RAPID INTERVENTION CREWS

Executive Analysis of Fire Service Operations in Emergency Management

Planning For The Effective Use of Rapid Intervention Crews

For the Watertown Fire Department

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Certification Statement

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

Signed_____

Abstract

The problem is the Watertown Fire Department does not utilize a Rapid Intervention Team as part of its response procedures which may result in a higher risk for injury or death on its personnel.

The purpose of this evaluative research is to determine if a Rapid Intervention Team would likely reduce, if not eliminate, the risk of injury and death to Watertown Fire Department Personnel. This research will be answered with the following questions,

a) What is a Rapid Intervention Team and why do we need them?

b) What standards or requirements exist for Rapid Intervention Teams?

c) What type of training should Rapid Intervention Team members have?

d) What equipment is needed to establish a Rapid Intervention Team?

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Introduction

The problem is the Watertown Fire Department does not utilize a Rapid Intervention Crew as part of its response procedures which may result in a higher risk for injury or death on its personnel. In the firefighting profession, we focus more on providing the best service to our constituents and little focus on ourselves, the providers. Firefighting is a risky business at best and as fire officers we must try and find a way to minimize the risks to firefighting personnel on the incident scene.

As the role of the fire service has increased in its ability to protect the public, so have the hazards that firefighters face. With different construction methods becoming prevalent and newer lighter weight materials being used in building construction that have a tendency to fail during high heat conditions, the risks to firefighters during a fire attack have increased substantially. The issues firefighters face include becoming lost in a structure or trapped by failure of these newer methods of building construction, which increases the need for the fire service to learn to not only provide the ultimate in service to the public, but to ourselves in being able to rescue our own from the dangers that have been created by building construction or hazards that may exist within a structure.

The purpose of this research project is to determine if a Rapid Intervention Crew would be able to reduce if not eliminate the risk of injury and death to Watertown Fire Department personnel. This will be done by answering the following questions which

should assist in resolving the problem of Watertown Firefighters becoming lost or trapped in a structure:

a) What is a Rapid Intervention Team and what are its benefits?

b) What standards or requirements exist for Rapid Intervention Teams?

c) What type of training should Rapid Intervention Team members have?

d) What equipment is needed to establish a Rapid Intervention Team?

Background and Significance

The City of Watertown is located in the southern part of Wisconsin approximately 38 miles west of Milwaukee and 33 miles east of Madison. The demographical makeup of the city is a combination of suburban, urban and rural settings with a mixture of medium to heavy industrial businesses scattered through the city. The city is crisscrossed by two major railroads with thirty five trains a day traveling through the city. The City of Watertown is unique in that the city lies divided between the counties of Dodge and Jefferson as well as divided again by the Rock River that flows approximately 5.75 miles through the city's center. The population for "Watertown has increased 18.8% between 1990 and 2000, to a total of approximately 30,000 residents" (Epodunk 2005) with this rise in population there has been a corresponding rise in the number of alarms handled by the department.

The Watertown Fire Department (WTTN) was founded in 1857 and operated as a volunteer fire company until 1866 when due to a rapid expansion of the city it was necessary to add full time personnel on 24-hour shifts. The department continued to grow, when in 1947 the department under went a major reorganization adding its current auxiliary force and switching the department status from a full time department to a combination department. The department relied very little on mutual aid from the outside surrounding volunteer departments being satisfied on handling any emergencies with its own resources.

As the city continued to grow in the 1950's and 60's, the volume of alarms for the city continued in the same manner the city chose to make little use of outside resources to

help in the expanded volume of calls. After September 11, 2001, the State of Wisconsin realized an almost two billion dollar deficit and was looking for ways to trim access spending from its budgets without much success. With Governor Jim Doyle's election in 2002 the state again tackled the deficit problem with large scale reductions in every venue including shared revenue which most Wisconsin cities relied upon to make up for their own budget short falls.

Faced with a budget reduction of nearly $300,000, the City of Watertown was forced to eliminate positions through attrition in all city departments including the fire department. This personnel reduction forced the fire department to staff the three shifts short of personnel. This short staffing forced the crews to be split up between several pieces of apparatus and placed the fire department in the position of having several apparatus on the scene with insufficient manpower to either operate any of the equipment, provide the necessary manpower to adequately control the incident, provide adequate personnel to staff a Rapid Intervention Crew (RIC), or even correctly adhere to the State of Wisconsin Administrative Code delegating the two in two out rule.

The current staffing for the WTTN consists of three authorized shifts of seven personnel with the majority being paramedics and three eight-hour day chief staff officers. This staffing fluctuates from day to day due to vacations, and sick leave. The daily staffing can range from seven personnel to a minimum of five personnel with the average being five personnel on duty to man the first out engine and the ambulance. The issue of staffing was complicated further this past year when the city elected to run the shifts short or only four personnel on duty due to multiple illnesses or someone on

vacation and a firefighter calls in sick. This reduced the chance of having an effective RIC when a shift was reduced to four personnel and the day officers went home.

When alarms are received for an interfacility call for the ambulance where a patient is transported from the local hospital to a facility 35 miles away which effectively lowers the shift manpower from five down to three. Two of the remaining engine personnel are required to staff the second ambulance. This requires the three chief staff officers to man the apparatus to facilitate responding on any subsequent alarms leaving very limited personnel to effectively perform any type of RIC activities should an alarm occur that requires the use of a RIC.

The lack of adequate staffing for any responding WTTN fire apparatus is in opposition to the standards set forth by National Fire Protection Association Standard 1710 *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments* that states "Fire companies whose primary functions are to pump and deliver water and perform basic firefighting at fires including search and rescue, shall be known as engine companies…these companies shall be staffed with a minimum of four on-duty personnel" (NFPA 1710, 2001). This issue of improper staffing was complicated further by the Wisconsin Department of Health and Family Services EMS Division ruling in 2002 which required that the participation of ambulance personnel in firefighting efforts is not a recognized function of an ambulance service and any calls for medical help would result in the personnel assigned to the ambulance to respond to the medical emergency regardless of the fire emergency status. This lowered the available manpower on the scene to facilitate any type of RIT activities or comply with the two in two out rule.

This ruling forced the WTTN to rely more heavily on auxiliary personnel. Since the auxiliary force holds other fulltime career positions and are not available on a consistent basis when needed, it then became necessary to rely on help from outside agencies to assist with RIC or two in two out. This reliance on outside agencies is risky due to their being strictly volunteer personnel and not available 24 hours a day due to their work schedules and personal lives.

The above issues place the WTTN in the position of being unable to adequately assemble a RIC to perform extrication of trapped or lost personnel. This is complicated further with the issue that Watertown personnel lack standard operating guidelines or have received proper training to effectively operate as a RIC. These situations place firefighters at risk during incidents that may require the use of a RIC if they should become lost, trapped, or disoriented during an incident. This lack of preparation creates stress during an incident for Watertown personnel with the simple fact of who is going to come and get them if something should go wrong.

It is the goal of this Applied Research Project to obtain a solution to the problem of the Watertown Fire Department's inability to have an effective Rapid Intervention Crew and share these solutions with the surrounding fire agencies. This Applied Research Paper is related to the course Executive Analysis of Fire Service Operations in Emergency Management in the areas covered include risk assessment, NIMS Compliance, media considerations, capability assessment and political considerations. This Applied Research Project will also meet the requirements of the United States Fire Administration in attempting to reduce the chance of injury or death of firefighting personnel over a five year period.

Literature Review

The literature review for this Applied Research Project (ARP) began with the purpose of identifying with the first question as to what a Rapid Intervention Crew is and why are teams needed in this day of thermal imaging, advanced rescue techniques, and modern turnout gear. No matter what you call them: Rapid Intervention Team (RIT), Rapid Intervention Crew (RIC), Firefighter Assist Search Team (FAST), or Rescue Assist Team (RAT), we are looking at a team that is responsible for the rescue of firefighters that have gotten in to trouble. For the specific intent and purpose of this ARP, the term Rapid Intervention Crew (RIC) which coincides with the term standardization used in the National Incident Management System (NIMS) and the National Fire Protection Association (NFPA) will be used in the context of this paper. The basic purpose of any team, no matter the name given it by the department, is to locate trapped or lost firefighters.

There are several texts on the subject of Rapid Intervention which basically state the definition given by the National Fire Protection Association in its definition of a RIC in the standard *NFPA 1500 Fire Department Occupational Safety and Health Program* which states "that a RIC is a minimum of two fully equipped personnel on- site, in a ready state, for immediate rescue of injured or trapped firefighters" (NFPA 1500, 2002). This concept of two fully equipped firefighters prepared to perform some type of firefighter rescue has evolved as Jakubowski and Morton state in their text *Rapid Intervention Teams,* "have grown from two person crews as stated in the NFPA definition and have grown into an actual Rapid Intervention Team consisting of more than two

members" (Jakubowski, Morton, 2001). In an article titled *Better Get in Fast*, the author Jakubowski likens the RIC as a "safety tool for emergency responders" (Jakubowski, 1996) that the incident commander can utilize at a moments notice when the situation turns sour for the firefighters operating on the inside or for that matter in a situation where they could become lost or trapped.

