

NEW JERSEY DIVISION OF FIRE SAFETY

Firefighter Fatality and Serious Injury Report Series

Firefighter Issues “Mayday” and Runs Out of Air While Operating at a Structure Fire

**Perth Amboy, New Jersey
March 26, 2013**

***Final Report Issued
June 20th, 2016***



-----**Chris Christie, Governor**



-----**Charles Richman, Commissioner**



-----**William Kramer, Acting Director**

The investigation of this incident was conducted by the New Jersey Division of Fire Safety / Office of the State Fire Marshal. This report was prepared in accordance with N.J.S.A. 52:27D-25d, Duties of the Division. The purpose of these firefighter casualty investigations is to report the causes of serious firefighter injuries or deaths and identify those measures which may be required to prevent the future occurrence of deaths and serious injuries under similar circumstances. In some cases new information may be developed, or old lessons reinforced, in an effort to prevent similar events in the future.

Comments and/or inquiries concerning this report may be addressed to:

*NJ Department of Community Affairs
Division of Fire Safety
Office of the State Fire Marshal
101 S. Broad St. (P.O. Box 809)
Trenton, NJ 08625-0809*

TABLE OF CONTENTS

INCIDENT SUMMARY Page 2

STRENGTHS & WEAKNESSES Page 6

SUPPLEMENTAL INFORMATION Page 9

INCIDENT SUMMARY

Pursuant to New Jersey Incident Management System regulations, to provide for uniform identification of locations and operational forces within an incident scene, the scene is divided geographically into smaller parts which are designated as divisions. Specific areas of the incident scene are to be designated as follows:

- Sides of incident scenes shall be identified as letters of the alphabet beginning with the letter "A."*
- The side of the incident scene that bears the postal address of the location shall be designated as Division "A" by the Incident Commander. Where the incident scene has no postal address, the Incident Commander shall select any side to designate Division "A."*
- Continuing in a clockwise rotation, the side adjacent to the Division "A" side shall be designated as Division "B." The side adjacent to the Division "B" side shall be designated as Division "C." The side adjacent to the Division "C" side shall be designated as Division "D."*
- Floor levels shall be designated as Division "Basement" or "0"; "1" (ground level – not necessarily street level); "2", "3", and so on.*

Fire Department Profile

The Perth Amboy Fire Department (PAFD) is a combination fire department, with 44 career Firefighters (FFs)/ Emergency Medical Technicians (EMTs), five Captains, and five Battalion Chiefs (BCs) operating under the direction a Fire Chief. They are supplemented by a volunteer staff of approximately 20 FFs, three Lieutenants, and six Fire Police members. The PAFD serves this urban, bayfront city with a population of approximately 52,000 residing in an area of almost five square miles. The department operates with 13 personnel on each shift out of one fire station, housing a fleet of two engines, one ladder truck, a command vehicle, and a transport van for volunteer staff to respond to scenes. The career staff also operates two rescue units and a marine unit as needed. The PAFD has a reserve fleet of two engines, one ladder truck, and other specialty trailer units. The PAFD is dispatched by the Perth Amboy Police Department and also performs "First Responder" Emergency Medical Services (EMS) responses. According to National Fire Incident Reporting System (NFIRS) records, the PAFD responded to approximately 1,800 fire calls and 800 EMS calls in 2012. Response totals for 2013 include approximately 1,600 fire calls and 1,100 EMS calls.

The Incident

On March 26th, 2013, at 0309 hours, the PAFD responded to 365 Grove St. for a reported structure fire. The initial response for the PAFD consisted of BC Timothy Simon (BC-5), Engines E-2 and E-3, and Ladder L-2. Additionally, off-duty fire officers and PAFD Volunteer FFs were automatically dispatched and responded directly to the scene. Upon arrival, at approximately 0319 hours, crews encountered heavy smoke showing from the structure, with a working fire in the basement; it was also noted that residents were evacuating the structure. BC-5 established Incident Command (IC), and mutual aid was requested from surrounding towns, as well as a recall of off-duty career personnel.

