

NEW JERSEY DIVISION OF FIRE SAFETY

Firefighter Fatality and Serious Injury Report Series

Firefighter Dies from Burn Injuries Sustained at a Structure Fire

**West Deptford Twp., New Jersey
January 1, 2001**

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STATE OF NEW JERSEY
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INTRODUCTION

The New Jersey Division of Fire Safety conducted the investigation of this incident. 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.

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EXECUTIVE SUMMARY

On January 1, 2001 at 0214 hours, the Verga Volunteer Fire Company (West Deptford Twp.) responded to a working structure fire with victims possibly trapped inside the private residence at 1669 Atkins Ave. in Woodbury, NJ. According to dispatch tapes, upon arrival, first due firefighters encountered heavy fire coming from the rear of the structure; further investigation revealed an active fire in the basement that could be seen through the basement windows and flames emitting from the rear kitchen window. During the initial stages of operations, a crew was ordered to enter the rear door of the structure for rescue and suppression. After advancing approximately 6 feet, the floor collapsed, which caused the lead firefighter James Heenan to fall into the basement and become entangled in debris from the kitchen area. As a result of the collapse, the fire flashed up out of the basement injuring a second firefighter, James Miller. He received minor burns to his face and arm. He was transported to Underwood Memorial Hospital and later released. Immediately following this collapse, a rescue operation ensued. After approximately 25 minutes, firefighter Heenan was removed from the structure conscious and alert, and was transported to Cooper Medical Center in Camden, NJ. From there, he was flown via NJ State Police helicopter to Chester-Crozer Burn Center in Upland, PA with critical burn injuries. Firefighter Heenan succumbed to these injuries at the aforementioned burn center on March 25, 2001.

The fire investigation was performed by the Gloucester County Fire Marshal's Office, with assistance from the Gloucester County Prosecutor's Office, and the West Deptford Police Department. The official cause of the fire was deemed accidental in nature, due to a rekindle of a previous dryer fire that was thought to be extinguished by residents at approximately 2200 hours on December 31, 2000. It should be noted that the initial fire was never reported to the fire department.

In order to minimize the risk of similar incidents, the New Jersey Division of Fire Safety identified key issues that must be addressed and remedies that should be implemented within all departments.

1. **FACTOR:**

Training standards within the Verga Fire Company were found to be inadequate, with many firefighters and officers not possessing required training certifications.

REMEDY:

Standards such as NFPA 1500 recommend that fire departments establish a regular training and education program that is commensurate with the duties and functions that firefighters are expected to perform. Additionally, proper record keeping is essential to certify that all personnel have received both required and supplemental training and education.

2. **FACTOR:**

Findings from the scene size-up were not properly evaluated so as to develop a basic strategy for implementation of safe and effective firefighting tactics. Hence, firefighters were directed to enter the structure directly above the seat of the fire, without a suppression crew in place.

REMEDY:

A proper size-up should begin at the time of alarm and end at the time that the emergency is under control. The information obtained during the size-up must be properly analyzed so as to determine an overall strategy, and implement safe and effective tactics. The information thus gained has a direct effect on where, when, and how firefighters operate on the fireground.

3. **FACTOR:**

Although the Verga Fire Company was equipped with a thermal imaging camera (TIC), both officers and firefighters failed to utilize it during the size-up, initial rescue or fire suppression operations, so as to analyze the scope of the incident and determine the tactics to employ.

REMEDY:

Fire departments that possess TIC units should use them regularly during routine operations such as training, scene size-up, search and rescue, and structural firefighting.

4. **FACTOR:**

There was a failure in determining the safest and most effective entry point into the structure for both rescue and fire attack, and lack of coordination between these crews.

Additionally, prior to entering the structure, firefighters failed to obtain tools and equipment to assist them in conducting interior operations.

REMEDY:

When the decision is made to place personnel inside a structure, the Incident Commander (IC) must not only coordinate rescue and fire suppression crews, but also determine the safest and most effective way for these personnel to make entry. Furthermore, it is imperative that firefighters remember “the basics” when preparing to enter a structure for rescue or fire suppression operations by first obtaining the proper tools and equipment needed to perform their assignments

5. **FACTOR:**

Fog fire streams being directed into the basement after FF Heenan fell through the floor impeded the natural upward and outward ventilation of the fire, producing large amounts of steam and forcing the fire and superheated gasses back down upon him.

REMEDY:

Fire streams should never be directed from the exterior or into a ventilation opening with personnel inside the structure. Furthermore, all firefighters should become familiar with the advantages and disadvantages of the different types of fire streams. This is especially the case when utilizing fog streams, which can produce large amounts of steam.