The goal of a RIC was further identified in an article by Cline when he wrote "The objective of a RIC should be clear and known to all. The company's main purpose is to locate and rescue trapped or missing firefighters. It has no other purpose and must not get involved with basic firefighting procedures during this important task" (Cline, 1995). Dunn in a Firehouse Magazine article described the RIC as "helping the Incident Commander react to one of the worst emergencies on the fireground – a missing or trapped firefighter" (Dunn, 1998). The use of a RIC on an incident scene is one of the most crucial elements that an incident commander can deploy. As Pickett put it the "RICs are like the "Wild Card" for the Incident Commander" (Pickett, 1995) in regards to firefighter safety and accountability on the incident scene.

Safety on the incident scene is the number one goal for any incident commander and this is further reflected in an article by Cline in which he states "the two-in-two out concept is one of the most important safety advances for firefighters in a decade" (Cline, 1999). In his article viewing RIC Teams as a Wildcard, Pickett likewise describes the "RIC as a built in safety factor for our members" (Pickett, 1995). What is being addressed with the use of RIC teams is elementary in that we are looking at a problem that has plagued the fire service for years and that is the issue of safety on the incident scene. In their text *Command and Control 2*, Murgallis and Phelps state that the RIC "is

a critical function, and it is vital to recognize its importance to firefighter safety and survival on the incident scene" (Murgallis& Phelps, 2004). In summary of this question a RIC is a safety team used to help rescue firefighters in the event they become lost or trapped.

The second part of this question is why do we need RIC teams? What has happened that this issue has come to the front? Review of the literature has shown several factors that have occurred over the past decade to bring the RIC concept into the minds of incident commanders.

In his article *Rapid Intervention teams: A Fireground Safety Factor*, the author Cobb sites an NFPA statistic on fireground fatalities, "20% of fireground fatalities are related to firefighters becoming lost or disoriented in a building. In several cases once the incident commanders became aware of missing members, there were no resources to immediately available to rescue them. If what looks like a text book job what happens when Murphy's Law comes into play?" (Cobb, 1998). The 20% factor is one reason incident commanders should be utilizing the RIC concept at every incident.

In a special report released by the United States Fire Administration titled *Rapid Intervention Teams and How to Avoid Needing Them*, it states several factors that are echoed by other authors in different texts that have led to the use of RIC's. The issues stated in this report are:

- Training and equipment that they bring to task
- Staffing levels of the department
- Decision making skills of fire officers
- Discipline

- Building construction
- Nature of the fire itself (USFA, 2003)

The report states that “due to the declining number of fires, the experience on the fireground that firefighters experienced has been reduced compared to what their predecessors had a generation ago” (USFA, 2003). The report also cited issues with “fires burning hotter because of increased use of synthetics and polycarbonate materials coupled along with light weight building construction has caused the building to create a dangerous environment that did not exist years ago” (USFA, 2003). The report goes on to describe the lack of not only firefighters but the issue of “experienced firefighters and fire officers retiring being replaced by younger officers with comparably less experience to recognize a critical situation when it arises” (USFA, 2003). The report also sites the manner used to train firefighters from the previous way of using “Class A Combustible materials to temperature controlled fuel controlled scenarios that are less realistic” (USFA, 2003). In regards to equipment, the report states that the personal protective equipment worn by firefighters is excellent “but it is too protective allowing firefighters to advance deeper into the structure, get closer to the seat of the fire” (USFA, 2003). This creates a problem for the firefighters as the report states “the firefighters get hotter, depletes their energy supply, they run out of air and then are in trouble” (USFA, 2003). Some of the same issues were substantiated by other authors well known on the subject of rapid intervention crews.

In the text *Rapid Intervention Teams* by Jakubowski and Morton they attribute the rising need for the use of rapid intervention crews to the following:

- Failure to recognize rapidly deteriorating conditions

- Poor survival training
- Poor communication
- Inexperienced officers
- Failure to use safety equipment
- Water loss
- Freelancing (Jakubowski, Martin 2001)

In their text the authors addressed the issue of staffing as the underlying cause for failure to recognize deteriorating fire conditions. They specifically state "with minimal staffing and multiple assignments, firefighters may neglect ventilation, thus allowing heat and smoke to intensify" (Jakubowski, Martin 2001). The authors felt this lack of manpower could lead to the firefighters "rushing to get the tasks done, missing an important size up, not having proper hose lines in place and then opening a wall and a hidden fire turns into a major inferno trapping the firefighters" (Jakubowski, Martin 2001). The authors also cite the issue of firefighters "failing to maintain a escape route and get further into the building only to look back and see the room deteriorate behind them" (Jakubowski, Martin 2001).

One other issue that was addressed by Jakubowski and Morton is receiving a great deal of attention is survival training. The authors emphasized that "many departments just do not properly train their firefighters to survive" (Jakubowski, Martin 2001). This writer agrees that the subject of survival training is either very loosely addressed or not at all in the fire academies today. As the authors mention in their text, it is crucial to "train firefighters to minimize the potential for bodily harm" (Jakubowski,

Martin 2001). The authors mention several drills that could be used to prepare firefighters for survival training in the event they become lost or trapped, which include "smoke divers drill, firefighter survival course" (Jakubowski, Martin 2001) are recommendations that the authors have to manage this issue.

A big issue in the area of rapid intervention crews that these authors mention is effective communications. This has been an issue facing the fire service for many years with little or no progress in improving communications on the incident scene. The authors mentioned within their text, issues of "communicating on wrong frequencies, sharing channels with other organizations, sharing channels that during a storm may tax the radio system" (Jakubowski, Martin 2001). This problem, together with incompatible equipment between responding agencies creates problems for the incident commander in effectively communicating with their personnel or assisting agencies on the incident scene in the event of a lost or trapped firefighter.

Jakubowski and Martin in their text agreed with the United States Fire Administration Technical Report in regards to inexperienced fire officers being a contributing factor to the issue of rapid intervention crews. Citing almost the same exact rationale as the USFA report, they felt that "due to the lower number of calls, firefighters are becoming less experienced in their main responsibility - fighting fires" (Jakubowski, Martin 2001). This can be seen through the additional calls for service that fire departments are now facing such as EMS, hazardous materials, emergency management, or as the author's state "alarm system malfunctions, burned food, or other minor situations. This may lead firefighters to going for months before they experience a working incident" (Jakubowski, Martin 2001).

Failure to use safety equipment as cited in both reports is an issue for firefighters when they arrive at a working incident. Often they are in a hurry to get the problem resolved and get back to the station, disregarding safety procedures or equipment put in place. As the authors mention, some firefighters will "disregard the use of self-contained breathing apparatus (SCBA) with a personal alert safety system (PASS)" (Jakubowski, Martin 2001). As this writer has found there are many excuses offered as to why SCBA are not worn and in the view of safety they are not valid. Even the lack of wearing proper protective equipment such as nomex hoods and gloves can be a recipe for disaster for the firefighter that becomes lost or trapped in a structure.

Cobb in his Firehouse Magazine article attributes the need for rapid intervention crews due to the following reasons:

- Lightweight wood–truss construction
- Energy efficient windows
- Older buildings
- Lack of survival training

Cobb addressed the issue of "building construction failing trapping firefighters, new energy efficient windows retaining heat in the structure allowing the building to reach flashover quicker trapping firefighters, older buildings with possible balloon frame construction or add-ons that allow fires in concealed spaces trapping firefighters, and the one issue echoed by other authors, the lack of survivability training where firefighters do not know the basics of surviving in a structure" (Cobb, 1998)

The author McCormack in his text *Firefighter Rescue and Rapid Intervention Teams* sums up the need for rapid intervention crews simply by stating "Because stuff

happens. No matter how much we prepare, how much we train, no matter how invincible we think we are things go wrong on the fireground and firefighters get into trouble. That's why we need rapid intervention crews" (McCormack, 2003). McCormack discussed three reasons why he felt rapid intervention crews are needed on the incident scene:

- Dynamic fireground
- Inadequate preparation
- The unexpected

McCormack feels the fireground is very dynamic and there are many variables that can occur on the incident scene that create a need for a rapid intervention crew. The author cites, "the possibility of a backdraft, flashover, and structural collapse of or within the building can lead to lost or disoriented firefighters" (McCormack, 2003). This creates the feeling of what can go wrong will go wrong reality for the incident commander. In the text the author also relates to some of the various issues mentioned by prior authors, such as inadequate preparation of personnel, lack of training, inexperienced officers all of which lead to what can go wrong will go wrong way of thinking on the incident scene.

The Rapid Intervention Crew basic concept is to locate trapped or missing firefighters but after conducting this literature review for the first question the need or why we should have rapid intervention crews should become the main focus of any fire administrator.

What standards or requirements exist for Rapid Intervention Crews?

In researching literature for this section of the Applied Research Project, this author found several laws or standards that may regulate or encourage the use of Rapid

Intervention Crews. These regulations or standards are written by federal and state agencies along with associations of private concern that write standards for the fire service to encourage health and safety within the profession.

The Occupational Safety & Health Administration (OSHA), a division of the U.S. Department of Labor, was founded in December 1970 by Congress to reduce the number of workplace injuries that were occurring. This is to be accomplished through training, administrative standards and workplace inspections. Reducing firefighter fatalities and injuries are the greatest concern for any fire service group. The goal behind the OSHA Standard was to accomplish that.

