

NEW JERSEY DIVISION OF FIRE SAFETY

Firefighter Fatality and Serious Injury Report Series

Two Chief Officers and a Firefighter Killed in a Collapse During a Structural Fire

**Gloucester City, New Jersey
July 4, 2002**

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**STATE OF NEW JERSEY
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INTRODUCTION

The New Jersey Division of Fire Safety in conjunction with the New Jersey Department of Labor and the New Jersey Department of Health 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 July 4, 2002 at 0135 hours, the Gloucester City Fire Department responded to a working structure fire with confirmed entrapment “twin” residence at 200-202 N. Broadway in Gloucester City, NJ. Approximately 30 minutes into the operation the structure collapsed, trapping eight rescue and suppression personnel inside. Five firefighters were rescued but tragically, Gloucester City firefighter Thomas Stewart III, Mt. Ephraim Chief James Sylvester and Deputy Chief / Assistant Camden County Fire Marshal John West died before rescue crews were able to locate them. Three children also died in this fire.

Although the official cause of the fire remains undetermined, investigators could not rule out the possibility that carelessly discarded smoking materials may have ignited an upholstered couch in the first floor front living room of unit 200.

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:

There appears to be a disconnect between career and volunteer personnel in the Gloucester City Fire Department (GCFD). Many personnel expressed the concern that the GCFD operated as separate fire departments rather than as one.

REMEDY:

It is essential that all firefighters put individual differences aside in order to work together successfully as a team to achieve their common goal of saving lives and property.

- 2. FACTOR:** The GCFD, faces a common dilemma associated with combination fire departments: staffing levels may be unpredictable depending on how many volunteers are available to respond to any one incident. This unpredictability can result in insufficient staff to perform required tasks until additional staff arrives.

REMEDY:

Elected or appointed municipal officials need to make a commitment to the adequate staffing of the fire department and staffing levels must allow for compliance with the two-in / two-out provisions of the Public Employees Occupational Safety and Health (PEOSH) Standard 29CFR1910.134. The New Jersey Division of Fire Safety can provide assistance to the municipalities and provide examples of how this can be accomplished.

3. FACTOR:

Due to the limited number of firefighting personnel who arrived at this incident, all initial efforts were focused on the rescue of occupants. This postponed fire suppression operations until additional resources arrived. Because rescue and fire suppression operations were performed sequentially rather than simultaneously, the fire may have spread more quickly resulting in the early failure of the structure.

REMEDY:

Sufficient personnel are critical to ensure that all necessary operations can be performed at the appropriate time. Furthermore, a continual size-up assessment must be maintained so that the Incident Commander (IC) can be kept aware of the conditions as the incident progresses. This continual size-up will allow the IC to modify the strategy and / or tactics as deemed necessary.

4. FACTOR:

Although the GCFD was equipped with a thermal imaging camera (TIC), firefighters failed to utilize it for the initial search for victims. The TIC was also not used properly to analyze the scope of the incident and determine what 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 fire fighting.

5. FACTOR:

From the onset of operations, the Incident Management System (IMS) was not properly expanded as the incident progressed. Given the scale of this incident, the span of control quickly became too large for the IC to effectively manage and additional functions were not delegated to subordinates. Critical tasks such as safety and accountability were not effectively implemented.

REMEDY:

N.J.A.C. 5:75 mandates that all fire departments utilize an IMS. It is a modular system, which allows the IC to apply only those elements that are necessary at a particular incident, and allows elements to be activated or deactivated as incidents escalate or decline. Fire departments are required to adopt written plans, or Standard Operating Guidelines (SOG's) based on the IMS, to address different types of incidents. The NJ Division of Fire Safety distributed suggested SOGs upon adoption of this regulation and they continue to be available to all fire departments.

6. FACTOR:

The GCFD did not assign a dedicated safety officer (SO) to observe operations and terminate potentially unsafe actions.

REMEDY:

IMS regulations under N.J.A.C. 5:75 mandate the use of safety officers (SO's) at all incidents. An SO is required to observe operations on the fire scene, identify next steps and order the correction of safety hazards to personnel. Given the scope of this incident, the IC should have assigned at least one SO.

7. FACTOR:

The GCFD did not designate accountability officers to monitor each area of entry into the structure. Nor was a Personal Accountability Report (PAR) or roll sheet utilized to track personnel and monitor their functions. Therefore, the concept of accountability of personnel location, function, and time failed.

REMEDY:

Although not enforceable at the time of this incident, the regulations for the NJ Personal Accountability System (NJPAS) under N.J.A.C 5:75 now require that fire departments utilize an accountability system. This system includes the designation of accountability officers and the use of PAR's / roll calls, all within the framework of the IMS that is required to be utilized at all incidents. The NJ Division of Fire Safety is in the process of finalizing suggested SOGs and will distribute them to all fire departments when complete.

8. FACTOR:

Although firefighters Sylvester and Stewart were equipped with Personal Alert Safety System (PASS) devices, they did not activate them prior to entering the structure. It should be further noted that their PASS devices were not automated; they had to be manually activated by the user. Firefighter West was not equipped with a PASS device.

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 activated 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 activating PASS devices.

9. FACTOR:

The GCFD did not specifically designate the required personnel for the rescue of distressed firefighters through the establishment of Rapid Intervention Teams (RIT) or Firefighter Assist and Search Teams (FAST). Consequently, when the building collapsed, there was not a properly equipped team in place for immediate rescue operations.

REMEDY:

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 a RIT or FAST as soon as possible after dispatch to allow the team to arrive quickly.

10. FACTOR:

Not all fire departments operating on the fire ground were communicating on the same radio frequency, which resulted in communication failures. Although, the Camden Fire Department (CFD) did have the capability to communicate on the GCFD "Fire 5" frequency they chose not to.

REMEDY:

IMS regulations under N.J.A.C. 5:75 require that a communication system allow for inter-agency communication during mutual aid responses by providing a direct communication link between companies. Fire departments should work with other departments that are used routinely for mutual aid to ensure radio interoperability.

11. FACTOR:

An emergency evacuation signal was sounded upon reports of a firefighter missing inside the structure before the impending collapse, however, the signal was never sounded at any other time prior to the collapse, nor was it sounded immediately after the collapse.

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 NJ DFS is finalizing a proposal that would establish a statewide emergency evacuation signal.

12. FACTOR:

During this incident, fireground conditions were not properly analyzed, which led to the failure to recognize an impending building collapse.

REMEDY:

Firefighters and officers need to learn the warning signs and causes of building collapses. Often following a collapse, as was the case with this incident, personnel on the scene report that the structure collapsed “without warning”. However, this is usually not the case; the reality is that the IC and firefighters simply failed to identify the indicators that were present prior to the collapse.

13. FACTOR:

After removal of all victims, the remaining structure was demolished and the incident scene was cleared of all debris within 48 hours of law enforcement concluding their origin and cause investigation. This prevented a thorough assessment of the remaining structure in order to identify the cause and contributing factors of the collapse.

REMEDY:

A protocol should be adopted to ensure that fire scenes are secured in a manner that not only allows for public safety, but also prevents immediate demolition. This will provide agencies with an opportunity to conduct any investigations that may be necessary.

14. FACTOR:

It was difficult to gauge the amount of training for all GCFD personnel due to insufficient record keeping. Although it was determined that the GCFD firefighters and officers met the minimum regulatory training requirements, many members did not possess a great deal of supplemental training with regard to structural firefighting. Additionally, the volunteer firefighters and officers often did not attend the scheduled departmental drills and rarely trained with the career personnel despite having frequent opportunities to participate.

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 or education.

15. FACTOR:

Qualifications of volunteer officers were difficult to judge and there were serious concerns voiced by the career members of the department regarding the suitability of some of the volunteer officers. This resulted in a lack of confidence by several career personnel in the volunteer officers and reluctance to take direction from them.