6. **FACTOR:**

Although FF Heenan was equipped with a Personal Alert Safety System (PASS) device, all indications are that he did not activate it prior to entering the structure. It should be noted that his PASS device was not automated; it had to be manually turned “on” by the user.

REMEDY:

PASS devices must be provided, used, and maintained in accordance with PEOSH regulations under N.J.A.C. 12:100-10 et seq. Although many departments still rely on PASS devices that must be turned “on” manually – devices that are acceptable by PEOSH regulations – they are not ideal because the firefighter must remember to activate the PASS device. For this reason, fire departments should strongly consider upgrading their SCBA to those employing automatic PASS devices.

7. FACTOR:

Since the collapse occurred so early in operations, a Rapid Intervention Team (RIT) or Firefighter Assist and Search Team (FAST) had not yet been designated during the initial stages of the incident when FF Heenan fell through the floor.

REMEDY:

Incident Management System (IMS) regulations under N.J.A.C. 5:75 require that fire departments utilize RIT or FAST to rescue distressed firefighters when operating in a hazardous atmosphere. The IC should request the RIT or FAST as soon as possible after dispatch to allow the team to arrive quickly, however, it is recommended that the RIT or FAST be automatically dispatched upon receipt of a “working” fire.

8. FACTOR:

An evacuation signal was never ordered following FF Heenan’s fall into the basement. This signal would have been an immediate and effective means of alerting all other personnel on scene that a hazardous condition existed, and to stay out of the structure.

REMEDY:

In the event an emergency evacuation becomes necessary and an emergency signal is required, N.J.A.C. 5:75 requires that fire departments utilize an emergency evacuation signal that is easily recognizable and distinguishable from all other fireground noises. The signal must be utilized when conditions on the fireground indicate an imminent and extreme risk to firefighters. At this time, the NJ DFS is finalizing a proposal that would establish a statewide emergency evacuation signal.

INVESTIGATION

The Structure

According to reports compiled by the Gloucester County Fire Marshal's Office, the structure at 1669 Atkins Ave. in Woodbury, NJ was a circa- late 1940's single family residence utilized as a rental property. Overall, the structure measured approximately 40' x 40', and was 1 ½ stories in height, typically known as Cape Cod style. It was constructed of unprotected wood framing using full-cut lumber (2" x 4" studs and 2" x 10" joists) and contained a full basement, which was partially at grade on the Division C side due to a sloping landscape. It should be further noted that the basement had an exterior door that was nearly at grade level on the Division C side near the Division B / C corner.

NOTE: 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."
- Continuing in a clockwise rotation, the side adjacent to the Division "B" side shall be designated as Division "C."
- Continuing in a clockwise rotation, the side adjacent to the Division "C" side shall be designated as Division "D."

The exterior walls were constructed of vinyl siding over the original wood clapboard siding and the roof was asphalt shingles over wood framing. The interior walls and ceilings consisted of plaster over lath construction, and the floors consisted of carpet and hardwood tongue-and-groove. Utilities for the structure consisted of a recently updated 110 / 220 volt electrical service, and oil heat (which were not operating at the time of the incident due to the oil tank being empty). All living areas were located on the first floor; the main sleeping quarters were located on the upper level. The basement was utilized predominantly for storage and utilities; however it also contained another makeshift living / sleeping area.

The Incident

On January 1, 2001 at 0214 hours, the Verga Fire Company (VFC) responded to a residential structure fire located at 1669 Atkins Avenue in the Woodbury

section of West Deptford Township. At the time of this incident, the weather was clear and cold, with snow and heavy ice on the roadways.

Chief John Casciano responded in his personal vehicle without a portable fire radio, and arrived on scene at approximately 0216 hours (2 minutes after dispatch). He found that there was a working fire and that neighbors were banging on the front door. They were yelling that there was possibly someone trapped inside due to a resident's vehicle being parked outside. Casciano advised the neighbors to move away from the structure for their own safety. Following this, he proceeded to conduct a scene size-up by walking around the structure, noting that fire was visible from a kitchen window on the Division B side near the Division B / C corner, and also from a basement window on the Division B side near the Division B / A corner. At this point, Casciano called Asst. Chief Frank Holzworth Jr., who was also responding, on his NEXTEL® phone to advise him about the working fire. Holzworth, in turn advised the dispatcher of the Chief's report. Additionally, Casciano told Holzworth to locate the nearest fire hydrant for the responding apparatus. During this time, Casciano again walked around the structure, trying to open the rear door. This door was locked; he could not gain access, therefore he continued around the structure, completing another full walk-around. At no time did Casciano get any response from anyone still within the structure.

