

WHO'S ON FIRST?

**IMPLEMENTING A PERSONNEL ACCOUNTABILITY SYSTEM IN THE
ROCKLAND, MASSACHUSETTS FIRE DEPARTMENT**

By

Marc Oshry, B.S., EMT-P
Rockland Fire Department
Rockland, Massachusetts

Submitted in partial fulfillment of the requirements

for the degree of

Master of Arts

in

Fire Science and Administration

Anna Maria College

Spring, 2008

Approved by
Professor John M. Moschella _____
Program Director Joe Guarnera _____

“You can have the best incident command system on the planet,
but if you have suicidal fire companies, there’s not a hell of a lot that the incident
commander can do”.

-Chief Alan Brunacini
(personal communication, February 26, 2008)

ABSTRACT

Personnel accountability is paramount to the safety and survival of firefighters on the fireground. The problem was that the Rockland Fire Department did not have a personnel accountability system in place. The purpose of the research paper was to design and provide for implementation a personnel accountability system that would fit the Rockland Fire Department. Extensive research was completed and an interview was conducted with Chief Alan Brunacini (Ret.) of the Phoenix Fire Department to answer the following research questions:

1. How specifically will having a Personnel Accountability System in place improve safety?
2. What are some of the different types of Personnel Accountability Systems available or in use by other fire departments?
3. What are the problems, if any, with the available systems as they relate to the Rockland Fire Department?
4. How can a Personnel Accountability System be designed and implemented in the Rockland Fire Department?

Action research was utilized to formulate recommendations and procedures for implementation by the Rockland Fire Department. Results from the review of current research indicated: 1) That a strong personnel accountability system reduces the ability for firefighters to freelance and provides the Incident Commander the ability to answer the questions: Who is working for you, What are they doing, Where are they, What is their progress, How long have they been working, and Are they okay. The information provided by the answers to those questions dramatically

improves the safety of firefighters on the fireground. 2) That a number of acceptable personnel accountability systems that offer varying degrees of effectiveness were found but no perfect system was identified. Numerous personnel accountability systems were examined from the basic tag system to very costly prototype electronic systems for the research. 3) Best practice systems are developed locally and are typically a combination of readily available systems.

Based on the research certain recommendations were made including: a Personnel Accountability System must be implemented within the Rockland Fire Department with the recommendation to examine alternative funding for a technologically advanced system in the future. Policies and procedures for maydays, radio use and rapid intervention must also be created to increase the effectiveness of the accountability system. Constant, consistent use and reinforcement of the ICS from all levels of the department is essential to the proper function to the accountability system. Last, the fire department's culture must be changed to focus on firefighter safety.

TABLE OF CONTENTS

ABSTRACT	3
TABLE OF CONTENTS	5
INTRODUCTION	6
BACKGROUND AND SIGNIFICANCE	8
LITERATURE REVIEW	15
Improve Safety	15
Types of systems	21
Tag systems	22
Passport System.....	22
Technology based systems	25
United Kingdom (UK) model	27
MARC/PAR systems.....	28
Problems with Available Systems.....	29
Implementation.....	34
PROCEDURES.....	42
Definition of Terms	43
RESULTS	47
DISCUSSION.....	61
RECOMMENDATIONS.....	71
REFERENCES	76
APPENDIX – A	81
APPENDIX – B	91
APPENDIX – C	97
APPENDIX – D	100
APPENDIX – E	107

INTRODUCTION

Accounting for the whereabouts of people and personnel is paramount in all aspects of work and school environments. School teachers, managers and supervisors must keep watch over their charges. Accountability is found everywhere, for example in school, it was just called attendance. Attendance was taken every morning and in every class to make sure students were where they belonged and were not missing or absent. If a student needed to leave class for any reason he or she were given a hall pass to their destination and must check in when they arrived at their destination. If there is any type of emergency in school then attendance or “personnel accountability” is the first item that was performed at the student’s assigned meeting location. Accountability was ingrained our brains as children. At home, parents do their best to have “accountability” of their children at all times. They want to know where their children are, whom they are with and when they will be home. In the office personnel accountability is usually accomplished with time clocks being punched, cubicles being occupied and payroll sheets being filled out. At the factory accountability is used to ensure that the appropriate tasks are being performed by the appropriate workers. In most environments personnel accountability is a function of pay. If one is not where they are supposed to be and accounted for then they do not get paid. Even the military needs to keep track of all personnel, civilian and military, in and out of combat situations. Generally, the more hazardous the work environment the more personnel accountability relates to safety rather than pay and the more closely accountability needs to be maintained.

The dangers of firefighting as a profession are well understood. In any emergency, firefighters could become lost, injured, or killed. Personnel accountability systems are one of the most important safety systems on the fireground. During an emergency situation a functioning personnel accountability system can mean the difference between life and death.

The problem being researched for this paper is that the Rockland Fire Department does not have a functional Personnel Accountability System. The purpose of this paper is to research and develop a plan for a Personnel Accountability System (PAS) for the Rockland Fire Department (RFD). Using action research methodology, the following research questions will be answered.

- 1) How specifically will having a Personnel Accountability System in place improve safety?
- 2) What are some of the different types of Personnel Accountability Systems available or in use by other fire departments?
- 3) What are the problems, if any, with the available systems as they relate to the Rockland Fire Department?
- 4) How can a Personnel Accountability System be designed and implemented in the Rockland Fire Department?

By way of thoroughly answering the questions above it is the intent of this author to create and implement a Personnel Accountability System within the Rockland Fire Department.

BACKGROUND AND SIGNIFICANCE

The Town of Rockland, Massachusetts is a 10.5 square mile, suburban community located 20 miles southeast of Boston incorporated from Abington in 1874. Rockland's population of over 18,000 residents reflects the populace of a changing America and includes a variety of cultures and economic backgrounds. From the mid 19th century until the mid 20th century, Rockland was a strong industrial community, once well known for its shoemaking. Today Rockland is primarily a bedroom community with some manufacturing industry. Many of the large, old shoe mill buildings are either vacant or repurposed into other occupancies.

The Rockland Fire Department (RFD) consists of 25 full time career Firefighters operating in four shifts of six, supplemented by two on-call firefighters. The Department provides Fire Suppression, Emergency Medical Ambulance Services, including both Basic and Paramedic level Advanced Life Support, Fire Prevention and Public Education. As well as providing Hazardous Materials Response and Technical/Water Rescue. In 2006, the RFD responded to over 4,500 incidents. Anecdotally, year after year the RFD is one of the busiest single station fire departments in Southeastern Massachusetts. Due to the size of the department, any working fire incident requires the extensive use of mutual aid.

When a fire call comes into the station a maximum of five firefighters respond to the initial alarm. They respond with two engines and one ladder and a total of four or five firefighters. The lead engine has the shift officer and a driver, the second engine is only staffed with a driver and is primarily used as a hose wagon. The

ladder truck is also only staffed with a driver. The shift officer is part of the initial fire attack and is unable to assume command. Typically all the first due personnel, with the exception of the lead pump operator, enter the fire building. This situation leaves no one in command outside, and no one to monitor the accountability of firefighters.

On anything more than a master box alarm a recall box is struck for off duty personnel and call firefighters. The procedure for recalled firefighters has been that they are to respond directly to the scene. These responding firefighters have no procedure for accountability and many arrive on scene and go to work wherever they feel they are needed, commonly called freelancing. Freelancing occurs when firefighters operate without direction from the Incident Commander and attack any situation that they feel needs to be addressed on the fireground (Brunacini, 2002, p. 25). These firefighters operate under the radar at an incident.

Freelancing is a major problem within the RFD. The lack of any firefighter accountability and commonplace freelancing leads to uncontrolled chaos. This unsafe fireground chaos continues after command has been established because no Personnel Accountability System (PAS) was established by the first arriving units. The Incident Commander (IC) does not have any idea who is working on shift and who arrived off duty or how long they have been working on scene and most important where they are. All full-time firefighters have been assigned a personal fire radio to have with them at all times, although many forget to bring it to work or even charge it. It is common for only one member of a crew to have a radio for communications. Minimal radio procedures and guidelines have been written. There are no guidelines for calling a "mayday" and no procedures for handling a "mayday."

Call firefighters are supposed to remain with full-time firefighters and are not allowed to talk on the radio. The RFD does have integrated personal alert safety systems (PASS) devices installed on all of its breathing air packs which turn on when the air bottle is turned on. This important safety feature can help to direct rescue crews to the location of a downed firefighter by emitting a high-pitched audible warning. Although without a personnel accountability system in place the last working location of the downed firefighter is unknown and the rescue can be delayed as rescuers spend valuable time searching in the wrong location.

At most incidents no true Incident Command is established per the National Incident Management System Incident Command System (NIMS ICS) guidelines (ICS 100, 2005). All RFD firefighters and officers have attended the federally required NIMS ICS training. When Incident Command is established in Rockland the IC is little more than the title of who is in charge of the scene. Often at emergency scenes today a Rapid Intervention Crew (RIC) is created. These crews are created because RIC is the hot topic of today rather than because it is a needed fireground tool. The RFD has some Rapid Intervention equipment, purchased through grant money, but no training and does not routinely place a RIC in service at an incident. In the event of a fireground emergency in Rockland, any Rapid Intervention Crew would come from mutual aid, and have a difficult time locating a firefighter in distress because of the lack of an accountability system. Today, in many fire departments, accountability is all but forgotten because it is no longer the new "buzzword" as it was in the 1990's when accountability systems were being championed as the new method to improve firefighter safety. In Rockland, there is no PAS established by the

first responding units and no PAS is established after an IC arrives and establishes “command.” The IC only knows that firefighters are operating at the scene and has no idea of their location. The only way for the IC to attempt to conduct a Personnel Accountability Report (PAR) in an emergency is to use the radio and without knowing who is there the IC does not know if all firefighters on scene are accounted.

Attempts at establishing an accountability system in Rockland were made in the past by other chiefs and deputy chiefs in the mid 1990s. The system consisted of brass tags with ID numbers on them assigned to each firefighter. The tags were supposed to be attached to the pump panel of an engine to signify that one was on scene. This tag system had no way of keeping track of where the firefighters were at the incident only that their tag was there. It was very common for tags to be left on the pump panels for days or weeks without being picked up. The system was never fully established and had poor compliance by firefighters. No policies or procedures were ever written. Today there are only a few firefighters that still have tags and the newer apparatus has no place to put them.

The RFD has been very fortunate over the years to have had only one line of duty death which occurred over 45 years ago due to a heart attack. There has never been an unaccounted for firefighter killed in Rockland although there have been many close calls throughout the years. At larger incidents the IC can very easily lose accountability of personnel. As mutual aid companies and off duty responders arrive and are put to work the span of control is easily lost. At many incidents, it is not uncommon to have the IC say to firefighters after the incident that he did not know they were on scene or that they were operating in the building.

Given the limited staffing from an on duty shift of only five or six firefighters, two of which are assigned to the ambulance, accountability should be a definite concern. Countless National Institute for Occupational Safety and Health (NIOSH) firefighter fatality reports sight the lack of a PAS as a contributing reason to the firefighter's death. Lack of fireground firefighter accountability leads to freelancing. Freelancing can be exceptionally dangerous and is also sighted as a contributing factor in many NIOSH firefighter fatality reports. Firefighters can become lost or trapped when working in a hazardous environment. Every second that it takes a rescue crew to find a firefighter means that much closer to running out of air and dying. A good PAS helps all firefighters on the fireground by keeping accurate track of their location, eliminating freelancing and if an emergency arises a RIC is able to locate the troubled firefighter much faster because the IC can provide the RIC with the firefighter's last known location.

National standards establish the need for an accountability system. The National Fire Protection Association (NFPA) Standard NFPA 1500: *Standard on Fire Department Occupational Safety and Health Program* defines a personnel accountability system as "a system that readily identifies both the location and function of all members operating at an incident scene" (NFPA 1500, 2006, 3.3.72). NFPA 1500 states that "the fire department shall establish written standard operating procedures for a personnel accountability system that is in accordance with NFPA 1561" (NFPA 1500, 2006, 8.4.1) and "it shall be the responsibility of all members operating at an emergency incident to actively participate in the personnel accountability system" (NFPA 1500, 2006, 8.4.3). The Standard also provides that

“the personnel accountability system shall be used at all incidents” (NFPA 1500, 2006, 8.4.9) and that “the fire department shall develop, implement, and utilize the system components required to make the personnel accountability system effective” (NFPA 1500, 2006, 8.4.10). NFPA 1561, *Standard on Emergency Services Incident Management System*, provides more information on accountability systems. It states that “the Emergency Services Organization (ESO) shall develop and routinely use a system to maintain accountability for all resources assigned to the incident with special emphasis on the accountability of personnel” (NFPA 1561, 2008, 4.5.1). The Standard provided that “all supervisors shall maintain a constant awareness of the position and function of all responders assigned to operate under their supervision. This awareness shall serve as the basic means of accountability that shall be required for operational safety” (NFPA 1561, 2005, 5.2.4). These standards define the need for a PAS within a fire department.

It is statistically difficult to determine the actual number of fireground firefighter deaths each year due to a lack or failure of an accountability system. Although NIOSH lists accountability as a contributing factor in some fatalities, the NFPA and the United States Fire Administration (USFA), two of the main agencies that report on firefighter deaths, do not breakdown and report the actual number of deaths from being missing, lost and/or unaccounted. In the annual reports for both agencies firefighter deaths are classified by the proximal cause, such as stress or overexertion, trauma, asphyxiation, being caught or trapped. Most fireground firefighter deaths are attributed to those or other causes where accountability may have been a direct contributing factor in the death of the firefighter. One could

extrapolate that a firefighter may have run out of air and asphyxiated because there was not an accountability system in place that would have recognized that the firefighter was in trouble, lost or was missing. If accountability is not maintained then firefighters are not being monitored and effective rescue efforts can not be mounted. Lack of close and functional accountability is probably connected to most types of firefighter fireground fatalities.

This writer has a stake in this research because he is one of the firefighters responding for the Rockland Fire Department. Witnessing firsthand the dangers of the lack of accountability on the fireground within Rockland this author understands the need to institute a Personnel Accountability System (PAS) within the RFD. If this problem is not addressed then the RFD will remain complacent to the dangers that exist by not having an accountability system in place. Through the literature the author will examine how an accountability system will improve firefighter safety the various existing personnel accountability systems and the problems that plague them. Finally the challenges that are associated with developing an accountability system will be examined. Through the answering of the research questions posed at the beginning of this paper using action research the objective of this author will be to write and provide for implementation by the department a PAS within the RFD.

LITERATURE REVIEW

Improve Safety

Fireground firefighter safety is an issue that transcends time. As long as there have been firefighters, there have been injuries and death while performing their duties. The inherent function of firefighters on the fireground will always include unforeseen dangers, injuries and death. As a profession we must figure out a way to reduce the possibility of fireground death and injuries of firefighters. Personnel Accountability Systems (PAS) is one area of firefighter safety where there is extensive literature.

The Literature reviewed for this research paper included various books, journal articles, magazine articles, the internet, Executive Fire Officer and other research papers, National Fire Protection Association (NFPA) Standards and Federal Occupational Health and Safety Agency (OSHA) Regulations.

According to Jakubowski (1998) accountability never seems important until it is needed. He likened not having an accountability system in place to the famous Abbott and Costello baseball parody "Who's on First." The Incident Commander may think he/she knows who is on scene until an emergency arises and then it may be dangerously unclear (p. 93). Morris, Brunacini, and Whaley (1994) went so far as to say, "today you can more accurately account for a Federal Express or UPS package than you can firefighters on the fireground" (p. 45). Hartin (1992), Jarboe and McBride (1992), and Brunacini (2002) stated that firefighters are at significant risk if supervisory personnel at any emergency scene can not answer: Who is working for you, What are they doing, Where are they, What is their progress, How long have

they been working, and Are they okay? If those questions are able to be answered by the Incident Commander (IC) then there is a strong and close accountability system in place, which according to Cobb (1996) and Byrne (2007) helps to keep track of firefighters so that if they become lost or injured they may be located by rescue crews faster giving them the best chance of survival. In response to those questions, Carter (2001) asked “how can you claim to be operating safely if you do not know where your people are located?” (p. 20). Coleman (2000) added that it was much more important to know where firefighters are in the building than just that they are in the building. If as the IC, you know where your firefighters are and what they are doing, then according to Gerner and Schaper (1997) you know that your orders are being carried out and that your firefighters are safe.

Gerner and Schaper (1997) acknowledged that firefighting is still one of the most dangerous professions, and added, that does not mean that firefighters need to work dangerously (p. 1). Smith (2001) stated that no risk can be completely eliminated but can be managed at a reasonable level (p. 18). The main reason for an accountability system, Cobb (1996) added, should be to reduce firefighter death and injury. He continued that “a well designed accountability system can accomplish both by strengthening the incident command and control system” (p. 66). Brunacini (2002) stated that the entire accountability system is set up and in place to make sure that firefighters do not become lost or missing in the hazard zone (p. 211).