REMEDY:

In addition to the NJ DFS requirement that all fire service supervisors obtain incident management certification, municipal officials need to establish uniform minimum qualifications for fire officers in order to ensure the effective provision of fire suppression services to the public. The NJ DFS recently adopted voluntary fire officer standards and will be developing a training curriculum to meet those standards.

16. FACTOR:

It was not possible to determine if a smoke detector inspection was conducted in the building after a change in occupancy in October of 2001 as required by the NJ Uniform Fire Code. The city's housing department, who has the responsibility for these inspections, was unable to provide documentation of such an inspection to either the Division of Fire Safety or to the Camden County Prosecutor's Office. It was not clear whether smoke detectors were activated during this fire incident.

REMEDY:

It is recommended that the responsibility for smoke detector inspections be transferred to the fire department to ensure complete and documented inspections.

INVESTIGATION

The Structure

According to reports compiled by the NJ State Police and the US Bureau of Alcohol, Tobacco and Firearms, the structure at 200-202 N. Broadway was a circa-1899 “twin” occupied residence located on a corner property at the intersection of N. Broadway and Mercer Street. Overall, the structure measured approximately 36’ x 76’, with a shared center wall dividing unit 202 on the north side from unit 200 on the south side. It was constructed of balloon-style wood framing using full-cut lumber (2” x 4” studs and 2” x 10” joists), and contained a full basement. Balloon construction is described by Francis L. Brannigan as a structure where the studs run two or more stories high from the basement to the attic and channels between the studs may be open. Thus; fire can spread through all the interconnected spaces from the basement to the attic and between the void spaces between ceilings and floors above. Without firestopping members present, which is *not* the case in modern day construction, the interconnected voids can be considered to be one big “balloon”, resulting in fire spread throughout the building.

The Division A (west) side was three stories high and contained an open wooden porch that provided access to the main entrance into each residence.

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.”*

Continuing around the structure, a side view revealed that the middle portion stepped down to two stories in height. The rear portion was single story and provided access to an additional entrance into each residence. A wrought-iron fence, approximately 3’ high, surrounded the structure. The exterior siding was originally wood, but was subsequently covered by vinyl siding.

The following interior descriptions are for unit 200, the original fire unit only. However, unit 202 was basically a “mirror-image” of unit 200, using the center dividing wall as an axis. The interior walls were both plaster and lath, and gypsum board. The floors were ¾” x 6” tongue-and-groove hardwood flooring, predominately covered by carpeting. All living areas were on the first floor and in the partially finished basement. The second and third floors contained the sleeping quarters - four bedrooms total. Interior stairways were along the center dividing wall: on the exterior, there were front and rear stairways to the upper levels, and a rear stairway into the basement. Most of the original windows had been replaced by vinyl, double-hung, insulated glass windows. Some of the windows contained air-conditioning units. Electrical wiring consisted of a combination of knob and tube, which is a wiring method using porcelain knobs and tubes, and flexible nonmetallic tubing for the protection and support of single insulated conductors; and NM “Romex” wiring. Witness statements concluded that there were smoke detectors present in the hallways and basement; however, it is unclear if they were in proper working order at the time of the fire.

The Incident

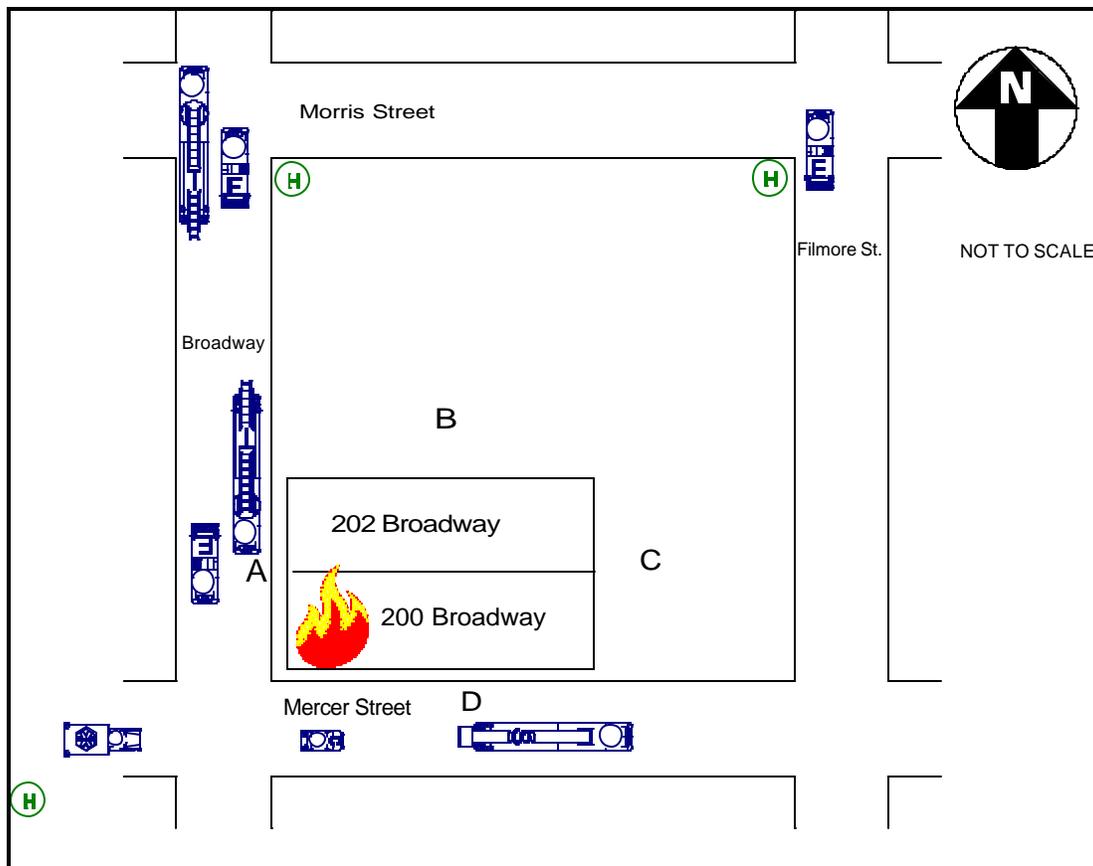
According to dispatch transcripts provided by the Camden County Communications Center, on July 4, 2002 at 0135 hours, the Gloucester City Fire Department (GCFD) responded to a residential structure fire located at 200-202 N. Broadway in Gloucester City. Prior to the arrival of the first GCFD units, it was reported by Gloucester City Police Department personnel on scene that there were multiple residents, including three children, trapped on the second floor of unit 200. Police reported that a woman was stranded on the front porch roof, but the flames caused her to retreat into an open window for unit 202. Within two minutes, the front and side of unit 200 was heavily involved in fire on all floors, and the intense fire was severely threatening the attached unit 202.

Upon receipt of a working fire, the entire GCFD was dispatched simultaneously by Camden County Communications Center. Five career firefighter / Emergency Medical Technicians (FF / EMT’s), including Battalion Chief (B.C.) John McNutt, immediately responded with three units: Engine 513, Ladder 514 and Squad 557 (ambulance). Off-duty career personnel, including GCFD Chief William Glassman, were automatically recalled and responded from their homes. Volunteer GCFD firefighters responded with Squirt 542, Engine 541 and Engine 521. Neighboring Mt. Ephraim Fire Department (MEFD) was dispatched and responded with Rescue 455 to the scene and Engine 452 for station coverage.

At 0139 hours (four minutes after the initial dispatch), the three career units arrived on scene. Engine 513 was positioned at the Division A / B corner of the structure. Upon arrival, B.C. McNutt reported a “twin”, three-story attached structure with heavy fire showing from unit 200, with people visible in the second-floor windows to the front of unit 202.

Upon hearing this report, Chief Glassman, who was still responding, requested Ladder 2 from Camden City Fire Department (CFD). After Ladder 514 positioned across from the Division A / D corner, B.C. McNutt ordered the crew to stretch a 1.75" hoseline off of Engine 513 through the front door of unit 202 for search and rescue operations. Upon reaching the second floor, the two-man interior crew encountered heavy fire conditions extending into the unit. Initially, this crew was making progress on the fire with the hoseline, however, interior conditions quickly deteriorated forcing them to retreat from the structure.