At approximately 0217 hours (3 minutes after dispatch), Holzworth and West Deptford Patrolman Anthony Scirrotto arrived on scene. Both observed heavy fire coming from the kitchen window on the Division B side near the Division B / C corner, and also from a basement window on the Division B side near the Division B / A corner; these reports were consistent with the conditions earlier reported by Casciano.

Engine 621, after connecting to a fire hydrant at the corner of Red Bank Ave. and Atkins Ave., and laying a 5" supply line into the scene arrived on scene at approximately 0218 hours (4 minutes after dispatch). The apparatus was positioned in front of the structure, and the crew was ordered to stretch a 1 ¾" hoseline around the Division B side to make entry through a first floor door on the Division C side. Firefighter (FF) James Heenan advanced the 1 ¾" hoseline onto the deck located at the Division C side. He waited for additional personnel prior to making entry through the door. At this time, Holzworth came onto the deck, met with Heenan, and tried to open the door but found it to be locked. FF James Miller then arrived to back-up Heenan on the hoseline, and once both FF's were ready to enter, Holzworth kicked the door in with his foot. He reported that the smoke was approximately ½ to ¾ of the way down to the floor upon entry. FF Miller later reported that although visibility was poor, he could still see the floor upon entry through the door. He also reported that Heenan pounded on the floor with his hand once or twice as they were entering. Miller followed Heenan, maintaining contact with his boot as they advanced the hoseline. After advancing approximately 6 feet, the floor gave way, causing Heenan to fall into the basement, and Miller to lose contact with Heenan's boot.

FF Miller immediately yelled back to A.C. Holzworth, who was still outside the doorway that Heenan had fallen through the floor. Holzworth radioed that he had “a firefighter down into the basement” at approximately 0223 hours (9 minutes after dispatch), and then instructed Miller to direct the hose stream into the hole in the floor to protect Heenan from the fire until he could be rescued. Miller proceeded to do so, utilizing a full fog pattern on the nozzle until he was running out of air in his self-contained breathing apparatus (SCBA). Miller was relieved of his assignment, and proceeded to the rehabilitation area, where it was found that he received minor burns to his wrist. He was transported to Underwood Memorial Hospital, where he was treated and released. During this time, additional hoselines were deployed to help protect FF Heenan; these hoselines were directed through the basement windows from the exterior Division B and D sides of the structure.

Chief Casciano, upon hearing the “firefighter down” call, requested paramedics and a helicopter due to the nature of injuries he anticipated. A rescue attempt was immediately initiated, with firefighters entering the basement through the exterior door on the Division C side. Heenan was quickly located, prior to firefighters bringing a thermal imaging camera (TIC) into the basement; however he was entangled in a large amount of storage and debris. Firefighter interviews revealed that at least 3 teams of rescuers were needed due to the extensive amount of work that was needed to free Heenan from the debris, and it was estimated that the rescue took approximately 25 minutes to complete. However, an exact time cannot be determined, as it was never reported over the radio when Heenan was removed from the basement.

Heenan was alert and conscious when he was removed from the basement; he complained of hand pain, but wanted to go back to fight the fire. Upon being brought out to the waiting ambulance, Chief Casciano opened Heenan’s turnout coat to assess his injuries, but noted only severe burns to Heenan’s hands. Heenan was turned over to the paramedics on scene, and was transported by ambulance to Cooper Medical Center. Although it was earlier requested, the paramedics cancelled the helicopter but failed to consult with or advise the IC on this decision. It was not until the IC requested the status on the helicopter that the dispatcher told him that it was recalled earlier. This matter became greatly disputed over the radio as multiple fire officers still insisted that the helicopter respond. However, Heenan was subsequently transported by ambulance.

It should be noted that following Heenan’s transport, Chief Casciano initiated a defensive fire attack, and the remaining operations were conducted without further incident.

The Casualty Scenario

Firefighter James Heenan was a 37-year-old member of the Verga Volunteer Fire Company, with approximately 18 years experience. During initial operations, he and FF James Miller were ordered to enter through the rear door of the structure with a hoseline for rescue and fire suppression duties. It was estimated that they advanced approximately 6 feet into the structure when the floor collapsed, dropping FF Heenan into the basement and covering him with debris from above. Upon this breach of the floor / ceiling assembly, the fire raged out of the hole that was just created, causing FF Miller to direct the hose stream into the hole in an attempt to protect FF Heenan until he could be rescued. Firefighter Heenan was alert and conscious when he was located and removed from the basement approximately 25 minutes later.