In an article written by Cline, he states that OSHA adopted a respiratory protection program that in 1971 "required employers to establish and maintain a respiratory protection program for their employees wearing respirators" (Cline, 1999). The ruling covered the wearing of respirators, and their use in an immediately dangerous to life and health (IDLH) atmosphere. According to research in his Applied Research Paper (ARP) Bertrand states that in "1998 that federal OSHA issued a modified standard regarding respiratory protection. This Standard has been a topic of the fire service since it has emerged" (Bertrand, 2000). This Standard has become known as the Two-In, Two-Out rule. Cowardin mentions the standard in his article he states "The Two-In, Two-Out ruling has forced many departments to change the way they operate" (Cowardin, 1999). The ruling states under section 1910.134 paragraph (g) section 4 "procedures for interior structural firefighting, that once interior firefighting has begun that two employees have entered the IDLH atmosphere they must remain in visual or voice contact with each other at all times" (OSHA, 2000). The Standard continues by requiring "at least two

employees are located outside the IDLH atmosphere" (OSHA, 2000). The intent of this rule was to have two individuals outside the IDLH atmosphere that could affect a rescue should the two members in the IDLH become lost or trapped. The Standard describes the various roles the two-out personnel may play as long as they "do not jeopardize the safety or health of any firefighter working on the incident scene" (OSHA 2000). This ruling had a great impact on manning levels in the fire service with both fully paid departments and the volunteer side of the service. Where some departments tried to initiate an attack on a structure fire with just a three person engine company now required the use of five personnel minimum to comply with the OSHA ruling. This greatly affected all departments in OSHA compliant states regarding budgeting, personnel and the department's response to incidents to comply with the ruling.

The National Institute for Occupational Safety and Health (NIOSH) was created by "Congress in 1998 when it was recognized that something needed to be done to curb the problem of rising firefighter injuries and deaths" (NIOSH, 1999). The basic goal of NIOSH is to investigate all accidents involving line of duty deaths of firefighters and to make recommendations as a means of further preventing firefighter deaths. Even though NIOSH recommendations carry no actual enforcement or punishment powers, these recommendations are used by OSHA in developing their administrative rules regarding the operation of the fire service on an incident scene. In a document entitled *Preventing Injuries and Deaths of Firefighters due to Structural Collapse*, NIOSH discusses the various recommended requirements for OSHA'S Two-in Two-out ruling and the use of a Rapid Intervention Crew, items such as number of personnel operating at an incident scene initially, the establishment of additional Rapid Intervention Crews, and

communications on the incident scene. These recommendations are substantiated with cases investigated by NIOSH involving structural collapse where the presence of a Rapid Intervention Crew either located the trapped firefighters or the crew was not present, creating an unnecessary delay in locating the trapped firefighters.

The State of Wisconsin is not an OSHA participating state but issues its own administrative laws based upon rulings from OSHA and the NFPA standards. The Wisconsin Department of Commerce is responsible for issuing administrative codes that affect the operation of the fire service in Wisconsin both on and off the incident scene. There are two administrative codes that affect the fire service regarding Rapid Intervention Crews. In the administrative code titled *Comm 30 Fire Department Safety and Health* (COMM 30) under Subchapter IX – Emergency Operations under section 2 and section 3 Incident Safety Requirements and Rescue of Members, the code specifically addresses the issue of adequate number of personnel on the incident scene in a possible IDLH atmosphere. It specifically states, "A firefighter using self-contained breathing apparatus and operating in an interior structural fire shall operate in a team of two or more. Except in the case of an incipient or beginning stage fire, A back up team of at least two members wearing self contained breathing apparatus shall be available at the scene for rescue shall the need arise" (COMM 30, 2002). The code further states that one outside team member should have at a minimum of "a charged line committed to a safe non-affected area in or near the structure" (COMM 30, 2002). The code goes one step further than OSHA 1910.134 in requiring some type of hose line is available for the two-out crew members. The code allows one of the two-out members to perform other functions such as the OSHA requirement but also requires they are in some type of voice

contact with each other. In a personal interview with Mr. Joseph A. Hertel, Program Manager in the Division of Safety and Buildings in the Wisconsin Department of Commerce, questions were posed regarding issues of the strength of Comm 30 (see appendix A for list of questions) compared to OSHA, how does it differs from OSHA, and any NFPA standards that may be referenced by Comm 30. In regards to the strength of the Wisconsin Administrative Code compared to OSHA 1910.134, he stated "it is more stringent than the OSHA regulation, more restrictive in nature than the OSHA regulation" A second question dealt with actually establishing the two-in, two-out requirement. In response to this question Mr. Hertel stated, "It is up to who is going to be the incident commander, and that the code follows OSHA in that regard". The third question posed dealt with the issue of other jobs being performed on the incident scene by members of the RIC and Mr. Hertel related that "yes, the code allows them to have other jobs as long as the job does not affect fire ground operations."

Mr. Hertel was asked to clarify communications on the incident scene between the two-in and two-out personnel where OSHA requires visual voice contact or a signal line and whether it was covered somewhere else in the standard Mr. Hertel replied "that OSHA addresses the issue and the Wisconsin Code is silent on the issue." This could lead to a broad interpretation by Wisconsin incident commanders as to how the teams would communicate on the incident scene.

In regards to actual radio communications between team members, Mr. Hertel stated "Comm 30 doesn't address radio communications; it needs to be addressed in the code in possible revisions." A final question was asked in regards to the Wisconsin Code referencing any NFPA standards in regards to RIC and he stated "No, Comm 30 needs to

be updated to take in any changes that have occurred" J.A. Hertel (personal communication, November 19, 2007).

Research for this literature review located a second State of Wisconsin Administrative Code that could be used to mandate the use of the two-in two-out concept or RIC due to its using the OSHA standard by reference. In the code titled *Comm 32 Public Employee Safety and Health,* the document references the OSHA Standard 29 1910.134 requiring the use of two-in, two out in section 32.50 Incorporation of Standards by reference under section (2) when it states "the standards listed in the following tables are hereby incorporated by reference into this chapter" (Com 32, 1999). Listed in the table by reference standards is OSHA Standard 1910 which would indicate the adoption of the OSHA standard by the state in this code requiring the use of the two-in, two–out provision.

Research for this Applied Research Project found one organization that stands paramount in writing standards that are used by the fire service community in regards to firefighter safety and health and that is the National Fire Protection Association (NFPA). Chudy writes in an Applied Research Project that the NFPA standards are "standards that are probably the most recognized that guide the fire service and other businesses through a mixture of requirements that are used" (Chudy, 2004). Research found there are several NFPA standards that recognize the use of RICs or state the use of RICs within their context.

The most notable standard is NFPA 1500 *Fire Department Occupational Safety and Health Program.* The standard defines a Rapid Intervention Crew in section 3.3.53 as "a minimum of two fully equipped personnel on site, in a ready state, for immediate

rescue of injured or trapped firefighters" (NFPA 1500, 2002). In Section 8.4.1 the standard states "the fire department shall provide an adequate number of personnel to safely conduct emergency scene operations" (NFPA 1500, 2002). This standard continues to define the minimum number of personnel to safely operate on the incident scene as four by stating in Section 8.4.7 "In the initial stages of an incident where only one crew is operating in the hazardous area at a working structural fire, a minimum of four individuals shall be required, consisting of two individuals working as a crew in the hazard area, and two individuals present outside the hazard available for assistance or rescue at emergency operations where entry into the danger area is required" (NFPA 1500, 2002). This standard basically mirrors OSHA 1910.134 in requiring two members out when two members are operating in an IDLH atmosphere and the two out may have other duties as long as it does not interfere with firefighter safety or the operation of the incident scene.

In the chapter of NFPA 1500 under Section 8.5 Rapid Intervention for Rescue of Members the number of personnel for a RIC is stated again along with the required equipment that the RIC will need. In Section 8.5.2 this section states "A rapid intervention crew/company shall consist of at least two members and shall be available for a rescue of a member or a crew" (NFPA, 2002). The standard describes the equipment that the RIC members shall have by stating, "A Rapid Intervention Crew/Company shall be fully equipped with appropriate protective clothing, protective equipment, SCBA, and any specialized rescue equipment that could be needed given the specifics of the operation under way" (NFPA, 2002). This section of the standard also

states the Incident Commander role in the use of the RIC and how this section of the standard involving RICS shall comply with earlier sections of the standard.

The NFPA standard 1561 *Emergency Services Incident Management System* 2005 edition discusses the use of a Rapid Intervention Crew in two places within the standard. In Section 3.3.28 Rapid Intervention Crew/Company (RIC) it defines the RIC "as a minimum of two fully equipped responders on-site, in a ready state, for immediate rescue of injured or trapped responders" (NFPA, 2005). The standard discusses the need for RICS and the need for two in/two out. It also states "that the initial two out will be the IRIC or Initial Rapid Intervention Crew as the incident escalates the rapid intervention crew should expand and become a dedicated rapid intervention crew/company" (NFPA, 2005).

In the NFPA Standard 1521 *Fire Department Safety Officer* 1997 edition, the standard does not mention within its context the requirement for a RIC but does state in Section 4-3.2 that the "incident safety officer shall ensure that a rapid intervention crew meeting the criteria of NFPA 1500 is available and ready for deployment" (NFPA, 1997). Other sections of the standard mention under duties of the safety officer, the requirement for the safety officer to determine the needs for Rapid Intervention Crews and to see that they are available for deployment.

The NFPA Standard 1710 2001 edition, *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments* discusses not only the standard NFPA definition of a rapid intervention crew, the deployment of an initial rapid intervention crew and when the initial crew should be in place but what to do when the incident escalates beyond an

initial full alarm assignment. In Section 5.2.3.3.3 the standard requires "when an incident escalates beyond an initial full alarm assignment or when significant risk is present to firefighters due to the magnitude of the incident, the incident commander shall upgrade the IRIC to a full rapid intervention crew(s) that consists of four fully equipped and trained firefighters" (NFPA, 2001). It is interesting that this standard is the only NFPA standard that states a manpower requirement beyond the initial two in/ two out when it requires the use of four firefighters for a full rapid intervention crew.