Chief Glassman arrived on the scene and designated himself as "Command" (known as the Incident Commander or IC) at 0141 hours (six minutes after the initial dispatch). The Command Post was located across from the Division A / D corner of the structure. Many of the off-duty firefighters were now arriving via personal vehicles. At this point, a full exterior attack was beginning on unit 200 while interior operations continued in unit 202. A water supply for Engine 513 was established by hand-stretching a 4" supply line approximately 150' to a municipal fire hydrant located at the corner of Sussex Street and Mercer Street. The extra manpower went to the engine and deployed a 1.75" hoseline to the Division A side, and a 2.5" hoseline to the Division D side of the structure. It was at this time that Squirt 542 arrived and was positioned on Mercer Street at the Division C / D corner of the structure, awaiting a water supply. CFD Ladder 2 arrived at 0143 hours (eight minutes after the initial alarm), however, it is unclear from dispatch transcripts if they were on the fireground radio frequency because the dispatcher needed to relay the IC's instructions to them. They staged their unit near the front of the structure and their crew put a ground ladder to the Division A / B porch roof of the structure. They became the Vent, Enter, Search (VES) team to the second floor of unit 202. At this time, GCFD Engine 541 arrived at a fire hydrant on the corner of Morris Street and Filmore Street, located at the rear of the structure. They then established a water supply for Squirt 542, which was preparing to place two, 1.75" hoselines and their master stream into operation. Thereafter, Engine 541 sent their personnel to the front of the structure. This crew was assigned to provide suppression support with a 1.75" hoseline to CFD Ladder 2. They entered the structure via the ground ladder placed at the porch roof by CFD and joined the CFD crew on Division 2. As GCFD Engine 521 was approaching, they were advised to go around the block to connect to another fire hydrant, lay a 4" supply hose into the scene to provide a water supply for Ladder 514 and set-up their deck gun.



At 0145 hours, the IC gave the dispatcher a 10-minute update report that he had two three-story dwellings (attached) well involved in fire, and that a deck gun would be in service momentarily. At 0147 hours (12 minutes after the initial dispatch), there was some confusion with respect to which fire hydrant Engine 521 was to connect to; the supply line they laid did not reach the scene, and personnel needed to hand-stretch 4" hose from Engine 513 to compensate. Ladder 514 was now being supplied by Engine 521, and they could now set-up their master stream. It was around this time that the deck gun from Engine 513 was placed into service, attacking the fire on the Division A / D corner of the structure.

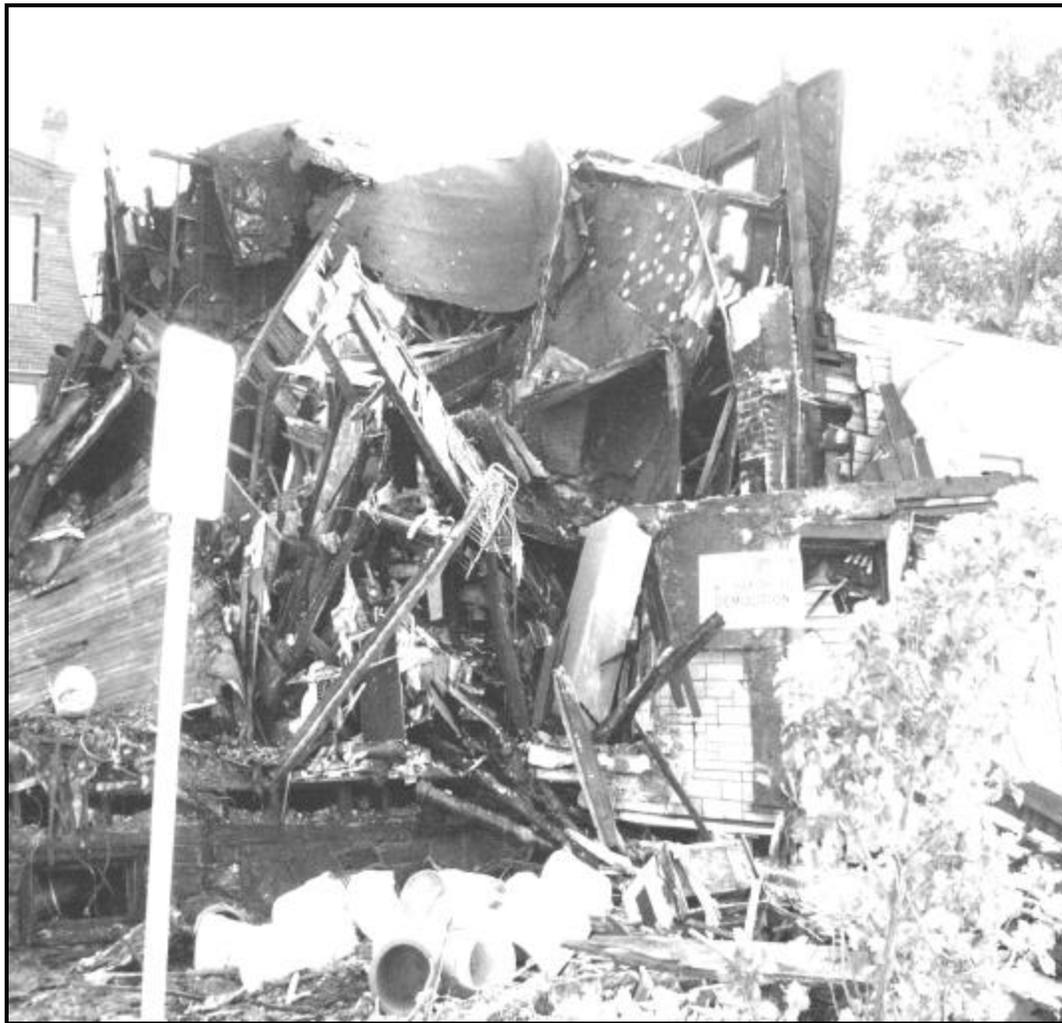
At this point, a defensive attack was underway on unit 200. Multiple hoselines were deployed and master streams were either operating or preparing to go into operation. A bulk of the fire was being quickly darkened down. At 0151 hours (16 minutes after the initial dispatch), the IC radioed dispatch with the update that multiple hoselines and master streams were in service, and that they were making good progress. He also stated that the victims were still unaccounted for, but they had two hoselines in the exposure unit (202) and were resuming the search. MEFD Rescue 455 arrived at 0153 hours (18 minutes after the initial dispatch), and their personnel were assigned to assist in operations.

The first sign of trouble inside the structure came at 0157 hours (22 minutes after the initial dispatch). While searching with a Thermal Imaging Camera (TIC) on the second floor of unit 202, the crews of CFD Ladder 2 and GCFD Engine 541 met up with another GCFD crew that was advancing a hoseline up the stairs. At this time, the CFD crew felt the floor start to give way and observed the roof and ceiling coming down. This information was immediately relayed directly to GCFD Lt. Shawn Paul, who was inside a front room. Radio communication transcripts show that Lt. Paul immediately radioed this information to the IC and advised him that they were dropping their hoseline and evacuating. Although the IC acknowledged this message, Lt. Paul repeated it. After the message was repeated, the IC had the dispatcher broadcast a message for all units to cease master stream operations. As the personnel were exiting unit 202, Lt. Paul remained in the structure to ensure that all personnel were out. At this point, Lt. Paul stated that he met with B.C. Williams and FF Stewart III advising them of the CFD report that the floor had dropped. At 0159 hours (24 minutes after the initial dispatch), while evacuating the structure, firefighters located a female victim on the first floor rear of unit 202 and pulled her out the rear door (she was later identified as Katia Williamson, the children's mother). It was at this time that an interior crew member radioed the IC to advise him of a firefighter missing on the second floor. At 0200 hours (25 minutes after the initial dispatch), the IC had the dispatcher broadcast three tones with an evacuation message, and subsequently, fire apparatus sounded their air horns signaling an immediate evacuation. Within two minutes, all personnel had evacuated, and it was confirmed that the "missing" firefighter had already exited the structure and was okay. After the dispatcher broadcasted this updated information, the IC met with B.C. Williams and D.C. West regarding the interior conditions. They agreed that the conditions were suitable for resuming interior operations, and the decision was made at 0204 hours (29 minutes after the initial dispatch), to resume an interior search for any additional victims. A crew consisting of MEFD FF's Bates, Campanell, Cantlin, Smith, Sylvester and GCFD FF Stewart III proceeded into the first floor of unit 202. D.C. West and B.C. Williams, who after meeting with the IC, proceeded to the second floor. At 0205 hours (30 minutes after the initial dispatch), the IC radioed to this interior crew to advise them that the deck gun would be going back into service because the fire was again intensifying. This message was acknowledged by the interior crew, who was now in the process of again retreating from the structure, due to rapidly deteriorating structural conditions.