Paramedic records later revealed that FF Heenan received 2nd and 3rd degree burns over 70% of his body. Shortly after transport to Cooper Medical Center, he was flown to Chester-Crozer Burn Center. James Heenan died due to complications from these injuries on March 25, 2001.

Following this incident, it should be noted that a physical inspection of FF Heenan's turnout gear revealed no significant burn damage. Although much of the reflective trim had burned away, there was no evidence of direct flame impingement upon the gear. The only areas of burn-through were a few small ember holes.

ANALYSIS

The New Jersey Division of Fire Safety is statutorily responsible for conducting investigations of incidents resulting in serious firefighter injuries and/or deaths. In conducting these investigations, full cooperation of all agencies and parties involved is not only anticipated, but also compulsory. It should be noted that during this investigation, New Jersey Division of Fire Safety was required to issue a subpoena to Chief Casciano, as investigators encountered difficulty obtaining information and materials from the Verga Fire Company.

Training

Following this incident, it was found that training within the VFC was inadequate. There was little evidence of training on structural firefighting, and poor maintenance of training records. Furthermore, many of the members and officers of the VFC did not possess the required training and officer certifications as per N.J.A.C. 5:75, including Firefighter Level 1 and Incident Management System (IMS) Level 1.

A roster provided by the VFC indicates a membership of 22 active firefighters (6 of which are officers). However, records within the NJ Division of Fire Safety indicate that at the time of the incident, only 5 members (including James Heenan) and 1 officer were certified as “Firefighter – 1”. Additionally, none of the officers were certified in “IMS Level 1”. It should be further noted that training records for FF James Miller, who served as the back-up man for FF Heenan, indicated that as of the date of this incident, he had not yet completed basic “Firefighter Level 1” training.

Utilizing Scene Size-Up to Determine Strategy and Tactics

Scene size-up is a means of evaluating problems and conditions that could effect the outcome of a fire. Proper size-up begins at the time of the alarm, and continues until the emergency is under control. Strategy involves the development of a basic plan to most effectively deal with a situation. Major goals or objectives must be identified and prioritized by evaluating the situation, the risk involved, and the capabilities of the available resources. Tactics are those methods or functions selected to implement the goals and objectives within the strategic plan.

During this incident, although the IC conducted exterior surveys of the structure, he did not properly evaluate his findings so as to develop a basic strategy for implementation of safe and effective firefighting tactics. This was evidenced in

that he and other officers circled the structure multiple times, noting that the fire was burning in the basement and first floor Division B/C area. Despite this fact, a crew consisting of FF's Heenan and Miller were ordered to enter the structure through a first floor door on the Division C side to conduct search and rescue operations. Although the IC believed that this door would be the best entry point, it consequently put FF's Heenan and Miller directly over the seat of the fire, resulting in the floor collapse due to the weakened structural members.

Non-Use of Thermal Imaging Cameras (TIC's)

A TIC is a device that translates a thermal picture into an electrical picture and then a visual image for the human eye. This is accomplished because 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 fortunately for firefighters, 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 firefighters to "see" through the smoke, providing a more rapid means of locating victims or hidden areas of fire.

During this incident, although a TIC was located on Engine 621, it was not utilized during the size-up, initial rescue, or fire suppression operations. Had the IC utilized the TIC during the size-up process, he could have gained a better perspective of the fire's location, size, and advancement through the structure. Additionally, had the initial entry team consisting of FF's Heenan and Miller been equipped with a TIC, it is a possibility that they would have been able to recognize that there was heavy fire burning below them, and that the integrity of the floor may be compromised. Furthermore, firefighter interviews revealed that it was not until after the collapse that the personnel put the TIC into service to assist in the rescue of FF Heenan. However, he was quickly located, even prior to the TIC being brought down into the basement.

Unsafe Entry Practices

This incident exemplified some notably unsafe entry practices by various VFC personnel. As previously mentioned, Chief Casciano, failed to analyze his size-up of the fireground conditions in determining the safest and most effective entry point into the structure for both initial rescue and fire attack crews.

Additionally, there was a lack of coordination between rescue and fire attack crews as evidenced by FF's Heenan and Miller entering the structure prior to the arrival of additional personnel to serve as the fire attack crew. Although the VFC operated in compliance with the 2-in / 2-out regulations under the Public

Employees Occupational Safety and Health (PEOSH) Respiratory Protection Standard 29CFR1910.134, there was no back-up hoseline in place to protect the rescue crew from the advancing fire.

