standard is assigned to each operation identified in NFPA 1410. Recommended times for the completion of these operations ranged from three and one half to six minutes.

Through legislative action in 2005, the State of Washington established a requirement for substantially career fire departments to annually report on various response related activities such as turn out time, time en route, arrival times for the first apparatus, arrival of specialized equipment, and arrival of a full alarm assignment. The law titled Washington House Bill (HB) 1756, *An Act Relating to the Occupational Safety and Health of Fire Department Employees* (Washington, 2005) addresses only the establishment and reporting of time elements related to the emergency response. Though the State identified which types of operations were to be measured and reported, each AHJ had the responsibility to establish its own timeframe in which to accomplish each operation.

The intent of Washington HB 1756 is to "…set the standards for addressing the occupational safety and health of substantially career fire department employees, and to specify performance measures applicable to response time objectives for certain major services." (p.1). As required by Washington HB 1756, the AHJ is required to inform the public of the established

standards for the community, and then report the outcomes annually. The legislation contains no recommendations for any of the reportable benchmarks, nor are recommendations provided for core emergency scene operation standards after a unit arrives at the scene.

The Washington State Survey and Rating Bureau (WSRB) is a privately held third party assessment group that looks at community fire risk in the State. The criteria for evaluating community fire risk is outlined in the publication *Public Protection Grading Process* (Washington Survey & Rating Bureau, 2002) as provided by the WSBR. The WSRB evaluates the fire protection and water supply of cities and fire protection districts to determine comparative public protection classifications for insurance rating purposes. The WSRB likewise evaluates the effectiveness of building code enforcement of cities and counties to determine comparative building code effectiveness grading classifications for insurance rating purposes.

Under WSRB criteria each community's and fire department's capabilities are evaluated in areas such as waster supply, communications, code enforcement, training, staffing, maintenance, and administration. The WSRB uses a grading scale to determine deficiencies in operations. The WSRB approach is nearly identical to that used by the Insurance Services Office (ISO) which provides the same service for much of the country. Once the WSRB performs the grading process, a rate is assigned to the community by which insurance premiums may be calculated.

The WSRB is not a standard setting organization though they evaluate the capabilities of a fire department to protect a community. The only area in which the WSRB has implemented a core emergency scene operation standard is in the publication *Tender Water Supply Credit* (Washington Survey & Rating Bureau, 2007). This standard allows a fire department to achieve a grade through the delivery of water using tenders/tankers which is near to that grade for water

delivered through fire hydrants. This standard outlines the number of people to be assembled, time allowed for set up and delivery of water, the number of gallons per minute (GPM) of water to be discharged, and the duration of the exercise. Success is achieved when water is supplied to the attack line within 10 minutes and the flow remains constant for 30 minutes. No other core emergency scene operation standard is outlined or evaluated by the WSRB.

The National Emergency Number Association (NENA) sets standards for the process to receive 911 calls to include the amount of time expected for the operation to be completed. The *NENA Call Answering Standard/Model Recommendation* (National Emergency Number Association, 2006) is a voluntary compliance document not intended to be a complete operational directive. Outlined in the recommendation are five primary functions or operations involved in receiving 911 calls. Determining the operational level of service, order of answering priority, answering protocol, information gathering, and call transfer are all listed as core element to processing emergency calls. Ninety percent of all 911 calls arriving at the Public Safety Answering Point (PSAP) are to be picked up within ten seconds during peak activity periods. Emergency calls during non-peak periods are to be answered within 20 seconds 95% of the time.

The *King County Emergency Medical Services (KCEMS) Division* of King County, WA. (King County Emergency Services Division, 2007) instituted a standard to determine within 60 seconds if a medical patient is critically compromised. The "Sick-Not Sick" rule is part of the Criteria Based Training (CBT) curriculum which all medical providers annually are required to demonstrate proficiency. All fire departments within King County have adopted the "Sick-Not Sick" standard. The "Sick-Not Sick" standard determines whether a patient will receive paramedic care rather than standard services provided by Emergency Medical Technicians (EMT's). The "Sick-Not Sick" determination is a rapid assessment tool that looks at the airway,

breathing, and circulation capabilities of the patient. Should any be viewed as life threatening, advanced life support protocols as provided by paramedics are implemented.

In February of 2008, the KCEMS Division, (King County Emergency Services Division, 2008) issued the *Aspirin for Acute Coronary Syndrome* memorandum that instituted a standard to deliver aspirin within the first two hours of chest pain onset. The program was determined to provide muscle and pain relief for those suffering heart attacks. All fire departments within King County must adopt this standard.

The KCEMS Division (King County Emergency Services Division, 2006) instituted a study in 2006 in an effort to establish a standard for defibrillation of patients with appropriate. The "Analyze Early" portion of the study assesses a patient's heart using an automated external defibrillator with the emphasis on determining whether the heart will respond to defibrillation. One half of the fire departments in King County were part of this study. The other departments continued to perform a required number of CPR cycles prior to analyzing the heart through the defibrillator. Under "Analyze Early" protocols the analysis of the heart is expected to be performed by firefighters within three cycles of CPR or about a minute after determining that CPR is the appropriate operation.

Michael Wieder (2000) writing for *Fire Protection Publications,* offered 11 evolutions for consideration. The majority of the evolutions are related to fire attack situations involving the advancement of attack lines and attaining water supplies, though he also suggests alternate operations such as automobile extrication, salvage evolutions, window rescues, and positive pressure ventilation be developed.

Question Number Three: "What core emergency scene operational standards have been adopted locally by other fire departments?"

Included in the *Company & Individual Performance and Evaluation/Article 11* policy of the Bellevue (WA) Fire Department (Bellevue Fire Department, 2001) are core emergency operational standards. All standards are strictly fire related. Reference to NFPA 1410 is given as the Department "…embraces the concepts presented in NFPA 1410, but does not use the specific evolutions mentioned in the standard. The timed evolutions utilized meet the spirit of NFPA 1410." (p.1).

Included in the *Hose Evolutions, Ground Ladders, Basic Methods and Pumping Procedures* drill manual of the Kent (WA) Fire Department (Kent Fire Department, 2006) are core emergency operation standards. The Department clarifies the intent of the procedures by stating, "There are our standard operating guidelines for fireground hose and ground ladder evolutions. Although firm in nature, these procedures are not meant to limit the resourcefulness of an engine company when solving fireground problems at the scene." (p.3). The Department identifies seven broad areas of operations each with several options within the operation. All standards are strictly fire based.

Included in the *Fire Department Hose Manual* of the Port of Seattle (WA) Fire Department (Port of Seattle Fire Department, 2005) are core emergency operational standards. The Port of Seattle Fire Department views the standards as guidelines rather than firm dictates. "These evolutions are a guideline for tactical hose and ladder operations on the fire ground. They are not intended to prevent Company Officers from using experience, creativity and common sense, to carry out their function during an emergency operation." (p.1). No specific ladder operations are identified in the document. All operations are strictly fire based.

Included in the Seattle (WA) Fire Department *Memorandum 63-07* (Seattle Fire Department, 2007) are core emergency operation standards. With one exception, that being the establishment of a rapid intervention group, there are no completion time expectations placed on a standard. In those cases, where no time element is assigned, the Department uses a system to evaluate overall firemanship and teamwork. Points are deducted from a maximum amount allowed when areas of compromise were found regarding safety, technical expertise, or failure to complete an evolution. A final score of excellent, above standard, standard, below standard, and not acceptable are given for each operation performed. All operations are strictly fire based.

Included in Renton (WA) Fire Department *Standard Operations Manual* (Renton Fire Department, 2006) are core emergency operation standards. No time element expectation was identified in the information provided. All operations are strictly fire based.

The North Highline Fire District's (North Highline Fire District, 2002) *Standards for Company Evolution's* contains core emergency operational standards. A time for completion is assigned for each standard. All operations are strictly fire based.

King County Fire District 40's (King County Fire District 40, 2006) *Hose Evolutions, Ground Ladders, Basic Methods and Pumping Procedures* drill manual contains core emergency operational standards. The department adopted the same standards as the Kent Fire Department. No time standard was identified in this document. All operations are strictly fire based.

Question Number Four: "What are the current times required to perform certain core emergency scene operations at EF&R?"

Eastside Fire & Rescue had not identified core emergency scene operations and therefore no time standard expectations exist in the Agency.

On June 21, 2007, during a meeting of the EF&R Chief Officers, the minutes of indicated

that Fire Chief Lee Soptich expressed his desire to move forward with the establishment of core emergency scene operational standards. (Eastside Fire & Rescue, 2007). In attendance at that meeting were Deputy Chiefs Griffin and Collins, and Battalion Chief Tryon. The minutes note that all in the meeting agreed to more forward with establishing standards.

On November 16, 2007, during a meeting of the EF&R Chief Officers, the minutes indicated that Fire Chief Lee Soptich asked those attending a series of questions related to core emergency scene operations (Eastside Fire & Rescue, 2007). He asked, "Do we know how long it takes to get water on a fire? Do we know how long it takes to get the aerial apparatus in service? Do we know how long it takes to ventilate a structure? Do we know how long it takes to set up the rescue tools during a motor vehicle accident?" Some had knowledge of actual crew performance, while others used their personal experience as an indicator. Chief McDaniel noted that the time would vary depending on the circumstances, while Chief Tryon noted that crew experience plays a large role in determining the length of time required. Chief Collins indicated that the time depended much on the leadership of the individual officer of each company. Chief Griffin believed that the time required depended on the level of Agency emphasis and educating of the crews as to the importance of goals. Chief Tryon believed that the primary value in standards would be realized at the company level. He did not agree with Chief Soptich that command officers would make more accurate tactical decisions at the scene once they had the knowledge of how long an operation would take to complete. The group provided suggestions on the number and type of operation standards to develop. Chief Tryon suggested that prior to establishing operational standards the Training Division should be contacted to determine what impact there may be on the JATC Program (pp.1-2).

Question Number Five: "What time standard should EF&R adopt for core emergency scene operations?"