The building suddenly collapsed at 0206 hours (31 minutes after the initial dispatch). The IC advised the dispatcher that there was a possibility of eight trapped firefighters, and he requested a Second Alarm Assignment consisting of designated units from surrounding towns. A special request also was made for rescue companies from Camden City and Philadelphia. At 0210 hours (35 minutes after the initial dispatch), the IC had the dispatcher broadcast a request for accountability of all personnel and for anyone trapped to issue a mayday. At this time, a priority message was radioed from the interior requesting manpower

to the rear of the structure for multiple trapped firefighters. At 0211 hours (36 minutes after the initial dispatch), one firefighter was rescued and another four were still trapped in the rear. The dispatcher proceeded to clear the frequency for emergency traffic only, because many mutual aid units were now signing-on. As rescue efforts continued, a manpower staging area was formed and relief crews began to assist. At 0221 hours (46 minutes after the initial dispatch), the IC requested Third and Fourth Alarm Assignments for “rescue” and “truck” companies from surrounding towns to report to a staging area set-up at Broadway and Hudson Street.

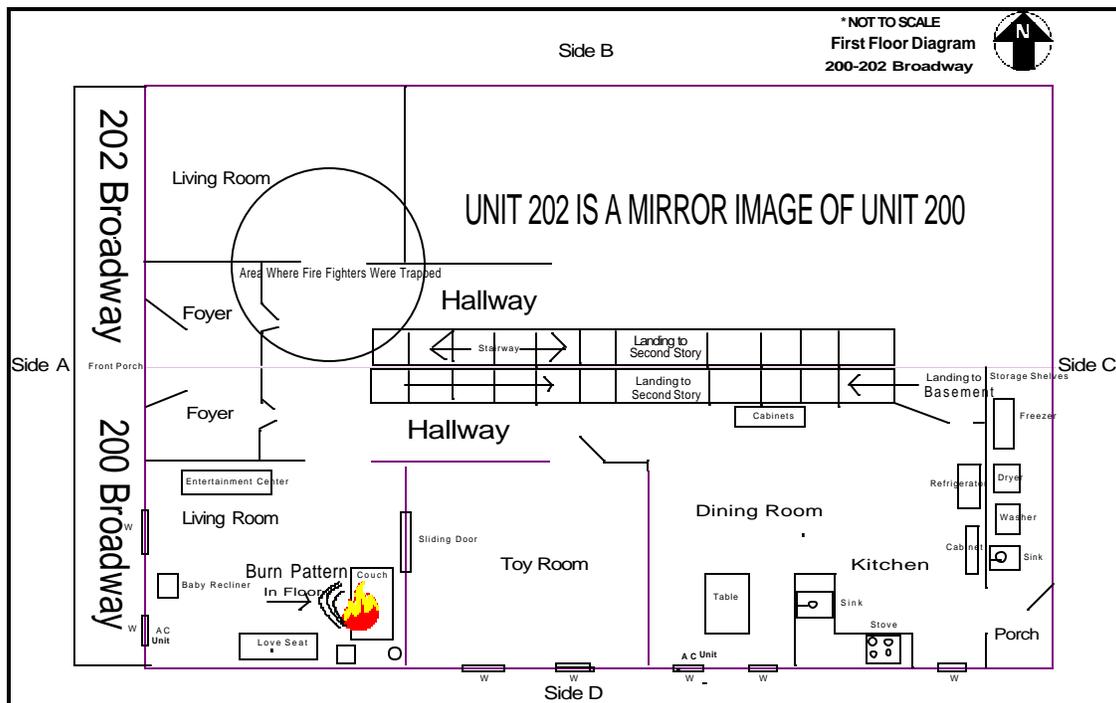
Although the initial rescue area was concentrated at the Division D side of the structure, as additional units arrived with manpower and tools, a second rescue area was established at the Division A side. At some time during the early stages of the rescue operation, the dispatcher switched all units responding into staging to utilize the “Fire 2” radio frequency. This allowed the original “Fire 5” frequency to be reserved for emergency fireground messages only.



View of collapse from the “A” – “D” corner.

A second firefighter was rescued at 0227 hours (52 minutes after the initial dispatch) from the rear of the structure. As time progressed, areas of heavy fire flared-up from within the debris. These fires were kept in-check by hoselines that surrounded the scene. A third firefighter was rescued from the front of the structure at 0240 hours (1 hour and 5 minutes after the initial dispatch). The fourth and fifth firefighters were rescued approximately 1 hour and 15 minutes later. Heavy equipment was now being brought to the scene to assist with rescue operations. At 0541 hours (4 hour and 6 minutes after the initial dispatch), all personnel ceased rescue efforts, allowing the machinery to clear the debris.

All officers met for a briefing at the Command Post at 0654. Within a short time, the bodies of the three remaining firefighters and the three children were located. Members of the GCFD removed the body of Thomas Stewart III at 0733 hours. Members of the Camden County Fire Marshals removed the body of John West at 0813 hours. Members of the Mt. Ephraim F.D. removed the body of James Sylvester at 0817 hours.





View of collapse from “A” – “B” corner.

Fire Cause Investigation

The fire investigation was performed by members of the New Jersey State Police Arson / Bomb Unit, the United States Bureau of Alcohol, Tobacco and Firearms (ATF), and the Camden County Prosecutor’s Office. Although the official cause of the fire remains undetermined, the investigators could not rule out the possibility that carelessly discarded smoking materials may have ignited an upholstered couch in the first-floor, front living room of unit 200.

The Casualty Scenario

Firefighter Thomas Stewart III was a 30-year-old career member of the Gloucester City Fire Department. He had approximately 10 years of experience in the fire service. FF Stewart III was operating inside of unit 202 when the structure suddenly collapsed. Through results obtained from an autopsy performed by the Camden County Medical Examiner’s Office (CCMEO), it was learned that FF Stewart III died due to a fixed compression on the body. Although no broken or fractured bones were noted, there were multiple areas of hemorrhaging and cyanotic red skin discoloration. It was noted that facial discoloration was consistent with that of FF Stewart III wearing his Self-Contained Breathing Apparatus (SCBA) mask at the time of the collapse.

An analysis of FF Stewart III's firefighting gear noted that the gear did not contain Personal Accountability Tags (PAT's), and that his Personal Alert Safety System (PASS) device was in the "off" position.

Chief James Sylvester was a 30-year-old member of the Mt. Ephraim Volunteer Fire Department. He had nearly 17 years of experience in the fire service. Chief Sylvester was operating inside of unit 202 when the structure suddenly collapsed. Through results obtained from an autopsy performed by the CCMEQ, it was learned that Chief Sylvester died due to a fixed compression on the body. Although no broken or fractured bones were noted, there were multiple areas of hemorrhaging and dark purple skin discoloration. It was noted that facial discoloration was consistent with that of Chief Sylvester wearing his SCBA mask at the time of the collapse. An analysis of Chief Sylvester's firefighting gear noted that he did have a portable fire radio in the "on" position, however the gear did not contain PAT's (they were later recovered at the scene). His PASS device was in the "off" position.