Furthermore, FF's Heenan and Miller failed to utilize the proper tools and equipment prior to entering the structure – namely a portable radio, flashlight, thermal imaging camera, and handtools such as an axe or halligan bar. During this incident, these items could have been utilized by FF's Heenan and Miller to perform the following tasks:

- *Portable radio* – to keep the IC advised of conditions upon entry, and allow FF Heenan to communicate with his rescuers
- *Flashlight* – to improve visibility upon entry, and allow FF Heenan to signal to his rescuers
- *Thermal Imaging Camera* – to allow them to recognize the fire / floor conditions upon entry
- *Handtools* – to properly force entry on the door, and to sound the floor for stability prior to advancing

It should be further noted that failing to utilize these tools is contrary to all recommended search and rescue practices noted in Essentials of Firefighting and Firefighter's Handbook.

Fire Stream Application

A fire stream is identified by the type and size of stream; the type of fire stream indicates a specific pattern of water needed for a specific job. There are three major types of fire streams:

- *Solid stream* – a fire stream produced from a fixed orifice, smooth-bore nozzle, designed to produce a stream as compact as possible with little shower or spray. It has the ability to reach areas that might not be reached by other streams and also minimizes the chance of steam burns.
- *Broken stream* – a fire stream that has been broken into coarsely divided drops of varied size, larger than those produced by a fog stream.
- *Fog stream* – a fire stream composed of small water droplets in a shower or spray, allowing for the maximum exposed water surface for heat absorption. Due to the rapid manner in which these small droplets are converted into steam, this type of stream increases the chance for steam burns.

Following FF Heenan's fall into the basement, multiple exterior hoselines were deployed to protect him from the fire. Additionally, FF Miller reported that he was instructed to protect FF Heenan from the fire by directing a full-fog hose stream

into the hole in the floor. In operating these hoselines into the basement, the natural upward and outward ventilation of the fire was interrupted. Not only were large amounts of steam being introduced into the basement, but the fire and superheated gasses were also being forced back down upon FF Heenan.

This is considered to be contrary to all recognized practices, including those found in Essentials of Firefighting, which contains the following caution: *“Warning: Never operate any type of fire stream through a ventilation hole while firefighters are still inside the building. This stops the ventilation process and places interior crews in serious danger”*. Additionally, it lists one disadvantage of fog streams as *“When improperly used during interior attacks, they can spread fire, create heat inversion, and cause steam burns to firefighters”*.

Personal Alert Safety System (PASS)

A PASS device is designed to assist rescuers in locating a downed or disoriented firefighter even in dense smoke. It is worn on the SCBA or turnout coat, and must be manually or automatically turned “on” prior to entering an IDLH atmosphere. Should the firefighter collapse or remain motionless for approximately 30 seconds, the PASS will emit a loud, pulsating shriek. The alarm can also be activated manually if the firefighter becomes endangered and needs assistance. Rescuers will follow the sound to locate the distressed firefighter. PEOSH regulations under N.J.A.C. 12:100-10 et seq. mandates that all firefighters and rescuers are equipped with the PASS device.

Reports from the Gloucester County Fire Marshal’s Office indicated that FF Heenan’s turnout gear contained a PASS device located on the waist strap of the SCBA. However, during firefighter interviews, it was reported that no PASS alarm was heard following FF Heenan’s fall into the basement. Therefore, it can not be determined whether FF Heenan manually turned “on” his PASS device prior to entering the structure.

Rapid Intervention Team (RIT) / Firefighter Assist & Search Team (FAST)

In accordance with Incident Management System (IMS) regulations under N.J.A.C. 5:75, which adopts the National Fire Protection Association (NFPA) Standard 1561, fire departments are required to provide at least two firefighters outside of an atmosphere that is immediately dangerous to life and health (IDLH). These firefighters are tasked with searching for and rescuing lost or trapped firefighters, should the need arise. It is recommended that this concept be taken to a higher level with the establishment of Rapid Intervention Teams (RIT) or Firefighter Assist and Search Teams (FAST).

This incident was unique in that the collapse occurred during initial operations, even prior to all VFC apparatus arriving on scene. As previously noted, these fireground operations were in compliance with the aforementioned 2-in / 2-out regulations which state:

- *At least two employees enter the immediately dangerous to life or health (IDLH) atmosphere and remain in visual or voice contact with one another at all times;*
- *At least two employees are located outside the IDLH atmosphere; and*
- *Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;*
- *The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;*
- *One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.*

However, due to the aforementioned fact that the collapse occurred during initial operations, there was no formal RIT / FAST established when FF's Heenan and Miller made entry into the structure.