NFPA Standard 1720 2004 edition *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Departments* goes through the requirement or use of RICS several times in its context. In section 4.6.6 under Initial Attack the standard requires "the capability of a dedicated Rapid Intervention Crew and provision of support activities for those situations that are beyond the control of the initial attack" (NFPA, 2004). NFPA Standard 1720 does not mention manpower requirements such as NFPA 1710 but does state in Section 4.9.5 under Special Operations Response that the "fire department shall have the capacity to implement a RIC during all special operations incidents that would subject firefighters to immediate danger of injury, or in the event of equipment failure or other sudden events, as required by NFPA 1500" (NFPA, 2004).

What type of training should Rapid Intervention Team members have?

Any training should address the fundamental skills involving search and rescue and emphasize to the firefighters the importance of such training. As Clarkson wrote in his Applied Research Project "continued firefighter training is the first line of defense towards our goal of going home to our families. Through training and fire prevention, we

can work to mitigate incidents and protect ourselves" (Clarkson, 2005). Leatherman writes in his Applied Research Project "Firefighters will become complacent if their skills are not maintained. Complacency will lead to injuries and can even become fatal" (Leatherman, 2007). To avoid this problem of complacency, one tactic that can be used is training, training and more training. There are several authors on the subject of training for RIC all agreeing that training is essential for the success of the RIC. OSHA even states in their standard for respiratory protection 1910.134 that the "employer is required to provide effective training to employees who are required to don respiratory protection equipment. The training must be comprehensive, understandable and recur annually, and more often if necessary" (OSHA, 2000).

Training of RIC teams is needed for the team to be successful and able to comprehend the assignment that is being asked of them. There are many issues to be dealt with in regards to training for the RIC, such as what level should team members be trained to for them in order to participate in RIC activities, what types of equipment should they train on, how often should this training occur, these are questions that any fire administrator should do the appropriate research to determine the needs for the RIC for their department. In training, as Snyder says in his Applied Research Project "the training program must be realistic and in line with the department's capabilities" (Snyder, 2001). Snyder goes on to state "while basic skills are being honed there is no better time to practice rapid intervention skills" (Snyder, 2001). This is also where other authors on the subject of rapid intervention stress the importance of basic everyday skills as essential to perform as members of a RIC. Jakubowski and Morton in their text stress that "at a minimum RIC members should meet Firefighter I requirements (NFPA 1001). This will

qualify them to perform basic search and rescue, forcible entry, and ladder operations, as well as the use of ropes and SCBA" (Jakubowski, Morton 2001).

The authors go on to list the additional following requirements in regards to training that RIC members should have:

- Building construction
- Basic rope rescue
- Collapse rescue
- Structural fire rescue
- Firefighter survival
- Vehicle rescue
- Emergency Medical Technician
- Firefighter II (Jakubowski, Martin 2001)

In the United States Fire Administration Report on Rapid Intervention Crews the subject of training is discussed with much of the emphasis as other authors in regards to stressing the fundamentals of firefighting and search and rescue. The report is similar to the Leatherman Applied Research Project in regards to complacency especially on the normal or average call. The report states "A casual, cavalier attitude toward answering calls can lead to disaster or result in injury or death. Basic firefighting skills and survival methods are reinforced during RIC training" (USFA, 2003). The report goes on to mention several areas in regards to training that were important involving training for RICs. The report states the basics as were covered in Firefighter I, but the report goes further into detail in regards to additional types of training that RIC members should

have. Mention was made of issues as RIC members should "review and discuss pre-plans to identify the more complex structures and land uses, and then use pre-plans as possible scenarios where firefighting is more risky. The report discussed reviewing fires that may have been intentionally set, possibly with accelerants or booby traps that may trap firefighters quicker" (USFA, 2003). There is no replacement for practical training in regards to RICS the drills that could be practiced are endless but the need to make the training as realistic as possible to gear the mindset of firefighters to the task they are about to face cannot be emphasized enough. The United States Fire Administration report mentions the psychological stress related to being a member of a RIC. It states "it is nearly impossible to simulate in training the stress levels associated with rescuing a downed firefighter where one's efforts directly affect the survivability of another member" (USFA, 2003). But are there ways to compensate or try and be prepared for the stress created by the sudden introduction of a "mayday" into the Incident Commander's plans? Yes, again making the training as realistic as possible. The USFA report describes how the Tempe, Arizona Fire Department did just that by creating "outside stressors." the report states that "the fire department used an acquired structure without live fire, and increased the stress level for the RIC by adding such noise as PASS alarms sounding, hysterical screaming, apparatus engine noise, and chainsaws" (USFA, 2003) to increase the training effect and mental preparedness of its RIC training. These areas are often overlooked in the training realm and should be included to make the training simulate the real situation as much as possible.

No matter the type of training given to firefighters as Lund stated in his article *Tactical Considerations for The Rapid Intervention Team* we need to "instill in training

for RICS the need to be “proactive” and not “reactive” in our approach to RICS” (Lund, 1999).

What type of equipment is needed to establish a Rapid Intervention Crew?

Research for the literature review for this question found that the equipment required for RICS could be incident specific. In an operational document from the Los Angeles Fire Department it states “equipment that is required for one incident may not be needed for another mission” (City of Los Angeles, n.d.) In a chapter from the *Fire Chief’s Handbook* it states all of the incidents that a RIC could possibly be used for and upon examination one could see that yes equipment required for each could be incident driven. Some of the incidents described in the chapter requiring a RIC were:

- Fireground operations
- Confined space rescue
- High-angle rescue
- Dive rescue
- Collapse search and rescue
- Landslides and mudslides
- Deep shaft rescue
- Mud and debris flows
- Flood rescue
- Swiftwater rescue
- Avalanche rescue (Coleman, 2003)

The types of equipment for each incident above could be endless. For this literature review this author will focus on equipment required for fireground operations.

In regards to laws or standards requiring or specifying equipment required for the RIC or two out OSHA 1910.134 section (g) states that the required equipment for a two-in two-out scenario would include “pressure demand or positive pressure SCBA’s or a pressure demand or other positive pressure supplied –air respirator with auxiliary SCBA” (OSHA, 2000). The regulation does not specify any particular equipment the team should have but does state that the two out should have “the appropriate retrieval equipment for removing the employee(s) who enter these hazardous atmospheres where appropriate retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk from entry” (OSHA, 2000). In regards to equipment needed for the two out members the Wisconsin code states, “the members shall have SCBA and at least one member shall have a charged hose line” (Comm 30, 2002).

Research for this question found in the NFPA standard *1500 Fire Department Operational and Safety Program* that the requirement follows closely to the OSHA standard and states in Section 8.5 under Rapid Intervention for Rescue of Members that “a rapid intervention crew /company shall be fully equipped with the appropriate protective clothing, protective equipment, SCBA, and any specialized rescue equipment that could be needed given the specifics of the operation under way” (NFPA1500, 2002). Any other NFPA standards that mention RICS state why or when they are needed but gives no specific mention to equipment necessary for the RIC.

The author McCormack in his text *Firefighter Rescue & Rapid Intervention Teams* states that the “tools used to perform rapid intervention operations on the fireground, and where these tools should be staged, is an area that receives considerable amount of debate” (McCormack, 2003). Research for this question found many different

ideas regarding what tools whether basic or advanced rescue should be considered for use by the RIC. McCormack states that there should be a "basic compliment of tools to be carried by each RIC member" (McCormack, 2003). McCormack lists basic tools as a "portable radio, flashlight and hand tools such as wire cutters, knife, door chocks, personal rope, and webbing" (McCormack, 2003). The Authors Jakubowski and Morton state in regards to basic equipment that "the rapid intervention crew's basic equipment is similar to that used for structural firefighting" (Jakubowski, Morton, 2001). The authors describe the equipment for a RIC can be divided into two types "personal equipment carried by all team members, and team resources that will be staged or collected on the scene" (Jakubowski, Morton, 2001).

When defining personal equipment these authors viewed items as "full turnout gear, SCBA, portable radio, and personal survival equipment as necessary items" (Jakubowski, Morton, 2001). In regards to team equipment, Jakubowski and Morton emphasize the need for ropes of varying size and lengths. The ropes could be used as "one for search and one for rescue of the lost or trapped firefighter" (Jakubowski, Morton, 2001). Other equipment recommended by the authors included:

- Power equipment
- Hydraulic tools – powered and hand devices
- Ladders
- Vent fans
- Spare SCBA
- Lighting equipment (Jakubowski, Morton, 2001)

In the report by the United States Fire Administration items that were found to be essential by the writers are as follows:

- Extra SCBA with harness, regulator and masks
- Search rope
- Forcible entry hand tools ie: axe, sledge, halligan bar, and bolt cutters
- Mechanical forcible entry tools such as chain saws, metal cutting saw, and masonry saw
- Hose line
- Ladder complement
- Thermal Imaging Camera
- High intensity handlight (USFA, 2003)

The report went on to mention that there were “pre-assembled systems and commercial systems that should be considered as well” (USFA, 2003).