Evans, Meyer and Rubinstein, (2001) writing for *APA Online* reported that the ability for a person to perform an operation in a timely manner depended on several key factors. They measured a person's speed of performance as a function of whether the successive tasks were familiar or unfamiliar, and whether the rules for performing these tasks were simple or complex. They noted that regardless of the task, time was lost when switching from one task to another. Simply switching tasks took time, but they also found time was lost depending on task complexity and people's were not very familiar with assignments.

The time taken to complete a task and the number of errors made in that process are the most classic ways of measuring task performance. This is what Perrin and Youngblut (2002) suggested through their research to be the most often used measurement of success or failure. They likewise found that a sterile environment as provided through common experiments often produced different results when compared to actual field settings. They also concluded that the more effort is dedicated to the primary task, the more performance on the secondary task will decrease. Their research was designed to demonstrate time and error measurements may not be the only criteria when considering the establishment of standards.

Braune, Colvin, Funk, Suroteguh, and Wilson (1999), while doing research funded by the U.S. Naval Weapons Center and National Aeronautics and Space Administration (NASA), found that task management was the key to peak performance. They created what they called the Cockpit Task Management System (CTMS) specifically designed to help aircraft pilots initiate, monitor, prioritize, and terminate tasks. They defined the CTMS and then developed methods to support the system.

Through the CTMS a "system" is an entity that can be described in terms of input, output, and state. In the case of the fire departments, state could be an officer, fire engine, ladder, or hose. A "goal" is a desired system or subsystem behavior which for the fire service may be seen as completing the mission safely or achieving a task in a prescribed period. A "function" is a process performed to achieve a goal such as taking a specific route to the emergency, or operating an aerial. A "task" is a function performed by a human, as opposed to a machine; in this case it would include turning a switch to activate lighting, or setting controls on a pump panel.

The CTMS includes the starting of new tasks, monitoring the status of on-going tasks, and continuous re-prioritizing of important assignments, environmental conditions, urgency, and other factors. In addition, the CTMS recognizes the need for the pilot to allocate available human resources to high priority task, address interruptions, or react to unplanned events. Monitoring subsequent resumption of lower priority tasks, and the termination of tasks that are completed or no longer relevant, round out the CTM process. The creators of CTMS suggest that advances in technology do not always lead to a reduction in accidents or the required number of steps to complete an operation. The CTMS research caused a review of several standards within the military and the time required to perform the same.

There are several traditional approaches to determine a number that may be assigned to a particular standard. According to Ryan Stokes (2008), a Senior Audit Manager with the Grant Thorton LLP Seattle office, the "mean" is achieved by adding all of the quantities together and dividing the result by the number of quantities. Another name for the mean is "average." To determine the "median" all numbers are listed in correct order, including all doubles. Then find the middle number. If there is an odd amount of numbers, the medium is the middle number. If

there is an even amount the medium is found by adding the middle two numbers and dividing by two. The resulting number is the medium. The "mode" is determined by listing all numbers in order; the mode is that number which appears the most times. There can be more than one mode provided they are listed the same amount of times. "Range" is the distance between the lowest and highest number. It's found by subtracting the lowest from the highest number. Stokes suggested that whether evaluating a process or auditing for compliance, care is required to make sure that the measurement used will provide the information needed to analyze and report what is truly happening.

How time is measured within an industry is critical according to Jack Stout (1987) who performed studies involving emergency service providers in multiple cities across the United States. He found that time consistencies must be sought for comparative purposes and to understand the entire service delivery picture. He believed that when simple averages are used, many fail to remember that the number represents half of the people are considered within acceptable limits, while the other half are somewhere outside the desired standard or goal. Stout indicated that when setting the standard we should be looking for the abilities of the majority. He felt that fractile measuring was a more accurate indication of what is actually happening in regards to all aspects of delivery periods.

PROCEDURES

This ARP utilized the Descriptive Research Method to recommend a course of action regarding the establishment of core emergency scene operation standards. The process to design the project, attain information, organize, consider, interpret information, and make recommendation involved many steps.

The process began by developing a survey to determine what other entities have done in

regard to the establishment of core emergency scene operation standards. Conducting focus and planning meetings, performing internal tests to evaluate crew abilities, along with determining the best method to circulate the survey, and establishing timelines for completion was a critical aspect of this first step. Circulating the survey, receiving feedback, clarifying information, requesting policies where appropriate, and plotting data tables followed survey development.

The next process entailed the reviewing of data received and the compiling of what was considered to be useful information, and constructing tables. Combining the research and survey data to provide discussion opportunities was next in the ARP development process. Formulating and drafting recommendations concluded the procedural part of this ARP.

Prior to survey development a literature search was conducted including a review of industry and non-industry journals, periodicals, news articles, and magazines. The King County Libraries located in Carnation and Issaquah, Washington, were visited in an effort to obtain research material. The Learning Resource Center (LRC) at the National Fire Academy (NFA) in Emmitsburg, Maryland, was visited as well in an effort to obtain research material.

"Standards," "evaluations," "criteria," "evolutions," "core," "measurement," and "operation" with various combinations of each were submitted as Internet search terms through the LRC and/or "Google" search options. This exercise provided hundreds of "hits" with a small fraction of usable information being obtained by this process.

Agency policies and other internal documents were obtained through the Agency intranet. Information related to the NFPA, State of Washington, KCEMS, E-911, and other standard proposing entities was either gather from the Internet or from written material managed by the EF&R Training Division.

Documents that have been adopted by other fire, medical, and rescue service providers within King County, Washington, were obtained from those agencies via fax, mail, email, or in person.

On June 21, 2007, the Chief Officers from EF&R met to discuss the concept and need of establishing core emergency scene operation standards. In attendance were Battalion Chief Tryon (B-Shirt), Deputy Chief of Operations Griffin, Deputy Chief of Planning Collins, and Chief of Department Soptich. Battalion Chiefs McDaniel (A-Shift) and McMahan (C-Shift) were unable to attend. (Eastside Fire & Rescue, 2007).

A survey (Appendix A) of the King County Fire Chiefs on August 15, 2007, sought information related to the number of departments that have adopted core emergency scene operation standards. The survey was transmitted via the Internet using the King County Fire Chiefs Association web site. The chiefs in King County were asked: (a) "Does your agency have established/written core emergency scene operation standards?" (b) "If so, what core emergency scene operation standards have been adopted by your agency?" (c) "If so, which core emergency scene operation standards include a time element?"

The survey sought a response from the chiefs by September 7, 2007. Those who did not respond within the allotted time were emailed the original request a second time on September 18, 2007, through a direct email to the address of each fire chief in the County. Attempts by phone were made to those who did not respond via the Internet during the week of October 1, 2007.

The survey of the King County Fire Chiefs was designed to better understand what standards exist locally and if there was consistency among departments in the region. Information made available may also provide insights into how each agency approached the

setting of standards and what process was in place to determine if the standards are achieving desired outcomes. Through knowledge gained regarding the practices of other agencies, EF&R may determine to include certain standards for adoption.

The analysis of this information could reveal inconsistencies between adjoining or dependant jurisdictions. The information gained could help EF&R avoid some mistakes, or perhaps move the planning process along at a quicker pace. More importantly, however, would be the opportunity to influence the adoption of EF&R standards designed to bring about consistency among crews and realistic expectations for Command Officers.

On November 16, 2007, the EF&R Chief Officers provided suggestions regarding the type and number of standards to be implemented. (Eastside Fire & Rescue, 2007).

On January 17, 2008, the Training Division lead by Captain Ducey and Lieutenant Geppert was contacted by Fire Chief Soptich who directed them to conduct a search to determine what core emergency operation standards existed at EF&R and how those standards aligned with the JATC Program. (Appendix B).

On February 3, 2008, the *Standards Meeting* minutes indicate all EF&R Chief Officers and the Training Division staff were assembled to finalize which core emergency scene operation standards would be established, how each standard would be established, and which standards would align with the JATC Program criteria. Over the next week of the Training Division drafted 10 core emergency scene operation standards which were approved by the Chief Officers. (Eastside Fire & Rescue, 2008).

On February 14, 2008, the Company officers (27 in all) received assignments to run time trials for core emergency scene operation standards via the Agency's Notice process. All career companies (27) would participate in the trials. (Appendix C).

A total of 10 core emergency scene operations would be established with Stations 71, 72, 78, 81, 82, 83, 85, and 87 each assigned one operation to perform. Station 73 would perform two operational tests as that station housed the 95' aerial apparatus. Each company was directed to perform its assigned operation a minimum of three times, and record the time required for each operation. (Appendix D).

The Chief Officers and Training Division determined that with a minimum of nine date sets to review (three shifts performing the same operation three times each) there would be enough information to allow a recommendation to be made on how long an operation should take to achieve. Trail results as attained by the Company Officers were to be forwarded to the Training Division prior to February 29, 2008. Results of the time trials were tabulated and provided for the Chief Officers and Training Division staff for review and comment. Several models were developed for the group to consider. In attendance at that meeting on March 17, 2008, were Captain Ducey, Deputy Chief's Collins and Griffin, Battalion Chief Tryon, and Chief of Department Soptich.

Some limitations were encountered. Some agencies had changes in leadership making the King County Fire Chiefs' roster inaccurate. Some email addresses and phone numbers were incorrect or deleted. Some Chiefs were not clear if their agency had standards and if so some did not know the standards that were adopted. Some Chiefs indicated that their agency had core emergency scene operation standards but were not able to locate the documents requested.

Some requests for information were not answered which limits the amount of data available for review. This limited or unavailable information may diminish EF&R's ability to develop a comprehensive standard for core emergency scene operations.

There is no common approach by local government agencies in regard to the

establishment of core emergency scene operation standards which makes an "apples to apples" comparison of programs somewhat ineffective. This lack of content consistency did not allow for establishing benchmarks among jurisdictions. Greater content consistency could have aided in helping EF&R to establish a proven process.

The survey seeking information from the King County Fire Chiefs (Appendix A) included only one example of a possible core emergency scene operation standard. The provision of a single example which was strictly fire related may have inadvertently biased the survey thereby excluding medical, rescue, or other operations, and thus limiting survey results.