Failure to Utilize an Evacuation Signal

An emergency evacuation signal is designed to alert all firefighters of an imminently hazardous condition that warrants the rapid removal of personnel from within a structure. During this incident, FF's Heenan and Miller attempted to initiate interior search and rescue operations due to the early reports of possible entrapment. Immediately following entry into the structure, the floor collapsed, causing FF Heenan to fall into the basement.

Videotape taken during operations revealed that in the minutes following the collapse, Chief Casciano could be heard relaying orders that nobody was to go into the structure. However, an evacuation signal was never sounded, therefore it is unknown if all personnel received his command. An evacuation signal would have been an immediate and effective means of alerting all other personnel on scene that a hazardous condition existed, and to stay out of the structure.

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. These events include death or serious injury of a co-worker, multiple deaths or the death of a child. 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 firefighters 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. CISD Teams are regionalized in New Jersey and are part of a statewide network.

It must be remembered that 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.

Reports indicated that following this incident, a CISD team responded to the VFC station to assist members in dealing with this incident.

NJ Department of Labor (DOL) Investigation

Following this incident, there was no formal investigation performed by the NJ Department of Labor.

LESSONS LEARNED

Elected and appointed municipal or fire district officials have an absolute responsibility to provide their citizenry with adequate emergency services provided by competent individuals. Every municipal government or board of fire commissioners, as the case may be, has an obligation to provide hands-on oversight of their fire department. In this way, they can ensure that it is effectively managed, adequately staffed, properly equipped, and its members and officers are well trained and qualified to deal with the hazards they face. Additionally, the governing body of the fire department must ensure that their fire department is in compliance with federal and state laws and regulations.

Municipal or fire district officials need to understand that as the recognized employers of the department, they are responsible for inadequacies of a fire department. As such, elected officials, as the recognized employer for both career and volunteer firefighters will be cited for violations of laws and regulations arising from departmental actions.

Training

In accordance with recognized standards such as NFPA 1500, fire departments shall establish and maintain a regular training and education program that is commensurate with the duties and functions that they are expected to perform. The main goal of this training and education is to prevent occupational deaths, injuries, or illnesses by ensuring that all members of a department operate in an efficient, safe, and uniform manner. Additionally, proper record keeping is essential to certify that all personnel have received both required and supplemental training and education.

It is imperative that both firefighters and fire officers possess at least the minimum qualifications for the positions they occupy. Therefore, it is incumbent upon municipal officials that minimum qualifications are established in order to ensure the effective provision of fire suppression services to the public.

To this end, the National Fire Protection Association (NFPA) standards 1001; *Firefighter Professional Qualifications*, and 1021; *Fire Officer Professional Qualifications* both delineate various levels of competencies for the different positions within a fire department organizational structure. Furthermore, regulations under N.J.A.C. 5:75 mandate that firefighters and fire officers obtain "Level 1" certifications in the IMS. This may serve as an excellent starting point for a municipality to develop common firefighter and fire officer qualifications.

Municipalities or fire districts, as the case may be, may also determine the manner of selection of volunteer officers.

Methods may include election, appointment via resume or even appointment based upon examination. However, no matter which method or methods is / are employed for selection of officers, all potential officers would be selected from a uniformly qualified pool of candidates.

Utilizing Scene Size-Up to Determine Strategy and Tactics

Size-up is not a task that is reserved for the IC only; regardless of the extent to which each is involved, all firefighters should routinely perform size-up activities. A proper size-up should begin at the time of alarm and end at the time that the emergency is under control. To ensure a thorough size-up, the use of the following 13-point acronym for size-up considerations is suggested in Fire Officer's Handbook of Tactics:

- C** – *Construction type*
- O** – *Occupancy*
- A** – *Apparatus / Manpower*
- L** – *Life Hazard*

- W** – *Water Supply*
- A** – *Auxiliary Appliances*
- S** – *Street Conditions*

- W** – *Weather*
- E** – *Exposures*
- A** – *Area & Height*
- L** – *Location and Extent of Fire*
- T** – *Time*
- H** – *Hazardous Materials*

The information obtained during the size-up must be properly analyzed so as to determine an overall strategy, and implement safe and effective tactics. The information thus gained has a direct effect on where, when, and how firefighters operate on the fireground.