Deputy Chief John West was a 40-year-old member of the Mt. Ephraim Volunteer Fire Department and also was an Assistant Camden County Fire Marshal, where he served as the K-9 officer. He had approximately 23 years of experience in the fire service. Deputy Chief West was operating inside of unit 202 when the structure suddenly collapsed. Through results obtained from an autopsy performed by the CCMEQ, it was learned that Deputy Chief West died due to a fixed compression on the body. Right-side rib fractures were noted, and there were multiple areas of hemorrhaging and purple skin discoloration. It was noted that facial discoloration was consistent with that of Deputy Chief West wearing his SCBA mask at the time of the collapse. An analysis of Deputy Chief West's firefighting gear noted that he did have a portable fire radio in the "on" position, and that the gear contained three PAT's (two were his and the third was for his K-9). However, his gear did not contain a PASS device.

Through results obtained from autopsies performed by the CCMEQ, it was learned that all three children died due to smoke inhalation and extensive thermal burns. They were listed as Claudia and Colletta Slack – 3-year-old twins, and Alexandra Slack, 5-years-old.

This incident also injured the children's mother, Katia Williamson, who was rescued by firefighters inside the structure. In addition, 11 other emergency personnel received minor injuries throughout the duration of the incident. All injured parties were transported to area hospitals, where they were subsequently treated and released.

ANALYSIS

Volunteer vs. Career Issues

The GCFD is a combination department that operates out of three fire stations; the headquarters which houses both career and volunteer personnel, and two other stations that house only volunteer personnel. The command structure consists of a career Chief, a volunteer Deputy Chief, a career Battalion Chief (one on each of four shifts), a volunteer Battalion Chief at each station, and a volunteer Captain and Lieutenant at each station. The GCFD career personnel provide 24-hour coverage for basic fire and EMS responses. However, upon receipt of a working fire, there is a simultaneous dispatch for all GCFD volunteers and a full recall of the off-duty career personnel. A total of 25 career and approximately 55 volunteer personnel serve in the GCFD.

During this investigation, FF interviews revealed evidence of a disconnect between the career and volunteer GCFD personnel. Many personnel expressed the concern that the GCFD operated as three separate fire departments, rather than one. They felt that when all the personnel were at an incident together, everyone was “fighting their own fire” and there was no teamwork. Some career personnel felt that they could not or should not take orders from volunteer fire officers due to a lack of confidence in those officers’ abilities.

There was a lack of coordination between personnel evidenced by the fact that many firefighters reported they were unsure of other firefighters’ identities in the structure or what their assignments were. This was especially true in the early stages of this incident. Furthermore, there was a lack of communication among crews inside the structure and between interior crews and the IC as to the tasks they were performing, what conditions they were encountering, and what additional resources were needed.

Apparatus Staffing

For this incident, the career staffing for the GCFD consisted of a driver, the officer, and a firefighter on Engine 513, a driver on Ladder 514, and a driver on Squad 557 (ambulance). Although this provided five personnel on scene, two were already committed: the driver of Engine 513 was the pump operator, and the officer was the initial IC, leaving three firefighters available for duty. Two of these firefighters stretched a hoseline into unit 202 for a rescue attempt, and the third went to the rear of the building for an additional size-up. An off-duty career firefighter ran to the scene and took over pump operations of Engine 513, allowing another firefighter to assist the interior crew.

Essentially, once positioned, Ladder 514 and Squad 557 could not be utilized because the drivers were needed for the initial operations. Mutual aid (CFD Ladder 2) and additional GCFD personnel and apparatus arrived soon after, providing the manpower necessary to operate these apparatus and conduct additional fireground operations.

During the initial stages of this incident, the following manpower reports were provided by the GCFD:

- 0139 hours – 6 FF's total (including B.C. plus one off-duty)
- 0145 hours – 11 FF's total
- 0147 hours – 25 FF's total (including IC)
- 0151 hours – 27 FF's total

As outlined above, although the career personnel operated with limited staff for approximately nine minutes, the subsequent addition of GCFD personnel and mutual aid provided an adequate number of personnel on scene within an acceptable amount of time to conduct further operations. It should be noted that these manpower timeframes are relatively consistent with other combination departments, in which the career personnel operate unassisted until the volunteers and/or mutual aid arrives. A common characteristic of combination departments is that volunteer staff may not always be available to respond, therefore the IC is oftentimes unsure as to the number of personnel he/she can expect at a given incident and at what point in the incident they may arrive.

Strategy and Tactics

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 the initial operations at this incident, the primary strategic goal was influenced solely by the imminent threat to human life. The tactic chosen to achieve this goal was to attempt an aggressive interior search and rescue. Given the heavy fire conditions throughout unit 200, it was realized that the only viable rescue(s) would be for the victim(s) that were seen trapped in unit 202. Due to the limited amount of firefighting personnel upon arrival, all efforts were concentrated on the rescue, thus temporarily postponing the fire suppression operations until additional resources arrived. It was not until the initial career crew realized that they could no longer continue searching due to the extensive fire conditions that they were forced to retreat from the structure to begin attacking the fire and establishing a water supply.

This delay provided for greater fire intensity allowing the fire to spread throughout the balloon framing of the structure, possibly weakening structural components. Upon the arrival of additional resources, a defensive fire attack ensued on unit 200, with multiple hose streams eventually being placed into operation. During this defensive attack, additional off-duty GCFD career personnel arrived on scene and resumed interior operations in unit 202. At approximately the same time, a crew from CFD Ladder 2 was making entry into Division 2 of the A side of unit 202. The CFD crew operating in unit 202 encountered rapidly deteriorating structural conditions, including falling ceilings and the floor starting to give way. The radio transcripts of the incident indicate that GCFD Lt. Shawn Paul radioed the deteriorating conditions to the IC and that they were evacuating. The IC acknowledged the radio report, however an evacuation signal order was not given until minutes later when it was believed that a firefighter was missing. Upon accounting for the missing firefighter, and despite the status reports from Division 2, the IC met with BC Williams and DC West and a decision was made to resume interior operations. However, considering the reports of structural instability, it appears that the risk to firefighters was greater than the potential chance for another viable rescue. This proved to be a critical decision, because the building collapsed two minutes later.

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. 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 when no light is 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.

Although GCFD Engine 513 was equipped with a TIC, the career firefighters failed to utilize it for the initial search for the victim(s) last seen in unit 202. The TIC should have been utilized immediately to properly analyze the incident scope and determine what tactics to employ. However, it was not until some time later when a CFD crew entered unit 202 for search and rescue that the TIC was used. This delay in TIC use may have hindered the chance for a quick rescue, or for the ability of the crew to accurately gauge the fire's progression into unit 202. This was confirmed through FF interviews, which stated that by the time the TIC was used inside unit 202, the floor was already “white” indicating that the fire was already burning heavily in the concealed spaces below.

It was not noted if there were additional TIC's on scene after the collapse, or if they were utilized during the collapse rescue operations.

Incident Management Issues

N.J.A.C. 5:75 mandates that all fire departments utilize an Incident Management System (IMS). The IMS is an organized system of roles, responsibilities and standard operating guidelines used to manage emergency operations. It provides an effective and efficient means of operating, regardless of the size or progression of an emergency incident.

From the onset of operations, the IMS was not properly expanded as the incident progressed. Normally, when operating under an IMS, the IC performs all functions until the span of control becomes too large. Given the scale of this incident, the span of control quickly became too large for the IC to effectively manage.

According to dispatch transcripts, there was little evidence that additional functions were delegated to subordinates, and it became obvious that critical tasks such as safety and accountability were not effectively implemented. This was confirmed through interviews, photos and videos demonstrating that the IC was trying to perform these tasks in addition to commanding the firefighting operations. It was further confirmed through reports that these additional tasks were not delegated because the IC did not have confidence in the ability levels of other officers on scene.