The core emergency scene operation assignments given to each station were intentionally void of many details with the intention that the crew could use the maximum amount of latitude in performing the evolution. Likewise, it was determined that the normally assigned officer and/or crew needed to be on duty when the evolution was performed. The lack of details in the assignments and the "crew of the day" approach may cause variances in test results.

The inability to provide one evaluator to oversee all 90 evolutions that were to be performed by the nine companies may limit the reliability of the data collected.

Definition of terms:

- Standard-"Something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality, or the fineness and legally fixed weight of the metal used in coins, or the basis of value in a monetary system, or a structure built for or serving as a base of support"(http://www.merriam-webster.com/dictionary/standard).
- Core-"A basic, essential, or enduring part (as of an individual, a class, or an entity), or the essential meaning, or the inmost or most intimate part"

(http://www.merriam-webster.com/dictionary/core).

- Operation-"Performance of practical work or of something involving the practical application of principles or processes" (http://www.merriam-webster.com/dictionary/operation).
- Evolution-"One of a set of prescribed movements, or the process of working out, or developing a process of continuous change from a lower, simpler, or worse to a higher, more complex, or better state" (http://www.merriam-webster.com/dictionary/evolutions).
- Golden Hour-"The first 60 minutes of intensive care during which it is possible to save the life of an injured or traumatized person"(http://www.erlanger.org/services/Emergency/lifeforce_golden.asp).
- Standard of Cover-"Those adopted written policies and procedures that determine distribution, concentration, and reliability of fixed and mobile response forces for fire, emergency medical services, hazardous materials, and other technical responses" (Eastside Fire & Rescue-Standards of Cover-June 2006.p.1).

RESULTS

The five research questions designed to generate needed information were: (1) Which core emergency scene operational standards should be considered at EF&R? (2) What core emergency scene operational standards exist in the industry which may be a model for EF&R to consider? (3) What core emergency scene operational standards have been adopted locally by other fire departments? (4) What are the current times required to perform certain core emergency scene operations at EF&R? (5) What time standard should EF&R adopt for core emergency scene operations? Information gained through the Descriptive Method of research,

combined with the survey and operational field tests, provided substantial insights and data for each of the questions posed.

Research attained related to question one, "Which core emergency scene operational standards should be considered at EF&R?" indicated that there is a wide variety of areas to consider. Survey results (Table 1) indicated that a minority (seven of thirty-three) of fire departments in the County had adopted core emergency scene operation standards. Only Bellevue, Kent, Port of Seattle, Seattle, Renton, King County Fire District 40, and North Highline fire departments had standards for EF&R to consider.

Jeffrey Saver (2005) determined a brain that is deprived oxygen for more than six minutes would most likely suffer irreversible damage. While he noted that strokes are highly treatable, the chances of positive outcomes rapidly decrease if there is not timely intervention by medical professionals. Saver emphasized rapid recognition, rapid assessment, access to critical care, and proper treatment as the best means to limit damage caused by stroke.

Research by the American Heart Association (American Heart Association, 2006) concluded that where cardio pulmonary resuscitation (CPR) training of citizens is widely provided and received, combined with a rapid service delivery system, the save rate of those suffering a heart attack is in excess of 30%. The AHA found that early CPR and defibrillation (within three to five minutes) plus early advanced care may result in a greater than 50% or higher long-term survival rate for those who had a witnessed heart attack. The AHA recommends that methods to provide life-sustaining oxygen along with defibrillation must occur within four to six minutes in order to optimize the survivability of a patient.

Darrell Pan (1998) saw the golden hour as the period of opportunity related to an injured persons long-term outlook. He concluded that the positive results for a patient primarily depended on the ability to quickly assess a victim's condition, remove the injured persons from the field, and rapidly deliver the individual to a properly equipped specialist. He looked at the golden hour as a standard for the medical profession to adopt and implement.

The *Eastside Fire & Rescue-Standards of Cover-2006* (Emergency Services Consulting Inc., 2006) did not speak to how core emergency scene operations will unfold or the time expected to initiate operations. The document focused on the expectation of the agency to arrive at the scene with varying numbers of responders and apparatus for certain types of incidents.

The *Standards of Apprenticeship Agreement* (Joint Apprenticeship Training Committee, 1996) does not require fire departments to adopt the Washington State program which is offered to both career and volunteer organizations. The program does not evaluate crew performance, rather focusing on individual skills. None of task assignments outlined in the JATC standards has an assigned time for expected completion.

The Chief Officers of EF&R met in the summer of 2007 to begin a dialogue regarding the establishment of core emergency scene operations standards. Minutes of EF&R Chief's Officers Meeting (Eastside Fire & Rescue, 2007) indicated that there was general support for the establishment of standards. The work of that group eventually lead to the identification of ten core emergency operational standards operation standards to be developed for the department. All operations focused on fire ground related activities.

Wieder (2000) stresses that standards are not set to demonstrate proficiencies on tasks crews should already master. He urged that local standards be aligned with those standards set by the NFPA whenever possible. Wider notes there is a need to limit variables, run tests several

times, and have expectations for success clearly identified before adopting standards. He recommends that completion times be identified according to local abilities and conditions. Wieder indicated there is a need to limit variables, run tests several times, and have expectations for success clearly identified, before adopting standards.

Question number two, "What core emergency scene operational standards exist in the industry which may be a model for EF&R to consider?" was not pursued as part of the survey questionnaire. However, the literature reviewed did provide several findings.

Recommendations contained in NFPA 1410, *Standard on Training for Initial Emergency Scene Operations* (National Fire Protection Association, 2000) speak specifically to emergency scene operations related to the delivery of water to the fire, and the setting of ladders. The evolutions center on the acquisition of water from a hydrant or draft and then discharging the same to other engines, fire protection systems, attack lines, and monitors or aerials. Later versions of the standard expanded the scope of operations to include truck company evolutions focusing on ventilation, rescue, and forcible entry. Prior to assigning a maximum completion time to each operation, the NFPA conducted extensive field testing as a means to validate the recommendations. The approach of the NFPA in formulating recommendations was not to take the best times recorded when testing against the standard, but to select those times reasonably achieved with best efforts of organization and training.

Examples of some recommended core emergency scene operational standards include a forward hose lay using two engines, a reverse hose lay with one engine using a wye adapter, a drafting operation using two engines, and a portable water supply tank using one engine and one water supply apparatus. A recommendation related to an amount of time that should be allotted for each standard was assigned to each operation and ranged from three and one half to six

minutes.

The law titled Washington House Bill (HB)1756, *An Act Relating to the Occupational Safety and Health of Fire Department Employees* (Washington, 2005) addresses only the establishment and reporting of time elements related to the emergency response. Though the State identified which types of operations were to be measured and reported, each AHJ had the responsibility to establish its own timeframe in which to accomplish each operation. The legislation contains no recommendations for any of the reportable benchmarks, nor are recommendations provided for core emergency scene operation standards after a unit arrives at the scene.

The WSBR (Washington Survey & Rating Bureau, 2002), a privately held third party assessment group that looks at community fire risk in Washington State, evaluates the fire protection and water supply of cities and fire protection districts to determine comparative public protection classifications for insurance rating purposes. Under WSRB criteria each community's and fire department's capabilities are evaluated in areas such as water supply, communications, code enforcement, training, staffing, maintenance, and administration.

The only area in which the WSRB (Washington Survey & Rating Bureau, 2007) has implemented a core emergency scene operation standard is through the delivery of water using tenders/tankers. This standard outlines the number of people to be assembled, time allowed for set up and delivery of water, the number of gallons per minute (GPM) of water to be discharged, and the duration of the exercise. Success is achieved when water is supplied to the attack line within 10 minutes and the flow remains constant for 30 minutes.

The NENA (National Emergency Number Association, 2006) sets standards for the process to receive 911 calls to include the amount of time expected for the operation to be

completed. Determining the operational level of service, order of answering priority, answering protocol, information gathering, and call transfer are all listed as core elements to processing emergency calls. Ninety percent of all 911 calls arriving at the PSAP are to be picked up within ten seconds during peak activity periods. Emergency calls during non-peak periods are to be answered with 20 seconds 94% of the time.

The KCEMS Division (King County Emergency Medical Services Division, 2007) instituted a standard to determine within 60 seconds if a medical patient is critically compromised. The "Sick-Not-Sick" rule determination is a rapid assessment tool that looks at the airway, breathing, and circulation capabilities of the patient. Should any be viewed as life threatening, advanced life support protocols as provided by paramedics are implemented.

The KCEMS Division (King County Emergency Medical Services Division, 2008) instituted a standard to deliver aspirin within the first two hours of chest pain onset. All fire departments within King County, Washington, must adopt this standard.

The KCEMS Division (King County Emergency Medical Services Division, 2006) instituted the "Analyze Early" program with the emphasis on rapidly determining whether the heart will respond to external defibrillation. Under "Analyze Early" protocols the analysis of the heart is expected to be performed by firefighters within three cycles of CPR or about a minute after determining that CPR is the appropriate operations.

Michael Wieder (2000) suggests alternate operations such as automobile extrication, salvage evolutions, window rescues, and positive pressure ventilation be developed. He did not focus solely on fire attack and/or water supply operations.

In reference to question three, "What core emergency scene operational standards have been adopted locally by other fire departments?," research yielded the following:

There are 33 fire departments in King County, 26 of which responded to the survey representing a return rate of 79%.

1) Of the 26 responding fire departments in King County, seven (26%) had adopted core emergency scene operation standards. 2) Three (11%) had a time expectation assigned to one or more of the operations. (Table 1). 3) The seven departments with standards (100%) forwarded copies of their document(s) for review. All departments had performed in-house testing to validate their standard. Three person companies where used to perform operations in all cases. The Bellevue Fire Department also set a companion standard using five persons on a company.