FFs deployed a 1-3/4" hoseline to the Division C side of the structure to access the basement for an interior fire attack. Upon entry, the fire and smoke conditions intensified, so the FFs were evacuated from the basement. They then deployed a 2-1/2" hoseline to the Division A side to attack the fire from a sidewalk hatch that accessed the basement. After darkening down the fire from the front, the crew re-entered the basement for an assessment. They noted no visible fire but did encounter extreme heat and "hoarder" conditions, which caused them to again exit the

basement. By this time, mutual aid fire companies, a Rapid Intervention Crew (RIC), and off-duty fire officers, including Chief Volk, had arrived on scene. Chief Volk then had a face-to-face meeting with BC-5 to get updated on the situation, and he assumed Command.

A crew, along with BC-5, then placed a ground ladder to the roof near the Division C side to cut a hole in the flat roof for ventilation. After the hole was made, they noted smoke but no fire within the attic “cockloft” space, and exited the roof. A crew then entered the 1st floor in an attempt to open up the flooring to expose the basement area; however, they were quickly evacuated due to heavy fire conditions now extending through the floor. Personnel continued to flow the 2-1/2” hoseline from the front in an attempt to extinguish the fire; however, they were not making much progress and control over the fire remained doubtful. A crew was also placing an additional ground ladder near the Division A/D corner and began to ventilate windows on the 2nd floor.



Photo 1: Heavy smoke still pushes from the structure, after multiple attempts to extinguish it from the exterior and interior. This photo is approximately an hour after arrival on scene, shortly before BC Simon's "Mayday".

By this time, it was approximately an hour after original dispatch. A crew, along with BC-5, then proceeded to the 2nd floor of the structure via a stairway accessed from the exterior Division C/D corner. They were tasked with getting toward the front of the structure to open up the walls and ceilings to expose fire hidden within the void spaces. Once on the 2nd floor, the interior crew encountered heavy smoke with zero visibility, hampering their ability to find a hallway to the front. These crew members lost contact with one another and quickly became separated in these poor interior conditions, with worsening conditions also noted by personnel on the exterior.

The Safety Officer (SO) then ordered the 2nd floor crew to evacuate the structure and get a Personnel Accountability Report (PAR), which was acknowledged by BC-5. Soon after, three out of the four crew members from the 2nd floor exited down the stairway; however, BC-5 was not with them. Personnel immediately realized that he was still inside and went back to the top

of the stairs to call for him. BC-5 then transmitted a message over the radio that he was unsure if he could get out, which was quickly followed by him issuing a “Mayday” message. The RIC was immediately mobilized to the rear stairway as additional messages from BC-5 followed, including that he was running low on air and that he was near a window but didn’t know where. Personnel on the street in front of the home then saw lights from BC-5’s flashlight shining through a 2nd floor window near the Division A/B corner. They immediately moved a nearby ground ladder to this window, and FF Thomas Macri ascended it and broke out the window.



Photo 2: Following his “Mayday”, BC Simon exits through the 2nd floor Div. A window, and descends down the ladder immediately after the assisting FF (Macri) fell to the sidewalk below. Note the heavy smoke condition throughout, over an hour after arrival on scene.

Upon breaking this window, BC-5 stuck his head out, and FF Macri made contact with him, telling him to turn around to come out. He later noted that BC-5’s regulator was removed from his Self-Contained Breathing Apparatus (SCBA) facepiece, likely due to him being completely out of air. BC-5 then turned around and attempted to exit down the ground ladder. He became caught multiple times on materials still hanging within the window opening. Upon clearing these items, FF Macri, who was assisting him, fell from the ladder onto the sidewalk below while BC-5 successfully descended to the ground. Both were immediately attended to by medical

personnel. By this time the fire was now burning through the roof and the remaining firefighting operations were strictly defensive in nature, using exterior hoselines and elevated master streams. The fire was eventually fully extinguished without further incident.

Incident Investigation

The fire investigation for this incident was conducted by the Perth Amboy Police Department. According to their report the origin of the fire was deemed to be at the front of the basement level; however, the cause of the fire was classified as “Undetermined.” It was noted that a resident stated that they may have left an electric space heater “on” near the front of the basement. However, extensive interior collapse made the structure unsafe to enter, thereby preventing a thorough scene examination from being performed at that time.