When emergencies occur in the hazard zone, crews must be able to be quickly identified to determine if anyone is missing (Howes, 1997, p. 50). According to Carlson (1992), accountability improves safety because if an emergency arises all

personnel are able to be located quickly and efficiently (p. 11). Tippett (2007) further argued that crew assignments and the number of personnel in each crew must be known for accountability to be useful (p. 132). Gallagher (2004) added that in a critical emergency a proper accountability system will help identify the member in trouble by eliminating those who are not. In other words, whoever does not raise their hand, or answer the radio is missing (p. 92). Tobia (2005) stated that the value of an accountability system is only as good as its ability to track the movement of firefighters in the hazard zone (p. 96).

The main mission of command staff is to make sure that all firefighters go home in the same condition as they responded (Hewitt, 1993, p. 12). Incident commanders are accountable to their firefighters to provide as safe an environment as possible (Carter, 2001, p. 21). Brunacini (2002) added that firefighter safety relates to the IC maintaining knowledge of current conditions, having an effective organization, and two-way communications to units and sectors operating in the hazard zone (p. 22). Accountability is a key component to a firefighter safety program (Carter, 2001, p. 20).

With respect to when accountability needs to be maintained, Melfi (2001) stated that firefighters need to be accounted for at all times (p. 68). Although Carlson (1992) stated that firefighter accountability should begin when a firefighter reports to work, either to the station for duty or directly to the incident scene (p. 10). Emery (2007) was more precise and added that the team or company leader is responsible for hazard area personnel accountability and that he or she should be supervising

the crew and not performing the task (p. 1). Compton (1998) countered that firefighter's are accountable and responsible to themselves (p. 44).

Brunacini (2002) elaborated on those concepts and stated that there are three types/levels of accountability. The first is the command or strategic level. The IC starts the strategic level accountability by recording and then tracking the assignment status and location of the incident scene resources, preferably on a tactical worksheet. As the incident expands, the IC can chop up the accountability responsibility into sectors and make it more manageable, this is the tactical level. In the tactical level the sector officer is in charge of a geographical/functional area around the fireground. In this level of accountability the sector officer is in command of all functions in their area. The third level is the task level. Task level accountability is a survival-assurance program. He stated that when firefighters enter toxic environments, the only thing keeping them alive is their protective gear, the finite amount of air carried in their SCBAs, and the support of their team members (p. 207).

The basis of task level accountability revolves around crew integrity, going in together, staying together, and coming out together. Crew integrity was defined by Compton (1998) and Brunacini (2002) as always being within voice, vision and touch of each other. If crew integrity is maintained then there is always someone watching out for the other and basic crew accountability is maintained (Byrne, 2007, p. 104). If firefighters do not stay together in crews, they tend to wander or freelance (Compton, 1998). Brunacini (2002) defined freelancing as "self-supervised, independent responders directly engaging the incident problem without any central

command or control, or any coordination with other responders” (p. 25). This type of behavior is usually by highly motivated, free-spirited workers who arrive on scene and attack an obvious and accessible problem without “checking in” to any standard incident command system. Freelancers are typically very skillful in avoiding, working around, or disregarding anything or anyone that slows them down. They are generally task competent and have enjoyed success in their freelancing in the past. They do not expect the unexpected. Beyond a certain point freelancing does not work and is always dangerous (p. 26). Young (2001) added that the “old aggressive, uncontrolled and individualistic approach to firefighting tends to invite accidents” (p. 47). Byrne (2007), Howes (1997) and Morris (2001) stated that a close accountability system virtually eliminates freelancing and improves firefighter safety. Eliminating freelancing reduces the chances that personnel will go missing or fail to hear an evacuation order.

Standard Operating Procedures (SOPs) for accountability are a vital component to fireground operations. Although Wood (1990) stated that having accountability procedures or SOPs in place will not protect firefighters from every life-threatening situation, however, having the appropriate equipment and procedures for personnel accountability will enhance the safety of every firefighter in the hazard zone (p. 9). Once accountability procedures are in place to limit the risk to firefighters, those procedures should not be forgotten and must be reviewed from time to time to ensure they are the best practice for the department. Risk reduction is a constant and continuous process (Smith, 2001, p. 18). Carter (2001) stated that

firefighters must be trained to use whatever system that the department chooses. A system that is not used does nothing to improve safety (p. 21).

Ratigan (2007) stated that the National Institute for Occupational Health and Safety (NIOSH) has determined that fire departments should “ensure that fire command always maintains close accountability for personnel at the fire scene” and that “the responsibility for ensuring close accountability of firefighters on the fireground is an integral function of Command” (p. 5). According to Colestock (1994) a functional accountability system must be backed up by a strong Incident Command System (p. 15), to which Brunacini (2002) attributes over all safety. Brennan (1993) added that if incident commanders are to be responsible and accountable for all personnel at an emergency scene, then they must be familiar with all policies and procedures for any type of unit involved in the operation. Operational goals and procedures are key to what each unit will be performing on scene and thus be a component to the units’ accountability. If the IC’s are aware of this vital information then they will be able to better monitor the whereabouts and safety of each member operating at an incident (p. 106).

With respect to standards and regulations for personnel accountability the National Fire Protection Association (NFPA) 1500, the Standard for Firefighter Occupational Safety and Health and 1561, the Standard for the Fire Ground Incident Management System as well as the Occupational Safety and Health Administration (OSHA) Regulation 29 C.F.R. § 1910.134(g), contain sections that deal with accounting of fireground personnel. Although both Agencies have policies for personnel accountability neither have procedures for accountability practices and

these standards and regulations do not carry the force of law in many locations. Wood (1990) commented that fire departments within OSHA states are obligated to comply with OSHA rules but departments in non-OSHA states are not obligated to comply with those same rules. If those departments choose not to comply with OSHA or NFPA requirements then, in a catastrophic incident, they may be held liable by a court of law for any firefighter death or injury that may have been prevented by following appropriate standards that were not followed because they are not required (p. 9). Morris, Brunacini, and Whaley (1994) predict that in the future, due to pressure from litigation, the federal government, regulatory agencies and many other sources, the entire fire service will be mandated to improve the way it accounts for personnel operating in hazardous environments (p. 45).

Types of systems

There are a multitude of personnel accountability systems in existence today. Some systems more complex than others; some require more personnel to operate; some operate better than others; while some cost more than others. Jakubowski (1998) stated that “any type of accountability system must have a device for identifying each responder” (p. 43). Compton (1998) added that accountability is incomplete without the ability to track personnel on the fireground, specifically when and who entered the hazard zone (p. 42). Coleman (2000) later qualified what Compton stated to mean that firefighters involved in search and rescue or fire suppression should be accounted for but firefighters placing a ladder or setting up a fan do not need to be fully accounted for in most circumstances (p. 28).

Tag systems

A tag based accountability system is the most widely accepted by the American fire service and probably, the most common type of accountability system in use by firefighters (Jakubowski & Morton, 2001, p. 151). These systems use some type of tag or token that identifies the member by name, number or other identifier. The largest benefits to a tag based system are the low cost, ease of implementation, and minimal training needed to operate (Ratigan, 2007, p. 96). The tags are turned in when the firefighter rides in a position on a fire apparatus or when he/she reports for duty. Tags are collected and organized in a manner that tracks the companies of firefighters (Teele, 1993, p. 342). Dyer (1996) added that as the incident expands a safety or accountability officer needs to collect the tags from the apparatus and bring them to the command post for recording. Some systems utilize a second tag that is left at the entrance to the hazard zone (p. 84). Firefighters “tag-in” before they enter the hazard zone so that a sector officer can track who is in the building. The most important part of this type of system is that personnel must collect their tags when they exit the hazard zone (Davis, 1998, p. 141).

Passport System

The Passport Accountability System was created by the Seattle Washington Fire Department after the fireground death of firefighter, who was killed after becoming disorientated and separated from his crew. The remainder of the missing firefighter’s crew made it out safely and were checked off as being a full crew and accounted. The firefighter was lost for over an hour in the building before anyone realized. The Passport system was designed to reinforce the buddy system and required firefighters to remain in contact with each other anywhere that protective

clothing had to be used (Rose, 1994, p. 148). Ronald Hiraki, the Chief of Training in the Seattle, Washington Fire Department stated that the company officer or team leader has the passport tag, which has all of the team member's individual name tags on it, and gives it to the appropriate supervisor when under that supervisor's span of control. Firefighters must remember to keep their supervisors informed of their status at all times (Coleman, 2000, p. 24).

In 1991 the Phoenix Fire Department assembled a team to upgrade their accountability system. The team researched various different systems and designed a system that would achieve the following objectives: Have the ability to identify at any given moment where each firefighter is on the fireground and, within a small geographic assignment area, within the "hazard zone." It needed to provide the ability to identify when a firefighter is delayed or missing from an assignment and initiate a search, rescue and recovery effort. The system must be simple to use and easily initiated so it can be used on a frequent and routine basis. They concluded that it also must lend itself to integration into the existing incident management system used by the Phoenix Fire Department (Morris, Brunacini, & Whaley, 1994, p. 46). Garry Morris, Assistant Chief of the Phoenix, Arizona Fire Department stated that Phoenix looked at many of the available systems and had six months of extensive field trials before deciding on a modified Passport System based on the Seattle model. The Phoenix system added some built in safety features such as automatic Personnel Accountability Reports (PAR) which are called for at various benchmarks. These benchmarks include time on scene, changes in fire condition

and changes in tactics. Morris added that the key to a successful Passport system is point-of-entry control (Coleman, 2000, p. 26).

Chief Brunacini (2002) described the way the Passport system is used within the Phoenix Fire Department. The officer of the responding companies verifies that their passport is correct with the names of all personnel in their company. By doing this they have covered most of the task-level front end accountability process. When the first due company arrives on scene they take command, and announce on the radio “accountability north – east, etc” as part of their initial radio report and commences initial fire attack. The pump operator of the first-due engine becomes the accountability officer for the initial part of the incident. An integral part of the Phoenix Passport accountability system is to make sure that all of the personnel assigned to the hazard zone are initially counted on a passport and then periodically checked throughout the incident through the use of Personnel Accountability Reports (PARs) by the IC (p. 210).

Brunacini continued that as the incident expands, the accountability system also expands. The IC assigns sector officers, who monitor accountability in their sector. If the incident continues to expand the IC will then assign accountability officers to assist the sector officers in maintaining accountability. At this level the accountability officer collects all of the passport tags from the initial accountability location. The accountability officer checks the passport to make sure all crew are accounted, serving as a hall monitor in their sector, anyone who comes in or out must go through them (p. 210).

Technology based systems

Technology based systems consist of anything from bar-coded tags to advanced GPS location systems. Schnaidt (1995) stated that bar codes have proved their worth in the private sector. By using bar codes in business, products are easy to track and available inventory is quick to be obtained (p. 113). Whelan (2001) described the bar code based Fire-Trax accountability system that utilizes an advanced, high capacity bar code. The Fire-Trax bar codes are two-dimensional, meaning they hold much more information than the traditional bar codes found on everyday products. Information that can be included into the high capacity bar codes is unlimited and may include the routine name and rank but also include pertinent medical history or qualifications and certifications. The system works by personnel scanning their bar codes into a computer as they arrive on scene and are then tracked using accountability software (p. 62). Wagner (1998) added that the system can be designed so that the bar codes are affixed to the firefighter's turn-out gear and scanned by an entry officer. The software allows the user to put different individuals into units and assign the units to various tasks and most important, the software is easy to use (p. 39). Whalen (2001) added that in the event of a software failure the bar-coded tags can be used as a traditional tag type accountability system (p. 62).

Global Positioning System (GPS) based accountability systems are becoming more prevalent as technology advances. Christin (2007) stated that new GPS-enabled tracking devices, similar to ones that some fire departments use to track apparatus, are currently available for the accountability of firefighters. He added that indoor tracking of firefighters may require additional technology such as local area

wireless networks. These indoor firefighter locator networks typically require strategically placed nodes or receivers within a building that can track a transmitter that the firefighter wears and relay that information back to a command post (p. 252).

A spinoff of military accountability technology provides the basis for a new a location device for firefighters, although it is still in the initial testing phases. The firefighter wears a small transponder device that transmits to three or four routers mounted on tripods located outside and around the structure to pinpoint the location of firefighters in the structure. During testing, firefighters have been located within 15 or 20 feet of their location. The testing has identified a few problems with this system so far, steel buildings can distort the signal from the GPS and there is no way to determine the height axis. In the future these types of problems will be overcome by new technology and like other tracking systems, by locating the routers in buildings as they are being built or retro fit them into buildings as part of the building codes (Page, 2003). A group of researchers from the National Institute of Standards and Technology (NIST) as well as researchers from Worcester Polytechnic Institute (WPI) are developing similar new firefighter location navigation and tracking technology that utilizes radio-frequency identification (RFID). RFID technology is taken from a variety of sources, including the military and retail markets. In this system a reader is worn by firefighters and as they travel throughout the building the location is picked up by receivers inside or outside the building and signaled back to a command post tracking the firefighters. WPI is developing a way to integrate the RFID receiver into fire apparatus to eliminate the need to set up external or internal receivers (Kelley, 2007).

Air pack manufacturers are starting to design products for accountability based around new telemetry technology. Most of these systems do not locate or track firefighters but monitor various environmental and vital signs of the firefighter. An entry control officer monitors on a computer the exact status (air pressure, heat absorption, time, and PASS [personal alert safety system] status) of all activated air-packs on the fireground. These systems allow the entry control officer to send an “all-out” or recall signal to personnel operating in the hazard zone (*Industrial Fire World*, 2005). These telemetry based systems should be augmented with another type of accountability system.

Another air pack manufacturer is working on a different type of telemetry based locator system to locate downed firefighters. This technology uses high frequency radio waves that are able to penetrate deep into building and through walls. When firefighters equipped with a special air-pack encounter a problem, they can either activate a locator alarm or after a set amount of time the alarm trips automatically, similar to standard PASS alarms. After the system has been activated, a rescue team enters the building with a handheld device that receives a signal from the downed firefighter’s air-pack and by sound and visual cues on the hand held device the rescue team is quickly able to locate the downed firefighter (Williams, 2006, p. 23).

United Kingdom (UK) model

In the English model, an SCBA officer monitors the entry point to the hazardous environment, recording who enters the hazard and how long they are working there (Jakubowski, 1998, p. 44). This tally (point of entry control tag) system

helps to eliminate the individualistic approach to the firefighting of old. The tally tag, which is attached to all air-packs, has the name of the fire brigade, the identity of the fire station, the type of SCBA and SCBA number, as well as the name of the wearer and the air pressure of the bottle written on it. The tally tag is collected by the Entry Control Officer (ECO) prior to the unit going into the hazardous environment. The ECO uses an entry control board to record all of the tallies and monitors the time that each unit has been in the hazard zone and calculates an approximate exit time based on air pressure. If a unit fails to exit the hazard zone at the estimated time the ECO will initiate emergency measures to find the missing unit (Young, 2001, p. 47).

MARC/PAR systems

St. Louis uses a system based around a Personnel Accountability Report (PAR) known as the 20 Minute Member Accountability Roll Call (MARC). The MARC is a roll call polling system by which the IC verifies that all members operating at the incident are safe and accounted for (Schaper & Gerner, 1996). While developing the MARC system for St. Louis, it was determined that their accountability system must be able to provide: a periodic, physical head count of all personnel on the scene; a wake up call to the IC requiring them to reassess the incident and report to someone; a system that quickly accounts for everyone in the building or area that needs to be evacuated (Gerner & Schaper, 1997, p. 2). The system takes into account that the first 20 minutes of an incident are the most hectic and dangerous and that most fires are controlled within that time. It is also based on the fact that while the average air bottle capacity is 30 minutes, very few firefighters get that amount of time while working at an incident. The last factor that the 20 minute

MARC system is based on is the structural integrity of the fire building. The system works by requiring a MARC at 20 minutes on all incidents that have personnel operating inside a structure. The IC contacts each company operating at the scene asking for a MARC or status report and accountability number which can be relayed very quickly and lets the IC know exactly how many personnel there are and where they are operating. The system can be used to augment a tag or passport system (Schaper & Gerner, 1996, pp. 42-45).

Problems with Available Systems

The fire service has tried to solve the accountability problem with various solutions, such as rosters, ID tags, and white boards. These solutions have fallen short in fully solving the problem. ID tags can be lost, white boards can be easily erased and rosters take time and can be lost (Wagner, 1998, p. 39). Gallagher (2004) added that there is no factual, foolproof way for the IC to determine the whereabouts of any firefighter engaged in offensive firefighting efforts at any given time short of very expensive and non-reliable electronic systems (p. 92).

Strand (2004) noted that most accountability systems have had two system deficiencies. The first is that most systems only track companies or crews. Those systems assume that a specific group of firefighters will arrive together and will continue to function as a group while on the fireground (pp. 22-23). The second deficiency with most of the readily available accountability systems is that they do not track firefighters on scene; they only tell us who is inside and who is outside and not much more (Strand, 2004, Coleman, 2000, Schaper & Gerner, 1996). Ratigan

(2007) added that any system that does not track personnel movement in real time is a compromised accountability system (p. 6).