The Bellevue Fire Department (Bellevue Fire Department, 2001) has eight core emergency scene operational standards all with time elements assigned. The complete list includes:

1. Forward Lay/1-3/4" Line to Fire (2:50) 3 Members

2. Forward Lay/Standpipe Skidload (4:50) 3 Members (4:10) 5 Members

3. Forward Lay/Sprinkler Supply (5:23) 3 Members (4:00) 5 Members

4. 1-3/4" Line to Fire/Shoulder Flake Supply (5:25) 3 Members (4:00) Members

5. 1-3/4" Manifold 4:30 3 Members (3:39) 5 Members

6. Skidload Manifold (4:30) 3 Members (3:39) 5 Members

7. Forward Lay/Dryline Up A Ladder (4:35) 3 Members (2:40) 5 Members

8. Forward Lay/Charged Line Up A Ladder (4:20) 3 Members (4:10) 5 Members

The Kent Fire Department (Ken Fire Department, 2006) has seven core emergency scene operational standards. No time expectations for completion were provided. The complete list includes:

1. Forward Lay Evolutions

2. Reverse Lay Evolutions
3. Engine Attack Operations
4. Residential Ventilation Operations
5. Standpipe Operations
6. Sprinkler Operations
7. Ground Ladder Operations

The Port of Seattle Fire Department (Port of Seattle Fire Department, 2005) has 11 core emergency scene operational standards. No time expectations for completion were provided. The complete list includes:

1. Pre-connect booster tank
2. Pre-connect with AFFF foam
3. 1-3/4 extend operation, with a 150' 1-3/4 bundle
4. 2-1/2 pre-connect attack
5. 2-1/2 extend operation, with 2-1/2 x 100' bundle
6. 2-1/2 extend operation, with 1-3/4 bundle
7. 2 1/2 wye extended with a 1-3/4 bundle
8. Standard hydrant using large diameter hose
9. Forward lay operations
10. Forward lay and extend with a manifold
11. Reverse lay operations

The Seattle Fire Department (Seattle Fire Department, 2007) has 16 core emergency scene operational standards. Of the standards listed only one operation (RIG) includes a time objective for evolutions. The complete list includes:

1. 2-1/2 tri-gated wye forward supply
2. Monitor with supply
3. 2-1/2 pre-connect attack
4. Foam reverse
5. Standpipe manifold
6. Fire boat manifold
7. Fire boat hand line under pier
8. Fire boat dock monitor operations
9. Fire boat salvage operations
10. Fire boat supply to beach
11. Ladder company aerial rescue using stokes
12. Ladder company rescue air bags operations
13. Ladder company vertical ventilation
14. Engine company gross decontamination corridor
15. Ladder pipe operation for emergency egress
16. Rapid Intervention Group (RIG) operations (10 minutes)

The Renton Fire Department (Renton Fire Department, 2006) has 15 core emergency scene operational standards. No time expectation for completion was provided. The complete list includes:

1. Ground ladders
2. Drafting
3. Placing aerial apparatus in service
4. Forward lay with 1-¾ or 2-½ pre-connect

5. Forward Lay-blind alley with 1-¾ or 2-½ pre-connect
6. Forward lay-sprinkler connection
7. Supply the ladder-reverse lay
8. Sprinkler reverse
9. Tank water with 1-¾ or 2-½ pre-connect
10. Tank water with transitional attack
11. Rapid intervention crew
12. Fire scene rehabilitation
13. Mass causality incident
14. Hazardous material operations
15. Water rescue operations

King County Fire District 40 (King County Fire District 40, 2006) adopted the same standards as those of the Kent Fire Department. Likewise, no time expectation was identified in the standards.

The North Highline Fire District (North Highline Fire District, 2002) has eight core emergency scene operational standards. The standards include a time objective (though not provided by the agency) for each evolution. The complete list includes:

1. 1-3/4 pre-connect attack with forward supply
2. Double header reverse supply to 1st in engine
3. Monitor attack with forward supply
4. 2-1/2 wye to 1-3/4 with forward supply
5. Sprinkler connect from forward supply
6. 1-3/4 attack from booster tank

7. Standpipe connect from reverse supply

8. Forward supply to aerial

Question four asks "What are the current times required to perform certain core emergency scene operations at EF&R?"

The Agency had not identified core emergency scene operations during the period when the literature review was conducted.

Ten core emergency scene operations were identified by the Agency on November 16, 2007, Chief Officers Meeting (Eastside Fire & Rescue, 2007). Each operation required a station comprised of three different companies to perform the operation a minimum of three times. Time trials were performed during the months of February and March of 2008. The results of these trials are included in Table 2 and are summarized as follows:

The fold a tank operation times as conducted by crews at Station 71 ranged from 3:22 to 8:00 minutes to complete.

The 5" manifold reverse operation times as conducted by Station 72 crews ranged from 6:10 to 8:38 minutes to complete.

The roof ventilation operation times as conducted by Station 73 crews ranged from 4:20 to 7:07 minutes to complete.

The elevated master stream operation times as conducted by Station 73 ranged from 5:15 to 7:56 minutes to complete.

The 1.75" pre-connect attack w/supply operation times as conducted by Station 78 crews ranged from 3:10 to 3:37 minutes to complete.

The 2.5" pre-connect attack w/supply operation times as conducted by Station crews 81 ranged from 3:45 to 4:30 minutes to complete.

The ground ladder second floor operation times as conducted by Station 82 crews ranged from 2:15 to 3:10 minutes to complete.

The 2.5" supply Y to 1.75" attack w/supply operation times as conducted by Station 83 crews ranged from 3:45 to 5:15 minutes to complete.

The 50' boom-elevated stream w/supply operation times as conducted by Station 85 crews ranged from 1:47 to 4:46 minutes to complete.

The set up rescue tool(s) operation times as conducted by Station 87 crews ranged from 1:06 to 3:32 minutes to complete.

Question number five "What time standard should EF&R adopt for core emergency scene operations?" provided the following information.

Evans, Meyer and Rubinstein, (2002) measured a person's speed of performance as a function of whether the successive tasks were familiar or unfamiliar, and whether the rules for performing these tasks were simple or complex. They noted that regardless of the tasks, time was lost when switching from one task to another. Simply switching tasks took time, but they also found time was lost depending on task complexity and people's familiarity with assignments.

Perrin and Youngblut (2002) suggested the time taken to complete a task and the number of errors made in that process are the most classic ways of measuring task performance. They found a sterile environment as provided through common experiments often produced different results when compared to actual field settings. They also concluded that the more effort is dedicated to the primary task, the more performance on the secondary task will decrease.

Braune, Colvin, Funk, Suroteguh, and Wilson (1999) found that task management was the key to perk performance. As the creators of CTMS they suggest advances in technology do not always lead to a reduction in accidents or the required number of steps to complete an operation.

There are several traditional approaches to determine a number that may be assigned to a particular standard. Ryan Stokes (2008) suggested that whether evaluating a process or auditing for compliance, care is required to make sure that the measurement used will provide the information needed to analyze and report what is truly happening.

Jack Stout (1987) found that time consistencies must be sought for comparative purposes and to understand the entire service delivery picture. He suggested simple averages are often misleading, and indicated that when setting the standard we should be looking for the abilities of the majority. He felt that fractal measuring was a more accurate indicator of what is actually happening in regards to all aspects delivery periods.

Survey results lead to the development of six calculations that provided various views of the data forwarded by company officers to the Training Division. Table 3 stated the average time required for each operation. Table 4 stated the "mid in range" value for each operation. Table 5 stated where the smallest differences between two numbers occurred. Table 6 presented the most often occurring number of each operation. Table 7 illustrated the middle number in each set. Table 8 calculated the average after removing the lowest and the highest number. Table 9 displayed the outcomes of the six calculation methods. Table 10 identified the lowest number for each operation from the various proposed calculation methods.

DISCUSSION

Based on the belief that an entity will rise or fall to the expectations set by the leadership, the author of this ARP was looking for best industry practices regarding core emergency scene operation standards. The desired outcome of this ARP would lead us to concepts, approaches, and existing emergency operations that would assist EF&R in creating a process for the establishment of core standards.

An assumption was made that standards existed which would provide a template for EF&R to follow. This proved to be true, though the information provided was not in the quantity that was expected, and few fire departments have ventured outside the traditional fire attack and water supply type operational standards.

Based on the research incorporated in this ARP, the theory that EF&R was in the minority by not having core emergency scene operation standards did not prove to be valid. Likewise the assumption that those fire departments with standards would also include a time expectation for completion did not prove correct.

Question Number 1: "Which core emergency scene operational standards should be considered at EF&R?"

Time does matter. Saver (2005) did not necessarily provide new information when speaking about the importance of early recognition and intervention of stroke patients. His most important contribution may be in raising awareness that stroke victims can have positive outcomes, which may change the way in which responders react to such patients. The AHA (American Heart Association, 2006) continues to concentrate its research on training, research, and recommendations to reduce the number of heart attacks. Its message of rapid response combined with the ability to provide defibrillation to heart attack victims should cause service

providers to address the need for core emergency scene operational standards that are not strictly fire based, but also include medical and related incidents.

Pan (1998) was looking at the broader picture in his assessment of final patient outcomes. The "Golden Hour" starts with the time element and then attempts to cram in the operations that will allow for a positive patient outcome. Certainly the tasks that are required to meet the one hour goal will determine the ability to meet the time standard. The ability to establish a standard when time is the primary goal may be unrealistic, since the number of tasks involved may exceed the equipment and staffing capabilities of the response package. Each response requires time to react, time to travel, time to set up for operations, all taking precious minutes off the clock. Once the ability to gain access to a patient, treat the patient, arrange for transportation, and transport the person, it is no wonder time often runs out for the injured victim.

When EF&R adopted their Standards of Cover (Emergency Services Consulting Inc., 2006) the emphasis was squarely on arriving, and with no expressed written expectation of being able to mitigate the situation found. Looking only at getting to the scene and then letting the event evolve without expectations should cause concern for agencies looking to adopt standards.

The JATC Program (Joint Apprenticeship Training Committee, 1996) focused only on the individual skill level and not that of a company or companies. The ability of the Agency to expand the scope to include operations involving a crew is possible, though not the focus of the program. Aligning core operations to JATC objectives gives purpose and validity to the program. While individual skill is the backbone of service delivery, the heart of an agency's capability is when the crew acts as one.