Following this incident, there was a safety inspection performed by the NJ Department of Labor and Workforce Development Public Employees Occupational Safety and Health Unit. They found no apparent or citable safety hazards present on the date of their inspection, and no further actions were taken.

The Casualty Scenario

At the time of this incident, BC-5 Timothy Simon was a 45-year-old career member of the PAFD with 22 years of firefighting experience. He had served as a fire officer for eight years, including as BC for nearly three years. Due to his injuries from running out of air he was flown by aeromedical helicopter to St. Barnabas Burn Center in Livingston, NJ. There, he was placed in a medically-induced coma for treatment. He suffered severe smoke inhalation, airway burns, and various injuries to other parts of his body. He has undergone extensive surgeries, rehabilitation, and ongoing treatments for these conditions, which persist to this day. He subsequently retired from the PAFD due to these injuries.

FF Thomas Macri was a 34-year-old volunteer member of the PAFD with six years of firefighting experience. He received minor injuries while assisting BC Simon down the ladder when he fell approximately 10 feet to the sidewalk below and landed on his back. He was treated and released from a local hospital. Following this incident, he became a career FF with the PAFD in February of 2014.

STRENGTHS & WEAKNESSES

The New Jersey Division of Fire Safety (DFS) identified several key issues that were either positives or negatives and ultimately contributed to the outcome of this incident. Departments should view “strengths” as testaments to their training and procedures, whereas “weaknesses” should be viewed as opportunities to reinforce and/or amend their practices to minimize the risk of similar incidents in the future.

STRENGTHS

STRENGTH: Staffing levels within the PAFD for this incident included nine career personnel on the initial dispatch, followed immediately by the automatic dispatch and response of off-duty fire officers, volunteer firefighters, and mutual aid companies.

MODEL: *Staffing levels have been studied and documented to ensure that an adequate number of personnel are available to perform all essential fireground duties. Model standards such as NFPA 1710 (Career majority FD) or NFPA 1720 (Volunteer majority FD) should be referenced as to recommended number of firefighting personnel on-duty and/or on each apparatus.*

STRENGTH: BC Simon immediately issued a “Mayday” upon being unable to locate an exit and becoming low on air. His “Mayday” was immediately received and acted upon by personnel on scene who subsequently quickly located him and assisted in his rescue.

MODEL: *Distressed FFs need to immediately notify the IC of their situation using a pre-determined emergency term such as “Mayday” and giving their name, location, and nature of the problem. They should also activate their Personal Alert Safety System (PASS) devices manually, and all non-essential radio transmissions should cease until the “Mayday” situation is rectified.*

STRENGTH: There was a dedicated RIC on scene during this incident, and they were initially deployed upon BC Simon issuing a “Mayday.” However, they did not need to enter the deteriorating conditions inside the structure because BC Simon was quickly seen at a 2nd floor window and a ladder was deployed to aid in his rescue.

MODEL: *FDs shall provide at least two firefighters outside of an atmosphere that is Immediately Dangerous to Life & Health (IDLH) to search for and rescue lost or trapped FFs should the need arise. Further, a dedicated RIC should be comprised of additional personnel who are specially trained, equipped, and ready to act should the need arise.*

STRENGTH: Upon coming under distress, BC Simon utilized several FF survival techniques to remain calm, continue searching for a means of egress, and communicating with outside personnel over his portable radio.

***MODEL:** Through repetitive training, FFs can learn to remain calm and make reasoned decisions upon coming under distress. They can employ emergency survival techniques, such as “skip-breathing” to conserve air, self-extrication techniques, wall breaching techniques, and ladder escape “bail-out” methods. Possessing wire cutters, personal flashlights, and personal lengths of rope or nylon webbing will further assist with this.*

WEAKNESSES

WEAKNESS: Building characteristics, including limited basement access, minimal doors and windows, excessive storage, and a narrow alleyway hampered effective fireground operations.

***LESSON:** FFs should anticipate a wide range of hazardous conditions in private residences and should modify their tactics and strategies based upon a thorough size-up and constant observation of fireground conditions.*

WEAKNESS: Personnel, including BC Simon, were operating above the fire after it had been burning for an extended period of time, with minimal ventilation and zero visibility. They did this without the protection of a hoseline for fire suppression and/or to designate an escape route to follow.