In implementing safe tactics, a risk / benefit analysis must be utilized in determining all operations; the risk of an action needs to be weighed against the probable benefit that may be reasonably and realistically expected. This is especially true when ordering firefighters to operate directly above the fire without the immediate availability of a second crew to attack the seat of the fire. This places these firefighters in an extremely hazardous position – they are operating in extreme heat and smoke, and may encounter sudden fire conditions or fire-weakened floor areas, as was the case during this incident.

Non-Use of Thermal Imaging Cameras (TIC's)

Fire departments in New Jersey have a unique benefit in that all were supplied with one or more Thermal Imaging Cameras (TIC's) by the state. The VFC was the recipient of one of these cameras.

Fire departments that possess these units should routinely employ them during various structural firefighting operations. TIC's can be a valuable tool during initial and on-going scene size-up, especially when dealing with fires in wood frame structures. In these instances, from the exterior the IC can gain valuable insight as to the fire's location, size, and advancement through the structure. This should be performed prior to the entry of personnel to recognize hazards and reduce risks.

Additionally, TIC's can also play a vital role during fire suppression operations. The TIC can help expedite the time needed for interior crews to locate and extinguish the seat of the fire. The TIC can provide a means of identifying hidden areas of fire spread and aid in the recognition of deteriorated structural conditions.

Furthermore, the TIC must be an integral part of search and rescue operations for lost or trapped civilians and firefighters, as it can help speed a RIT / FAST to the firefighter saving precious time in locating and removing the victim(s). While TIC's must not replace time-honored skills, they serve as an important tool to make operations more efficient, resulting in a higher level of safety for firefighters.

Just as firefighters equip themselves with a set of handtools and flashlight, they must include the TIC in their cadre of tools every time they enter a situation where visibility is reduced. Fire departments must realize that the TIC is a versatile tool, and continually train utilizing their TIC in various situations and operations. This serves to enhance firefighters' proficiency in its use, allowing them to interpret the images it displays, and to understand its uses and limitations.

Safe Entry Practices

It is imperative that firefighters remember "the basics" when preparing to enter a structure for rescue or fire suppression operations. While responding to the scene, firefighters must obtain the proper tools and equipment before exiting the

apparatus. This should include a minimum of full personal protective equipment (PPE), a portable fireground radio, flashlight, handtools, and a TIC (if available).

As previously discussed, firefighters need to perform a mental size-up prior to arrival on scene. They should consider the time of day, the typical building construction, and the anticipated occupancy. Upon arrival, they need to look for fire / smoke conditions, signs of building instability, or cars in the driveway. Furthermore, FF's must familiarize themselves with the location of windows and doors that may be useful as emergency exits should a problem develop.

During operations, firefighters must always work in teams of at least 2 personnel whenever entering an involved structure for duties such as search and rescue, fire suppression, or ventilation. In accordance with the aforementioned 2-in / 2-out regulations, these firefighters must be backed-up by at least 2 fully equipped personnel on the exterior of the structure, ready to intervene should the interior crew encounter trouble.

Fire Stream Application

As water is discharged from a nozzle, it is converted into steam as it absorbs the heat produced during a fire. Steam conversion and heat absorption becomes more rapid when a nozzle discharges smaller particles of water, such as when employing the use of a fog stream. During this steam conversion, a natural characteristic of water is that it expands in surface area; the greater the temperature, the higher the amount of expansion. For example, at 212° F, a cubic foot of water expands approximately 1700 times its original volume, and at 500° F, the expansion ratio is approximately 2400 times. However, it is this characteristic that poses a threat to firefighters as steam can cause serious burn injuries during interior fire suppression operations, as noted in Essentials of Firefighting.

During these interior operations, a nozzle discharging 150 gallons of water fog every minute into a heated area of approximately 500° F rapidly expands as it converts into steam. During one minute of operation, 20 cubic feet of water will have been discharged and vaporized, expanding to approximately 48,000 cubic feet of steam. This is enough steam to fill a room approximately 10 feet high, 50 feet wide, and 96 feet long. Additionally, in extremely hot atmospheres, steam expands to even greater volumes. Thus, it can be seen how firefighters operating in a room where a fog stream is being utilized can be exposed to the threat of steam burns.