The Los Angles Fire Department in their operational document listed basically the same equipment as prior authors and the USFA report but also added items as:

- Quartz lights
- Drop bags
- Chalk
- Pike Poles
- Lighted rescue lines
- Mattress carrier
- Strobe lights
- Cyalume® sticks

- Litter Basket (Los Angles, n.d.)

The operational document included the above equipment, but mentioned the use of a Paramedic RIC who should carry with them items as “Gurney and backboard, Oxygen, Defibrillator, and a Trauma box” (Los Angles, n.d.).

In an operational document from the Village of Jackson Fire Department the document requires the RIC to have the following equipment with them when assembling a RIC:

- SCBA
- Extra SCBA
- One set of Irons
- High Rise Pack with Nozzle
- Stokes Basket
- Two hand lights
- Two portable radios
- Chainsaw (Jackson F.D., 2002)

It can be seen the equipment that different authors or entities may require vary based on anticipated needs of the organizations or what the author on the subject may have found to be successful in their studies and writings on the subject of necessary equipment for RICS. The final decision comes down to the incident itself as to the equipment that will be needed for the rescue of lost or trapped firefighters.

In summary, after completing a review of the literature regarding what a RIC is and why they are needed it can be realized that without the staging or implementation of a RIC on standby the ability to rescue lost or trapped firefighters can be very difficult at best.

Fireground pandemonium may set in and turn the scene into one of chaos. The laws and standards that exist will not only require departments to use the RIC concept but encourage the use of the team in areas other than firefighting. The ultimate goal of any RIC is to relieve the stress and anxiety of any incident commander when the term "mayday" is transmitted across the air.

Procedures

Procedures for this project focused on four main areas. First what is a Rapid Intervention Crew and why do we need them was examined. Research for this project was started at the National Fire Academy's Learning Research Center (LRC) in Emmitsburg, Maryland after consultations with instructors for the class Emergency Analysis of Fire Service Operations in Emergency Management at the National Fire Academy in October of 2007. The collection of various publications such as Federal OSHA Regulations, State of Wisconsin regulations regarding RIC teams in the State of Wisconsin, NFPA standards as well as well known authors on the subject of Rapid Intervention Crews was researched and copied for further study.

Various Internet search engines as Yahoo, Google, and Alta Vista were utilized to obtain further information by authors on the subject of Rapid Intervention Crews and to obtain various publications and departmental operational procedures in regards to Rapid Intervention Crews. Research was also conducted on websites of various fire publications such as Firehouse, Fire Engineering, and Fire Chief to obtain additional information on the subject. Research was conducted via the internet on the Learning Research Center website and various Applied Research Projects on the subject of RICS

were ordered via the inter-library loan system for study. This was accomplished by entering words as rapid intervention team, rapid intervention crew, firefighter assist search teams, and rapid assist team to achieve the desired results.

At Watertown, research was conducted in the fire department library searching the applicable NFPA standards in regards to Rapid Intervention Crews. Any related texts were also obtained from the Watertown Library and additional material was found in the personal library of this researcher. All material was photocopied and highlighted for future reference. As copies of information were read it was color coded, highlighted, and placed in color coded folders pertaining to each question to make information retrieval much easier. All information was reviewed for clarity and pertinence to the issue of Rapid Intervention Crews and highlighted again for specific information.

This researcher felt that the literature review produced the necessary information as to what a rapid intervention crew is, why they are needed, what laws and standards do exist requiring the use of rapid intervention crews. This research also aided in determining what other departments have done in regards to the questions posed in the literature review.

To determine what Wisconsin laws or codes that require a Rapid Intervention Crew a personal interview was conducted with Mr. Joseph A. Hertel, Program Manager in the Division of Safety and Buildings in the Department of Commerce a branch of the State of Wisconsin which governs the operation of fire departments through out the state through administrative laws. Questions were sent to Mr. Hertel prior to the interview (see appendix A) so he could be prepared with the appropriate information.

Through this interview Mr. Hertel gave this researcher copies of applicable OSHA regulations and the latest Wisconsin regulations in regards to Rapid Intervention Crews. Several questions were posed to Mr. Hertel referencing strengths and weaknesses of the Wisconsin regulations as compared to the Federal OSHA regulations and all answers were recorded for inclusion in this research paper.

Two surveys were conducted regarding questions posed in this research paper and to aid this researcher in developing recommendations for the Watertown Fire Department. The first survey was directed at departments similar in Watertown's size and population within the State of Wisconsin. The surveys were distributed by mail to all fire chiefs with an explanatory cover letter and self-addressed stamped envelope. (See appendix B, C and D) Of the 20 surveys sent out 17 surveys were returned. The 17 that responded to the survey indicated they used some form of a Rapid Intervention Crew. Whether it was complying with the two- in/two- out principle or having a full fledged rapid intervention crew. Some surveys returned included copies of that department's operational documents that this researcher will use to aid in making recommendations for the Watertown Fire Department with this paper.

A second survey was conducted (see Appendixes E, F, and G) and was distributed by the author to full- time personnel of the Watertown Fire Department with the intent to seek the input of the departmental members in regards to establishing a Rapid Intervention Crew, training for the crew, tools that should be included for use with the Rapid Intervention Crew, when the Rapid Intervention Crew should be activated, and if they felt a county wide Rapid Intervention Crew would be of any benefit. There were 16 surveys distributed with 15 returned to this researcher.

The literature review supplied an abundant amount of information which was substantiated by surveys sent to Wisconsin Fire Departments. The literature review, returned surveys and the personal interview provided enough information to assist this researcher in planning for an effective Rapid Intervention Crew for the Watertown Fire Department.

Results

The results of the research review answers the research questions posed in the abstract and the introduction.

What is a Rapid Intervention Crew and why are they needed?

Research for this proposal discovered many different terms to describe what a Rapid Intervention Crew is. All of the terms basically mean the same thing, a dedicated team of firefighters that will perform search and rescue of lost or trapped firefighters. The research also substantiated as to why the fire service needs Rapid Intervention Crews reviewing such items as an incident commander's "Wild Card" to enable them to provide assistance to the lost or trapped firefighters. This researcher agrees that no matter the term used, the definitions still point to the example given in the NFPA Standard 1500 *Fire Department Occupational Safety and Health Program* states that the "Rapid Intervention Crew is a minimum of two fully equipped personnel on site, in a ready state, for immediate rescue of injured or trapped firefighters" (NFPA 1500, 2002).

Cline in his article *Rapid Intervention Companies* stated that the "object of RIC should be clear and known to all. The company's purpose is to locate and rescue trapped or missing firefighters. It has no other purpose and must not get involved with basic firefighting procedures during this very important task" (Cline, 1995). Cobb wrote in his

article, *A Fireground Safety Factor* that "the basic concept of the rapid intervention crew is simple- they are the first responders sent to rescue or locate trapped or missing firefighters" (Cobb, 1998). The report by the United States Fire Administration states, "The use of a Rapid Intervention Crew is the only way to prevent firefighter deaths" (USFA, 2003).

Research for the second part of this question produced several results why the fire service needs Rapid Intervention Crews along with their use being a safety factor for the Incident Commander, McCormack stated in his text that RICS are needed strictly because "stuff happens" (McCormack, 2003). The fireground is such an evolving dynamic place, that the chance for problems to arise are numerous such as firefighters freelancing, becoming lost or trapped unknown hazards due to building construction and the like.

Research for this part of the question produced results that show there are many reasons for the inclusion of a RIC on the fireground. The United States Fire Administration report listed several reasons for the need for a RIC. The report stated the following:

- Hotter fires causing building components to fail
- Use of lightweight construction that fails quicker
- Due to the decrease in fires the experience level of firefighters is less
- Older officers retiring, newer officers with less experience taking over
- Personal Protective gear allows firefighters to get further into the structure and possibly get into trouble
- Due to inexperience abilities to recognize fire conditions as flashover are diminished (USFA, 2003)

Further research by other authors produced results similar to the USFA report but added other reasons for the need for a RIC. Jakubowski and Morton feel that the following should also be used as criteria by departments to establish a RIC:

- Poor survival training
- Poor communications on the fireground
- Failure to use safety equipment
- Water loss
- Free lancing (Jakubowski, Morton, 2001)

McCormack in his text lists a major reason for the need for RIC is the "safety of the firefighters operating on the fireground" (McCormack, 2003). The safety of their personnel should be paramount in any Incident Commander's mind. Results for this question showed that there is no more important aspect for the Incident Commander than having a team ready to rescue their own people. As Coleman stated in the *Fire Chief Handbook* "Rapid Intervention Crews are essential because it involves saving the lives of those who voluntarily placed themselves in harm's way to help others" (Coleman, 2003).

Results for this question have shown that the name applied by jurisdictions does not mean anything different in regards as to how the team will function. It comes down to the same basic principle that the Rapid Intervention Crew is there for the rescue of lost or trapped firefighters in an expedient manner by well trained and equipped teams of firefighters.

What Standards are Requirements exist for a Rapid Intervention Crew?

Research for this question provided several results in regards to the requirement or need for a Rapid Intervention Crew. Research produced two types of results for the question with the first result being a mandated regulation or administrative requirement. The Federal OSHA Regulation under 29 CFR 1910.134 General Industry regulations has a requirement governing the use of SCBA and structural firefighting when firefighters are entering an atmosphere that may be considered Immediately Dangerous to Life and Health (IDLH) that "two personnel are located outside the IDLH atmosphere and they should have the appropriate retrieval equipment for removing the employees who enter these areas" (OSHA, 2000).