Jakubowski (1998) pointed out that no matter which system is in place standardization is critical so that all personnel are familiar with the operation of that system (p. 43). All members operating at an incident must actively participate in the accountability system for it to function (Cobb, 1996, p. 68). In an effort to make some accountability systems work, numerous personnel are required to operate, at the expense of personnel to fight the fire. This can distract the IC from other important fireground tasks and cause the system to fail (Gerner & Schaper, 1996, 1997). McCormack (2005) stated that the problem with systems where accountability is phased in, such as systems that collect tags from apparatus only when the incident escalates, is “like saying that when we find out we need more water we will go out and find it” (p. 3). Jakubowski and Morton (2001) added that in those systems where the tags are only collected after a sudden catastrophic event, require an IC or accountability officer to trudge around to every piece of apparatus to assemble an accountability system (p. 151). As systems become complicated with multiple tags and various check-in points opportunities for confusion abound. This confusion leads to a condition where participants will not use a system they perceive as ineffective (Tobia, 2005, p. 94). If members are not willing to use the system properly, if they do not believe in it, or if the department administration does not support it then any system will fail (Coleman, 2000, p. 43).

Ratigan (2007), while talking about tag systems, stated that one of the largest drawbacks is the human factor. At the beginning of their shift firefighters must place

their tag on some type of riding list and at the end of their shift must remove that tag. If the tags are not placed on the riding list then the IC does not know who is there and if the tag is not removed after the shift then countless time may be wasted searching for the “missing” firefighter who was never there. Tags are also frequently lost or misplaced (pp. 96-97). Tobia (2005) added that all too often the tags are dropped off at a collection point for accountability and are never moved to track firefighters as they move about the fireground (p. 94). With most tag systems, if more than a first alarm assignment is working, it may be difficult or impossible to track firefighters (Jakubowski, 1998, p. 43). These manual accountability systems have no way of tracking personnel once they have entered the hazard zone (USFA, 1999, p. 11). An IC or accountability officer should not have to fumble through 50 tags to find the 10 individuals that are in the hazard zone (Tobia, 2005, p. 94).

With respect to electronic accountability systems, Ratigan (2007) stated that the biggest drawback to an electronic accountability systems is the cost. An electronic system can cost thousands of dollars and be difficult to implement (pp. 96-97). The cost of electronic system is directionally proportional to the technology involved (Howes, 1997, p. 52). Some departments seem to have unlimited funds for whatever is in vogue. Other departments take a more modest approach towards innovation, waiting until it is tested with time and through trial (Coleman, 2001, p. 47). One particular drawback of the expensive bar code based accountability systems is that they do not track firefighters on scene, but rather facilitate data entry to help with accountability (USFA, 1999, pp. 17-20). With many fire departments

budgets running short of funds to buy basic equipment it may be impossible for them to purchase an electronic system (Ratigan, 2007, p. 97).

Another problem that plagues electronic accountability systems is that many firefighters may not have confidence in the dependability and reliability of new technology. Any system that relies on batteries, wireless signals, and other prone to fail parts will take some serious convincing for firefighters to trust it (Ratigan, 2007, p. 97). Most firefighters have experience with electronics crashing at the worst time and Yaccich (2003) noted that almost everything electronic can and does crash. He went on to ask when it crashes do we really want firefighters lives on the line (p. 19). So called military tracking and accountability technology is unproven in fire scenarios and in what firefighters will put it through. The harsh environments that the military puts its technology through are very different from what the fire service will put the same technology through (Wilmoth, 2007, p. 74). With respect to an RFID accountability system, no system is currently commercially available that addresses every demand of tracking firefighters throughout the hazard zone (Kelley, 2007, p. 54). A problem with RFID systems that must be integrated into buildings is when the power is either lost or cut in the firefighting process the receiver nodes will also lose power rendering the system useless. These systems rely heavily on pre-fire planning and obtaining accurate building floor plans that may not be available for all structures (Kelley, 2007, p. 48).

Global Positioning System (GPS) accountability systems are becoming more prevalent as the technology expands. There are a few problems associated with GPS based systems. Most GPS systems do not work indoors and require an

unobstructed view of the sky. The GPS systems are very susceptible to interference from steel buildings blocking the satellite signal. Some GPS receivers have no way to determine height and in a high-rise operation would be useless. The military which controls the satellites builds in a reduction in accuracy into the civilian GPS signal causing the units to be off by 50 to 60 feet, rendering it useless for accountability (Page, 2003).

Manufacturers of SCBAs have designed air packs with built in telemetry systems that they refer to as “accountability systems”. These telemetry systems do not track firefighters but rather monitor the vital signs of the firefighter and the conditions in which the firefighter is operating. This is both a benefit and drawback. Although it is very important to know the conditions of firefighters, not being able to locate them does not solve the accountability problem (*Industrial Fire World*, 2005, p. 13). Stevens (1999) pointed out that for these systems to work they require the firefighter’s air pack to be activated and that not all firefighter activity happens with air packs on and activated. The information that these systems provide is relayed back to a computer screen where a dedicated person must monitor each air pack (p. 65). An added problem, more than the need to dedicate personnel to monitoring computer screens, is that if additional personnel, such as the IC, needs access to that information quickly they may not be able to view it if the system does not support more than one terminal (Christin, 2007, p. 252).

Radio based accountability systems, such as the MARC system, require all firefighters to carry a portable radio. These systems are not automatic and require someone to monitor all radio traffic and update resource status as needed. In

addition, the radio based systems also assume that the command post and IC will also be able to hear and monitor radio messages. If some transmissions are not heard then the system will not work properly (USFA, 1999, p. 23-24). Coleman (2001) added that these systems do not always work because firefighters are reluctant to talk on the radio. He reasoned that this because firefighters are taught that excessive radio traffic causes radio congestion and important messages can not get through (p. 48).

Morris, Brunacini, and Whaley (1994) stated that “point of entry” control is one of the most important pieces in the accountability puzzle (p. 56). This point of entry control positions accountability personnel by each entrance to the hazard that firefighters use and record when and who entered the hazard zone. Many of the available accountability systems require the point of entry accountability personnel or accountability officers to collect tags and attempt to run a fire as a hazardous materials (hazmat) incident, which improve safety. Schaper and Gerner (1996) disagree with Morris, Brunacini, and Whaley and stated that although they do have many similarities hazmat incidents and fire scenes are very different. At hazmat incidents site safety and action plans are drawn up before anyone makes entry. At most fire incidents, while there may be pre-fire plans, the scenes are very dynamic and fast moving (p. 43).

Implementation

An accountability system is the only way to maintain incident control on the fireground (Jakubowski & Morton, 2001, p. 151). Personnel accountability systems vary from state to state and, in some or even most places, from department to

department. The system used depends on a variety of factors such as the size of the department, number of personnel, call volume, etc. (USFA, 1999, p. 7). Section 3-5 of NFPA 1500 places a specific responsibility on the fire department to develop and implement an effective accountability system (Teele, 1993, p. 342). Although, given the requirement, the NFPA fails to outline any specific type of accountability system to be used on the fireground. According to the United States Fire Administration (USFA, 1999) it is difficult and confusing for some departments to choose a system and equipment that is best for them because of the wide variety of options available (p. 5). Cobb (1996), Tobia (2005), and Hewitt (1993) stated that no matter which accountability system is chosen, for it to be functional it must be simple and maintenance free. The more complicated the system the less it will be used. Conversely the easier a system is to use the more personnel will use it (*VFIS News*, 2003). In deciding on any system the basic elements remain the same, the identification of individuals on scene, typically by name or number (McCormack, 2005, p. 1).

According to Brunacini (2002) when developing an accountability system it must fit into and improve the way that the firefighters operate on the fireground. The accountability system must allow firefighters the flexibility to live in the world of fast-and-dirty, offensive front-end operations, while keeping track of firefighters (p. 208). Aggressive firefighters will sacrifice the accountability system if it slows down their operation (Hewitt, 1993, p. 12). The accountability system must be easily incorporated into the existing incident command system, be easily expanded as the incident grows and must be fully integrated into everything that the department does

(Cobb, 1996, Jakubowski, 1998, Hewitt, 1993, Morris, Brunacini, & Whaley, 1994).

The extent of the accountability system depends on the span of control at the incident (Hewitt, 1993, p. 13). Compton (1998) noted that “it’s impossible to effectively operate a personnel tracking system without the overall structure of incident command” (p. 42). While Howes (1997) disagreed stating that the incident command system does not address accountability of personnel at incidents (p. 50). Compton (1998) added that any system that falls short of complete accountability throughout the command and control structure, not just tags or passports, of an incident may only be good for identifying the dead firefighter after the incident ends (p. 42).

Morris, Brunacini, and Whaley (1994) described the fourteen key points they believe are needed to design an accountability system. The first point is to track only individuals in the hazard zone. They realize that tracking personnel across a large scene may be impossible and that a much more manageable task is to only track individuals in a hazardous environment, described as anywhere that an SCBA needed to be used. The next item was that accountability procedures must be written down and adhered to by all personnel. Training on the policies, procedures and tactics of an accountability system is a must to have a successful system, was their next piece of advice. The fourth point was to always maintain crew integrity and company supervision. By maintaining company supervision and crew integrity freelancing is prohibited. Communications was the next key point. Morris, Brunacini, and Whaley direct that all firefighters operating in the hazard zone must have the ability to communicate with command. It was recommended that all firefighters have

personnel radios when working at an incident. The sixth item was company or crew identification. It is essential that command be able to visually identify different crews by means of an “identifier.” System hardware, such as ID tags or passports, must identify the company that the member is assigned as well as the member’s name was their next key detail to designing an accountability system. There are several criteria for hardware design. It should be simple to use; should not slow down the initial attack operation; be of a size easily handled by a gloved hand; be brightly colored so as to be visible in poor lighting; identify the company as well as the individual crew members; affix easily to some form of status board. For the system to work the next item must be followed. The system must have a “caretaker” or accountability officer. The accountability officer must remain outside the hazard zone and have communications to command and all crews operating in the hazard zone. The ninth point was that there must be an Incident Management System in place. Firefighter accountability is ultimately the responsibility of the incident commander. Other officers (i.e. accountability officer) may help the IC with accountability but the final responsibility lies with the incident commander. Another detail for the system to function properly was that the point(s) of entry must be monitored. Hardware must be turned in at the point of entry and retrieved as crews leave the hazard zone. A written rescue/recovery plan is an integral part of an accountability system. The plan must address rapid intervention of missing or downed firefighters. Any firefighter suspected to be missing must be assumed to be lost in the hazard zone and immediately reported to command. The next key point was that at certain benchmarks during the incident, or when hazardous events occur, or when tactical

goals are achieved, a roll call of personnel must be conducted. The thirteenth aspect that they advise was that firefighters' attitudes toward accountability systems must be changed for a system to be effective. The organization's culture must be changed so that firefighters' understand that failure to adhere to standard accountability practices places them, and any rescue personnel, at unusual risk. The last point that Morris, Brunacini, and Whaley describe was that the accountability system, once in place, must be continuously evaluated. They list these fourteen points as key to designing and implementing a successful accountability system (pp. 46, 49-50).

Coleman (2001) added that when designing an accountability system, one needs to begin by looking at how your department operates at incidents (p. 53). The accountability system must be designed by using input from all levels of the organization (Jarboe & McBride, 1992, p. 16). For the accountability system to be functional it must be designed around response procedures and staffing levels (Coleman, 2000, p. 18). If a system does not have support of all personnel then it is doomed to fail (Jarboe & McBride, 1992, p. 16). One of the most important factors in implementing an accountability system is the need for commitment from the top of the chain of command (Cobb, 1996, p. 70). For any system to work properly, well trained and disciplined firefighters must work within a competent and organized incident management system (Coleman, 2000, p. 18). Teele (1993) added that accountability is accomplished through a layering process, with more specific accountability at each layer (p. 341).

Accountability on the fireground is the responsibility of the fire chief or incident commander (Jarboe & McBride, 1992, p. 16). Compton (1998) supported the idea

that the IC is responsible for personnel accountability because the IC is responsible for who is assigned to each sector and what each sector is assigned to do; they are therefore responsible for accountability (p. 42). Emery (2007) disagreed and stated that accountability is not the responsibility of the Incident Commander. He went on to say that the IC is responsible to make sure that there is accountability but the IC should not be charged with the actual accounting for team-level personnel (p. 1). Hartin (1992) added that anyone in a supervisory role needs to know who reports to them and whom they report to so that span of control can be maintained. He continued that a proper span of control allows for easier accounting of firefighters (p. 76). Most, if not all, authors agreed that the IC must make sure that the accountability system is used on all incidents. Individuals do not have the right to decide whether the accountability system will be employed or not (Tobia, 2005, p. 94). No matter which system is employed, it takes time and constant reinforcement for the system to become second nature (Morris, Brunacini, & Whaley, 1994, p. 58).

In describing personnel accountability, Gallagher (2004) used football as an analogy with the incident like the football game. Team members know where they are supposed to be, and the coach in “command” never changes the playbook unless absolutely necessary. There are plays, routes and purposes of function for each offensive and defensive member that everyone on the team knows. The players do not just do whatever they want and do not jump into other players’ assignments. In a football game the coach has a game plan and everyone follows it. Players are where they are supposed to be when they are supposed to be there. If not fines are levied. In firefighting there are no fines, only the potential for injury and

death (p. 92). Brouwer (2003) added that individuals or crews on the fireground should be restricted from wandering in non functioning groups. If they are allowed to wander they create a potential liability (p. 19). Melfi (2001) raised the point that necessary discipline is horribly lacking at many of our emergency scenes. He stated that when we disregard accountability and freelance without any consequences from the IC or other command staff that we just reinforce bad behavior and increase the potential for injury or death on the fireground (p. 68). Very simply, freelancing cannot be tolerated. Members must realize that they are accountable for their own safety. They need to know whom they are working with and whom they are working for and remain within the ICS (Jakubowski, 1998, p. 44).

When arriving at the incident, the IC must realize that accountability should be a tactical priority and as such be assigned resources to manage it. The IC and accountability officer must understand that there is a difference between incident management and resource management. They must also realize that there is a difference between fireground accountability and resource status. Resources can be anywhere on the fireground in various stages of availability or in staging. These resources do not necessarily need to be placed into the personnel accountability system unless they are actively involved in fire operations. Accounting for resources outside of the hazard zone should be a logistical problem and not an accountability problem. If the accountability system is to be functional the numbers of firefighters being tracked must be limited to those firefighters operating in the hazard zone (Tobia, 2005, pp. 93-94).

If command officers are not fully committed to using an accountability system it becomes nothing more than a boat anchor (Tobia, 2005, p. 92). Tobia (2005) stated that for the accountability system to work there has to be a buy-in at all levels of the organization. This becomes a training and cultural issue. All personnel must be adequately trained to use and believe in the accountability system at all incidents (pp. 92-94). One of the largest problems implementing any accountability system in the fire service is tradition. Some of the traditions within the fire service are good but some firefighters are so resistant to change that the reason they do not want to change is because "that's the way we've always done it" and since they feel that it has worked before, why change now (Coleman, 2001 p. 47). For an accountability system to be successful the department's organizational culture must be changed by reinforcing the ideas of safety and accountability (Tobia, 2005, p. 94).

PROCEDURES

The literature for this research paper was collected over a period of time beginning before the Fall of 2007. The Literature Review was conducted utilizing a multitude of available resources, including many from the National Fire Academy (NFA) Learning Resource Center (LRC) in Emmitsburg, MD, the National Fire Protection Association Library (NFPA) in Quincy, MA as well as the Internet. Some of the resources used were fire service journals, fire service text books, other fire related books, NFA Executive Fire Officer (EFO) Applied Research Papers, public safety journals, as well as non fire related personnel accountability articles found from a variety of sources. The above sources enabled the researcher to answer the research questions.

A telephone interview was conducted with Alan Brunacini, former Phoenix, Arizona Fire Chief and main architect of the Phoenix Fire Department Passport Accountability System. Chief Brunacini is well known and respected as an authority on fireground safety and operations. The interview was conducted on February 26, 2008 and lasted for approximately 20 minutes. The transcript of the interview and coding appears in the appendix. A sample of questions:

- 1) How does a firefighter accountability system improve the safety of firefighters?
- 2) How much trial and error was there in the development of the Phoenix accountability system?

3) Are there or should there be limitations to a firefighter accountability system?

For example staffing requirements or technological requirements or the cost of the systems. At what point is it too much?

4) Do you have any advice for establishing an accountability system in a smaller department?

There were a few limitations and delimitations noted with respect to this research paper. There was a limitation on the amount of time that was allotted to complete this research paper. A limitation was also noted on the amount of statistical information relating firefighter fatalities and injuries with personnel accountability. A further limitation was that most accountability systems were not physically available to the researcher for examination. Because there are so many different accountability systems available, this researcher restricted the variety of accountability systems reviewed basing the research on the most common systems available and future technology currently under development.