When the EF&R Chief Officers (Eastside Fire & Rescue, 2007) met to consider the need for standards, the focus was on the fire scene operations. This may have been the appropriate

approach given that this would be the first effort to establish core emergency scene operational standards, and most likely the easiest way to get the buy-in needed from all levels of the Agency. With fire related events constituting the minority number of incidents in fire departments, perhaps initiating standards involving medical, rescue, or other services, would have been equally embraced.

Wieder (2000) took another approach to setting standards emphasizing the need to look at skills known rather than teaching to meet a standard. He advised fire departments to run multiple tests, have clear expectations, and look for ways to limit testing inconsistencies. His views were well aligned with those of the NFPA in regard to how to set standards. He was bolder to suggest that standard setting is not all about fire attack and water supply, suggesting operations that went beyond the command and control measures.

Clearly there are several aspects and approaches to setting core emergency operation standards. All the material reviewed lead to the importance of careful planning in order to identify and set expectations. As the Agency provides services other than strictly fire related, there need to be a recognition and effort made to expand the scope of core emergencies in which to provide measurements.

Question Number Two: "What core emergency scene operational standards exist in the industry which may be a model for EF&R to consider?"

The National Fire Protection Association (2000), as the agency name would suggest, appears to be fixed primarily on fire related standards, especially when a time expectation for completion is offered. Their approach of refraining from taking "best times" as the standard, and looking more to selecting a measurement that is agency specific, taking into consideration local capabilities and conditions, is a refreshing notion. That said, the amount of testing that was

performed and the number of agencies involved to create their recommendations for standard types and times cannot be ignored when looking to establish what is right for a local jurisdiction.

Washington HB 1756 (Washington, 2005) pushed the fire service industry in the State to set standards, but addressed only getting to the emergency, and not the activities to follow. The legislation does not appear to be driving the fire service to setting core emergency operational standards. One could speculate that HB 1756 was a band aid approach to the matter of setting expectations. If so, these expectations may be a direct result of standards that may have been imposed by the Federal government or other recommendation producing entity. A combination of the NFPA approach of setting operational standards after the arrival of emergency services, along with the State's approach of requiring substantially career departments to declare expectations about arrival times would be reasonable and complementary of both, essentially completing the package.

The WSRB (Washington State Survey & Rating Bureau, 2002) grades fire department and community abilities, yet with one exception does not have or has not taken the position to impose standards. This "I won't make you do it, but I will punish you if you don't" technique puts the fire industry and the WSRB at odds and trust suffers. The opportunity for collaboration between the fire service and the WSRB would appear ripe, with the property owner being the overall winner. Of all that could be measured, it seems odd that something unique and not universally needed in rural and city fire departments, this tanker/tender operation was selected to me measured. As with the one case where a tanker/tender operation is expected to be completed within 30 minutes, there seems to be the means to set other realistic and achievable targets.

The EMS Division of King County has taken the pro-active role of setting standards. This would most likely be an affront to some fire departments. The "sick-not-sick" (King, 2007)

goal is much like the "golden hour" determination, though the operation requires only assessment of the patient. That seemingly simple operation may have as much potential for leading into the setting of other standards, as the good it would do immediately for the patient. The KCEMS Division (King County Emergency Services Division, 2006) is inclined to experimentation as is the case with the "analyze early" trials. The attitude of trying new processes signals to fire departments that the EMS Division is leading the continuous improvement movement, rather than becoming a follower. Finally, the simple operation involving administration of aspirin (King County Emergency Services Division, 2008) as a treatment for chest pain would seem simplistic to the uniformed. Aside from the medical benefit, the delivery system and people that work within it are increasingly immersed in a culture of experimentation that relies on testing, measuring, reporting, and analyzing.

The development of non-conventional core emergency scene operational standards such as automobile extrication, salvage evolutions, window rescues, and positive pressure ventilation was suggested by Michael Wieder (2000). He included traditional fire based operations, but was bold enough to float the notion that there were other important operations as well. The results of this review found Wieder as the more inclusive thinker when looking at the total service delivery system.

Eastside Fire & Rescue can take the approach of waiting for standards to be imposed or create its own expectations. The Agency may need to start with traditional fire based operations, but should not be satisfied with limiting the measuring to that single area of service delivery. An environment that welcomes looking at a wide range of potential operational standards and investing in the time to create expectations for each service delivered will only grow stronger. Failure related to core emergency operational standards will not be determined by making

mistakes in the process of selection and testing, but rather will come if the initiative is dropped or allowed to be diminished in importance.

Question Number Three: "What core emergency scene operational standards have been adopted locally by other fire departments?"

Of the 33 fire departments in King County, only seven had core emergency scene operation standards. (Table 1). The Bellevue Fire Department (Bellevue Fire Department, 2001) and the North Highline Fire District (North Highline Fire District, 2002) had eight similar core emergency scene operational standards. The departments went further by assigning time expectations.

The Kent Fire Department (Kent Fire Department, 2006) and King County Fire District 40 (King County Fire District 40, 2006) have seven identical core operations, while the Port of Seattle Fire Department (Port of Seattle Fire Department, 2005) has 11 operational standards. No time elements are assigned to these operations.

The Renton Fire Department (Renton Fire Department, 2006) has 15 core emergency scene operational standards, none with identified time expectations. Renton went beyond traditional fire based operations to include water rescue, haz-mat operations, mass casualty management, a rapid intervention team, and emergency scene rehabilitation. Establishing a draft operation was also listed by Renton.

The Seattle Fire Department (Seattle Fire Department, 2007) with 16 core emergency scene operational standards, listed only one operation (RIG) with a time objective for evolutions. They included several operations that included a fire boat as a delivery platform.

With the exception of Kent and Fire District 40, there did not appear to be collaboration between agencies in the establishment of operational standards. Being neighbors, Kent and Fire

District 40 were forward thinking and developed identical standards. Bellevue identified NFPA as a referenced document prior to the establishment of its standards. Bellevue did not adopt the NFPA recommendations, yet made clear of its intent to align with the recommendations. Bellevue, Kent, Fire District 40 and the Port of Seattle emphasized intent and purpose statements that indicated that the standards should be viewed more as goals and would not detract from the officers ability to exercise flexibility at an emergency scene. This qualifier is a powerful motivator to reduce fear in the minds of decision makers and would serve as a means to invite and solidify stakeholders in helping to develop expectations. Few agencies went outside the traditional confines of the fire based operations. Interesting to note was that Seattle chose to set a time expectation only for the operation (RIG) designed to rescue trapped firefighters, while all other operations were assessed on ability to avoid mistakes or cause safety errors. It may be that this calling out of one specific operation to assign a time expectation was caused by outside influences, or the agency identified this as the only operation needed to have a different method to measure success.

An agency's core emergency scene operational standards just don't happen. At some point there must have been a motivating factor to not only establish standards, but also to determine where the best efforts would be put. Eastside Fire & Rescue shares many of the common operations as those departments that have already established their expectations. Likewise, EF&R shares common boundaries with Bellevue and Renton, both with an adopted standards which EF&R should know. Bellevue and Renton should know EF&R's as well. In any case, the County becomes a small place when the collective resources are needed to mitigate a large event in a single community, and knowing what others expect is useful knowledge.

In the collective bucket of core operations offered by the seven departments with standards, predominate are those tied to fire operations. Here we have a few local departments that recognize there is more to the work than fighting fires; this should be a lesson for others to learn, adapt, and adopt.

Question Number Four: "What are the current times required to perform certain core emergency scene operations at EF&R?"

A total of 90 tests were conducted involving 10 evolutions. (Table 2) Every EF&R engine and ladder company was involved in the testing. In some cases the crew times were relatively close. This was the case in simple evolutions such as a pre-connect attack with supply, or setting a ladder for various second floor evolutions. In these operations, less than a minute separated the three companies performing a total of nine tests. In other more complicated operations such as drafting or aerial evolutions, the differences in times were considerable longer, in some cases twice among several crews.

Only through testing were outcomes known. Though tests were performed of the same apparatus from crews working at the same station, some significant differences were reported. It may be argued that the system was imperfect, not enough data sets were collected, expectations were not clearly identified, or evaluations were inconsistent since no one person reported all finding. Some might declare that test results not valid and consideration of standards at this time is not realistic. Harder to argue would be the point that the exercise did not illustrate room for improvement either at the company or system level. With the knowledge gained, the Agency is better positioned to take the next step and determine if the areas tested are valued as core emergency scene operations for which a time expectation can be assigned.

Question Number Five: "What time standard should EF&R adopt for core emergency scene operations?"

Evans, Meyer and Rubinstein, (2001), studied time loss factors involving task switching, familiarity, and complexity of the job. Braune, Colvin, Funk, Suroteguh, and Wilson (1999) found that task management was the key to peak performance. Combined with the findings of Perrin and Youngblut (2002) who looked at the order of tasks performed and the difference in times recorded related to the environment, careful consideration should be used when establishing expectations. In the case of core operations involving multiple tasks and using the measurement of time as the determination of success, one cannot be too careful when creating operational standards.

Jack Stout (1987) suggested simple time averages look at half the picture and indicated an agency should be looking for the abilities of the majority. His solution was found using fractile measurements, while Ryan Stokes (2008) suggested that with many options from which to choose, the critical view, is the measurement that gives meaningful information.

Table 9 looks at the various calculations performed, none of which gave a clear and consistent indicator that one single method of measurement was best. The only calculation that did not illustrate the best time in any operation was the average, yet the time shown as average was very close in nearly every operation when compared against other calculations showing best times. (Table 10). With the exception of the small-gap adjusted, which in the opinion of the author looks like it's clearly a method that should not be considered, the average appears to be the safest measurement to begin time assigned expectations. By setting the average as the expectation, the under 50% performers that concerned Stout (1987) as being somewhere outside expectations, would be eliminated.