Results showed on a state level that Wisconsin has regulations regarding the use of the RIC or two- in two- out. In the administrative regulation Comm 30 Fire Department Safety and Health it states under emergency operations section 3, Rescue of Members that members when "operating in an interior structure fire shall operate in teams of two or more. It also requires when these two members are operating in this IDLH atmosphere that there be two members outside the IDLH atmosphere in SCBA and a charged hose line to affect a rescue if needed" (Comm 30, 2002).

The results of a personal interview with Mr. Joseph A. Hertel of the Department of Commerce confirmed the authority of this regulation and its regulatory authority compared to the Federal OSHA Regulation. The interview also produced results where the state regulation duplicates OSHA in some regards such as requiring the two out when members are in the IDLH but also showed weaknesses in regards to communication of members on the two out team. During the interview with Mr. Hertel, discussion showed that the Comm 30 chapter needs to be revised or updated to bring it in line with current

Federal Regulations and adopting industry wide standards in regards to the two in/two out rule.

In the private sector, research for the requirements for a RIC team in the fire service produced several results. The National Fire Protection Association in several of its standards regarding operations on the fireground defines what a RIC is and when it is needed. Research showed the one NFPA standard that specifically defines and addresses requirements for a RIC in the NFPA Standard 1500 *Fire Department Occupational Health and Safety Program* 2002 edition. This standard defined what a RIC is, its function on the incident scene and tools that would be required under this standard. Results further showed that other NFPA standards mention RICS by definition or within the contents of a specific section requiring the use of a RIC but nothing as definitive as NFPA 1500.

What type of training should Rapid Intervention Crews have?

Research for this section found results from regulations, standards and several authors in regards to training for a RIC and their recommendations as to what level RICS should be trained for.

In the OSHA standard regarding training the regulation states that the “employer is required to provide effective training to employees who are required to don respiratory protection equipment. The training must be comprehensive, understandable and recur annually, and more often if necessary” (OSHA, 2000). In the State of Wisconsin research produced results from the administrative document Comm 30 that state under Subchapter VI Training and Education that “a training program for any firefighter engaged in fire ground operations shall include procedures to effect his or her safe exit

from a dangerous area if equipment fails or fire conditions change suddenly" (Comm 30, 2002).

In the NFPA standard 1500 on Occupational Safety and Health it states in regards to training in section 4.9 under training and education that "training in safety procedures relating to all fire department operations and functions is provided to all members" (NFPA 1500, 2002). This would certainly include RIC since the subject was shown in research from the literature review that RIC'S are considered a safety procedure for the rescue of lost or trapped firefighters.

In the report by the USFA it mentions training for RIC as a "refresher of the fundamentals of firefighting and search and rescue. The training should be used to stress and attitude of safety and caution in responding to incidents combined with the art of firefighting" (USFA, 2003).

Research indicated that some authors recommend at least the minimum of Firefighter I certifications as a requirement to be a RIC. More specifically, Jakubowski and Morton state "this will qualify them to perform basic search and rescue, forcible entry, and ladder operations as well as to use ropes and SCBA" (Jakubowski, Morton, 2001). McCormack stated that firefighter training in regards to RICS "should be frequent and on going. Firefighters should continually practice individual firefighter survival skills as well as basic engine and truck company operations" (McCormack, 2003). Research available through various Applied Research Projects produced results indicating areas that should be trained on by fire department personnel. In his paper, Leatherman writes that "some training topics that should be considered when conducting skills and RIC training should include but not limited to:

- Building construction
- Scene size-up
- Fire Behavior
- Search and Rescue techniques and scenarios
- Use of equipment such as Thermal imaging cameras, SCBA
- Self rescue techniques" (Leatherman, 2007)

Results for this question have shown that training is an essential part of the fire service. Techniques for RIC and survival training should be practiced weekly, if not daily, to see that all personnel skills are kept honed to deal with the possible issues that they may face in the event of fellow firefighters or themselves becoming lost or trapped. What equipment is needed to establish a Rapid Intervention Crew?

Results for this question were found not only in a review of the literature but also through the results of a survey that was mailed out to different departments through out Wisconsin which were similar in size and personnel as Watertown. The results from the literature and the surveys indicate that the RIC equipment needed could be incident specific. As stated in the *Fire Chief's Handbook* "there are many incidents that may require a Rapid Intervention Crew that range from fires through confined space to hazardous materials with each having its own specific requirements in regards to tools that maybe needed for the RIC" (Coleman, 2003). This Applied Research Project focused on the equipment that was required for the rescue of lost or trapped firefighters in regards to structural firefighting. These tools or kits as some departments referenced them in the survey could be carried on a heavy rescue or a dedicated apparatus for the RIC. The kits could include items as tools for cutting, various types of ropes, thermal

imaging camera or cameras, hand lights, variety of hand tools, and additional SCBA. The survey also showed that some departments went past the norm and were showing a proactive approach to RIC equipment by listing heavy extrication items as:

- Axes
- Sledge hammers
- Chain saws
- Trauma bags
- Air bags
- Hydraulic tools
- Stokes basket
- Bolt cutters and torches
- Webbing

One department was proactive enough to include an Automatic External Defibrillator (AED) as part of its equipment for the RIC to take into the structure. It needs to be emphasized in this section of this research paper that the above equipment list is appropriate as long as the RIC is made up of sufficient personnel to advance this equipment in to the area the firefighters are either lost or trapped. If the RIC is comprised of just the bare two- out the equipment maybe relegated to basic hand tools and SCBA to attempt to locate or free the firefighter until additional help could be summoned.

Research of the literature for tools to be used found various authors on the subject with lists similar to equipment lists within the surveys. Authors researched recommended the use of small hand tools for quick release and larger forcible entry style tools for heavier entrapment. Authors Jakubowski and Morton listed items such as “Kelly

bars, a variety of hooks, battering rams, and wire or bolt cutters" (Jakubowski, Morton, 2001) as items that could be used in regards to small or medium hand tools. Author McCormack essentially limited the tools to a small number that would be carried by each RIC team member. His list included "portable radio, flashlight and assorted hand tools" "McCormack, 2003). The list of hand tools included items such as "door chocks, wire cutters, personal rope, and webbing" (McCormack, 2003). This list would be manageable for the initial two out team which was a concern expressed in some of the surveys in regards to having appropriate manpower available to do an effective RIC with the number of tools that some authors were recommending.

The report on RIC by the USFA indicated a list that basically complimented previous authors and included items as:

- Extra SCBA complete with harness
- Search rope
- Hand tools
- Mechanical forcible entry tools
- Hose line
- Ladders for access (USFA, 2003)

Results again for this question revealed numerous variations to the tools required by various authors based on their past experiences, or as in the surveys based upon basic manpower available at the scene, or just the severity of entrapment of the firefighters.

In a survey conducted of 20 departments equal in size to Watertown in manpower, or type of department and located in Wisconsin, it was found that the following survey results (see appendix C), all departments use some form of a Rapid Intervention Crew.

One objective of this survey was to determine if the departments had a dedicated crew strictly for Rapid Intervention. Survey results showed six departments used some type of a dedicated team whether it was always assigned to the same engine or squad or they utilized some form of a county wide RIC team which was a question in the survey. All departments were attempting to comply with the Wisconsin Administrative code Comm 30 in supplying the two out personnel for the team.

Departments were asked if they had specific guidelines in regards to RIC's. 11 departments stated they had some form of a standard operating guideline which they supplied to this author to be utilized for recommendations for a Watertown RIC. Due to manpower issues, the question was asked if they utilized mutual aid for their RIC. Six stated no "they preferred to keep the RIC personnel in house with the greatest concern being the training levels for the mutual aid companies.

The survey asked what tools they assigned to the RIC. The survey results showed the majority of the departments utilized lists similar to those offered by earlier authors in this paper. The results of this question were fairly consistent and revealed items such as hand tools, Thermal Imaging Cameras, SCBA, and rope. One item that appeared in the tools question was pre-arranged RIC Packs that were kept on certain apparatus which apparently allowed the crew to grab the RIC Pack and go, allowing quicker access to the fireground and alleviating having to go through compartments to find the appropriate tools.

One question that revealed a difference of opinion in regards as to when the RIC is called for showed some departments complying with the two- out rule, with others leaving it up to the discretion of the Incident Commander, and still others depending

upon the severity of the incident. Some departments surveyed suggested whenever there is an event that presents a hazard to firefighters.

In preparing to institute a RIC program at Watertown, during the survey it was asked of the responding departments what frequency that they trained during the year. Results for this question ranged from annually to four times a year. The results of this question were a little surprising given the nature of the RIC's responsibilities.

The last question asked if the responding departments felt there was any benefit to a county RIC. 50% stated "yes" with some teams in place and some respondents answering "yes" as along as the county teams were trained. This same question was offered in a survey to Watertown personnel and the results will be discussed in that section of the paper.

An explanatory letter and a survey were distributed to Watertown personnel, 16 surveys were distributed and 15 were received (see Appendix D). The first question attempted to achieve what is needed to establish a RIC or policy at Watertown. The majority overwhelmingly stated additional personnel and training for the concept to be effective. One respondent even answered a team that would be out of service to other calls which has been an issue with utilization of the crew from the ambulance where they are initially assigned RIC and an EMS alarm is received and they must leave according to state EMS policy (see background and significance).