Definition of Terms: (in alphabetical order)

- ECO- (Entry Control Officer): A person situated at the entrance to the hazard zone that monitors the personnel operating within the hazard zone.
- Freelancing: Described as individuals, working teams, units, or entire companies self-deploying on an incident scene or picking their own work as a result of vague orders.
- GPS- (Global Positioning System): Utilizing a constellation of at least 24 Medium Earth Orbit satellites, managed by the United States Air Force 50th

- Space Wing, that transmit precise microwave signals, the system enables a GPS receiver to determine its location, speed, direction, and time.
- IC- (Incident Commander): The person in charge of the incident.
 - ICS- (Incident Command System): A standardized, on-scene, all-hazard incident management concept. ICS is based upon a flexible, scalable response organization providing a common framework within which people can work together effectively.
 - LRC- (Learning Resource Center): One of the foremost fire centric libraries in the world, located on the campus of the NFA.
 - MARC- (Member Accountability Roll Call): The MARC is a polling accountability system by which the incident commander will verify that all members operating at the incident are safe and accounted for.
 - NFA- (National Fire Academy): The NFA's mission is to enhance the ability of fire and emergency services and allied professionals to deal more effectively with fire and related emergencies. Located in Emmitsburg, Maryland.
 - NFPA- (National Fire Protection Association): The NFPA's mission is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. Located in Quincy, Massachusetts.
 - NIMS- (National Incident Management System): NIMS integrates existing best practices into a consistent, nationwide approach to domestic incident management that is applicable at all jurisdictional levels and across functional disciplines in an all-hazards context.

- NIOSH- (National Institute for Occupational Health and Safety): A division of the Centers for Disease Control. NIOSH is in the U.S. Department of Health and Human Services and was established to help assure safe and healthful working conditions for by providing research, information, education, and training in the field of occupational safety and health.
- NIST- (National Institute of Standards and Technology): An agency within the U.S. Department of Commerce. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.
- OSHA- (Occupational Health and Administration): OSHA is a division of the U.S. Department of Labor and is responsible for developing and enforcing workplace safety and health regulations.
- PAR- (Personnel Accountability Report): A method to maintain personnel safety and accountability at emergency incidents.
- PAS- (Personnel Accountability System): The method used for tracking the position and function of firefighters on the fireground.
- PASS- (Personal Alert Safety System): A small device that automatically alarms if the device does not detect motion for a certain short period of time.
- RFD- The Rockland Fire Department, Rockland, Massachusetts.
- RFID- (Radio-frequency identification): An automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders.

- RIC/RIT- (Rapid Intervention Crew/Rapid Intervention Team): A team of two or more firefighters dedicated solely to search and rescue of other firefighters in distress.
- SCBA- (Self Contained Breathing Apparatus): A device worn by firefighters to provide breathable air in a hostile environment.
- SOP- (Standard Operating Procedure): A procedure or set of procedures to perform a given operation or evolution or in reaction to a given event.
- USFA- (United States Fire Administration): An entity of the Department of Homeland Security's Federal Emergency Management Agency.
- WPI- Worcester Polytechnic Institute, Worcester, Massachusetts.

RESULTS

1) How specifically will having a Personnel Accountability System in place improve safety?

A Personnel Accountability System (PAS) will improve overall firefighter safety on the fireground in a number of ways. With a strong PAS in place supervisory personnel would be able to answer: Who is working for you, What are they doing, Where are they, What is their progress, How long have they been working, and Are they okay (Hartin, 1992, Jarboe & McBride, 1992, and Brunacini, 2002). To which Carlson (1992), Cobb (1996), and Byrne (2007) added that a PAS will keep track of firefighters so that if they become lost or injured they may be located by rescue crews quickly and efficiently, giving them the best chance of survival.

Byrne (2007), Howes (1997) and Morris (2001) stated that a close accountability system virtually eliminates freelancing and improves firefighter safety. Eliminating freelancing reduces the chances that personnel will go missing or fail to hear an evacuation order. The basis of task level accountability revolves around crew integrity, going in together, staying together, and coming out together. If crew integrity is maintained then there are always firefighters watching out for each other and basic crew accountability is maintained (Byrne, 2007). Task level accountability is a survival-assurance program (Brunacini, 2002, p. 207).

Chief Brunacini stated that “historically the center of fireground control is to somehow be able to manage the position and function, not location... of firefighters. I think that what accountability has done is create the actual programic capability to

do that” [manage the location of firefighters] (Brunacini, personal communication, February 26, 2008). Brunacini later added that,

We depended on the incident organization from the task level, tactical level, and then up to the strategic level to manage accountability as we call it today. I think that those systems, the Passport system, the PARs, the no-PARs, all of that vision, voice and touch stuff sort of fit in as the next logical step in the development of the incident command system. (personal communication, February 26, 2008)

Cobb (1996) stated that a well designed accountability system can reduce both firefighter death and injury by strengthening the incident command and control system. This according to Cobb (1996) is the main reason for an accountability system.

2) What are some of the different types of Personnel Accountability Systems available or in use by other fire departments?

There are a number of widely available systems, ranging from inexpensive tag based systems to electronic systems that can cost thousands of dollars. The Tag based system is probably the most common system used in the American fire service (Jakubowski & Morton, 2001, p. 151). These systems use some type of tag or token that identifies the member by name, number or other identifier. The tags are collected and organized in a manner that tracks the companies of firefighters (Teele, 1993, p. 342).

The Passport system is based around the company officer or team leader utilizing the passport tag. The passport has all of the team member’s individual

name tags on it and the company officer or team leader gives the passport to the appropriate supervisor when under that supervisor's span of control (Coleman, 2000). The Phoenix Fire Department developed their own Passport based system which Chief Brunacini stated was "the natural evolution of the hazard zone management that we had been practicing for, maybe 20 or 25 years" (personal communication, February 26, 2008). In the Phoenix Passport system the officer of the responding companies verifies that their passport is correct with the names of all personnel in their company. When the first due company arrives on scene the company officer takes command, and announces on the radio "accountability north – east, etc" as part of their initial radio report and then commences initial fire attack. The pump operator of the first-due engine becomes the "accountability officer" for the initial part of the incident. An integral part of the accountability system is to make sure that all of the personnel assigned to the hazard zone are initially counted on a passport and then periodically checked throughout the incident through the use of Personnel Accountability Reports (PARs) by the IC. The accountability officer checks the passport to make sure all crews are accounted, serving as a hall monitor in their sector, anyone who comes in or out must go through them (Brunacini, 2002, p. 210).

Technology based systems are being advertised as the future of accountability systems. These technology based systems consist of anything from bar-coded tags to advanced GPS location systems. The Fire-Trax bar code based system uses high capacity two-dimensional bar codes as accountability tags.

Personnel scan their bar codes into a computer as they arrive on scene and are tracked using accountability software (Whelan, 2001, p. 62).

Some of the newer accountability systems are based around GPS-enabled tracking devices, similar to ones that some fire departments use to track apparatus, are currently available for the accountability of firefighters (Christin, 2007, p. 252). Still in the testing phases for firefighter accountability is a spinoff of military technology. In this system the firefighter wears a small transponder device that transmits a signal to three or four routers mounted on tripods located outside and around the structure to pinpoint the location of firefighters in the structure (Page, 2003). Another group of researchers from the National Institute of Standards and Technology (NIST) as well as researchers from Worcester Polytechnic Institute (WPI) are developing similar new firefighter location navigation and tracking technology that utilizes radio-frequency identification (RFID) (Kelley, 2007).

Air pack manufacturers are now designing and building telemetry based accountability systems. Most of these systems do not locate or track firefighters but rather monitor various environmental and vital signs. Another style of air pack based accountability system, is one that has the ability to track an air pack that has an emergency signal activated. When firefighters equipped with a special air-pack encounter a problem, they can either activate a locator alarm or after a set amount of time the alarm trips automatically, similar to standard PASS alarms. Another firefighter uses a handheld locator/tracking device and by using on screen prompts on the unit locates the downed firefighter (*Industrial Fire World*, 2005).

The British use a point of entry control based system that incorporates a tally tag and Entry Control Officer (ECO) to monitor the units operating in the hazard zone (Jakubowski, 1998, p. 44). The tally tag is collected by the ECO prior to the unit going into the hazardous environment. The ECO uses an entry control board to record all of the tallies and monitors the time that each unit has been in the hazard zone and calculates an approximate exit time based on air pressure. If a unit fails to exit the hazard zone at the estimated time the ECO will initiate emergency measures to find the missing unit (Young, 2001, p. 47).

Another popular system is based around frequent radio reports. The system was developed in St. Louis and is known as the 20 Minute Member Accountability Roll Call (MARC). The MARC is a roll call polling system, similar to a Personnel Accountability Report (PAR), by which the IC verifies that all members operating at the incident are safe and accounted for (Schaper & Gerner, 1996).

Brunacini (personal communication, February 26, 2008) while speaking about different types of accountability systems, stated,

The system has to match where they are using it. So from that standpoint, they are all similar, trying to do the same thing. They almost have to develop locally because of the differences in organizations and forms and sizes and the kinds of work they do, command structure and so on.

3) What are the problems, if any, with the available systems as they relate to the Rockland Fire Department?

The fire service has tried to solve the accountability problem with various solutions, such as rosters, ID tags, and white boards. These solutions have fallen

short in fully solving the problem. ID tags can be lost, white boards can be easily erased and rosters take time and can be lost (Wagner, 1998, p. 83). Strand (2004) noted that most accountability systems have traditionally had two system deficiencies. The first deficiency is most of the commonly used systems only track companies. These systems assume that a specific group of firefighters will arrive together and will continue to function as a group while on the fireground (pp. 22-23). The second deficiency with most of the readily available accountability systems is that they do not track firefighters on scene; they only tell us who is inside and who is outside and not much more (Strand, 2004, Coleman, 2000, Schaper & Gerner, 1996).

As systems become complicated with multiple tags and various check-in points opportunities for confusion abound. This confusion leads to a condition where participants will not use a system they perceive as ineffective (Tobia, 2005, p. 94). In an effort to make some accountability systems work, numerous personnel are required to operate, at the expense of personnel to fight the fire. This can distract the IC from other important fireground tasks and cause the system to fail (Gerner & Schaper, 1996, 1997). If members are not willing to use the system properly, if they do not believe in it, or if the department administration does not support it then any system will fail (Coleman, 2000, p. 43).

Ratigan (2007), while talking about tag systems, stated that one of the largest drawbacks is the human factor. At the beginning of their shift firefighters must place their tag on some type of riding list and at the end of their shift must remove that tag. If the tags are not placed on the riding list then the IC does not know who is there

and if the tag is not removed after the shift then countless time may be wasted searching for the “missing” firefighter that was never there. Tags are also frequently lost or misplaced (pp. 96-97).

With respect to electronic accountability systems, Ratigan (2007) stated that the biggest drawback to an electronic accountability system is the cost. An electronic system can cost thousands of dollars and be difficult to implement. Firefighters may not have confidence in the dependability and reliability of new technologies. Any system that relies on batteries, wireless signals, and other prone to fail parts will take some serious convincing for firefighters to trust it (pp. 96-97). Brunacini (personal communication, February 26, 2008) added that “I don’t think that technology can outperform... physics, in other words, if your taking a hose into a commercial building 300 feet, there ain’t any technology that’s around now that’s going to solve that for you”. So called military tracking and accountability technology is unproven in fire scenarios and in what firefighters will put it through (Wilmoth, 2007, p. 74). Brunacini (personal communication, February 26, 2008) stated that any technology “will have to be simplified, because of where we use them”.

Most GPS systems do not work indoors and require an unobstructed view of the sky. They are very susceptible to interference from steel buildings blocking the satellite signal. Some GPS receivers have no way to determine height and in a high-rise operation would be useless. The military, which controls the satellites, builds in a reduction in accuracy into the civilian GPS signal causing the units to be off by at least 50 to 60 feet, rendering it useless for accountability (Page, 2003). Brunacini (personal communication, February 26, 2008) added that,

The GPS challenge is inside of a structure. So far I haven't seen anybody who has developed the technology that works, just simply under a roof. So from that standpoint I think that's a development that is pretty challenging because they are all line of sight.

The telemetry accountability systems that some air pack manufacturers are developing do not track firefighters but rather monitor the vital signs of the firefighter and the conditions in which the firefighter is operating. They are not able to locate the firefighter and this does not solve the accountability problem (*Industrial Fire World*, 2005, p. 13). For these systems to work they require the firefighter's air pack to be activated and not all firefighter activity happens with air packs on and activated, causing the system to be inadequate as a stand alone accountability system (Stevens, 1999 p. 65).

Radio based accountability systems, such as the MARC system, require all firefighters to carry a portable radio. Radios are expensive and many do not function well in a wet environment. These systems assume that the command post and IC will also be able to hear and monitor all radio messages. If some transmissions are not heard then the system will not work properly (USFA, 1999, p. 23-24). Coleman (2001) added that these systems do not always work because firefighters are reluctant to talk on the radio (p. 48).

Many of the available accountability systems require the point of entry accountability personnel or accountability officers to collect tags and attempt to control a fire as a hazardous materials (hazmat) incident (Morris, Brunacini, & Whaley, 1994). At hazmat incidents site safety and action plans are drawn up before

anyone makes entry and a very small entry team is sent in to mitigate the problem. At most fire incidents, while there may be pre-fire plans, the scenes are very dynamic and fast moving (Schaper & Gerner, 1996, p. 43).

Brunacini (personal communication, February 26, 2008) stated that, although not a problem,

There is a limitation to what accountability systems will do. In other words if you think that an accountability system is going to save you if you go 300 feet on the inside of a commercial building, it won't. It can't and it won't. So there is limitations there, on what the system will actually be able to accomplish.

4) How can a Personnel Accountability System be designed and implemented in the Rockland Fire Department?

It was stated that an accountability system is the only way to maintain incident control on the fireground (Jakubowski & Morton, 2001, p. 151). The United States Fire Administration (USFA) acknowledges that it can be difficult and confusing for some departments to choose a system and equipment that is best for them because of the wide variety of options available (p. 5). Brunacini (2002) added that when developing an accountability system it must fit into and improve the way that the firefighters operate on the fireground. Cobb (1998), Tobia (2005), and Hewitt (1993) stated that no matter which accountability system is chosen, for it to be functional, it must be simple and maintenance free. The more complicated the system the less it will be used.

When designing an accountability system, one needs to begin by looking at how the department operates at incidents (Coleman, 2000, p. 53). The accountability

system must be designed by using input from all levels of the organization (Jarboe & McBride, 1992, p. 16). It must be easily incorporated into the existing incident command system, be easily expanded as the incident grows and must be fully integrated into everything that the department does (Cobb, 1996, Jakubowski, 1998, Hewitt, 1993, Morris, Brunacini, & Whaley, 1994).

With respect to accountability within the incident command system, Brunacini (personal communication, February 26, 2008) stated that,

It's kind of hard for the accountability process to outperform the incident command system process. In other words, if you have a level 3 on a scale of 10 command system and want to do a level 6 accountability system, there is a pretty good gap there.

For the accountability system to be functional it must be designed around response procedures and staffing levels (Coleman, 2000). Continuing with that theme, one of the most important factors in implementing an accountability system is the need for commitment from the top of the chain of command (Cobb, 1998). For any system to work properly, well trained and disciplined firefighters must work within a competent and organized incident management system (Coleman, 2000).

Brunacini (personal communication, February 26, 2008) added,

Of course firefighters die on the task level or get injured, so I guess from that standpoint, from kind of an organic, biological standpoint, you could say that really the whole system defaults down to that level, of the workers who are in the hazard zone.

He also stated, with respect to strategic, tactical, and task level accountability that,

The systems can't outperform each other. In other words, the only person on the fire ground or incident site, who has the capability to look at a 360 perspective of that incident is the IC. In other words, if you are the roof sector, the interior sector or the rear sector, what you can see is the assignment that you have. The only person who logically and practically, is getting reports from all of those places is the IC. So from a standpoint of situation awareness if you don't have a strategic level IC in place, there isn't anything that those other levels can do that can outperform that. By the same token, if you look at it from an accountability standpoint, the function and the roll of fire companies. You can have the best incident command system on the planet, but if you have suicidal fire companies, there's not a hell of a lot that the incident commander can do.

No matter which system is chosen, the IC must realize that accountability should be a tactical priority and as such be assigned resources to manage it (Tobia, 2005, pp. 93-94). Members also must realize that they are accountable for their own safety. They need to know who they are working with and who they are working for and remain within the ICS (Jakubowski, 1998, p. 44).

Morris, Brunacini, and Whaley (1994) described fourteen points that they offer as key to designing an accountability system. They are:

- The system must track individuals in the hazard zone.
- Accountability procedures must be written and followed.

- Training on the policies, procedures and tactics of the accountability system is a must to have a successful system.
- Always maintain crew integrity and company supervision. By maintaining company supervision and crew integrity freelancing is prohibited.
- All firefighters operating in the hazard zone must have the ability to communicate with command.
- It is essential that command be able to visually identify different crews by means of an “identifier.”
- The system must have a “caretaker” or accountability officer.
- There must be an Incident Management System in place.
- The point(s) of entry must be monitored. Hardware must be turned in at the point of entry and retrieved as crews leave the hazard zone.
- A written rescue/recovery plan, that addresses missing or downed firefighters, is an integral part of an accountability system.
- A roll call of personnel must be conducted at certain points during the incident, such as hazardous events or when tactical benchmarks are achieved.
- The organization’s culture must be changed so that firefighters’ understand that failure to adhere to standard accountability practices places them –and any rescue personnel- at unusual risk (pp. 46, 49-50).