Personal Alert Safety System (PASS)

PASS devices can save lives, however they must be provided, used, and maintained in accordance with PEOSH regulations under N.J.A.C. 12:100-10 et seq. Although newer technology automatically turns “on” an integrated PASS device upon turning-on an SCBA, many departments still rely on PASS devices that must be activated manually. Although these devices are acceptable by NFPA standards, the burden is on the firefighter to remember to turn “on” the PASS device. As is the case with anything else, adding the human factor into the equation increases the chance for error. For this reason, fire departments should strongly consider upgrading their SCBA to those with automatic PASS devices.

Tests conducted by the Mesa, Arizona Fire Department yielded the following recommendations regarding the use of PASS devices:

- *Test the PASS at least weekly, and maintain it in accordance with manufacturer’s instructions;*
- *Conduct practical training with the PASS under realistic conditions;*
- *Check the PASS device calibration during training, and return units for recalibration if necessary;*
- *Retrain every six months with PASS devices;*
- *Train firefighters to always turn on and test the PASS before entering a hazardous atmosphere;*
- *Train rescuers to listen for the distress sound by stopping in unison, controlling breathing, and lifting hood or earflaps away from ears;*
- *When a downed firefighter is located, turn off the PASS device or communications will be impossible.*

Firefighters 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. For this reason, every interior crew should be equipped with a portable radio equipped with a sufficient number of frequencies for fireground operations as well as a dedicated command frequency. Utilizing their radio, they need to notify the incident commander of their situation using a pre-determined emergency term such as “May-Day.” Additionally, firefighters need to immediately activate the manual alarm on their PASS device so as to help rescue crews locate them quickly.

***Rapid Intervention Team (RIT) /
Firefighter Assist & Search Team (FAST)***

Emergency services personnel respond to many incidents that present high risks to personnel safety. As previously stated, IMS regulations under N.J.A.C. 5:75 require that fire departments have a minimum of two fully equipped personnel ready to rescue distressed firefighters when operating in an IDLH atmosphere.

These teams, specially trained and equipped to deal with rescue of firefighters under the worst possible conditions, can be composed of departmental personnel or mutual aid personnel. It is important for the IC to request a RIT or FAST as soon as possible after dispatch to allow for the team to arrive quickly.

Some fire departments have refined their response plans to dispatch a RIT or FAST automatically upon receipt of a report of a working fire.

If this concept is adopted by the fire department, it is crucial that the members of the RIT or FAST obtain all necessary training and equipment. Other fire department members need to be well versed in the duties, responsibilities and operations of the RIT or FAST, and what needs to be done by fire crews in support of the team.

Evacuation Signal

In accordance with IMS regulations under N.J.A.C. 5:75, fire departments must adopt a procedure to follow in the event an emergency evacuation becomes necessary during fireground operations. An emergency evacuation signal must be easily recognizable and distinguishable from all other fireground noises. A typical signal involves the dispatcher giving alert tones followed by the evacuation message over the radio. Upon hearing this, the air horns on all apparatus shall be blown in cycles of 3 short blasts, followed by a pause. This alerts all personnel to immediately abandon their equipment, exit the structure, and report to their assigned supervisor for a roll call. The results of this roll call shall be relayed to the IC.

Critical Incident Stress Debriefing (CISD)

The Division of Fire Safety 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 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*
- *co-worker suicides*
- *any other unspecified highly traumatic event*

The statewide emergency contact number for activation of a CISD team is (609) 394-3600.

NJ Department of Labor (DOL) Investigation

As a reminder, all fire departments are subject to the *mandatory* reporting requirements under N.J.S.A. 34:6A-25 et seq., and PEOSHA regulations at N.J.A.C. 12:110-5.8. All work-related public employee (firefighter, career or volunteer) fatalities or 3-or-more in-patient hospitalizations shall be reported *within 8 hours* of occurrence to the NJ Department of Labor 24-hour hotline at 1 (800) 624-1644. Additionally, the NJ Division of Fire Safety shall be notified of any firefighter fatality or serious injury via 24-hour Staff paging system at 1(800) 327-2751 or at (609) 633-6070. Both agencies shall respond and conduct independent but coordinated investigations as deemed necessary.

CONCLUSION

The death of firefighter James Heenan can be directly attributed to a cumulative effect of three factors. Firstly, the IC did not properly analyze the fire conditions, and FF Heenan was ordered into the structure through the first floor Division C door, putting him directly over the seat of the fire. Secondly, there was a failure to utilize the proper equipment prior to entering the structure – namely a thermal imaging camera and handtools to sound the floor for stability. Thirdly, the introduction of the fog fire streams into the hole in the floor and through the exterior basement windows pushed the fire and superheated gases back down upon FF Heenan, thus causing the burn injuries that ultimately led to his death.

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