In the second question, this researcher was trying to establish when members felt a RIC should be called to the incident scene or established. The majority answered on any working structure fire or when the first in crew needs help. Some members stated when crews enter the building; a RIC should be in place. There has been some

controversy at Watertown as to where the RIC should be staged awaiting assignment. The survey revealed that the members surveyed felt that the crew should be staged close to the entry of the initial crew. Nothing was mentioned in any of the surveys about allowing the crew members to do other jobs as allowed by OSHA or Wisconsin Comm 30 rules.

In regards to tools and RIC packs, all agreed there should be a RIC pack aboard the apparatus. If one was not available the tools listed by each respondent was in line with the tools mentioned in the state survey and those of the authors in the literature review. Items such as SCBA, forcible entry tools, axes, Thermal Imaging Camera, and ropes were among the tools mentioned to be carried by the RIC. A seventh question which was designed to see what level of training should be recommended for the Watertown Fire Department resulted in answers of specialized training done on a monthly basis to general basic firefighting training.

It was asked of the survey respondents if they felt there would be in benefit to a county- wide RIC and the answers received were 50% for no county wide team with those responding “no” stating it would not be practical because the county is spread out too far apart. The 50% for a county wide team stating it would ease manpower problems and could be utilized as long as the training is consistent. The results of both surveys will be used to make a recommendation for the Chief Administrator of the department along with the research obtained in regards to having an effective Rapid Intervention policy in place for the City of Watertown.

Discussion

The purpose behind this Applied Research Project is to recommend a policy or procedures that will establish a framework for the implementation and use of a Rapid Intervention Crew for the Watertown Fire Department. Basically it is understood that the RIC is a safety tool for the incident commander as the author Jakubowski states "it's a safety tool for the emergency responders" (Jakubowski, 1996). We are looking at preventing the loss of firefighters with the implementation of such a team. With the use of a RIC we could allow the incident commander to react as Dunn states "to one of the worst emergencies on the fireground – a missing or trapped firefighter" (Dunn, 1998).

This concept of a two in two out requirement or recommendation is one of the greatest safety issues to face the fire service in many years. By establishing and utilizing the RIC concept, it allows the incident commander to accomplish a very high safety priority on the incident scene. As Cline states in regards to the two in/two out concept "that this is one of the greatest safety advances for firefighters in a decade" (Cline, 1999). By utilizing a RIC as fire service administrators and leaders we are preparing for the worst or to put it in fire service terms "pre-planning" for the worst dilemma that could face an incident commander. By pre-planning with the training and implementation of a RIC we are as Pickett describes "planning a built in safety actor for our members" (Pickett, 1995).

With this built in safety factor we are addressing an issue that has been and continues to plague the fire service for years and that is the issue of safety for firefighters on the incident scene. As the authors Murgallis and Phelps state in regards to the RIC "it

is a critical function and is vital to recognize its importance to firefighter safety on the incident scene" (Murgallis & Phelps, 2004).

As fire service administrators and leaders we should not only look at the requirements for establishing a RIC policy and training for their use but why do we need to keep such a team on standby? What has drastically changed in the late 1980's and 1990's that have brought this RIC concept to the forefront of any incident commander's mind? Author Cobb cites a NFPA statistic that showed "20% of fireground fatalities are related to firefighters becoming lost or disoriented in a building. In several cases once the incident commanders became aware of missing members there were no resources available to rescue them" (Cobb, 1998). This 20% factor should be grounds enough for any fire service administrator to take a very serious look at establishing a RIC policy for their departments. All administrators should look at the rationale that is available in the literature as to why we need these teams and what has changed to bring about rules and standards that require the use of the RIC.

As stated in the United States Fire Administration report on Rapid Intervention Crews items such as staffing levels are inadequate, where departments do not having enough training whether it is in fire extinguishment methods or even survivability training can lead to the use of a RIC on the incident scene. As Jakubowski and Martin state "many departments do not train their firefighters to survive" (Jakubowski & Martin, 2001). This lack of training and experience has led to the 20% factor as stated in Cobb's article with apparently one method of correcting the situation being through the mandating of rules and standards by agencies outside the fire service.

OSHA, Wisconsin Comm 30 and the NFPA standards have been in existence for many years yet the fire service no matter if you are on the full time side or the volunteer side still fail to comply with these rules or standards completely. One has to question as to why this is still a factor was addressed in an ARP by Sanchez when he stated "fire departments get bogged down with other priorities as EMS, hazardous materials WMD training and the like" (Sanchez, 2000). This researcher has to agree we have become our own worst enemies in regards to becoming so busy with the items mentioned in Sanchez's ARP that we are failing to pay attention to the major issue that face fire departments on the fireground scene and that is firefighter safety.

A question that should be asked by government and private standard writers is should there be a penalty for failure to follow the mandated or recommended RIC requirements? What could happen if a department would elect not to follow the requirements as set forth in NFPA standards? Research has shown that some states such as Wisconsin incorporate these standards into their administrative codes thus making them law. This could be looked upon as a way to enforce the use of a RIC on the incident scene by departments of all sizes. Rukavinia takes the following position on standards, "in the fire service written standards are the norm, these standards define or describe acceptable practices" (Rukavinia, 1998). If these standards describe acceptable practices that are accepted nationally such as the use of RICS, would it not be in the best interest of fire departments to follow the standard or requirements as in NFPA 1500? This author feels by following the established administrative codes and applicable NFPA standards groundwork can be established that will allow for the implementation of a RIC on the incident scene.

Training is always an important issue for fire service administrators. Without the proper training and constant reinforcement of policies and procedures through training problems are sure to occur. The question has been proposed as to what types of training are needed for RIC is there specialized training? What basic fundamentals should RIC members have? This author feels that any type of training should begin with the essential skills involving search and rescue. As Clarkson stated in his ARP "continued firefighter training is the first line of defense towards the goal of going home to our families. Through training and prevention we can work to mitigate incidents and protect ourselves" (Clarkson, 2005).

Training is the background and foundation of any fire department organization. The lack of training can again be linked to the USFA report in regards to the need for RIC due to lack of fires allowing experience on the incident scene. The only way viable for the fire service to gain experience then is through training on the basics. As Leatherman stated in his ARP without proper training reinforcing the basics "firefighters will become complacent if their basic skills are not maintained. Complacency will lead to injuries and even become fatal" (Leatherman, 2007). The only cure for this complacency as stated in the Leatherman report then is training, reinforcing the basic skills necessary for the survival of firefighters on the incident scene. Even the Federal Government, in its OSHA standards, reinforces the idea of training when it states that "training must be comprehensive, understandable, and recur annually and more often if necessary" (OSHA, 2000).

Some authors such as Jakubowski and Morton feel training for RIC should begin with "the minimum of RIC members having met Firefighter I requirements. This will

allow them to perform the basic search and rescue, forcible entry, and ladder operations" (Jakubowski & Morton, 2001). No matter the level found to be suitable by the individual department, this training should be thorough and repeated to keep the skills of all department personnel up to standard were any member can function as a member of a RIC at any given time.

In the matter of tools required by a RIC on the fireground may be relegated to the size of the department, the number of units responding, or plain availability of personnel to participate as RIC members. There are laws and standards that state certain types of equipment but none that are specific as to equipment needed. A question could be asked is, should there be something spelling out the equipment required to function as a RIC? Again, this will depend on department size, number of members available at the incident to participate and to try and require a small volunteer department to carry the same items as a large major department would certainly place a strain on their limited budgets.

In research if the departments should follow OSHA or NFPA 1500 where it states "members should be fully equipped with the appropriate protective clothing, protective equipment, SCBA and any specialized equipment that could be needed to get the specifics of the operation under way" (NFPA 1500, 2002). Departments should consider the recommendations of various authors on the subject of RIC such as McCormack. He addressed the issue of tools by stating "that there should be a basic complement of tools to be carried by each RIC member. These tools could consist of items as portable radio, flashlight and hand tools" (McCormack, 2003). This small amount of hand tools should allow any department to begin an effective RIC on the incident scene. The amount and

types of tools again is going to be department specific being relegated to available manpower to handle large amounts of equipment.

The use of a well trained and equipped RIC can alleviate a lot of problems for incident commanders in regards to firefighter safety. With the completion of this ARP it is hoped that with the cooperation of the union at Watertown and the willingness of the administration to work together, an SOG can be drafted and placed into effect that will establish an effective Rapid Intervention Crew. This concept will assure the safety of all fire department personnel. Whether this concept employs the use of Watertown personnel or the formation of a county wide team the use of a Rapid Intervention Crew on the incident scene should be mandatory for the Watertown Fire Department in regards to firefighter safety.

Recommendations

With the information found during the literature review section of this Applied Research Project, it has been determined that the Watertown Fire Department needs to place into affect a Standard Operating Guideline on Rapid Intervention Crews. These guidelines should cover the implementation, staffing, training and tool selection for structure fires. This operating guideline should be implemented at every fire incident where there is an IDLH atmosphere. The research for this ARP clearly shows a need for the use of a RIC on the incident scene and the administration should take immediate steps to see that the policy is administered as soon as possible to follow these proceeding recommendations.

- With the report of smoke showing or a working fire, the RIC team should be activated and placed on standby prior to the initial crew entrance.
- Utilize all available personnel on the incident scene to participate in the RIC. By utilizing the crew off the Ambulance initially, the RIC can be utilized immediately if needed. Should they be called away, as required by the state EMS protocols, have back up personnel in place such as the engineer of the apparatus or other non-essential personnel as an operations officer participate as the RIC.
- Utilize upon arrival additional fire department personnel to place a well maintained RIC on standby.
- The mandatory training of all department personnel in MAYDAY procedures to assure that all members can assist themselves in self extrication.
- Mandatory training of all department personnel in RIC procedures with quarterly reviews both classroom and practical to see that all personnel keep the skill sets necessary to be an effective RIC.
- Establish a mandatory list of tools to be used by the initial RIC and see that all apparatus have the appropriate tools located on them not just the first out engine.
- Explore the concept of establishing a county wide RIC trained to respond to all incidents not just fire related. This team would alleviate the manpower issues that face all fire departments in the surrounding areas and establish the criteria for calling the RIC to an incident.