Building on Morris, Brunacini, and Whaley's last point, Tobia (2005) added that for an accountability system to be successful the department's organizational culture must be changed by reinforcing the ideas of safety and accountability (p. 94). It takes time and constant reinforcement for the system to become second nature (Morris, Brunacini, & Whaley, 1994, p. 58).

Within the Rockland Fire Department the personnel accountability system would be developed using recommendations garnered from the research. The system would need to be designed around, as Coleman (2002) recommended, the staffing and response procedures of the Rockland Fire Department. Personnel accountability procedures for the RFD must take into account the fast and dirty, offensive fireground operations that firefighters operate in due to the reduced staffing levels in Rockland (Brunacini, 2002). One key point in the design of the new accountability system must be the elimination of freelancing within the Rockland Fire Department (Morris, Brunacini, & Whaley, 1994). Brunacini (personal communication, February 26, 2008) recommended that the system be developed locally, to match where the system will be used. The new RFD personnel accountability system will utilize specific components of existing accountability systems that fit into and enhance the way that the RFD operates (Cobb, 1996, Jakubowski, 1998, Hewitt, 1993, Morris, Brunacini, & Whaley, 1994). Once established, the new PAS must be enforced and reinforced by the department at all incidents to ensure that the safety of firefighters is increased (Morris, Brunacini, & Whaley, 1994, Brunacini, 2002, Jakubowski, 1998, Cobb, 1996, Tobia, 2005, Jarboe & McBride, 1992)

When asked if he had any advice for implementing a Personnel Accountability System Chief Brunacini (personal communication, February 26, 2008) advised to, Make it a natural act that emerges out of what you do everyday. Don't try to implement an accountability system at the 11th hour after you've done 15 things that have gotten you into trouble and then expect the accountability system [to save you]. If it's an unnatural act, it ain't going to work when you need it. Because when you need it, it's the worst time of your life.

DISCUSSION

Every year the USFA and the NFPA publish reports on the number of firefighter fatalities and the statistics surrounding those deaths. Neither of these agencies list accountability as a direct factor in the deaths of firefighters, but both acknowledge that accountability is necessary for firefighter safety (USFA, 2006, pp. 41-44, NFPA 1500, 2006). The NFPA, the agency that develops the standards that fire departments utilize for policies and procedures, only dictate that a department must have an accountability system but do not specify what type of system that should be used. The standards do not call for standardization.

1) How specifically will having a Personnel Accountability System in place improve safety?

Based on the literature, it is clear that utilizing a personnel accountability system will improve firefighter safety on the fireground. The answers to the questions, Who is working for you, What are they doing, Where are they, What is their progress, How long have they been working, and Are they okay, is the key information that is needed to account for firefighters operating the hazard zone. If the IC can answer those questions then the safety of all personnel operating at an incident is greatly increased (Hartin, 1992, Jarboe & McBride, 1992, Brunacini, 2002, Carlson, 1992, Cobb, 1996, and Byrne, 2007).

The ability to quickly locate firefighters operating on the fireground improves the overall safety of all personnel working on the fireground. If a firefighter is in trouble his/her best chance for survival is to be located quickly. A fully functional personnel accountability system will assist in the location of the downed firefighter.

Currently in Rockland the IC has no procedure to determine the location of firefighters operating on the fireground. An accountability system, used properly, will aid the IC in tracking and determining the locations of personnel operating on the fireground.

Byrne (2007), Howes (1997) and Morris (2001) stated that a close accountability system virtually eliminates freelancing and improves firefighter safety. Without a personnel accountability system, firefighters are free to wander the fireground completing whatever task they determine needs to be performed. In Rockland, after the ICs initial orders are completed, firefighters routinely freelance. Off duty, recalled personnel typically do not report to the IC for orders but rather attack the incident as they see fit. The elimination of this freelancing within the Rockland Fire Department is a necessity to improve safety and a personnel accountability system will assist in accomplishing that task.

- 2) What are some of the different types of Personnel Accountability Systems available or in use by other fire departments?**
- 3) What are the problems, if any, with the available systems as they relate to the Rockland Fire Department?**

These two research questions are complimentary to each other and should be discussed as such. The fire service has tried to solve the accountability problem with various solutions, such as rosters, ID tags, and white boards (Wagner, 1998, p. 83). Although tag based systems are the most common in use by the American fire service, they are also the most dependent on the individual firefighter to initiate the system. The tags must be left somewhere on the apparatus by each firefighter then,

according to Teele (1993), the tags must be collected and organized in a manner that tracks the companies of firefighters (p. 342). This step requires, as Jakubowski and Morton (2001) pointed out that an IC or accountability officer must trudge around to every piece of apparatus to assemble the accountability system (p. 151). A tag based accountability system, by itself, might work for some departments although it would likely work much more efficiently in conjunction with a system that includes frequent and routine PARs.

Rockland attempted a tag based accountability system in the 1990s but never fully implemented and enforced the system. Many of the common tag system problems were realized in Rockland causing the system to fall out of use. Today there are only a few firefighters who have the old tags and there is no policy on how to use them.

The Passport system is based around the company officer or team leader utilizing a passport tag. As with the tag system the individual firefighter must give the company officer their individual tag to place on the passport. The passport tags are easier to initiate than a traditional tag system because the company officer is responsible for all personnel working under him/her. Within most of the passport based systems the pump operator of the first-due engine becomes the “accountability officer” for the initial part of the incident (Brunacini, 2002, p. 210). The pump operator adds the passports from each arriving company to an accountability board and makes quick notes about where each company is assigned. Although the initial pump operator has a large number of other tasks to accomplish in a short amount of time, the accountability that he/she must maintain is basic and must only

be maintained until the Incident Commander establishes command and takes over the accountability function. A passport system operating in this way would probably work well in Rockland with some local adaptations. The initial pump operator would be able to manage accountability in Rockland until the IC arrives although current procedures concerning the pump operator would have to be revamped. The pump operator would no longer be allowed to freelance and wander in the building to assist the first entry crew he/she would have to remain near the engine.

Technology based systems are being advertised as what the future holds for accountability systems. These systems consist of anything from bar-coded tags to advanced GPS location systems. The Fire-Trax bar code based system, which uses high capacity bar codes as accountability tags, and other bar code based systems do not actively track the location of firefighters on the fireground. Second to the cost, the largest drawback to the bar code based accountability systems is that they do not track firefighters on scene, but rather facilitate data entry to help with accountability (USFA, 1999, pp. 17-20).

Some of the newer technology based accountability systems are based around GPS-enabled tracking devices (Christin, 2007, p. 252). As Brunacini (personal communication, February 26, 2008) pointed out "The GPS challenge is inside of a structure. So far I haven't seen anybody who has developed the technology that works, just simply under a roof". This maybe true today but as technology improves there may be GPS units developed that will work in the harsh conditions of the fireground.

Researchers from the National Institute of Standards and Technology (NIST) as well as Worcester Polytechnic Institute (WPI) are developing new firefighter location navigation and tracking technology that utilizes radio-frequency identification (RFID) (Kelley, 2007). Currently the system is not fireground ready, far too complicated, and requires a large number of personnel to operate. Although this system is early in the stages of development, it someday may change the way firefighters operate in the hazard zone.

The telemetry accountability systems that air pack manufacturers are designing do not locate or track firefighters but rather monitor various environmental and vital signs. These telemetry based systems are not stand alone accountability systems but will aid the IC in monitoring the conditions of the firefighters as well as the conditions within the hazard zone. The knowledge that these systems provide to an incident commander is essential in the management of the incident but that knowledge is not required for accountability.

The biggest drawback identified for any electronic accountability system is the cost. These systems are typically very expensive and require constant monitoring and may require frequent upgrades as technology improves. Given the current funding situation for the Rockland Fire Department this type of system will be impossible to establish. In addition, firefighters may not have confidence in the dependability and reliability of new technologies. Any system that relies on batteries, wireless signals, and other prone to fail parts will take some serious convincing for firefighters to trust it (Ratigan, 2007, pp. 96-97). Brunacini (personal communication, February 26, 2008) correctly pointed out that "I don't think that technology can

outperform... physics, in other words, if your taking a hose into a commercial building 300 feet, there ain't any technology that's around now that's going to solve that for you".

Personnel Accountability Systems based around frequent radio reports, such as the St. Louis MARC, provide the IC with crucial information about the safety and whereabouts of personnel operating on the fireground. The problem with this type of system is it requires all members to have a portable radio and the system needs to be augmented by another system that records personnel by name or number to maintain full accountability. The MARC system would probably work well in Rockland so long as it was combined with another system that tracks the names or numbers of the firefighters working in the hazard zone. This is essential to know if there are units operating in the hazard zone that are unable to respond to the MARC.

Accountability systems that utilize an Entry Control Officer have worked well in England and may, over time, work in the American fire service but because they require additional personnel to serve as entry control officers the system may be sacrificed in order to add more personnel to effectively control the incident. These models of accountability systems have their place in the fire service but should remain where they work best, at hazardous materials incidents and not at the dynamic and fast moving fire scene.

Overall most solutions for accountability have fallen short in fully solving the problem. ID tags can be lost, white boards can be easily erased and rosters take time and can be lost (Wagner, 1998, p. 83). Based on the research, it would appear

that the best system for the accountability of firefighters is a combination of systems. Brunacini (personal communication, February 26, 2008) stated that “the system has to match where they are using it. [The systems] almost have to develop locally because of the differences in organizations and forms and sizes and the kinds of work they do, command structure and so on”.

4) How can a Personnel Accountability System be designed and implemented in the Rockland Fire Department?

The design and implementation of an accountability system requires trial and error for the department. No system will be perfect during its first incarnation. The United States Fire Administration (USFA) acknowledges that it can be difficult and confusing for some departments to choose a system and equipment that is best for them because of the wide variety of options available (p. 5). Brunacini (2002) added that when developing an accountability system it must fit into and improve the way that the firefighters operate on the fireground. Cobb (1998), Tobia (2005), and Hewitt (1993) stated that no matter which accountability system is chosen, for it to be functional, it must be simple and maintenance free. The more complicated the system the less it will be used.

Coleman (2000) accurately pointed out that for the accountability system to be functional it must be designed around response procedures and staffing levels, a system designed for a large metropolitan fire department might not work in Rockland. When designing the accountability system, how the department operates at incidents should be one of the main factors (Coleman, 2000, p. 53). The accountability system must be designed by using input from all levels of the

organization (Jarboe & McBride, 1992, p. 16). This ensures that all personnel have a stake in the accountability system.

Morris, Brunacini, and Whaley (1994) described fourteen points that they offer as key to designing an accountability system. Most of the points that they raised are necessary for the accountability system to maintain full accountability of personnel, other points are dependent on the type of system in place. The main point of accountability, to track individuals in the hazard zone, is their first point. They stated that policies and procedures must be written and firefighters must be trained on the system. These points establish the system as something more than the Chief's whim, they give the system force. Crew integrity and the direct supervision of firefighters operating in the hazard zone reduces or eliminates freelancing, thus reducing the overall potential of firefighter death and injury on the fireground. Communications with command is essential for the tracking of firefighters and their safety. Firefighters must be able to give reports, update command on their progress, and call for help if needed. Morris, Brunacini, and Whaley stated that firefighters must have some kind of identifier to visually differentiate them from other crews. This point is difficult to accomplish in departments, such as Rockland, where personnel who make up a crew arrive on different pieces of apparatus or in personal vehicles. Individual ID numbers on firefighters' gear and helmets should accomplish this point for the RFD. They continued that the system must have a "caretaker" or accountability officer. The IC, at most incidents, is more than capable of handling the accountability function. The IC must realize that as the incident expands he/she must hand over the accountability function to a formal accountability officer. Morris,

Brunacini, and Whaley added that there must be an Incident Management System in place. The Incident Management System is a must to maintain control of the fireground. Chief Brunacini (2002) insisted that the Incident Management System is the key to firefighter safety. Morris, Brunacini, and Whaley stated that the points of entry must be monitored and hardware collected as firefighters enter the hazard zone. Point of entry control is not always necessary if other means of tracking personnel in the hazard zone are in place. They add that a written rescue plan for a missing or downed firefighter is an integral part of an accountability system. An accountability system that does not have a procedure to rescue firefighters in trouble is an incomplete system. There must be some type of physical response procedure to rescue firefighters; if not then the system does nothing more than identify who is on scene. Morris, Brunacini, and Whaley point out that the system must have a policy for a roll call (PAR) of personnel operating on the fireground. This is an essential part of fireground communications and aids the IC in his/her ability to monitor personnel in the hazard zone. The last point that Morris, Brunacini, and Whaley raised in implementing an accountability system was probably the most difficult and one of the most important. They stated that the organization's culture must be changed so that firefighters' understand that failure to adhere to standard accountability practices places them –and any rescue personnel- at unusual risk (pp. 46, 49-50). To change a department's organizational culture takes times and constant reinforcement from all members within the organization. Centuries old traditions must be overcome for a cultural change to become second nature and develop into new traditions.

When asked if he had any advice for implementing a personnel accountability system Chief Brunacini (personal communication, February 26, 2008) offered that the system should be a “natural act that emerges out of what you do everyday.” He continued that you should not “try to implement an accountability system at the 11th hour after you’ve done 15 things that have gotten you into trouble and then expect the accountability system [to save you].” Most important he stated that “if it’s an unnatural act, it ain’t going to work when you need it. Because when you need it, it’s the worst time of your life.” Chief Brunacini’s advice may be simple but very important for the process of developing an accountability system.

The need to implement a Personnel Accountability System is established from the research. Although there are many available systems from which to choose, the system should be developed locally utilizing parts from existing systems to make a functional system for the Rockland Fire Department. It is acknowledged that an accountability system will not prevent all injuries on the fireground but will reduce the number of preventable deaths and injuries that plague the fire service every year.

RECOMMENDATIONS

The results of this research paper clearly show the need to design and implement a Personnel Accountability System within the Rockland Fire Department. At a minimum, a system must be developed that meets the spirit of the NFPA standards and the OSHA regulations. The RFD must show a commitment to safety for all of its personnel.

1) A Personnel Accountability System must be implemented within the Rockland Fire Department.

The literature has shown that an accountability system is essential for firefighter safety on the fireground. For the system to function properly all fire department personnel must be extensively trained and the system must be enforced. It must be incorporated in all incidents and training exercises. PARs must be utilized. The system must include some form of time marks from the dispatcher so that the PARs may be completed in a timely manner at all incidents.

2) A policy and procedure for the response to maydays must be created.

Without some type of policy for initiating a mayday, firefighters have no official and proper method of informing the IC that they are in trouble and need assistance. The policy must address various methods for initiating a mayday. Once a policy and procedure is established firefighters must be trained and the policy enforced.

3) Policies and procedures for radio use must be established and enforced.

Any accountability system must include some type of communication from firefighters operating at the task level to their supervisors. The use of portable radios is necessary to facilitate this communication. All Rockland firefighters have been issued portable radios but no policies and procedures exist on their operation and maintenance. Portable radio communication should be made a priority.

4) Establish a RIT at incidents as part of the accountability system.

According to Morris, Brunacini, and Whaley (1994) a written policy and procedure for the rescue of a downed firefighter is an integral part of an accountability system. Within the Rockland Fire Department no policies or procedures for rapid intervention currently exist. The RFD recently received a federal grant for rapid intervention training although this training has not occurred yet and may be delayed for some time. The RFD must work with its mutual aid communities to establish regional rapid intervention policies and procedures. This is necessary due to the heavy reliance on mutual aid for even small, routine fires. Regional RIT policies and procedures will ensure that all personnel from different communities will perform the RIT function the same way at all incidents.

5) The RFD must work with mutual aid communities to establish a regional accountability policy and procedure.

The RFD relies heavily on mutual aid for even the most routine fires, therefore for an accountability system to function properly all personnel in the hazard zone, mutual aid included, must operate within the same system. In addition to a local

department accountability system a regional policy and procedure will enhance the safety of all firefighters operating at any incident within the area because all firefighters on the fireground are operating under the same accountability system. Every effort must be made by the RFD to work with its mutual aid communities to establish policies and procedures for a regional personnel accountability system.

6) There must be constant, consistent use and reinforcement of the ICS from all levels of the department.

The Rockland Fire Department must fully commit to using the Incident Command System properly at all incidents. For any accountability system to function properly a strong ICS is necessary. Chief Brunacini (personal communication, February 26, 2008) stated that the accountability system is only as good as the Incident Command System. Therefore to properly implement a personnel accountability system the ICS must be consistently and properly used at all incidents by all personnel.

7) Investigate the possibility of obtaining a technologically advanced accountability system in the future through the use of alternative funding sources.