***LESSON:** Interior crews should not operate above a fire without the protection of a hoseline and ground ladders to windows for emergency egress. Rescue, suppression, and ventilation operations must be strictly coordinated, and communication must be maintained with personnel reporting their status, progress, and observations.*

WEAKNESS: There were multiple instances of crew integrity being compromised, including when the crew that was operating on the 2nd floor became separated immediately upon entering into zero visibility conditions.

***LESSON:** Crew integrity should be maintained at all times to ensure that all FFs are paired in teams to avoid freelancing and that they enter the hazardous area together, perform their assigned task together, and exit together.*

WEAKNESS: The Personnel Accountability System (PAS) utilized by the PAFD was a two-tag system; however, personnel did not give their second tag to an accountability officer upon entry into the structure. Therefore, their PAS was not able to effectively track personnel operating on the scene.

***LESSON:** FDs shall utilize a PAS in accordance with regulations under N.J.A.C 5:75, in which the FFs’ second tag is given to a designated accountability officer upon entry into the structure, so as to effectively track their location, function, and time.*

WEAKNESS: There were multiple Thermal Imaging Cameras (TICs) on scene during this incident, including one that was with BC Simon upon his distress on the 2nd floor. The TICs went unutilized or underutilized for the duration of the incident.

LESSON: *TICs should be routinely utilized during all aspects of structural firefighting operations, especially whenever personnel enter a situation where visibility is reduced, as they allow the FF to “see” through the smoke. TICs make searching for a fire and/or its victims much more efficient and therefore safer for personnel.*

SUPPLEMENTAL INFORMATION

Building Considerations

Building and occupancy characteristics can play a significant role in both fire spread and personnel safety during incidents. Fires that occur in one- and two-family residences may be some of the most hazardous for FFs to battle, as these structures do not possess the same life safety or construction design features as commercial structures, nor are they subject to any regular fire safety inspections after initial occupancy. It is for this reason that FFs must anticipate a wide range of dangerous conditions in private residences, including hazardous materials, excessive storage, shoddy construction/alterations, lightweight/truss construction, and high numbers of occupants.

Operating Above the Fire

As previously noted, fire will cause smoke, heat, and flames to spread upward and outward from its source. This creates a hazard for anyone operating above a fire and should be avoided until at least one ground ladder is placed to upper windows for emergency egress, a crew with a fully charged hoseline is in place to control the fire, and personnel are ready to perform ventilation to remove the smoke and heat. Rescue, suppression, and ventilation operations must be strictly coordinated by the IC or Operations officer, and communication must be maintained with personnel reporting their status, progress, and observations. Any changes in fire conditions or problems encountered while conducting these vital operations must be conveyed immediately to all those operating in the fire building. Failure to keep all members informed of changing conditions can, and often does, result in FF injuries and deaths.

Additionally, basement fires are inherently dangerous due to limited access for fire suppression, emergency egress, and ventilation, as well as unprotected structural members. Crews will be descending down into high heat and heavy smoke conditions, which can suddenly become untenable. Combine this with excessive amounts of storage, and you have a recipe for disaster if the proper tactics and strategies are not developed and employed to quickly control the fire.

Crew Integrity

The concept of crew integrity is paramount to ensuring the safety of FFs and helps to prevent freelancing. Simply stated, FFs are paired in teams that enter the hazardous area together, perform their assigned task together, and exit together. As a team, they formulate tactics that will most efficiently and safely accomplish what is to be done. Through continual training, the concept of crew integrity will become second nature, and FFs will understand that working as an individual is neither desirable nor tolerated.

FDs must take all possible measures to maintain crew integrity to prevent freelancing on the incident scene. Company officers and training officers should work within the context of ongoing training programs to create a culture in the FD's ranks that freelancing is never acceptable or tolerated. Company officers and safety officers on incident scenes need to be constantly vigilant with respect to crew integrity and immediately intervene if they see that freelancing is occurring.

Personal Accountability System (PAS)

A PAS is utilized to provide the IC with an improved means of tracking the location, function, and time of personnel operating at the incident scene. Regulations for the NJPAS under N.J.A.C 5:75 require that FDs utilize a two-tag accountability system in which the first tag is placed by the FF on the responding apparatus, and the second tag is given to a designated accountability officer prior to entering the IDLH. This system includes the use of Personnel Accountability Reports (PARs)/roll calls, all within the framework of the Incident Management System (IMS) that is required to be utilized at all incidents.