By utilizing the above recommendations, incident commanders at Watertown should not have to face the reality of a routine fire turning into a tragedy. The implementation of these recommendations along with constant training will allow the Incident Commanders at Watertown to have as Pickett stated in his article “the Wild Card” (Picket, 1995) to increase the safety of all firefighters operating on the scene of an incident.

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Appendix A

1) Is Comm 30 meant to be the same as the Federal OSHA two in/two out rule?
2) When should the two in/two out be established?
3) By Comm 30 can the two out have other jobs on the incident scene or are they relegated to just two out and no other duties?
4) Comm 30 does not really establish what type of communications between the two in/two out or is it covered somewhere else in the standard?
5) OSHA does not believe in radio communications between the two parties, what about Comm 30?
6) Are there any NFPA standards that are directly referenced in regards to RIT or two in/two out? If so which ones?

Appendix B

November 5, 2007

Fire Chief Name

Name of Fire Department

Fire Department Address

Fire Department City and State

Dear Chief:

I am Assistant Fire Chief Michael Quint with the Watertown Fire Department. I am a student in the Executive Fire Officer Program conducted at the National Fire Academy. Part of this program requires the writing of an Applied Research Project. In this project I will be analyzing information in regards to Rapid Intervention Teams.

I am requesting assistance from you in participating in a survey sent to departments across the state. This survey will aid in my research in improving the Rapid Intervention Team system currently in place in Watertown. Please fill out the attached survey, and return it to me, in the self-addressed stamped envelope.

If you have any questions, please call me at 920-261-8812, ext, 339.

Sincerely,

Michael Quint

Assistant Fire Chief

Enclosure

Appendix C

RAPID INTERVENTION TEAM QUESTIONNAIRE

Please answer the following questions appropriately

1) Does your department currently have a dedicated RIT/RIC team?

2) Do you have any written guidelines regarding the use of this team?

3) If you do not have a dedicated RIT/RIC team do you utilize personnel from mutual aid departments for the RIT/RIC?

4) What tools and equipment does your department provide for RIT/RIC?

5) When does the RIT/RIC become operational in your department?

6) If your department does perform RIT/RIC how often do you train on RIT/RIC?

7) Do you feel there would be a benefit to establishing a county wide RIT/RIC team in your area?

Please feel free to use additional sheets of paper to answer

Appendix D - Survey Results from Wisconsin Fire Departments

Department	Have dedicated RIC Team?	Guidelines	Utilize Mutual Aid	Tools Assigned to RIC	When is RIC Operational	Frequency of Training	Benefit to County Team?
Beloit	No	No	Yes	TIC, SCBA, assorted tools	Upon Entry of Primary units	Twice a year	Yes
Brookfield	No, rely on mutual aid dept	No	Yes	Have equipment and adding	On any Interior fire attack	No answer	Yes, need to know they are trained
Delafield	Use county team	No	Yes, county team	TIC, SCBA, saws & tools	Up to IC, or mayday situation	Co team 4xs a year	Yes, increases manpower to effect rescue
Eau Claire	No, only if warranted	No	No	SCBA	When assigned by Command	No	Yes and No worried about costs
Fond du Lac	No, assigned to arriving Eng Co	Yes	No	SCBA	On entry of two in crew	No answer	Little support in area
Janesville	No, 4th due Eng Co	Yes	No	TIC, handlights & axes	On assignment from IC	Once a year	Not really
LaCrosse	Yes, Firefighters off Heavy Rescue	Yes, have SOG	No	RIC bag, SCBA ,Tools	Initial assignment after size-up	Minimum Annually	No
Marshfield	Use initial arriving personnel	Yes	No	SCBA, rope, tools	Upon entry into IDLH area	Annually	No
Menomonie	No	Working on them	Yes	Standard rescue equip	Event that presents hazards	Bi-annually	Yes
North Shore	Assigned at the time of the call	Yes	Depending on incident	RIC SCBA, tools ,rope	At any working structure fire	Co level quarterly Dept annually	No, call volume to great
Onalaska	No, use staff members for RIC	Yes, under safety	Yes, by contract	RIC bag, SCBA , tools	Follow two in/out rule	Annually	Yes, increase safety
Oshkosh	Yes	Yes	No	SCBA, rope , tools	Any reported structure fire	3-4 times a year	Not at this time
Sheboygan	Yes	Yes	No	RIC KIT, TIC, hand tools	Discretion of IC	Annually	Yes train with neighbors
Stevens Point	Use county team	No	Yes	None	Working fire	No answer	Already in place
Two Rivers	Yes	Yes, in SOG form	No	Depends on bldg construction	If there is an indication of need	2-3 times a year	Yes
Waukesha	No, use 4th due station	No	No	SCBA and RIC Pack	Working incident	Recruit academy, annually	No, rather do our own
Wisconsin Rapids	Team assigned at each fire	Yes	No	TIC, RIC Bottle, Tools	Upon arrival on fireground	Periodically through year	Already established

Appendix E

November 5th, 2007

All fellow Watertown Fire Department Personnel as a participant of the Executive Fire Officer Program at the National Fire Academy I am writing a paper on Rapid Intervention Teams and I am soliciting your input as officers and firefighters as to what you deem essential for the effective use of a RIT/RIC on the incident scene to better protect all personnel on the incident scene.

If you would complete the survey and return to me by December 1st, 2007 I will insert the results into my paper. The result of this survey will be used to improve our method of doing RIT/RIC or assist in possibly establishing a county wide RIT/RIC concept

I value your opinions and your cooperation in making this a successful project deemed to save firefighter lives and reduce injuries. I appreciate your participation and assistance in this survey.

Thank You

Michael Quint

Assistant Fire Chief

Appendix F

RAPID INTERVENTION TEAM QUESTIONNAIRE FOR WATERTOWN FIRE DEPARTMENT

1) What is needed for effective RIT/RIC operations for the WFD?

2) When do you feel the RIT/RIC should be activated?

3) Where should the RIT/RIC team be staged?

4) When do you feel the RIT/RIC should be deployed?

5) Do you feel there should be a pre-assembled RIT/RIC pack for immediate use?

6) What tools should be included in this RIT/RIC Pack?

7) What type of training should be done for this RIT/RIC team?

8) Do you feel there would be any benefit to a county wide RIT/RIC team

Appendix G - Watertown Survey Results

What is needed for effective RIC	When should RIC be called for?	Where should RIC be Staged	When should RIC be deployed	RIC Pack?	What tools	Type Training	Benefit to county team?
Training, Organization, Consensus of equipment	Any confirmed structure fire	Near entry point	When communications is lost	Yes	Rope, light, strobe unit at entry	Structure	Yes but when do we call them
Training, classroom and practical PT training	When 1st in needs assistance	At entry point	Hear Pass or called for	Yes	SCBA, ropes, tools	Specialized	No
Training, SOP's, Proper tools	Any hazardous environment	Outside of hazard area	Before they enter hazard area	Yes	Entry tools,rope,SCBA, O2	Specialized	No
Tools, Training, Dedicated Personnel	When crew enters building	Point of entry	When needed, mayday or PAS fails	Yes	TIC, forcible entry tools, rope	Hands on	No
Manpower, additional tools	With first alarm assignment	Next to IC, monitoring radio traffic	When IC calls for it	Yes	SCBA, rope pike poles, TIC	Monthly	yes, funding and staffing issues
No answer	No answer	No Answer	At structure fire	No Answer	Irons set, TIC	No Answer	No Answer
More Staff, Training	Working Fire	Where first line went in	When called, loss of contact	Yes	Rope, TIC, Axe, extra air tank	RIC	No
Personnel	Any possible structure fire	Available on the scene	When called for	Yes	Axe, pry tools, TIC, lights	Any type	No, we are too spread out
4-5 experienced personnel	At all incidents when indicated	As close to incident as possible	When someone is in trouble	Yes	TIC, SCBA, rope, saws, axe	Monthly	Not practical
More personnel, training	At time of dispatch for fire call	At entry point	When you have the need	Yes	TIC, scba, door chocks, tools	Rescue	No
Additional Personnel, Training	All working Structure Fires	Where first in team went in	Soon as possible	Yes	TIC, ropes, webbing, SCBA	Extrication	No county too spread out
Dedicated team out of service to other calls	With initial dispatch	Same entrance as first in crew	During rescue situation only	Yes	Halligan, axe, wire cutters etc	Basic Firefighting	Yes especially with our staffing levels
Additional Personnel and equipment	When attack crew enters IDLH area	Near initial entry point	When called by the IC	Yes	TIC, pike pole, tether rope	Practical Training	Undecided
Proper Training, and dedicated tools	When crew enters the structure	Near the front door	Not until there is a firefighter down	Yes	Unknown	Specialized Training	Yes, would be more consistent training
More personnel , more training	Any time a firefighter is in the hot zone	Near command	Anytime crews enter IDLH area	Yes	See commercially available	Specialized	Yes, anything to be cohesive with neighbors