Current and future fiscal problems play a role in whether the RFD would be able to purchase and implement a technologically advanced personnel accountability system without utilizing alternative funding. The benefits of these systems will continue to expand as more and more research dollars are spent in trying to solve the firefighter accountability problem. The RFD must consider

perusing alternative funding sources as these systems become better at tracking firefighters in the hazard zone.

8) The fire department's culture must be changed to focus on firefighter safety.

For the accountability system to function properly there must be a buy in from all members of the organization. The most difficult part in implementing an accountability system will be convincing the personnel of the RFD that it is necessary for their safety. Traditions will need to be changed and overlooked so that safety may be increased. Firefighters must realize that the personnel accountability system was created for their safety and survival and the system is useless without their commitment to it.

The Rockland Fire Department must show a strong commitment to the safety of its members. All personnel need to understand the importance of firefighter safety and the need for accountability on the fireground. Any system that is not fully established and implemented only reinforces the old "traditional" way of operating at incidents. If the accountability system is not properly and fully utilized then it is only a matter of time before firefighters are injured or killed operating in the hazard zone. A model personnel accountability system SOP for the Rockland Fire Department is attached in the Appendix. This SOP will be presented to the RFD for implementation within the department.

All future readers of this research project should realize the importance of firefighter accountability and work towards developing an accountability system that meets the needs of their particular department. Most accountability systems are

inexpensive and after only minimal expense, require only the full commitment from the organization. Each year the NFPA and USFA report the deaths of over 100 firefighters operating at emergency scenes. Far too many of those firefighters die needlessly while operating at those incidents. The research has proven the need for personnel accountability systems at all incidents and we as a profession must do everything in our power to reduce the number of firefighters needlessly killed or injured in the line of duty.

REFERENCES

- Accountability. (2003, Spring). *VFIS News*, 3(1), 5-6.
- Brennan, T. (1993, May). Accountability. *Fire Engineering*, 146(5), 106-105.
- Brouwer, E. (2003, May). Increase fireground safety through IC and accountability. *Fire Fighting in Canada*, 47(3), 18-19
- Brunacini, A. (2002). *Fire command* (2nd ed.). Quincy, MA: National Fire Protection Association.
- Byrne, J. (2007, April). Understanding fireground lods: A fresh perspective on an old problem. *Fire-Rescue Magazine*, 25(4), 100-106.
- Carlson, G. (1992, August). Personnel accountability. *Fire Engineering*, 145(8), 10-11.
- Carter, H. (2001, March). Honor the dead: Kill the living - how do you find them?. *The Voice*, 30(3), 20-21.
- Christin, P. (2007, April). Fireground accountability using mobile GIS. *Fire Engineering*, 160(4), 252.
- Cobb, R. (1996, June). Accountability on the fireground. *Firehouse*, 21(6), 66-70.
- Coleman, J. (2000, May). Accountability. *Fire Engineering*, 153(5), 16-38.
- Coleman, J. (2001). *Managing major fires*. Tulsa, OK: Penn Well.
- Colestock, M. (1994, January). Personnel accountability. *Fire Engineering*, 147(1), 10-15.
- Compton, D. (1998, January). Fireground accountability... more of the story. *Firehouse*, 23(1), 42-46.

- Davis, L. (1998, May). Checks and balances: Do-it-yourself labels provide easy accountability. *Fire-Rescue Magazine*, 16(5), 36-41.
- Deep breath: SCBA makers introduce new innovation. (2005, January/February). *Industrial Fire World*, 20(1), 13-14.
- Dyer, B. (1996, February). Fireground roll calls. *Pennsylvania Fireman*, 80-84.
- Emery, M. (2007, August). C.A.R.E.: As a team leader your responsibility is to c.a.r.e. for your team members. *FDSOA Health & Safety*, 18(8), 1-7.
- Federal Emergency Management Agency. (2005, September). *ICS 100: Introduction to ICS* [Electronic Version].
- Gallagher, D. (2004, April). Fireground shuffle. *Fire Chief*, 48(4), 92-95.
- Gerner, G., & Schaper, F. (1998, July). Paper & pencil accountability: Using incident worksheets. *Firehouse*, 23(7), 124-127.
- Hartin, E. (1992, April-May). Accountability on the fireground people or things?. *Firefighter's News*, 10(2), 75-80.
- Hewitt, J. (1993, September/October). Personnel accountability system tracks fireground crew. *Minnesota Fire Chief*, 30(1), 12-13.
- Howes, K. (1997, November). Worthy of a pat on the back. *Fire Chief*, 41(11), 50-55.
- Jakubowski, G. & Morton, M. (2001). *Rapid intervention teams*. Stillwater, OK: Fire Protection Publications.
- Jakubowski, G. (1998, March). Who's on first? Personnel accountability on the fireground. *Fire-Rescue Magazine*, 16(3), 43-45.
- Jarboe, T., & McBride, D. (1992, July/August). Personnel accountability system. *The Voice*, 21(7), 15-18.

- Kelley, K. (2007, October). New research promises firefighting tracking. *Public Safety Report*, 47-52. Retrieved February 28, 2008, from http://www.ece.wpi.edu/Research/PPL/News/PSR_07.pdf
- McCormack, J. (2005, June). Accountability: It's more than knowing who's there!. *FDSOA Health & Safety*, 16(6), 1-3.
- Melfi, P. (2001, December). Fire service accountability. *Fire Engineering*, 154(12), 67-68.
- Morris, G. (2001, November). Health and safety issues on the fire ground. *FDSOA Health & Safety*, 12(11), 10-11.
- Morris, G., & Brunacini, N., & Whaley, L. (1994, April). Fireground accountability: The phoenix system. *Fire Engineering*, 147(4), 45-50, 54-61.
- National Fire Protection Association. (2005). *Standard on Emergency Services Incident Management System – NFPA 1561* [Electronic Version]. Quincy, MA: Author.
- National Fire Protection Association. (2006). *Standard on Fire Department Occupational Safety and Health Program – NFPA 1500* [Electronic Version]. Quincy, MA: Author.
- National Fire Protection Association. (2008). *Standard on Emergency Services Incident Management System – NFPA 1561* [Electronic Version]. Quincy, MA: Author.
- Occupational Health and Safety Administration. (1998). Respiratory Protection: Standard 29 CFR § 1910.134 [Electronic Version].

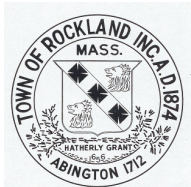
- Page, D. (2003, December). Rising Star. *Fire Chief*, 47(12), 34-37. Retrieved November 29, 2005, from http://firechief.com/training/apparel/firefighting_rising_star/
- Ratigan, S. (2007, April). Simplified: personnel accountability. *FDSOA Health & Safety*, 18(4), 5-9.
- Schaper, F., & Gerner, G. (1996, October/November). The 20 minute MARC. *Firefighter's News*, 14(5), 42-45.
- Schnaidt, B. (1995, January). Barcodes assure fireground accountability. *Fire Chief*, 39(1), 110-113.
- Smith, J. (2001, February). Safety monitoring. *Firehouse*, 26(2), 18-20.
- Stevens, L. (1999, May). PASS revolution - will transmitting pass provide accountability answers?. *Fire-Rescue Magazine*, 17(5), 61-68.
- Strand, C. (2004, July/August). A task-based firefighter accountability system. *Minnesota Fire Chief*, 40(6), 22-23.
- Teele, B. (1993). *NFPA 1500 handbook*. Quincy, MA: National Fire Protection Association.
- Tippett, J. (2007, February). No place like home: Residential structure fires require a coordinated & safe fire attack. *Fire-Rescue Magazine*, 25(2), 132-134.
- Tobia, M. (2005, August). Tags, not it?. *Fire Chief*, 49(8), 92-96.
- United States Fire Administration. (1999). *Personnel accountability system technology assessment*. Washington, DC: Federal Emergency Management Agency.

- United States Fire Administration. (2006). *Fire fighter fatalities in the United States 2005*. Washington, DC: Federal Emergency Management Agency.
- Wagner, M. (1998, November). Keeping track with basic bar codes. *FIRE International*, 39-40.
- Whelan, M. (2001, December). Express-lane accountability. *Fire Chief*, 45(12), 62-64.
- Williams, G. (2006, August). The black box principle and approach for missing firefighters. *FIRE*, 99(1213), 22-23.
- Wilmoth, J. (2007, May). Train to play. *Fire Chief*, 51(5), 74-79.
- Wood, J. Jr. (1990, January). Fireground accountability: SOPs can save lives. *Fire Engineering*, 143(1), 8-9.
- Yaccich, T. (2003, March/April). Accountability: A prerequisite. *Every Second Counts*, 5(2), 19.
- Young, P. (2001, November). The UK approach to firefighter safety in structure fires. *Fire Engineers Journal*, 61(215), 47-48.

APPENDIX – A
Standard Operating Procedure
Personnel Accountability System

Rockland Fire-Rescue Department

P.O. Box 542
360 Union Street
Rockland, MA 02370



Standard Operating Procedure Personnel Accountability System

I. Purpose.

To identify a system of incident site personnel accountability. To account for all personnel, at any given time, within a small geographic area inside the Hazard Zone of an incident.

II. Scope.

This procedure applies to all Rockland Fire Department (RFD) operational personnel.

- A. Use of the system will provide enhanced personal safety for the individual firefighter and an improved means for the Incident Commander (IC) to track and account for all personnel working in the Hazard Zone.
- B. The Hazard Zone will be defined as any area requiring SCBA and in which personnel are at risk of becoming lost, trapped, or injured by the environment or structure, i.e., entering a structure reported to be on fire, operating in close proximity to a structure during exterior operations, technical rescue, confined space, or trench rescue.

III. Accountability Responsibilities – Descriptions:

Accountability requires a strong personal commitment to the safety system to be successful. This commitment involves the following responsibilities:

- A. **Firefighter:** The term "firefighter" refers to any personnel on the fireground, regardless of rank, i.e., "firefighter down" includes any personnel injured on the scene. The firefighter must stay with the crew at all times, and ensures their name tag is given to the Company Officer to be placed on the PASSPORT (*See Section V.*)
- B. **Pump operator:** The pump operator of the first engine to each geographic side of the incident becomes the initial Accountability Officer for that area. The pump operator collects the PASSPORTs from the assigned crews and apparatus to that area and manages accountability until relieved by the IC or Accountability Officer.
- C. **Company Officer:** The term is meant to be interpreted as crew leader. This would preferably be an officer, but, depending on the situation and manpower available, could be any qualified individual delegated this responsibility by the

- IC. The company officer is responsible for keeping the crew intact at all times and ensuring the PASSPORT is current and accurate. The PASSPORT must reflect only those personnel entering the Hazard Zone. It is the responsibility of the Company Officer to ensure the PASSPORT is turned in at the point of entry and retrieved upon exit. The term "Point of Entry" will be the location where the crew will leave their PASSPORT with an Accountability Officer before entering a Hazard Zone.
- D. **Group or Division Officer:** Responsible for accounting of all crews in their assigned area, being aware of their location, and maintaining accurate PASSPORT of crews in the Hazard Zone. The Group or Division Officer may be relieved of the accountability responsibilities by the IC or Accountability Officer. When the Group or Division Officer must enter the Hazard Zone, PASSPORTs will continue to be managed by the pump operator of the first engine to each side of the incident, or a designated Accountability Officer for their area.
- E. **Accountability Officer:** Teams with the assigned Group or Division Officer to manage accountability for that area. The Accountability Officer must collect all PASSPORTs from pump operators, apparatus, or the Group / Division Officer, and maintain close coordination with other Accountability Officers on escalated incidents.
- F. **Accountability Group Officer:** Responsible for managing Accountability Officers and the Accountability System, and causes Personal Accountability Reports (PARs) to be initiated at tactical benchmarks or as needed.
- G. **Rehab Group Officer:** A "Rehab Group" is a designated area outside the Hazard Zone where firefighters may receive rest, nourishment, and SCBA replenishment. Crews surrender their PASSPORTs or individual name tags to the Rehab Group Officer upon their arrival. The IC may use the Rehab Sector for a manpower staging area for unassigned crews or individual firefighters.
- H. **Incident Commander (IC):** Responsible for initiating the Accountability System for tracking all crews. The IC must advise later assigned crews that an engine company or an Accountability Officer is accepting PASSPORTs at the point of entry. The IC must initiate PARs as required by various benchmarks.

IV. Accountability:

Accountability involves a personal commitment to work within the safety system at an incident.

- A. The IC always maintains an accurate tracking and awareness of where resources are committed at an incident.

- B. The IC is responsible for including accountability as a major element in strategy and attack planning, and must consider and react to barriers to effective accountability.
- C. Group / Division Officers will maintain an accurate tracking and awareness of assigned crews. This requires the Group / Division Officer to be in his assigned area and maintain close supervision.
- D. All crews work for the IC or Group / Division Officers. Freelancing (performing tasks without direct orders) is prohibited.
- E. Crews arriving on scene should remain intact.
- F. All crews entering a Hazard Zone must have a designated Company Officer/ Team Leader.
- G. All crews enter, remain, and exit together. Reduced visibility and increased risk requires very tight “togetherness”. Crews must remain in contact via voice, vision and/or touch.
- H. If a radio fails while in the Hazard Zone, the crew will exit unless there is another working radio with the crew.
- I. All personnel must carry a portable radio with them at all times while in the Hazard Zone. It is the responsibility of each firefighter to ensure that his/her radio is in working order at the beginning of their shift.
- J. Personnel in Sectors/Divisions/Groups other than the Hazard Zone will turn in their Passports to the appropriate Sector/Division/Group leader for accountability. As units move out of these areas Passport tags will be brought with them and turned in at their next assignments for accountability. Sector/Division/Group leaders will notify the IC as units are moved.

V. PASSPORTS:

To enhance accountability and to improve tracking of personnel in the Hazard Zone, the PASSPORT system will be used. A “passport” is a plastic card with the names of crew members affixed to it which is turned into an Accountability Officer. The Accountability Officer may be a Pump Engineer, Group / Division Officer, or a designated Accountability Officer, depending on the nature, type, and complexity of the incident.

VI. PASSPORT Equipment.

- A. PASSPORT equipment includes a plastic card with the company's ID etched on it, containing names of all personnel presently responding on a particular apparatus.
- B. The PASSPORT will initially be located on the dashboard of the apparatus at the Captain's position or passenger side. A Velcro strip allows the PASSPORT to be affixed on the dashboard and easily removed.
- C. Each firefighter will be issued three individual name tags, two color-coded to their rank, and one blue, that are affixed to Velcro strips on the underside of their helmet. The rank tags will be used on the PASSPORTs to indicate the location of the firefighter. If a firefighter is reassigned to a Group / Division, not the same as the original location, communication to the first Group / Division will be required to remove his name tag from the first PASSPORT. Only one tag should be on any PASSPORT on the fireground at any given time. Only after both rank tags have been used will the blue tag be used. This may be an indicator to the Accountability Officer that the firefighter is being reassigned for a third time and he may have two other name tags already assigned, or the firefighter may have lost his tags. If the firefighter has no name tags, he will not be reassigned to the Hazard Zone until tags are located. An additional three tags will be issued for off duty response. These tags will be used in the same fashion as the on duty tags, except they will only be used when working at an incident on call back.
- D. All engines, ladders, and specialized equipment will be equipped with a status board, on which PASSPORTS will be placed. It will initially be located in the area of the inside door of the pump operator's / driver's position. The status board will be attached with Velcro to permit easy removal.
- E. The Company Officer will be responsible for ensuring the PASSPORT always reflects only currently assigned personnel. When entering a Hazard Zone with a partial crew (i.e., pump operator remains at the engine to pump lines), the Company Officer must remove the name tags of those members not entering the Hazard one. They may be returned to the individual, placed on the Company Officer's helmet Velcro strip, or placed in his coat pocket.

VII. Tactical Benchmarks:

- A. Several accountability benchmarks are included in tactical operations. The Personnel Accountability Report (PAR) confirms the presence of personnel assigned to a crew. For the Group / Division Officer, a PAR is an accounting for all crew members of all his assigned companies. Reports of PARs should be conducted face-to-face within the company or with the Group / Division Officer, whenever possible, and should include the number of personnel in that group, and location and function of crew if over the radio.

Example: “Accountability, Engine 3, I have a PAR of three, first floor, fire attack (or, “Accountability, Roof Group.....”), indicating all members are accounted for.

- B. A personnel accountability report (PAR) will be required for the following situations:
1. Any report of a missing or trapped firefighter. (IC initiates a PAR of all crews on scene.)
 2. Any change from offensive to defensive. (IC initiates a PAR of all crews on scene).
 3. Any sudden hazardous event at the incident (e.g., flashover, backdraft, collapse). (A PAR is initiated by IC).
 4. By all crews once the “all clear” benchmark is achieved. (Company officers are responsible for search and rescue and will ensure they have a PAR for their crews at the time they report an “all clear”).
 5. At each 15 minutes of elapsed time. (Clock starting with first arriving apparatus).
 6. At a report of fire under control.