Safety Officers

IMS regulations under N.J.A.C. 5:75 mandate the use of safety officers (SO's) on all incidents. The SO should be appointed by the IC as the incident escalates. The SO shall have the authority to stop immediately, alter or suspend operations which may cause serious injury to emergency personnel on the emergency scene. If deemed necessary, the SO also shall have the authority to sound the evacuation signal in the event of an imminent hazard to personnel.

During this incident, the GCFD did not assign a dedicated SO to observe operations and terminate potentially unsafe actions. Normally, when operating under an IMS, the IC retains this function if it is not delegated to a subordinate. However, considering the scope of this incident, overseeing fireground operations *and* acting as SO was too much of a burden to be placed upon the IC. Therefore, it is imperative that SO's are designated and utilized to help prevent future disasters on the fireground.

Accountability System

An accountability system is utilized to provide the IC with an improved means of tracking the location, function and time of personnel operating at the incident scene.

The GCFD utilized a two-tag accountability system in which the first tag stayed on the apparatus and the second tag remained on the firefighter's turnout gear at all times. Although this system can track personnel that are on the incident scene, it does not allow for the tracking of their specific location or assignment on the scene.

At this incident, the GCFD did not designate accountability officers to monitor each area of entry into the structure, thus the concept of accountability of personnel location, function and time was subject to, and did in fact, fail. Normally, when operating under an IMS, the IC retains this function if it is not delegated to a subordinate. However, given the scale of this incident, it would not have been possible for the IC to also effectively perform the duties of an accountability officer.

A Personal Accountability Report (PAR), or roll sheet, was not utilized to track personnel and their functions. Personnel arriving in private vehicles reportedly "tagged-in" to Engine 513, however many began freelancing. Freelancing can be simply defined as fire department members acting as individuals without proper authorization from their supervisors, rather than as part of a team with clearly defined task assignments provided by a supervisor.

Due to the failure in accountability, confusion ensued upon collapse of the structure. It was not immediately known exactly how many firefighters were trapped, who they were, their approximate locations or their last known assignments.

Personal Alert Safety System (PASS)

A PASS device is designed to assist rescuers in locating a downed or disoriented firefighter. It is worn on the SCBA or turnout coat and must be manually or automatically activated prior to entering an atmosphere that is considered Imminently Dangerous to Life & Health (IDLH). 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. Public Employees Occupational Safety and Health (PEOSH) regulations under N.J.A.C. 12:100-10 et seq. mandate that all firefighters and rescuers are equipped with and utilize the PASS device.

At this incident, following the structural collapse, many firefighters reported that they did not hear PASS devices going off, which would have signified that there were personnel trapped within the debris. The aforementioned casualty report indicated that although firefighters Sylvester and Stewart were equipped with PASS devices, they were not activated prior to entering the structure. It should be further noted that their PASS devices were not automated; they had to be manually activated by the user. Furthermore, firefighter West was not equipped with a PASS device.

***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 IDLH atmosphere. 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).

During this incident, although a pool of FF's were available, the GCFD did not specifically designate the required personnel for the rescue of distressed firefighters. There was no RIT or FAST assigned because most of the personnel who responded on the first alarm assignment were being utilized for the rescue and suppression operations. Hence, when the building collapsed, there was not a properly equipped team in place for immediate rescue operations.

Communications

The GCFD is dispatched by Camden County Communications Center on the "Fire 1" frequency. Following the dispatch, the GCFD utilizes the "Fire 5" regional frequency for all operations. Camden City Fire Department (CFD) also utilizes the Camden County Communications Center, however, they have their own dedicated frequencies for dispatch and operations. The CFD did have the capability to switch their radios over to the "Fire 5" frequency upon responding into Gloucester City, but it appears that this was not done.

It was reported that the Camden firefighters communicated with their Battalion Chief on their own frequency. Firefighter interviews revealed that the radio transmission from Camden's interior crew reporting that the floor and walls were dropping (prior to the total collapse) was never received.

At this exact same time, Camden's Battalion Chief was trying to radio to his crew that from the exterior, he observed the interior walls falling. It is believed that these two transmissions cut each other out. Despite this fact, GCFD Lt. Shawn Paul also radioed the IC with the same information, advising him that they were evacuating. Following this incident, Chief Glassman (the IC) reported that he never heard any message about these interior conditions. However, in the Fire 5 dispatch transcript, it appears that the IC acknowledged the report from interior on that channel.

It should be noted that following this incident, the CFD issued a policy that upon responding into Gloucester City, they were to switch over to, and operate on, the GCFD "Fire 5" frequency. However, this policy has since been rescinded by the CFD, which again operates solely on CFD frequencies on mutual aid calls.

Emergency 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.

As stated in the above narrative, the IC sounded the emergency evacuation signal upon reports of a firefighter missing inside the structure. However, firefighter interviews revealed that some personnel temporarily disregarded this signal and continued their operations. Unfortunately, the emergency evacuation signal was never sounded as prior warning to the impending collapse, nor was it sounded immediately after the collapse.

Failure to Recognize Impending Collapse

During this incident, fireground conditions were not properly analyzed, which led to the failure to recognize several key collapse indicators. Collapse indicators present during this incident included:

- Construction type – The structure was balloon frame construction. Therefore, the concealed chases between wall studs and floor joists provided for a rapid, intense fire spread both vertically and horizontally throughout the structure.
- Heavy fire burning over 20 minutes – It should be noted that the 20 minutes is from when the fire becomes free-burning, not from fire department arrival. During this incident, water was not applied to the fire for approximately 12 minutes due to the initial rescue efforts and limited staffing during the early stages of the incident.
- No appreciable water run-off – Although during a defensive fire attack this would typically mean additional water weight affecting the structure, during this incident it is suspected that most of the

water was accumulating in the basement.

- Cracks or bulges in walls – Photos and videos showed significant bowing of the Division D wall during defensive operations prior to the collapse.
- Obvious movement of floors, walls, or roofs – FF's on the interior of unit 202 reported that the floor, walls and ceiling were dropping. This also was confirmed by FF's on the exterior that reported seeing debris falling from within unit 200.
- Unusual noises – FF's on the interior of unit 202 reported hearing sounds of debris falling from within unit 200.

Critical Incident Stress Debriefing (CISD) Team Use

Immediately following the recovery of the three deceased firefighters, a brief mass was held approximately two blocks away at St. Mary's Church. A CISD team was contacted to respond shortly after the building collapse occurred. 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 such things as the 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.

Securing Fire Scenes

During this incident, it should be noted that upon the arrival of the heavy equipment and the removal of all victims, the remaining structure was demolished and the incident scene was cleared of all debris within 48 hours. This action prevented a thorough assessment of the remaining structure and / or debris, so as to eliminate any prior structural damage or alterations that may have acted as contributing factors in the collapse.

Training

Following this incident, it was difficult to gauge the amount of training for both the career and volunteer GCFD personnel, due to insufficient record keeping. It was found that the GCFD firefighters and officers had met the minimum regulatory training requirements, such as Firefighter Level 1, IMS training and certification, hazardous materials awareness, Community Right-to-Know and bloodborne pathogens training. However, supplemental training with regard to structural firefighting was unable to be verified, due to the insufficient record keeping. This was particularly the case for the volunteer personnel. Additionally, the volunteer firefighters and officers rarely trained with the career personnel and often did not attend the scheduled departmental drills, despite having frequent opportunities to participate.

Volunteer Officer Training and Qualifications

Volunteer fire officers, unlike their career counterparts who must pass promotional examinations to ascend the ranks, often times are not required to meet specific qualifications to serve as officers. Usually, local policies dictate how volunteer officers are selected. These policies may or may not be based upon qualifications and/or training, and vary greatly from department to department.

As stated previously in this report, training records, especially relating to the volunteer members of the department, were found to be seriously lacking. The same holds true for training of volunteer officers. Although city ordinance established minimum qualifications for officers, the level of training for each was difficult to judge and there were serious concerns voiced by the career members of the department regarding the suitability of some of the volunteer officers. This situation resulted in a lack of confidence by several career personnel in the volunteer officers, not only at this incident, but in general. This situation further contributed to the ineffective utilization of the incident management system at this incident. This resulted in Chief Glassman retaining many functions that would normally be delegated to lower ranking officers because he lacked confidence in those officers.