The reading and interpreting of the information contained in this ARP has benefited the author and should assist EF&R and others in similar positions to advance the work related to the establishment of core emergency scene operations. EF&R does not have core emergency scene operation standards, but the research conducted in this ARP has illuminated areas which should be considered as the agency develops standards.

RECOMMENDATIONS

Eastside Fire & Rescue has not established core emergency scene operational standards. This lack of standards causes inconsistencies and conflicting expectations in service delivery. The purpose of this ARP is to provide recommendations that could assist in establishing standards for core emergency scene operations.

Prior to establishing core emergency scene operational standards, the Fire Administration of EF&R needs to determine those areas of emphasis which should be aligned with most often used operations. The results of this assessment should guide the Fire Administration to determine the number of and which core emergency scene operational standards to establish.

The Fire Administration of EF&R should move forward with the adoption of core emergency scene operational standards as expressed in Appendix E. The following criteria should be used to guide the process:

- Invite stake holders (i.e.., Company Officers, Training Division, Chief Officers, Fire fighters, etc.) to be involved in each portion of standards development.
- Circulate the adopted standards with adjoining fire departments so they are familiar with EF&R expectations and capabilities.
- Prior to adopting any additional core emergency scene standards, research and review local, state, and national standards for best industry practices.

- Expand the areas of emphasis beyond the traditional fire scene operation to include creation of core emergency scene operations for emergency medical, rescue, special operations, and other services.
- Wherever possible tie core emergency scene operation standards to the EF&R-JATC training objectives.
- Where practical, EF&R should attempt to align department standards with adjoining jurisdictions.
- Provide greater detail (e.g. length of hose lay, type of equipment needed, etc.) in future EF&R standards to strengthen continuity.
- Implement a method to provide greater continuity and consistency in the evaluation of operational standards.
- Foster an environment where experimentation is welcome and core operational standards are seen as guidelines not limitations of the ability of people to perform tasks.
- Six months after the adoption of operational standards, the Agency should repeat the testing and compare those results to the baseline data as found in Table 2 to determine if adjustments to the expectations are warranted.

Future readers who may wish to replicate any portion of this study should inquire through a survey of those with standards, what inspired them what caused the interest in establishing operational expectations. Prior to conducting the work required to establish standards, time should be spent with stakeholders in an education process to build awareness and appreciation regarding the potential benefits of instituting core operational expectations.

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APPENDIX A

TO: King County Fire Chiefs
FROM: Lee Soptich, Eastside Fire & Rescue
DATE: August 15, 2007
REFERNECE: Request for Information/Survey Participation

As a student in the Executive Fire Officer Program (EFOP) I am writing an Applied Research Paper (ARP) designed to help our agency identify and establish core emergency scene operations standards. Specifically, I am interested in knowing which operations and supporting evolutions you have identified as core to emergency scene effectiveness. Examples of such may include but are not limited to hose evolutions, ground ladder sets, supplying sprinkler/standpipe systems, short reports, drafting evolutions, placing ladder apparatus in service, etc. Along with the elements of the evolution, I am also seeking the time standard (if any) which was adopted for each. The following is an example of the type of statement which would be useful in our quest for knowledge.

Forward lay from hydrant and flow water from pre-connected line.

The 3-person company in full protective clothing and the SCBA is the standby position, will establish a hydrant supply using 300' of 5" line and once secured, flow water from a 1.75" pre-connect line extended 200'. The evolution begins when the unit stops at the hydrant and concludes when an effective attack stream is put into service. Time allowed for this evolution is 3 minutes.

You would be most helpful if you could respond to the following questions.

1) Does your agency have established/written core emergency scene operations standards?
2) If so, what core emergency scene operations standards have been adopted by your agency?
3) If so, which core emergency scene operation standards include a time element?

Please respond to this request for information prior to September 7th.
Fax to: 425-313-3255
Email to: lsoptich@esf-r.org
Phone if you have questions: 425-313-3201

Thank you in advance for this consideration to help our agency.

Sincerely,
Lee Soptich
Fire Chief
Eastside Fire & Rescue

APPENDIX B

1-18-09-Training Division Email

Gentlemen,

As with the case with the 90/90, I am doing another research paper on the setting of timed standards for certain evolutions in the Agency.

The DC's, Chief Tryon and I listed several core evolutions and wanted to get your feedback Assuming that we would move forward with some trails/tests to determine what the standards should be, I wanted to first meet with you to see how best to get this accomplished in short order.

The following items were what we came up with. We also heard that we should see what you have by way of existing standards (JATC, etc.) and see where this effort would compliment or conflict with current practices/policy. (excerpt from Chief Officers Meeting Minutes.)

1. *As part of the continuous improvement movement, the Chief spoke of his desire to establish time standards for core evolutions performed at the emergency scene. The standards would define expectations, create more continuity, and give officers and commanders a realistic view of capabilities from which to make critical scene decisions. The establishment of timed standards would compliment the Standard of Cover criteria adopted previously by the Board and would address some of the recommendations as outlined in NFPA 1410. Those attending had a general support for the establishment of timed standards and identified the following as some evolutions which should be considered as we moved forward:*

    a. *1.75 pre-connect attack from booster (82)*
    b. *1.75 pre-connect attack/forward (83)*
    c. *2.5 pre-connect attack/blind alley (81)*
    d. *2.5 bundle "Y"d to 1.75/forward (72)*
    e. *Ground ladder to second floor (78)*
    f. *Set up T-73 for roof ops (73)*
    g. *Set up T-73 for elevated steam/forward (73)*
    h. *Set up rescue tool (87)*
    i. *Ground tank operation (71)*
    j. *Elevated stream operation using 50' boom (85)*

    Was discussed and then suggested that each station have their companies perform the assigned evolution and record times to determine what the standard should be for EF&R. The effort may take several months to lay out the components for each evolution, conduct the drills, interpret the data, and then establish the time standard. Several options were identified as to how the crews would be evaluated, by whom, and how often. No conclusion was reached in this regard. The standard would be approached similar to the 90/90 Turnout Time Standard regarding raising awareness and then working toward meeting or exceeding the goal.

Also, I did a survey and got quite a bit of feedback on what others are doing in the County, though few have a time element attached. This may be interest to us in any case.

Please let me know when best to get with you.

APPENDIX C

Eastside Fire & Rescue General Notice Number 08-014

Subject: **Trials to Establish Core Emergency Scene Operations**

Affected Area: **All Personnel**

Effective Date: **2/14/08** Revised Date: Pull Date: **12/31/08**

Pages: **1** Attachments: 1 Approved by: **Soptich**

The Agency is working toward the establishment of standards for core emergency scene operations. We believe that in order to have greater consistency among crews, have clear expectations established, and an actual knowledge of the time needed to accomplish assignments, all stake holders will be better served.

In November of last year, we began the discussion among the Deputy Chief's and Battalion Chief's on which evolutions we viewed as frequent, basic or critical by way of initiating core operations. This work progressed to include the Training Division, who wisely guided the process to line up as much as possible with their training objectives, JATC criteria, and recording needs.

We now need your help to do some field testing and data collection of which we will consider in establishing a timed operation.

Each career station (with the exception of 73 that will get two assignments) will receive one assignment that will require each crew at the station to perform an objective described in a document that will be forthcoming. An example of such is attached to this Notice. Each crew will be required to perform the assignment a minimum of three times and record the time needed to complete the assignment.

By having each crew at each station perform that same assignment, a minimum of three times, we will have enough data sets (9) to establish a timed standard for each core emergency scene operations. The results of the test are to be forwarded to Training, specifically Lt. Geppert.

After the data is returned I will reconvene the group of Chief's and those in Training to determine what time will be set as the standard for that operation.

As with the 90/90 Turnout Time Standard, this is a measuring tool that we believe will help Company Officers assess their crew's abilities and help Command Officers make informed critical decisions at emergencies.

All three tests may be conducted on the same day, spread over a set or however best to fit into the work schedule. It is not necessary to have the regularly assigned company perform the tests, though that would be ideal. If you have questions about how to proceed in the testing phase, please notify your Battalion Chief.

Please make a concerted effort to return results as soon as possible, but no later than the 29th of February.

Attachment to Notice 08-014

EXAMPLE

Set Up Ground Ladder to Second Floor
Station 82

Objective:

The crews, while wearing SCBA's, shall demonstrate a 2-person extension ladder carry, bed or beam raise for the purpose of proper positioning of a ground ladder to a second floor for one of the following three scenarios:

- Window ventilation, OR
- Rescue from window OR
- Entry through a window
- The evolution is complete when the ladder is in the proper position, ladder secured, with a Firefighter at the 2nd floor window (with equipment to perform selected task) and all safety precautions observed.

Crew (shift/station)	Date of Trial	Attempt	Time to Complete

Certificate Training Accomplished:

Fire Suppression Certificate -- 1.5C & 1.5D 1st Quarter Ladders

Company Officer:_____

Return this document to Training upon completion

APPENDIX D

Core Emergency Scene Operation Standards Assignments

Fold a Tank Operation
Station 71

Objective: The crew shall demonstrate setting up for a port-a-tank drafting operation.

- The evolution shall include dumping the tank from the Tender, proper apparatus positioning to best accommodate vehicle movement, port-a-tank placement and drafting from the Tender.
- The evolution is complete when a draft has been secured and water is flowing from a discharge.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1.5C & 1.5D 1st. Quarter Ladders

5" Manifold Reverse
Station 72

Objective: The crew, while wearing SCBA's, shall demonstrate a 5" manifold reverse.

- The pump operator shall secure his/her supply from a hydrant and shall supply a 300' 5" manifold reverse.
- The manifold will have a 200' 1 ¾" handline in operation.
- The evolution is completed when all hose is laid out, and water is flowing at the proper pressure.

Equipment to be removed for the reverse evolution

- chain saw,
- pike pole
- ladders
- scba's
- PPV fan
- 200" of 2 ½" hose)

Certificate Training accomplished:

1. Fire Suppression Certificate -- 4th Quarter Hose Evolution
2. Driver/Operator Certificate -- 2.4P 5" Manifold Reverse

Set up Ladder 73 for Roof Ventilation
Station 73

Objective: The crew, while wearing SCBA's, will demonstrate the ability to set up the aerial apparatus to perform a roof ventilation.