The NJPAS is more than simply handing tags to the designated officer. It is also a system that requires communication between crews working inside the structure or hazardous area and company officers and the IC. Interior crews must continually apprise their company officers regarding conditions, location, and what they are doing. At the same time, company officers responsible for crews must solicit information from their crews and pass it along to the IC or Operations Chief. With proper two-way communication, everyone on the incident scene is cognizant of what each team is doing and generally has a sufficient idea of where they are, thereby lessening the chances of FFs freelancing.

Thermal Imaging Camera (TIC)

A TIC is a device that translates a thermal picture into an electrical picture and then a visual image for the human eye. The TIC relies on the thermal energy emitted by all objects and not on reflected visible light, providing vision capability even with no light present. Thermal energy is characterized by its long wavelength, and the nature of this long wave thermal energy allows it to travel through smoke. The TIC generates a true black and white image; hotter objects appear white and cooler objects appear black to gray. It is this image that allows FFs to “see” through the smoke, providing a more rapid means of locating victims or hidden areas of fire.

FDs that possess TICs should routinely employ them during all aspects of structural firefighting operations, especially whenever personnel enter a situation where visibility is reduced. The TIC is an important tool to make searching for a fire and/or its victims more efficient, resulting in a higher level of safety for FFs. The TIC must be an integral part of rescue operations for lost or trapped firefighters, as it can help speed a RIC to the distressed FF(s), thereby saving precious time in locating and removing them.

FDs must continually train utilizing their TIC so that all FFs become proficient in its use. This training should cover the features of the TIC, how to interpret the images on the screen, and how to make adjustments to the contrast and resolution depending on the situation involved.

“Mayday” Procedures

FFs must be taught that if they become lost or trapped the most important thing they can do is notify others of their plight and their best guess of their location. To this end, the DFS has adopted regulations for standardizing “Mayday” and evacuation procedures. These regulations can be found in the IMS regulations under N.J.A.C. 5:75-2.6.

At a minimum, every interior crew, if not each crew member, should be equipped with a portable radio with a sufficient number of operational frequencies as well as a dedicated command frequency. Utilizing their radio, if a FF comes under distress, he/she needs to notify the incident commander of the situation using a pre-determined emergency term such as “Mayday” and giving his/her name, location, and nature of the problem. Additionally, FFs need to immediately activate their PASS device manually to help rescue crews locate them quickly, and all non-essential radio transmissions should cease so that the IC or rescue personnel can communicate with the distressed FF(s).

Rapid Intervention Crew (RIC)

In accordance with IMS regulations under N.J.A.C. 5:75, FDs are required to provide at least two FFs outside of an IDLH atmosphere. These FFs are tasked with searching for and rescuing lost or trapped personnel, should the need arise. To every extent possible, it is recommended that this concept be taken to a higher level with the establishment of a dedicated RIC comprised of additional personnel.

These crews should be specially trained and equipped to deal with rescue of FFs under the worst possible conditions. Once on scene, RIC crew members should not be utilized for any other tasks, and other FFs need to be well versed in the duties, responsibilities, and operations of the RIC. The RIC can be composed of departmental personnel or mutual aid personnel; however, it is important for the IC to request a RIC as soon as possible after dispatch to allow the crew to arrive quickly. Many FDs have even refined their response plans to dispatch a RIC automatically upon receipt of a report of a structure fire. To this end, the DFS has issued “Rapid Intervention Crew Training Guidelines” to provide FDs with additional detailed information for RICs.

It should be noted that the “2-in/2-out” provisions of the Respiratory Protection Standards under 29 CFR 1910-134 are separate from the RIC requirements and mandate that there must always be at least two responders stationed outside during interior structural firefighting. They must be trained, equipped, and prepared to enter if necessary to rescue responders inside. The exception to this rule is when there is an emergency rescue operation required. However, the DFS strongly recommends that FDs strive to meet the more stringent requirements of the “2-in/2-out” provisions with adequate staffing and not by relying on the rescue exception. In this way, FF safety will be enhanced to the greatest extent possible during operations that are typically the most hazardous.