NJ DFS adopted mandatory incident management certification requirements in November 1995. This standard requires all firefighters to be trained in basic incident management and fire service supervisors to obtain incident management certification. The certification requires the individual supervisor to have three years experience in the fire service, firefighter certification and formal incident management training. The GCFD officer staff were in compliance with these requirements. It could not be determined if all firefighters received the required training.

NJ Department of Labor (DOL) Investigation

An investigation regarding this incident was conducted by the DOL. Violations were issued to the municipality of Gloucester City as a result of the DOL investigation.

The violations included the failure of Chief Sylvester and FF Stewart to turn on their PASS devices; the failure of Deputy Chief West to wear a PASS device; violations relating to the improper utilization of an effective incident management system; and inadequate training of firefighters.

LESSONS LEARNED

Elected and appointed municipal officials have a responsibility to provide their citizenry with adequate emergency services provided by competent individuals whether career or volunteer. Every municipal government 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. Furthermore, the governing body must ensure that fire departments are in compliance with federal and state laws and regulations.

Municipal 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 will be cited for violations of laws and regulations arising from departmental actions.

Volunteer vs. Career Issues

It is essential that all firefighters work together as a team, regardless of their status within a department. There is no doubt that a certain animosity often exists in a combination fire department such as the GCFD. This is usually due to volunteers' jealousy of the career personnel for getting paid to do the same job that they do for free. Additionally, career personnel often feel that the volunteers are not as skilled or qualified as they are.

All personnel must put their egos aside to successfully operate as a single unit. All firefighters, whether career or volunteer, must remember that they are all there to achieve a common goal – to save lives and property.

Apparatus Staffing

It has been demonstrated that when staffing levels fall below four firefighters per company, critical fireground operations are not carried out when needed. This is something municipal officials, fire departments and IC's must remember when determining staffing levels. Tests conducted with the Dallas, Texas, Fire Department indicated that staffing below a crew size of four can overtax the operating force and lead to higher losses.

Municipal officials need to make a commitment to the adequate staffing of the fire department in order to allow the most efficient fireground operations in the safest possible manner. Additionally, fire department staffing levels must allow for compliance with the two-in / two-out provisions of the PEOSH Standard

29CFR1910.134 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.*

Strategy and Tactics

The basic principle for firefighting is that human life must take precedence over all other concerns. Effective management of fire ground operations requires several tasks to be accomplished simultaneously. These can include establishing a water supply, forcible entry, deploying hoselines, ventilation, and search and rescue. If sufficient personnel are not available for these simultaneous operations, the rescue must be given preference and all other operations must be conducted sequentially. A risk / benefit analysis must be conducted by all firefighters on the fireground prior to conducting all operations; the risk of an action needs to be weighed against the probable benefit that may be reasonably and realistically expected.

A serious disadvantage of conducting sequential operations rather than simultaneous operations is that the fire may be permitted to escalate, possibly allowing it to extend beyond the area of origin and potentially to adjacent structures. Additionally, by not conducting these basic time-tested operation firefighters are exposed to greater danger. This is mainly because the IC must pick and choose from a “menu” of operations that need to be accomplished due to limited staffing, rather than coordinate the operations at the appropriate times when sufficient personnel are present.

Furthermore, during fireground operations, a continual analysis must be maintained, so the IC can be kept aware of the conditions as the incident progresses. This continual analysis will allow the IC to modify the strategy and / or tactics as information is received from all personnel operating on the fireground. Since conditions on the fireground are dynamic, an ongoing analysis of all fireground information is required to develop a successful strategy and to implement the most effective tactics.

Use of Thermal Imaging Cameras (TICs)

Fire departments in New Jersey have a unique benefit in that all were supplied with one or more Thermal Imaging Cameras (TICs) by the State. The GCFD was the recipient of one of these cameras.

Fire departments that possess these units should routinely use them during structural firefighting operations. Cameras also can play a vital role during search and rescue operations. While TICs must not replace time-honored skills, they serve as an important tool to make searches for victims more efficient and result in a higher level of safety for firefighters. Just as firefighters equip themselves with a set of irons and flashlight, they must include the TIC in their cadre of tools every time they enter a situation where visibility is reduced. Furthermore, the TIC must be an integral part of rescue operations for lost or trapped firefighters from the inception of the rescue.

The TIC can help speed a RIT / FAST to the firefighter saving precious time in locating and removing the victim(s). Fire departments must continually train with TICs in order to become proficient in its use, interpret the images it displays and understand its limitations.

Incident Management Issues (IMS)

As previously stated, Division of Fire Safety regulations mandate that all fire departments utilize an IMS and all firefighters and fire officers receive previously noted training and certification. Effective February 17, 1998, this regulation established a minimum performance standard necessary to meet the requirements set forth in NFPA 1561. The IMS enables departments to operate more efficiently and effectively due to the organizational structure that it establishes. It is a modular system, which allows the IC to apply only those elements that are necessary at a particular incident and allows elements to be activated or deactivated as incidents escalate or decline.

Fire departments must adopt written plans, or Standard Operating Guidelines (SOG's) based on the IMS, to address the requirements of the different types of incidents that can be anticipated. These plans shall establish supervisory assignments to be applied to incidents of varying type, size or complexity. Additionally, departments must incorporate the IMS into drills, training exercises and other situations involving hazards typically encountered at emergency incidents.

Furthermore, the command structure for each incident shall maintain an effective supervisory span of control at each organizational level. This span of control shall be determined by the ability of each supervisor to monitor the activities of,

and effectively communicate with, assigned subordinates. Typically, this number ranges from three to five personnel, with a maximum limit of seven personnel to maintain effective control.

Safety Officers

As previously stated, IMS regulations under N.J.A.C. 5:75 mandate the use of safety officers (SO's) on all incidents. A SO is needed to observe operations on the fire scene to identify and order the correction of safety hazards to personnel. The IC may retain this function, however at larger incidents, the IC must delegate this responsibility to a subordinate in order to maintain an effective span of control. Fire departments must make provisions to have a designated SO, or multiple SO's, at large scale or complex incidents. This will lessen the load on the IC and allow for continuous monitoring of safety conditions at the incident.

Accountability System

Although not enforceable at the time of this incident, the regulations for the NJ Personal Accountability System (NJPAS) under N.J.A.C 5:75 require that fire departments utilize a two-tag accountability system. 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 atmosphere. This system includes the use of PAR's / roll calls, all within the framework of the IMS that is required to be utilized at all incidents.

The NJPAS is more than simply handing tags to the designated officer. It also is a system that must be based upon 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, therefore lessening the chance of firefighters freelancing.

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 activates 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 PEOSH regulations, the burden is on the firefighter to remember to activate the

PASS device and upon the employer to ensure the utilization of the unit. 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.*

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 should be trained and equipped to deal with rescue of firefighters under the worst possible conditions and can be composed of departmental personnel or mutual aid personnel. The IC should request a RIT or FAST as soon as possible after dispatch, allowing 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.

Ideally, a RIT or FAST assignment should come from surrounding areas, preferably not from a department's initial mutual aid companies. In this way, RITs or FASTs composed of members from various area companies can respond to nearby department's incidents without placing a strain on the host company or initial mutual aid resources.

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 to support the team.

Communications

As per IMS regulations under N.J.A.C. 5:75, a communication system must be flexible enough to handle a wide variety of emergency situations. It must allow for inter-agency communication during mutual aid responses by providing a direct communication link between companies. However, this often results in the fireground frequency becoming tied up with unnecessary radio traffic during escalating incidents. Therefore, the communication system also must be capable of providing additional frequencies, should the need arise.