VIII. Accountability Officers:

- A. Accountability Officers may be pump operators or personnel specifically assigned to serve as Accountability Officers by the IC.
- B. The first engine to each geographic side of the incident will serve as the initial accountability location.
- C. **The pump operator will serve as the initial Accountability Officer.** All crews entering the incident will deliver PASSPORTS to the Accountability location closest to their point of entry prior to entering the Hazard Zone. As Groups / Divisions are implemented, Company Officers will manage PASSPORTS only if not entering the Hazard Zone, e.g., defensive operation. When the Company Officer must enter the Hazard Zone, PASSPORTS will remain on the first engine (accountability location). As additional personnel arrive on the scene and stage, they may be assigned accountability responsibilities for given areas. These officers will report to their assigned officer to manage accountability for that division, e.g., lobby division.
- D. As the incident escalates and staff officers fill accountability positions for each area, these Accountability Officers will be assigned to a radio channel designated by the IC. Accountability Officers will report to the IC.

IX. Accountability Group:

- A. If the incident escalates to the level that multiple Accountability Officers are assigned, the IC should implement an Accountability Group to coordinate all Accountability Officers.
- B. The Accountability Group Officer will be assigned a radio channel; he/she may be located at the Command Post.
- C. The Accountability Group Officer's responsibilities include:
 - 1. Develop and implement a plan designed to track and account for all personnel working in the Hazard Zone.
 - 2. Ensure Accountability Officers are implemented in each area, as necessary.
 - 3. Request and manage resources as needed to accomplish personnel accountability.
 - 4. Provide progress reports to the IC.
 - 5. Initiate PARS upon benchmarks or as needed.

X. "Rules of Thumb":

PASSPORT implementation should consider the following basic "Rules of Thumb":

- A. PASSPORTs never enter the Hazard Zone.
- B. PASSPORTs must be maintained at the point of entry to the Hazard Zone.
- C. PASSPORTs will reflect all personnel presently in the Hazard Zone.
- D. Crews must turn in their PASSPORTs upon entering and must retrieve them upon exiting the Hazard Zone.
- E. **Freelancing is prohibited**

XI. PASSPORT Implementation – The Incident:

- A. Implementation of the PASSPORT system will occur at any incident that requires the use of SCBA and in which personnel are at risk of becoming lost, trapped, or injured by the environment or structure (e.g., entering a structure reported to be on fire, operating in close proximity to a structure during exterior operations, technical rescue, confined space, or trench rescue).

- B. The objective of the PASSPORT system is to always have crew PASSPORTs at the point of entry and to be accurate, reflecting only those members entering the Hazard Zone. For those situations where it is not clear as to when and where to turn in PASSPORTs, crews should consider the above-cited objective for their decision.
- C. Upon the arrival of the IC and establishment of command, he/she will call for a PAR. The information provided by the crews will be: the number of personnel in the crew, their location and function (e.g., Engine 3, two members, first floor fire attack).
- D. For single company incidents, the PASSPORT system will function as follows:
1. The first pump operator of the first engine to each geographic side of the incident becomes the initial Accountability Officer, and a point of entry location for all later arriving companies to that side of the incident.
 2. The PASSPORT of the first engine to each geographic side of the incident will be attached to the engine Accountability Status Board.
 3. The pump operator remains the initial Accountability Officer until PASSPORTs are collected later in the incident by the IC or Accountability Officer who assumes accountability responsibilities.
 4. Crews of the initial assignment who have apparatus parked in close proximity to the initial engine deliver PASSPORTs to the first engine (accountability location), unless assigned a different point of entry.
 5. The pump operator of the first engine mounts PASSPORTs on the status board and makes quick notes of locations of crews.
 6. If the incident escalates, and Accountability Officers are assigned, all PASSPORTs will be delivered to these officers prior to entry into the Hazard Zone.
 7. When the Group / Division Officer is operating within the Hazard Zone, PASSPORTs must remain outside the zone with a designated Accountability Officer (e.g., initial engineer or staff officer). A Group / Division Officer operating within the Hazard Zone will not have PASSPORT accountability responsibilities.
 8. The IC must maintain an awareness of which engines are serving as accountability locations, and provide this information to companies being assigned to each geographic side of the incident (companies – groups / divisions).

XII. Point of Entry Control:

- A. PASSPORTs will remain with the designated Accountability Officer at the point of entry to the Hazard Zone. Upon entry, crews will turn in their PASSPORT. Upon exit, the crew must retrieve their PASSPORT. The Accountability Status Board will contain only the PASSPORTs of those crews in the Hazard Zone.
- B. Crews exiting at a different location than the original point of entry must immediately notify their Accountability Officer. The PASSPORT should be retrieved.
- C. Where physical distance / barriers prevent easy retrieval of the PASSPORT, or the crew is being re-assigned to another group / division, a “make-up” PASSPORT must be assembled. Crew members will provide the new officer another name tag. If a “make-up” PASSPORT is not available, individual name tags will be placed on the Accountability Status Board. If this should occur, the original Accountability Officer must be made aware of the change, and remove the original PASSPORT from the status board.

XIII. Multi-Story / High Rise:

- A. Multi-story or high rise incidents present only a minor modification in the standard approach to PASSPORT accountability.
- B. The first engine to each geographic side of the incident remains the accountability location.
- C. First-in crews parked in close proximity to the first engine will deliver PASSPORTs to the Accountability Officer.
- D. Once a lobby division is established, all crews reporting to the building will deliver PASSPORTs to the lobby division.
- E. The lobby division will be responsible for collecting PASSPORTs of the initial companies as soon as possible and may use incoming crews reporting to the building to pick them up.
- F. PASSPORTs for crews assigned to the lobby division or any support Groups / Divisions within the building (non-Hazard Zone crews) will be maintained by the Accountability Officers.

XIV. Terminating the PASSPORT System:

- A. PASSPORT accountability will be maintained through a report of “fire under control”, at which time a PAR for all crews must be obtained. The IC will determine at that time, based on the situation and risk, whether to continue with the PASSPORT system. If visibility is still impaired or a significant

hazardous condition exists, the IC may choose to extend the PASSPORT system further.

- B. Upon termination and release from the incident, Company Officers and crew members will ensure the PASSPORT is returned to the dashboard of their apparatus and is up-to-date.

XV. Rapid Intervention Crews (RIC):

The IC will assign Rapid Intervention Crews (RICs) at each side of the incident or point of entry. The number of RICs that will be assigned is dependant on each individual incident (e.g., small house fire may only need one RIC). These crews will serve as stand-by rescue teams during all hazardous operations.

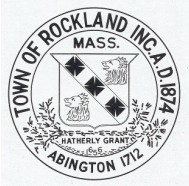
XVI. Lost / Missing Firefighter:

An absent member of any crew will automatically be assumed lost or trapped in the Hazard Zone until otherwise determined safe. Company Officers must immediately report any absent members to Accountability Officers or the IC. For any reports of missing firefighters, the IC must request the next greater assignment or alarm (e.g., a first alarm goes to a second alarm, a second alarm goes to a third, etc.). The IC must initiate an immediate roll call (PAR) of all companies assigned to duty in the Hazard Zone, and send the Rapid Intervention Crew (RIC) to the last reported working area of the lost firefighter to begin a search. Simultaneously, the IC must adjust on-scene strategies to a priority search and rescue effort.

APPENDIX – B
Standard Operating Procedure
Mayday Policy

Rockland Fire-Rescue Department

P.O. Box 542
360 Union Street
Rockland, MA 02370



Standard Operating Procedure Mayday Policy

I. Purpose.

The purpose of this procedure is to identify the roles and responsibilities of all the parties involved at an incident where a "Mayday" has been transmitted.

II. "Mayday" Radio Message.

The radio message "Mayday" will be used by firefighters to report their status as being lost, trapped, or injured and needing rescue. Any member may use "Mayday" to report a lost firefighter. Any report of "Mayday" will receive priority radio traffic followed by the emergency traffic tone. The term "Mayday" will be reserved **ONLY** to report a lost, trapped, or injured firefighter(s). The terms "emergency traffic" or "priority traffic" will be used to report all other emergencies.

The "Mayday" shall be called by stating "Mayday, Mayday, Mayday" (three times) over the radio wait for the IC or dispatcher to acknowledge and then proceed with "Mayday" traffic. The message should include company number/crew identifier, approximate location and condition. After confirmation of the "Mayday" or failure to communicate a "Mayday", activate the PASS alarm on the air-pack.

Hearing the term "Mayday" all members shall withhold all other messages and keep the channel clear for emergency traffic.

III. Command Responsibilities

Command will maintain an awareness of the location of firefighters on the fireground primarily through assignments and the accountability system. In the event that a firefighter cannot be located through a PAR, or any other time a firefighter is missing, the officer or any member should announce a "Mayday." The term "Mayday" will indicate a lost, trapped, or injured firefighter. Command shall respond to a "Mayday" by implementing a rescue plan for the firefighter(s).

IV. Missing Firefighter

Company officers and individual firefighters who suspect a firefighter is missing must notify the incident commander immediately. The incident commander **MUST ALWAYS** assume that the missing firefighter is lost in the building until the member is accounted for. The system must include the ability to identify when a firefighter is going to be delayed beyond his/her SCBA air time. The plan should include:

- Fire operations during rescue efforts
- Expanding organization

- Establish/deploy the RIC/Rescue Sector
- Assign a chief officer to manage the Rescue Sector
- Medical operations
- Family support branch officer
 - Member support--debriefing, etc.
- Logistics--specialized equipment
- Safety
- Support activities
- Media control--information management

V. Use Emergency Alert Tone

All personnel operating at the scene need to be alerted that a firefighter is lost, trapped, or injured. The emergency alert tone will be sounded followed by a radio update when a firefighter is reported missing.

VI. Change the Strategy

The Incident Commander must restructure his/her strategy and action plan to a high priority rescue effort. This may seem obvious to most. However, incident commanders can become overwhelmed by the emotion related to the crisis at hand and may become hooked on reacting to tasks rather than looking at the global picture. This can lead to disorganization and delays that can be fatal to the missing firefighter.

Accurate information must be quickly obtained and acted upon. Additional resources must be immediately obtained. Rapid commitment of the RIC must occur. These resources must be organized and controlled. The Command organization must expand. The strategy, plan, and objectives must be quickly communicated to Command staff and sector officers. The plan and rescue activities must be continually monitored and revised as necessary. Conditions and updated information causes changes in the plan and objectives. The Incident Commander must communicate any changes to the Command staff and sector officers (if in place).

VII. Immediately Request Additional Alarms

In most situations, all resources on-scene may already be committed to firefighting positions. Some firefighters may already be approaching physical exhaustion, their SCBAs may be nearly empty. Relocating committed forces is difficult and slow. At least one additional alarm with an ambulance should be immediately requested upon a report of a lost, trapped, or injured firefighter. Additional alarms may need to be requested based on circumstances and potential. There should be no hesitation in requesting additional resources.

VIII. Include Ambulances When Requesting Additional Resources

Medical personnel will be needed to treat rescued firefighters. The incident commander must ensure that an adequate number of paramedics are responding as well as an adequate number of ambulances to transport injured firefighters. The incident commander should understand that the situation is critical, and that

firefighters sometimes tend to overextend themselves when searching for a missing firefighter, resulting in additional firefighters becoming injured. Adequate medical resources must be readily available and on site.

IX. Utilize a Centralized Staging Area

All additional resources should be sent to a centralized staging area. The incident commander should commit resources from staging based on needs at the site. Staging controls resources and ensures that there is a route in and out of the scene, free of congestion, for rescues to transport recovered firefighters.

X. Commit the Rapid Intervention Crew

All significant firefighting operations will have a rapid intervention crew (RIC) assigned. This team should be fully outfitted with protective clothing, SCBA, etc., and monitoring all tactical radio traffic. Upon report of a missing firefighter, the incident commander has a completely fresh crew/crews fully outfitted, available for commitment to an immediate search and rescue of the last known area of the missing firefighter(s). The RIC team, or any fresh crew(s) in staging, must be immediately sent to the rescue area. The commitment of additional crews, however, must be controlled and organized.

There is a direct relationship to the routine use of RIC teams and firefighter survivability on the fireground. The significance of the routine use of RIC teams to firefighter survivability on the fireground is substantial. National Fire Protection Association (NFPA) studies reveal that a majority of firefighter fatalities occur at residential fires. To combat this risk the officer will request an additional engine upon the report of a working structural fire. Once the fire is declared under control, the incident commander has the option to cancel the company's response, utilize the company as a fresh crew for relief, or to conduct overhaul if needed. At multiple alarms, additional companies will be assigned to the "Rescue Sector".

XI. Withdraw Crews from the Affected Area (If Appropriate) To Obtain A Roll Call and Reconnaissance Information

In some situations, such as collapse or explosion, crewmembers may get separated. The only practical method, to obtain an accurate PAR of effected crews, may be to withdraw them to the exterior. In addition, withdrawal may be the only way to quickly obtain accurate information and reconnaissance on exactly where trapped members may be, routing to victims, debris locations, and the type of rescue equipment needed. Once the roll call and reconnaissance information is quickly obtained, crews can be re-assembled into a more organized rescue effort. Withdrawal is a judgment call based on circumstances at the time, information available, and resources. It may not be practical or possible to do. However, the absolute need for an accurate roll call and information on missing firefighters remains a critical priority. If it's determined not to withdraw, a detailed roll call must be obtained from each sector for all crews operating under his/her direction.

XII. Do Not Abandon Fire Fighting Positions--Hold Positions and Prevent Fire Spread

The reasons for a rapid intervention crew and the immediate request for additional resources, becomes very clear with this critical fireground need. If a missing firefighter(s) is to survive, the incident commander must keep the fire out of the rescue area. Without rescue teams in place, any rescue effort will be significantly delayed and a decision must be made. Does he/she relocate companies committed to fire combat to the rescue effort and allow the fire to spread? Or does he/she hold the fire positions and wait for additional resources for the rescue effort? With a RIC team in place, the incident commander can initiate an immediate rescue effort without withdrawing or relocating fire attack companies.

In most situations the incident commander cannot allow the fire to spread. If anything, these fire attack positions need to be reinforced. Additional companies should be sent to priority positions to keep the fire out of the rescue area. Large diameter handlines and master-stream appliances should be deployed when safe to do so. Adequate water supply must be obtained for this reinforced response.

XIII. Assign a Chief Officer and Create a Rescue Sector

The incident commander is faced with a time critical crisis. Critical decisions and strong management of rescue operations is essential. A chief officer must be assigned to direct rescue operations if not already assigned. Depending on the size of the rescue area and the complexity of operations, more than one chief officer may be needed to fill additional support positions or sectors.

XIV. Assign a Safety Sector to the Rescue Operation

Rescue operations are high risk. The operation may be taking place in a post-collapse environment. Flashover may have occurred. The incident commander must avoid sustaining additional injuries. Each additional injury requires a resource commitment that will draw away from the priority rescue effort. A safety sector in the affected area will help control the risk taking. The officer will be able to conduct an assessment of the hazards allowing time for the rescue sector officer to concentrate on the critical rescue effort. These sector officers must work hand in hand to insure that a safe and effective rescue operation is conducted.

XV. Individual Responsibilities

- to follow directions from superiors
- to continue with assignment unless otherwise directed
- to keep your cool

Every member on the scene should listen specifically for a "Mayday" as fireground noise could cover a call for the "Mayday."

XVI. Dispatcher Responsibilities

When a firefighter is declared lost, trapped, or injured, the dispatcher will sound emergency alert tones; personnel will be advised that a "Mayday" exists for a lost, trapped, or injured firefighter. If the station is empty the IC will contact Plymouth County Control and request additional resources. Abington Fire Dispatch can assist, if available.

Command must immediately assign someone to monitor fireground radio traffic in the event the missing firefighter broadcasts further information.

XVII. Portable Radio Emergency Activation

All RFD fire radios have an emergency alert button. The button is orange in color and when pressed/activated by the firefighter that units designation registers on the dispatch radio consol. When activated, the portable radio Emergency Traffic tone transmits an audible signal on the dispatch radio consol, along with a name/numerical identification of the unit the portable is assigned to.

Should the dispatcher receive an emergency activation from a portable radio (button), the dispatcher will first identify the firefighter, which activated the alert. The dispatcher will contact with the affected firefighter to determine if an emergency exists.

When the activation occurs during an incident where Command has been established, the dispatcher will contact Command directly. Command will contact the affected firefighter to determine if an emergency exists.

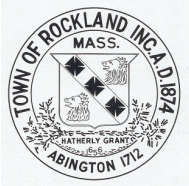
If the missing firefighter comes up on a channel/frequency other than the assigned channel, the dispatcher will maintain communications with him/her on that channel and relay to Command. It is essential that once communications have been established they not be lost.

APPENDIX – C
Standard Operating Procedure
Incident Evacuation Plan



Rockland Fire-Rescue Department

P.O. Box 542
360 Union Street
Rockland, MA 02370



Standard Operating Procedure Incident Evacuation Plan

I. Purpose.

The purpose of this procedure is to identify the procedures for an Incident Evacuation.

II. Initiating an Evacuation Order.

The Incident Commander initiates the order to evacuate an unsafe building or structure. The IC activates the plan by broadcasting the incident identity and all personnel are to evacuate immediately.