- Demonstration will include the proper positioning of the aerial given all safety considerations met to include building collapse, overhead hazards, slope, etc.
- Demonstration will include the proper setting of outriggers.
- The evolution is complete when the platform is fully extended to at maximum elevation with two Firefighters equipped with proper ventilation tools. (No water operation included in this evolution)

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1.5C & 1.5D 1st Quarter Ladders

Set up Ladder 73 for Elevated Master Stream
Station 73

Objective: The crew, while wearing SCBA's, will demonstrate the ability to set up the aerial apparatus to perform elevated stream operations.

- Demonstration will include the proper positioning of the aerial given all safety considerations met to include building collapse, overhead hazards, slope, etc.
- Demonstration will include the proper setting of outriggers.
- The demonstration shall include pumping to monitor at the platform from a 150' forward lay.
- The evolution is completed when water is flowing, with the platform extended to a minimum elevation of 75' with two Firefighters at the monitor.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1.5C & 1.5D 1st Quarter Ladders

1¾' Pre-Connect Attack
Station 78

Objective: The crew, while wearing SCBA's, shall demonstrate taking a hydrant and extending an 1¾'" pre-connect to a structure.

- Demonstration shall include proper preparation prior to entry, including positioning, nozzle prep, donning face piece, etc.
- The evolution must include transitioning from tank to hydrant supply.
- The apparatus should position between 75 to 100 feet from the hydrant.
- The evolution is completed when all hose is laid out, the transition from tank to hydrant is made, and water is flowing at the nozzle.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 2.14A1st Quarter Hose Evolutions
2. Driver/Operator Certificate -- 3.8B 1¾" Pre-Connect

2½" Pre-connect Attack
Station 81

Objective: The crew, while wearing SCBA's, shall demonstrate taking a hydrant and extending a 2½" pre-connect into a structure.

- Demonstration shall include proper preparation prior to entry, including positioning, nozzle prep, donning face piece, etc.
- The demonstration shall include pumping to a 2½" pre-connect from a 150" forward lay.
- The evolution must include transitioning from tank to hydrant supply.
- The evolution is completed when all hose is laid out, the transition from tank to hydrant is made, and water is flowing.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1st Quarter Hose Evolutions
2. Driver/Operator Certificate -- 3.8A1¾" Pre-Connect

Set Up Ground Ladder to Second Floor
Station 82

Objective: The crew, while wearing SCBA's, shall demonstrate a 2-person extension ladder carry, bed or beam raise for the purpose of proper positioning of a ground ladder to a second floor for one of the following three scenarios.

- Window Ventilation, OR
- Rescue from window OR E
- Entry through a window.
- The evolution is complete when the ladder is in the proper position, ladder secured, with a Firefighter at the 2nd floor window (with equipment to perform selected task) and all safety precautions observed.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1.5C & 1.5D 1st Quarter Ladders

2½" supply Wyed to 1¾" Attack Line
Station 83

Objective: The crew, while wearing SCBA's, shall take a hydrant, extend 150' or 2½" working line (not the pre-connect) and extend the 1¾" wyed bundle from the 2½" line to a structure.

- Demonstration shall include proper preparation prior to entry, including positioning, nozzle prep, donning face piece, etc.
- The evolution is completed when all hose is laid out, the transition from tank to hydrant is made, and water is flowing.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1st Quarter Hose Evolutions
2. Driver/Operator Certificate -- 2.4G 1¾" Pre-Connect

Set up 50" Boom for Elevated Master Stream
Station 85

Objective: The crew will demonstrate the ability to set up aerial apparatus to perform elevated stream operations.

- Demonstration will include the proper positioning of the aerial given all safety considerations met to include building collapse, overhead hazards, slope, etc.
- Demonstration will include the proper setting of outriggers.
- The demonstration shall include pumping to the master stream on the boom with a supply from a 150' forward lay.
- The evolution is completed when water is flowing, with the boom fully extended.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- 1.5C & 1.5D 1st Quarter Ladders

Set Up Rescue Tool for Extrication Operation
Station 87

Objective: The crew will demonstrate the ability to set up rescue tool for extrication operations.

- Demonstration will include the dismounting of rescue tools from apparatus and placement of same in a ready position (power tools energized) to facilitate a cutting, spreading, lifting operation.
- The evolution is completed when the tool is energized and all safety measures (protective gear, fire extinguisher in place, etc.) are observed.

Certificate Training Accomplished:

1. Fire Suppression Certificate -- (pg 18)

APPENDIX E

Proposed Core Emergency Scene Operations Standards

- **Fold a Tank Operation**

  Time Expectation: 5:01

- **5" Manifold Reverse**

  Time Expectation: 7:15

- **Set up Ladder 73 for Roof Ventilation**

  Time Expectation: 6:05

- **Set Up Ladder 73 for Elevated Master Stream**

  Time Expectation: 6:16

- **1¾" Pre-Connect Attack**

  Time Expectation: 3:16

- **2½" Pre-Connect Attack**

  Time Expectation: 4:02

- **Set Up Ground Ladder to Second Floor**

  Time Expectation: 2:46

- **2½" supply Wyed to 1¾" Attack Line**

  Time Expectation: 4:34

- **Set up the 50' Boom for Elevated Master Stream**

  Time Expectation: 3:26

- **Set Up Rescue Tool for Extrication Operation**

  Time Expectation: 2:30

TABLE 1

King County Fire Chiefs Survey Results

DEPARTMENT	ESTABLISHING CORE EMERGENCY SCENE OPERATIONS	TIME STANDARD INCLUDED
BELLEVUE	YES	YES
BLACK DIAMOND	NO RESPONSE	NA
BOTHELL	NO	NA
ENUMCLAW	NO RESPONSE	NA
KENT	YES	NO
KIRKLAND	NO	NA
MERCER ISLAND	NO	NA
REDMOND	NO	NA
RENTON	YES	NO
SEATAC	NO	NA
SEATTLE	YES	PARTIAL
SNOQUALMIE	NO	NA
TUKWILLA	NO	NA
DISTRICT 2	NO	NA
DISTRICT 4	NO	NA
NORTH HIGHLINE	YES	YES
DISTRICT 16	NO	NA
DISTRICT 20	NO	NA
DISTRICT 26	NO RESPONSE	NA
DISTRICT 27	NO	NA
DISTRICT 40	YES	NO
DISTRICT 43	NO	NA
DISTRICT 44	NO	NA
DISTRICT 45	NO	NA
DISTRICT 47	NO RESPONSE	NA
DISTRICT 50	NO RESPONSE	NA
BOEING	NO RESPONSE	NA
EASTSIDE FIRE & RESCUE	NO	NA
PORT OFSEATTLE	YES	NO
SOUTH KING FIRE & RESCUE	NO	NA
SNOQUALIME PASS FIRE & RESCUE	NO	NA
VALLEY REGIONAL FIRE AUTHORITY	NO	NA
WOODINVILLE FIRE & SAFETY	NO	NA

TABLE 2

Core Emergency Scene Operation Time Trials
Eastside Fire & Rescue 2008

Fold a Tank	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 71***	2-17	1	5:59/359
A-Shift	2-17	2	3:42/222
A-Shift	2-26	3	3:22/202
B-Shift	2-28	1	5:06/306
B-Shift	2-28	2	4:48/288
B-Shift	2-28	3	5:15/315
C-Shift	2-18	1	8:00/480
C-Shift	2-18	2	5:20/320
C-Shift	2-29	3	3:36/216
5" Manifold Reverse	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 72***	2-17	1	8:38/518
A-Shift	2-17	2	6:10/370
A-Shift	2-14	3	6:14/374
B-Shift	3-1	1	8:00/480
B-Shift	3-1	2	7:00/420
B-Shift	3-1	3	8:00/480
C-Shift	2-18	1	7:20/440
C-Shift	2-18	2	6:50/410
C-Shift	2-18	3	6:40/400
Station 73 Roof Ventilation	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 73***	3-14	1	5:27/327
A-Shift	3-14	2	4:40/280
A-Shift	3-14	3	4:20/260
B-Shift	3-1	1	5:15/315
B-Shift	3-1	2	5:00/300
B-Shift	3-1	3	5:30/330
C-Shift	2-29	1	7:07/427
C-Shift	2-29	2	6:30/390
C-Shift	2-29	3	5:26/326
Station 73 Elevated Master Stream	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 73***	3-4	1	6:17/377
A-Shift	3-4	2	5:38/338
A-Shift	3-4	3	5:25/325
B-Shift	2-28	1	6:45/405
B-Shift	3-1	2	6:15/375
B-Shift	3-1	3	5:15/315
C-Shift	2-25	1	7:56/476
C-Shift	2-25	2	6:00/360
C-Shift	2-25	3	6:54/414

1.75" Pre-Connect Attack w/Supply	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 78***	2-24	1	3:37/217
A-Shift	3-2	2	3:14/194
A-Shift	3-2	3	3:10/190
B-Shift	2-21	1	3:15/195
B-Shift	2-21	2	3:15/195
B-Shift	2-21	3	3:12/192
C-Shift	2-27	1	3:20/200
C-Shift	2-27	2	3:10/190
C-Shift	2-27	3	3:15/195
2.5" Pre-Connect Attack w/Supply	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 81***	2-24	1	4:00/240
A-Shift	2-24	2	4:15/255
A-Shift	2-24	3	3:45/225
B-Shift	2-23	1	4:15/255
B-Shift	2-23	2	3:20/200
B-Shift	2-23	3	4:30/270
C-Shift	2-29	1	4:20/260
C-Shift	2-29	2	4:06/246
C-Shift	2-29	3	3:45/225
Ground Ladder Second Floor	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 82***	3-2	1	3:10/190
A-Shift	3-2	2	2:45/165
A-Shift	3-2	3	2:45/165
B-Shift	2-23	1	2:28/148
B-Shift	2-23	2	2:50/170
B-Shift	2-23	3	2:15/135
C-Shift	2-24	1	2:45/165
C-Shift	2-24	2	3:10/190
C-Shift	2-24	3	2:50/170
2.5" Supply Y'd to 1.75" Attack w/Supply	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 83***	2-26	1	5:02/302
A-Shift	2-26	2	5:15/315
A-Shift	2-28	3	4:45/285
B-Shift	2-28	1	4:30/270
B-Shift	3-1	2	4:25/265
B-Shift	3-3	3	5:04/304
C-Shift	2-29	1	4:15/255
C-Shift	2-29	2	3:45/225
C-Shift	2-29	3	4:02/242