Radio communication is an essential tool for personnel operating during an emergency. It is essential that communication be maintained between units on the scene and dispatch, operating personnel and the IC, and among members of an operating unit. Clear communication is the primary means to relay orders and ensure that they are carried out. To avoid confusion, all personnel must remember that transmitted messages must be clear and concise, using plain language with uniform terminology. The following format should be followed:

- *Originator identify unit and request the attention of the receiver*
- *“Engine 3 from Dispatch”*
- *Receive the recipient’s attention*
- *“Engine 3, go ahead Dispatch”*
- *Convey your message, using simple English, clearly and concisely*
- *“Engine 3 respond 123 Main St., report of a structural fire”*
- *Get acknowledgement that the message was received and understood*
- *“Engine 3 responding 123 Main St.”*
- *Confirm reply*
- *“Acknowledged Engine 3”*

Emergency Evacuation Signal

Fire departments should 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 three short blasts, followed by a pause. This alerts all personnel to 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.

At this time NJ DFS is finalizing a proposal that would establish a statewide emergency evacuation signal.

Failure to Recognize Impending Collapse

Collapses have accounted for some of the largest firefighter death tolls in United States history. It is the responsibility of every FF and officer to realize the warning signs of impending collapse and the causes behind them. Often following a collapse, as was the case with this incident, personnel on scene report that the structure collapsed “without warning.” However, this is usually not the case. The reality is that the IC and FF’s simply failed to identify the indicators that were present prior to the collapse.

A constant examination of the structure is key to prevent being caught in a collapse. This examination should focus on identifying the following collapse indicators, as listed in Fire Officer’s Handbook of Tactics:

- *“Problem” occupancies*
- *Construction type*
- *Overloaded floors*
- *Heavy fire burning over 20 minutes*
- *No appreciable water runoff*
- *Cracks or bulges in walls*
- *Water or smoke seeping through brick walls*
- *Roofs pulling away from walls*
- *Roofs sagging or “spongy”*
- *Obvious movement of floors, walls or roofs*
- *Unusual noises*
- *Sliding plaster or hanging plaster dust*

Although any one of these indicators might not be viewed as a problem, the cumulative effect of multiple indicators should be a warning of an impending collapse. All personnel should be immediately evacuated from the structure and a collapse zone should be established.

Critical Incident Stress Debriefing (CISD) Team Use

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.

Securing Fire Scenes

Following the origin and cause investigation, it is recommended that a protocol be adopted to ensure that fire scenes are secured in a manner that not only allows for public safety, but also prevents immediate demolition. This will provide additional agencies with further opportunity to conduct any supplemental investigations that may be necessary. This is especially true in high-profile incidents, such as this incident where fire service casualties are incurred.

In this case, investigators, including those from DFS, could not examine structural members to determine if there was rot or insect infestation or renovations done without a building permit. The Gloucester City construction office did have permits on file for work previously done to both units. However, none of this permitted work was of a nature that would have contributed to the collapse.

Training

In accordance with recognized standards such as NFPA 1500, fire departments should 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 or education.

In a combination department such as the GCFD, training must be scheduled to meet the needs of both the career and volunteer personnel. Additionally, departments should train regularly with other departments or personnel that are expected to respond as mutual aid for larger incidents. Ideally, departments that train together on a regular basis will operate in a more efficient and effective manner during emergency situations.

Volunteer Officer Qualifications

Fire officers must possess minimum qualifications for the positions they occupy. This is especially critical in combination fire departments where there are both volunteer *and* career officers, and where lower ranking career members may be required to take direction from volunteer officers.

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 standard 1021 *Fire Officer Professional Qualifications* delineates various levels of competencies for the different ranks of officers within a fire department organizational structure. This may serve as an excellent starting point for a municipality to develop common officer qualifications. In this way, competencies will be developed and improved confidence in officers by both career and volunteer personnel should be the logical result.

Municipalities 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.

Smoke Detector Inspection

The NJ Uniform Fire Code under N.J.A.C. 5:70-2.3 requires smoke detector inspections to be conducted in one and two-family residences any time there is a change in occupancy. In Gloucester City, the housing department is responsible for these inspections. In October of 2001, a change of occupancy occurred in this building, however it was not able to be determined if a smoke detector inspection had been conducted. The city's housing department was unable to provide documentation of such an inspection to either the Division of Fire Safety or to the Camden County Prosecutor's Office.

As was stated earlier in this report, it was not able to be determined if smoke detectors were in working order at the time of the fire. It can be speculated that if smoke detectors operated as designed, the occupants may have escaped and the fire department may have been alerted earlier. This may have resulted in less serious fire conditions upon fire department arrival. The possibility exists that the structure would not have sustained the amount of fire damage which ultimately contributed to its collapse.

There were concerns voiced by the fire department regarding the reliability of smoke detector inspections by the housing department. For this reason, it is recommended that the responsibility for these inspections be transferred to the fire department in the hope that inspections will be completed and documented as required.

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 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 must be notified via 24-hour answering service at 1(800) 327-2751. Both agencies will respond and conduct independent but coordinated investigations.

CONCLUSION

The deaths of Firefighters Thomas Stewart III, James Sylvester, and John West can be directly attributed to a failure of all personnel on scene to properly analyze fireground conditions, and/or their disregard for the observed and reported warning signs of the impending collapse.

Three minutes after dispatch, the career firefighters arrived on scene, encountering a century-old balloon-frame “twin” style residence, which had extensive fire conditions that were rapidly progressing toward total involvement. Given a fire of this magnitude, rapid suppression using large-diameter hose streams is very effective in controlling the fire spread. However, due to the confirmed entrapment in the adjoining residence (Unit 202), the career firefighters had to delay their fire suppression efforts to perform an aggressive interior search and rescue operation. It was this delay coupled with construction characteristics that set the stage for a rapid, intense fire spread throughout the concealed spaces of the residence, greatly deteriorating structural members.

Six minutes after dispatch, Chief Glassman (the IC) arrived on scene. As of this time, fire was now extending into unit 202. The interior conditions were quickly deteriorating, and firefighters were forced to retreat from the structure, leaving the fire unchecked. Shortly thereafter, additional firefighters began to arrive. Although a defensive fire attack quickly knocked down the bulk of the visible fire, flames continued to extend in the concealed spaces, further deteriorating structural members throughout the entire structure. Despite the previous conditions, firefighters again resumed interior search and rescue operations.

The aforementioned consequence of the delayed suppression and hidden fire spread became evident when the CFD firefighters using a TIC on the 2nd floor of unit 202 observed heavy fire burning the floor beneath them. Furthermore, reports from the 2nd floor interior of unit 202 at 0157 indicated that the floor had dropped, the ceiling was coming down, and that personnel were evacuating. At this same time, exterior personnel had also witnessed structural components failing from within unit 200. Although the IC acknowledged the interior report of deteriorating conditions, an evacuation signal was not sounded as a result of the interior report, nor were crews ordered to cease all interior operations. Additionally, photos and videos obtained during this investigation also revealed that at this point in operations, there was significant bowing in the Division D exterior wall of the structure, and that the interior walls of unit 200 had burned completely away. Although many firefighters and officers surrounded the structure, it appears that these findings were either not reported, or were ignored.

It is believed that had the IMS been properly implemented, a designated safety officer could have observed and properly analyzed these fireground conditions, recognizing the warning signs of the impending collapse.

During the course of this investigation, it was discovered that just prior to the collapse, the IC met with other officers that had just evacuated the structure. The nature of this meeting was to discuss interior conditions and to formulate operational strategies. Jointly, a decision was made to have a crew resume search and rescue operations in unit 202. However, they failed to recognize that the structural conditions had deteriorated to such an extent that all personnel should have been prohibited from any further operations inside the structure.

Ultimately, firefighters would realize that this was not a wise decision as upon entry, they encountered extremely hazardous interior conditions. At this time, a decision was made by firefighters to exit the structure. However, before firefighters were able to escape, the structure suddenly collapsed at 0206 hours. Although 5 firefighters were saved during the exhaustive rescue operations, the collapse claimed the lives of firefighters Thomas Stewart III, James Sylvester, and John West.

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