Firefighter Survival Skills

No matter how cautious FFs are, fires are dynamic and conditions can deteriorate rapidly. It is imperative that they be prepared for dire situations should they occur. FDs need to train personnel to deal with the possibility of becoming lost or trapped. While it is difficult to simulate a training scenario in which a FF actually feels his/her life is threatened, creative, realistic, and safe training exercises can be developed to help prepare them for dire situations.

Through repetitive training, FFs can learn such emergency survival techniques as “skip-breathing” to conserve precious air supply, entrapment self-extrication techniques, wall

breaching techniques, ladder escape “bail-out” methods, and so forth. It is also important that they be equipped with small items such as wire cutters, personal flashlights, and personal lengths of rope or nylon webbing. Above all, FFs must be conditioned to respond to individual emergencies calmly in order to make reasoned decisions. As previously stated, they must be taught that if they become lost or trapped the most important thing they can do is notify others of their plight and location as best they can by utilizing “Mayday” messages and activating their PASS devices manually.

Emergency Care of Firefighters

FFs are exposed to mental and physical stressors during all phases of firefighting, all of which have the potential to be life-threatening by putting firefighters at critical exertion limits. In many instances these stressors keep the body stressed at unhealthy levels for hours after leaving the scene of an incident. Firefighters should receive appropriate levels of rehabilitation based upon individual levels of physical and mental conditioning because when personnel are pushed beyond the limits of their conditioning, injury or deaths will occur. To this end, the DFS has issued a guide book, “Statewide Incident Rehabilitation Guidelines for Emergency Responders.” All FDs and EMS providers should possess and be familiar with this guide book and develop local policies to determine how rehabilitation services will be provided.

In accordance with American Burn Association-recommended guidelines, and in keeping with the policies of The Burn Center at Saint Barnabas, all individuals meeting the following criteria should be referred to the nearest certified burn center:

- All Partial Thickness (2nd degree) burns to $\geq 10\%$ of the Total Body Surface Area;
- All Full Thickness (3rd degree) burns, regardless of size;
- All chemical, inhalation, and electrical burns;
- Any burns to the face, feet, joints, or genitalia;
- Patients with pre-existing medical disorders compromising outcome;
- Patients with burns and concomitant trauma (Follow regional medical control and triage protocols);
- Patients requiring extensive social, emotional, or long-term rehabilitation; and/or
- Pediatric burns without qualified personnel or equipment.

In New Jersey, consult with The Burn Center at St. Barnabas Hospital directly at (973) 322-5920, or the NJ DOH at (609) 984-1863

Critical Incident Stress Debriefing (CISD)

The purpose of a CISD Team is to provide individual counseling, group sessions, and, if necessary, referrals to members of an emergency response organization involved in traumatic events. The teams are made up of specially trained fire, police, and EMS personnel, along with mental health professionals who provide training and guidance to the team members and assist at the debriefing sessions.

The assistance provided by the CISD Team helps to sensitize the FFs to the possibility of stress reactions, hopefully avoiding future stress related problems. It allows the members to

understand the range of normal reactions and provides a method to deal with the incident and its after-effects. The use of a CISD Team in situations such as this is not a sign of weakness on the part of emergency personnel. Failure to deal completely with the emotional stress of such a traumatic occurrence can negatively affect both the professional and personal lives of those involved.

The DFS recommends the notification and use of CISD teams when the CISD trigger events are found to be present. Such significant events may include:

- Line of duty death or suicide of a co-worker;
- Mass casualty incidents;
- Death of a child;
- Death occurring after prolonged rescue efforts;
- When a victim reminds an emergency worker of a loved one;
- During highly dangerous or highly visible events;
- When the emergency worker influences death or injury; and/or
- Any other unspecified highly traumatic event.

Currently, CISD Teams are regionalized in New Jersey and are part of a statewide network. These teams will respond on a 24-hour basis whenever requested. Emergency contact numbers for activation of a CISD team are as follows:

The Statewide CISD Network – (609) 394-3600
The NJ Fire & EMS Lifeline – (866) 653-3367
NJ Local Assistance Support Team (LAST) – (866) 736-5868