50' Boom-Elevated Stream w/Supply	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 85***	3-4	1	2:33/153
A-Shift	3-4	2	1:47/107
A-Shift	3-4	3	1:51/111
B-Shift	2-28	1	4:18/258
B-Shift	2-28	2	3:20/200
B-Shift	2-28	3	3:32/212
C-Shift	2-29	1	4:37/277
C-Shift	2-29	2	4:10/250
C-Shift	2-29	3	4:46/286
Set Up Rescue Tool(s)	**Date**	**Attempt**	**Time/Total Seconds**
A-Shift ***Station 87***	3-2	1	2:42/162
A-Shift	3-2	2	1:42/102
A-Shift	3-2	3	1:32/82
B-Shift	3-8	1	2:50/170
B-Shift	3-8	2	3:10/190
B-Shift	3-8	3	3:00/180
C-Shift	2-29	1	3:32/312
C-Shift	2-29	2	1:15/75
C-Shift	2-29	3	1:06/66

TABLE 3

Time Trial Averages

Add all totals and divide by the number of data sets submitted.

Operational Performed	Total Seconds (combined station results)	**Average Time…Seconds**
Fold a Tank-Station 71	2709	5:01…301
5" Manifold Reverse	3892	7:12…432
Roof Ventilation	2955	6:05…365
Elevated Master Stream	3385	6:16…376
1.75" Pre-Connect Attack w/Supply	1768	3:16…196
2.5" Pre-Connect Attack w/Supply	2176	4:02…242
Ground Ladder Second Floor	1498	2:46…166
2.5" Supply Y'd to 1.75" Attack w/Supply	2463	4:34…274
50' Boom-Elevated Stream w/Supply	1854	3:26…206
Set Up Rescue Tool(s)	1349	2:30…150

TABLE 4

Time Trials Mid in Range

Operation	Average	Range	Difference	**Mid in Range**
Fold a Tank	5:01	3:22-8:00	278 seconds	**5:41 (341 seconds)**
5" Manifold Reverse	7:12	6:10-8:38	148 seconds	**7:24 (444 seconds)**
Roof Ventilation	6:05	4:20-7:07	167 seconds	**5:44 (344 seconds)**
Elevated Master Stream	6:16	5:15-7:56	161 seconds	**6:36 (396 seconds)**
1.75" Attack	3:16	3:10-3:37	27 seconds	**3:24 (204 seconds)**
2.5" Attack	4:02	3:45-4:30	45 seconds	**4:08 (248 seconds)**
Ground Ladder 2nd Floor	2:46	2:15-3:10	55 seconds	**2:43 (163 seconds)**
2.5" Y'd	4:34	3:45-5:15	90 seconds	**4:30 (270 seconds)**
50' Boom	3:26	1:47-4:46	179 seconds	**3:17 (197 seconds)**
Rescue Tool	2:30	1:06-3:32	146 seconds	**2:19 (139 seconds)**

Subtract the shortest from the longest. Divide that sum by two and add the remainder to the best time to determine the mid range.

TABLE 5

Time Trials Smallest Gap…Adjusted

Operation	Average	Mid in Range	**Smallest Gap…Adjusted**
Fold a Tank	5:01	5:41	**3:15-3:20…3:18**
5" Manifold Reverse	7:15	7:24	**8:00-8:00…8:00**
Roof Ventilation	6:05	5:44	**5:26-5:27…5:27**
Elevated Master Stream	6:16	6:36	**6:15-6:17…6:16**
1.75" Attack	3:16	3:24	**3:10-3:10&3:15-3:15…3:13**
2.5" Attack	4:02	4:08	**3:45-3:45&4:15-4:15…4:00**
Ground Ladder 2nd Floor	2:46	2:43	**2:45-2:45&3:10-3:10…2:58**
2.5" Y'd	4:34	4:30	**5:02-5:04…5:03**
50' Boom	3:26	3:17	**1:47-1:51…1:49**
Rescue Tool	2:30	2:19	**2:42-2:50…2:46**

Identify the numbers that had the smallest gap. Note the adjusted number which is the difference between the two.

TABLE 6

Time Trials Most Often

Operation	Average	Mid in Range	Small Gap Adjusted	**Most Often**
Fold a Tank-Station 71	5:01	5:41	3:18	**NA**
5" Manifold Reverse	7:15	7:24	8:00	**8:00**
Roof Ventilation	6:05	5:44	5:27	**NA**
Elevated Master Stream	6:16	6:36	6:16	**NA**
1.75" Pre-Connect Attack w/Supply	3:16	3:24	3:13	**3:10/3:15**
2.5" Pre-Connect Attack w/Supply	4:02	4:08	4:00	**3:45/4:15**
Ground Ladder Second Floor	2:46	2:43	2:58	**2:45/2:50/3:10**
2.5 Supply Y to 1.75 Attack w/Supply	4:34	4:30	5:03	**NA**
50' Boom-Elevated Stream w/Supply	3:26	3:17	1:49	**NA**
Set Up Rescue Tool(s)	2:30	2:19	2:46	**NA**

The number that appears most often in a set. NA indicates that the data set held no identical numbers.

TABLE 7

Time Trials Middle Number

Operation Performed	Average	Mid in Range	Small Gap Adjusted	Most Often	**Middle #**
Fold a Tank-Station 71	5:01	5:41	3:18	NA	**5:06**
5" Manifold Reverse	7:15	7:24	8:00	8:00	**7:00**
Roof Ventilation	6:05	5:44	5:27	NA	**5:27**
Elevated Master Stream	6:16	6:36	6:16	NA	**6:15**
1.75 Pre-Connect Attack w/Supply	3:16	3:24	3:13	3:10/3:15	**3:15**
2.5 Pre-Connect Attack w/Supply	4:02	4:08	4:00	3:45/4:15	**4:06**
Ground Ladder Second Floor	2:46	2:43	2:58	2:45/2:50/3:10	**2:50**
2.5 Supply Y to 1.75 Attack w/Supply	4:34	4:30	5:03	NA	**4:30**
50' Boom-Elevated Stream w/Supply	3:26	3:17	1:49	NA	**3:32**
Set Up Rescue Tool(s)	2:30	2:19	2:46	NA	**2:42**

The fifth number in order from the set of nine numbers.

TABLE 8

Time Trials Average w/o Low & High

Operation Performed	Low-High	**Average w/o Low & High #**
Fold a Tank-Station 71	3:22-8:00	**5:12**
5" Manifold Reverse	6:10-8:38	**7:09**
Roof Ventilation	4:20-7:07	**5:24**
Elevated Master Stream	5:15-7:56	**6:10**
1.75 Pre-Connect Attack w/Supply	3:10-3:37	**3:14**
2.5 Pre-Connect Attack w/Supply	3:20-3:45	**4:10**
Ground Ladder Second Floor	2:15-3:10	**2:47**
2.5 Supply Y to 1.75 Attack w/Supply	3:45-5:15	**4:34**
50' Boom-Elevated Stream w/Supply	1:47-4:46	**3:28**
Set Up Rescue Tool(s)	1:06:3:32	**2:18**

The top and bottom numbers in the set removed, with the remaining seven numbers combined to determine the average.

TABLE 9
Time Trials Display of All Calculations Provided

Operation Performed	Average	Mid in Range	Small Gap Adjusted	Most Often	Middle #	**Average w/o Low & High #**
Fold a Tank-Station 71	5:01	5:41	3:18	NA	5:06	**5:12**
5" Manifold Reverse	7:15	7:24	8:00	8:00	7:00	**7:09**
Roof Ventilation	6:05	5:44	5:27	NA	5:27	**5:24**
Elevated Master Stream	6:16	6:36	6:16	NA	6:15	**6:10**
1.75 Pre-Connect Attack w/Supply	3:16	3:24	3:13	3:10/3:15	3:15	**3:14**
2.5 Pre-Connect Attack w/Supply	4:02	4:08	4:00	3:45/4:15	4:06	**4:10**
Ground Ladder Second Floor	2:46	2:43	2:58	2:45/2:50/3:10	2:50	**2:47**
2.5 Supply Y to 1.75 Attack w/Supply	4:34	4:30	5:03	NA	4:30	**4:34**
50' Boom-Elevated Stream w/Supply	3:26	3:17	1:49	NA	3:32	**3:28**
Set Up Rescue Tool(s)	2:30	2:19	2:46	NA	2:42	**2:18**

TABLE 10
Display of best time from each operation when compared against all calculations

Operation Performed	Average	Mid in Range	Small Gap Adjusted	Most Often	Middle #	Average w/o Low & High #
Fold a Tank-Station 71	5:01	5:41	3:18	NA	5:06	5:12
5" Manifold Reverse	7:15	7:24	8:00	8:00	7:00	7:09
Roof Ventilation	6:05	5:44	5:27	NA	5:27	5:24
Elevated Master Stream	6:16	6:36	6:16	NA	6:15	6:10
1.75 Pre-Connect Attack w/Supply	3:16	3:24	3:13	3:10/3:15	3:15	3:14
2.5 Pre-Connect Attack w/Supply	4:02	4:08	4:00	3:45/4:15	4:06	4:10
Ground Ladder Second Floor	2:46	2:43	2:58	2:45/2:50/3:10	2:50	2:47
2.5 Supply Y to 1.75 Attack w/Supply	4:34	4:30	5:03	NA	4:30	4:34
50' Boom-Elevated Stream w/Supply	3:26	3:17	1:49	NA	3:32	3:28
Set Up Rescue Tool(s)	2:30	2:19	2:46	NA	2:42	2:18