“Command to all units operating at the NAMED incident **“EVACUATE IMMEDIATELY”**”

III. Alert Tone.

The dispatcher, if the station is manned, will broadcast the alert tone, then announce the evacuation of the incident.

IV. Air Horn Use.

All apparatus operating at the incident will sound their air horns simultaneously in 5 second blasts for a 30 second period after the order to evacuate.

V. Responsibilities.

After the evacuation order, all personnel operating in the hazard zone shall withdraw from the affected area.

Evacuation is to be immediate - hose lines, tools, etc. are to be abandoned as members quickly exit the building.

All officers are responsible for completing an immediate PAR and reporting that information to Commander.

VI. Plan Use.

The evacuation plan should only be used for emergency evacuation, not just a change in strategy.

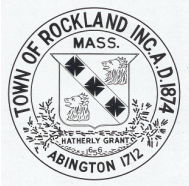
VII. Non-PAR Situation.

In the event on a non-PAR, the Rapid Intervention Crew must be activated and sent to the non-PAR crews last location. Any non-PAR situation will be treated as a missing firefighter until proven otherwise.

APPENDIX – D
Standard Operating Procedure
Radio Policy and Procedure

Rockland Fire-Rescue Department

P.O. Box 542
360 Union Street
Rockland, MA 02370



Standard Operating Procedure Radio Policy and Procedure

I. Purpose.

The standard operating procedure concerning radio use and instructions is designed and intended to promote efficiency in all areas of fire department operations with regard to use of radio communications equipment.

Effective radio communications are a vital component in modern firefighting operations. Of all communications facilities available today, the radio is recognized as one of the most efficient systems for directing fire tactics and strategy. Its value in the control, response, mobilization, and placement of resources along with other factors of fire operations has been well established. Its application to the fire department goes beyond fire suppression. It is a proven asset in response to medical emergencies, hazardous materials incidents, and administering fire prevention activities.

This radio procedure is established to promote firefighter safety, to enhance fireground operations while providing for effective and efficient operations in all areas of administration. The proper use of radio terminology enhances the professionalism of fire department operations, and provides for standardization routines to be followed, even in the most urgent situation.

II. Scope.

This procedure applies to all Rockland Fire Department (RFD) operational personnel.

All operations shall comply with FCC regulations as promulgated in directives issued by the Chief of Department. Successful operation of the system depends upon the rapid exchange of information between units utilizing radio communications.

The Rockland Fire Department is assigned the station ID WPNP248 on a frequency of 482.675 MHz by the FCC.

III. Responsibilities.

The system shall be used only for the transmission of official business of the fire department, and only by persons authorized by the Chief of Department. Members shall be mindful at all times that communications on any frequency shall

be conducted in a professional and respectful manner. Profanity of any type, disrespectful language or communications not in compliance with this document or other department directives is prohibited.

All personnel shall have a portable radio with them anytime they are on a call and/or outside of the station. The radio should be charged and in working order.

Chief Officers and company officers shall monitor radio traffic to determine that proper radio procedure is used. If a subordinate member fails to follow procedure, the officer shall take corrective action.

IV. Use of Equipment

All radio messages should be brief, clear and concise, containing essential information consistent with this procedure. Personnel should prioritize radio messages in the following order:

1. Information affecting life safety (Mayday, Priority, Urgent, etc.)
2. Ordering additional resources
3. Command and control of responding units
4. Arrival and departure reports
5. Progress reports
6. Routine business

Administrative information, whenever possible, should be communicated by alternate means, such as cellular phone.

Personnel operating in close proximity to each other should use face to face communications whenever feasible in order to reduce radio traffic.

Sensitive information, such as the identity of a fire victim or injured member(s), shall **NOT** be broadcast by radio unless it is necessary to affect a rescue. Information of this nature shall be restricted to cellular phone or face to face communications.

IV. Radio Designations.

- 270- Chief of Department
- 271- Deputy Chief
- 272- Captain
- 273- Lieutenant
- 274- Lieutenant
- 275- Lieutenant

Personnel shall use the vehicle identity number (e.g., Engine 3) while operating from that vehicle or the hundred series number when on portable (e.g., Engine 300) for communications.

All firefighters are assigned a 2700 series ID number. These ID numbers shall be used when firefighters are not assigned to or working from a vehicle (e.g., callback).

V. General Procedures.

The call name for dispatch is Rockland Fire Alarm. This should be used in all communications.

The time shall always be given using the 24-hour (military time) clock standard.

Whenever a unit calls with a message that requires an action or acknowledgement, the caller shall wait until the intended receiver of the message acknowledges the unit BEFORE giving the message. This practice reduces the possibility of a fragmented message exchange.

Whenever a user keys a microphone, the member shall press the transmit button until the radio tone stops before starting the message. When the message is completed, keep the transmit button depressed momentarily before releasing it. This practice ensures the entire message is transmitted.

When the dispatcher acknowledges the final portion of a message, the dispatcher shall indicate the time.

Whenever a request for a non-fire department service is made, the reason for the request must be given. Example: Engine 3 requests the Police for a domestic dispute or Engine 3 requests wiring Gas Company for an odor of gas in the street.

Requests for additional resources shall go through command.

The dispatcher will notify Plymouth County Control on all working fires and for calling of additional alarms or resources.

At all incidents where personnel are operating in hazardous environments, the dispatcher shall announce 15 minute time intervals. This time mark will help the IC with accountability.

All radio traffic is now recorded.

VI. Progress Reports.

The FIRST arriving officer (senior member if there is no officer) shall immediately give a brief arrival report to indicate what is showing and to alert other responding units. In the absence of additional narrative, a report of "investigating" shall indicate *nothing showing*.

As soon as possible a detailed progress report shall be given. Where appropriate the IC shall give a progress report every 20 minutes.

This report shall include:

- Building size up
- Building construction
- Location of fire
- Number of lines operating
- Status of Primary and Secondary searches
- Exposures
- Control of the fire
- Other status as needed

Progress Report Terminology:

- Primary Search: refers to the *initial* search for occupants of a building or other exposure to fire or products of combustion.
- Secondary search: refers to the *subsequent* thorough search undertaken to confirm that all occupants of the fire building or other area exposed to fire or products of combustion have been removed.
- Sides: refers to the building in which the incident is occurring. They are listed, in order, starting at the FRONT of the building and proceeding CLOCKWISE.
 - Side A: Front street address side
 - Side B: Left side
 - Side C: Rear side
 - Side D: Right side
- Exposures: are structures or properties immediately surrounding the fire building or fire area. They are listed, in order, starting at the FRONT of the building and proceeding CLOCKWISE. Exposures are described by building size and general construction type (number of stories, wood frame or masonry). If multiple exposures on one side they are listed as Exposure A1, A2, B1, B2, etc.
 - Exposure A: Front street address side exposure
 - Exposure B: Left side exposure
 - Exposure C: Rear side exposure
 - Exposure D: Right side exposure
- Under Control: the term is used to signal that no additional resources will be required.

- All Companies Working: the term is used to signal that the scene is still fluid and a still developing situation exists. Additional resources may be necessary.
- Rehab Area: refers to the site selected by the Incident Commander for the rehabilitation of firefighters. The location may be staffed by firefighters, EMS or other rehab personnel (e.g., DFS ISU).
- Staging Area: refers to the physical location selected by the Incident Commander to which responding units shall report, pending specific assignment.
- Incident Commander: The Chief Officer, Shift Officer or other member in command of the incident.
- Command Post: refers to the physical location selected by the Incident Commander as the position to which responding officers should report, and the incident in controlled from.

VII. Care and Maintenance of Equipment.

Steps shall be taken to prevent damage to radio equipment.

Programming and repairs shall only be made by authorized personnel.

Radio damage or defects must be reported to the OIC and/or the Chief.

Portable radios shall be secured and accounted for at all times.

Adjustments, alterations, or use of radio equipment by unauthorized persons can be considered “tampering” with radio equipment, which is expressly prohibited by federal law.

VIII. Portable Radios

All members are assigned a portable radio and extension microphone. They are either the Motorola HT1250 or HT1000.

All radios used on Rockland Fire Department radio frequencies must have the appropriate ID programmed into the radio. No unauthorized radio equipment will be used.

Portables are programmed with the following channel list:

1. Rockland Fire
2. RFD Direct (no repeater)
3. Abington Fire
4. Hanson Fire
5. Hanover Fire

6. Norwell Fire
7. Whitman Fire
8. Rockland Police
9. Plymouth County Control Ch. 1
10. Plymouth County Control Ch. 2
11. Plymouth County Control Ch. 3
12. Plymouth County Control Ch. 4 (main calling channel)
13. Plymouth County Control Ch. 5
14. Plymouth County Control Ch. 6
15. RFD Direct (no repeater)
16. Rockland Fire

Portable Radio Emergency Button:

In the event of an emergency affecting a fire department member, he/she will verbally attempt to call the IC or Fire Alarm to describe their emergency before activating the emergency button (orange button on top of radio). The emergency signal will be cancelled if the transmit button is pressed or the radio is shut off. Do **NOT** shut the radio off if there is an emergency.

APPENDIX – E
Coded Interview
Chief Alan Brunacini
February 26, 2008

APPENDIX - E		
<i>Line Coding</i>	<i>Focus Coding</i>	<i>Interview February 26, 2008 Chief Alan Brunacini</i>
		How does a firefighter accountability system improve firefighter safety?
Center of fireground control to manage position and function. AS added capability to do location.	Accountability added the ability to manage location of firefighters. Accountability catching up to other incident management systems.	We have said historically that the center of fireground control is to somehow be able to manage the position and function, not location, and the activities of firefighters. I think that what accountability systems have done is they create the actual programic capability to do that. It's one thing to say that, and I think it's true, but we had, well I don't know, 20 years of incident command before we developed the accountability systems that are in place today. I think what those accountability systems have started to do, is to catch up with that position and function thing.
		How much trial and error was there in the development of the Phoenix Passport accountability system?
Natural evolution after 20-25 years of ICS. Task, tactical, and strategic levels to manage accountability. AS was next step in ICS. AS can't outperform ICS.	Accountability was the natural evolution of years of ICS. Hard for accountability to outperform the incident command system.	Well it was kind of the natural evolution of the hazard zone management system that we had been practicing for, like I say, maybe 20 or 25 years before the systems showed up in the form that they are today. In other words, we depended on the incident organization from the task level, tactical level, and then up to the strategic level to manage accountability as we call it today. I think that those systems, the Passport system, the PARs, the no-PARs, all of that vision, voice and touch stuff sort of fit in as the next logical step in the development of the incident command system. I think it's kind of hard for the accountability process to out perform the incident command system process. In other words if you have a level 3 on a scale of 10 command system and want to do a level 6 accountability system, there is a pretty good gap there. If you sort of think about it.

		<p>In your book Fire Command, you talk about Strategic, Tactical, and Task level accountability. Is there one component that is more important than another? If there is, which one and why?</p>
<p>Systems can't outperform each other.</p> <p>IC 360 degree view.</p> <p>Situational awareness.</p> <p>IC can't lookout for suicidal fire co.</p> <p>Levels can't outperform each other.</p> <p>Accountability defaults to task level.</p>	<p>Systems on the fireground can not outperform each other. The IC has the 360 degree view with information provided from the crews.</p> <p>The IC is unable to lookout and protect suicidal fire companies.</p> <p>AS defaults to the task level workers in the hazard zone.</p>	<p>No, I don't think there is. The problem with that is the systems can't outperform each other. In other words, the only person on the fire ground or incident site, let me say, who has the capability to look at a 360 perspective of that incident is the IC. In other words, if you are the roof sector, the interior sector or the rear sector, what you can see is the assignment that you have. In other words you can see the top of it, the inside of it, or the back of it. The only person who logically and practically, is getting reports from all of those places is the IC. So from a standpoint of situation awareness if you don't have a strategic level IC in place, there isn't anything that those other levels can do that can outperform that. By the same token, if you look at it from an accountability standpoint, the function and the roll of fire companies. You can have the best incident command system on the planet, but if you have suicidal fire companies, there's not a hell of a lot that the incident commander can do. What we see in significant, kind of longer duration incidents, the same thing about the tactical levels of sectors, divisions or groups or whatever you call them, where middle managers who connect the top and the bottom. In other words they're the level that somehow causes the strategic level and the task level to make sense. Because beyond a certain place in size, complexity, unusual nature whereas all of those things that we would say a single IC, in other words, that event will out perform a single IC operating at command post ability to again manage the accountability, lets say, but also a lot of other things operationally for that incident. So I don't think that you can say that one level, now the dynamic of it is, is that the problem from the stand point of outcome occurs on the task level. Of course firefighters die on the task level or get injured, so I guess from that standpoint, from kind of an organic, biological standpoint, you could say that really the whole system defaults down to that level, of the workers who are in the hazard zone.</p>

		Are there or should there be any limitations to a firefighter accountability system? For example, staffing requirements, technological requirements required to run the system. At what point is the system too much?
Probably limitations to systems. Limitations in what a system will do.	There are probably limitations to every system. There are limitations to what a system will do. It won't protect from bad judgment.	Well there is probably limitations to any system, I guess, but I don't know what it would be. I'd have to think about it. Now there is a limitation to what accountability systems will do. In other words if you think that an accountability system is going to save you if you go 300 feet on the inside of a commercial building, it won't. It can't and it won't. So there is limitations there, on what the system will actually be able to accomplish.
		After traveling around the country and looking at different accountability systems, is there a perfect or better system out there? What was it and how did it work?
No perfect system.		I don't think there is any perfect systems period. No I don't think there is a perfect system.
		Are there any that you like, or are better than the Passport system with PARs, or is for example the St. Louis MARC system where they use a PAR in conjunction with a Passport, is it the same system by a different name.
Local variations. System has to match location.	Systems have to develop locally to match where they are going to use it.	Yeah, there are some local variations I think, and I think that's probably good. The system has to match where they are using it. So from that standpoint, they are all similar, trying to do the same thing. They almost have to develop locally because of the differences in organizations and forms and sizes and the kinds of work they do and so on, command structure and so on.
		Are there any types of technologically based systems, GPS, telemetry etc., that you like or you think the future might hold for accountability?

<p>Needs to be simplified.</p> <p>GPS doesn't work under a roof.</p> <p>Technology can't outperform physics.</p>	<p>Technology needs to be simplified to be used in the fire service.</p> <p>Technology can't outperform simple physics. Technology will not solve bad judgment.</p>	<p>There probably are, but I think that they're going to have to be simplified, because of where we use them. The GPS challenge is inside of a structure. So far I haven't seen anybody who has developed the technology that works, just simply under a roof. So from that standpoint I think that's a development that is pretty challenging because they are all line of sight. You got OnStar on your Suburban, if you park it in a garage you ain't got OnStar. From that standpoint, but I don't know, I think technology is an interesting part of it. I think that technology will continue to develop just like technology does. I think that's certainly a good thing. I don't think that technology can outperform.... physics, if you may, in other words, if your taking a hose into a commercial building, like I said, 300 feet, there ain't any technology that's around now that's going to solve that for you. The only thing you can do strategically is get out of there or don't go in. When it's all said and done.</p>
		<p>In addition to better technology are we getting smarter, better educated firefighters and command staff? If we don't do better ourselves do you see accountability mandated by regulatory agencies, OSHA or the NFPA?</p>
<p>Watch Charleston.</p> <p>Regulatory process is real</p>	<p>Watch Charleston for the future.</p>	<p>Well I think that we're doing better because of what you said, I guess. Right in the middle of it you have Charleston. And I think that the regulatory process is certainly a real thing. I don't know exactly how those collide. I don't know if the fire service can keep up with that. In other words, keep ahead of that, I guess you could say. Watch Charleston. That will be a pretty good indication of the future of the answer to your question.</p>
		<p>Do you have any advice, for a smaller department, for establishing an accountability system?</p>
<p>Make it a natural act.</p>	<p>Make the system a natural act and use it in everything you do.</p>	<p>Make it a natural act that emerges out of what you do everyday. Don't try to implement an accountability system at the 11th hour after you've done 15 things that have gotten you into trouble and then expect the accountability system, it's like a RIT team. One of the things about rapid intervention teams</p>

<p>Understand limitations and capabilities of what an accountability system will do.</p> <p>Make it part of everything you do.</p>	<p>You must understand the limitations and capabilities of what an accountability system will do and not do.</p> <p>An accountability system needs to be part of everything you do.</p>	<p>is that they're not rapid and they don't intervene. So if what your thinking is I can be a daredevil here, because there is 2 guys out in the front yard who are a RIT team. You live in a dream world. So I guess I would understand the limitations and the capabilities of accountability and ever other system we have and never manage outside of those. In other words I would understand what we can do and what we can't do. And every system has a set of limitations and capabilities. That's hard to do sometimes, I mean it's easy to say, that's it's hard to do though I'm afraid. So in other words make it part of everything you do, I guess. That's the point. If it's an unnatural act, it ain't going to work when you need it. Because when you need it, it's the worst time of your life. We hope to never need it, that's pretty simple but that would be my perspective of it.</p>
--	---	---

