1000 FREDERICK LANE, MORGANTOWN, WV 26508 · 304.285.5916

Volunteer Firefighter Killed after Becoming Trapped at an Assisted Living Facility Fire and Two Firefighters Injured – New York

Revised Date: December 17, 2024

Executive Summary

On March 23, 2021, a 35-year-old volunteer firefighter died after becoming trapped while rescuing occupants at a fire in an assisted living facility. Two other firefighters were injured during fireground operations. Fire Department 17 was dispatched to the assisted living facility at 00:53 hours with visible smoke showing. Chief 17-1 arrived on-scene at 01:00 hours and assumed Command. Chief 17-1 requested Fire Department 6 respond with Tower 6-75. At approximately 01:01 hours, an occupant of Room 306 called 9-1-1 stating he was trapped in his room and needed to be rescued. Tanker 17 arrived on-scene at 01:12 hours and parked in the driveway on Side Alpha near the front awning. Tanker 17's officer (Tanker 17A) split his crew between rescue and firefighting. The crew entered through the lobby. The crew went into the hallway that led to the kitchen area, which was the older or original section of the facility. They noticed the carpet was wet as they entered the kitchen area. They found no victims and then went back down the hallway. The 1st floor was clear of occupants. Tanker 17D (deceased firefighter) and Tanker 17E were ordered to the 2nd floor and made several rescues, requiring at least two air cylinder changes. The firefighters were "on-air" going to the 2nd floor as occupants were being brought down to the lobby and then outside. Tanker 17E went

The collapse of Side Alpha/Side Bravo corner at 03:01 hours of the assisted living facility.
(Photo courtesy of Kenneth Flynn)

to the 2nd floor and found a victim, which he got down to the lobby and outside with another firefighter. Tanker 17E went back to the 2nd floor and brought another victim down to the lobby and outside to emergency medical services (EMS). Tanker 17D was also removing victims from the 2nd floor at this time with Captain 12. Both firefighters then responded to the 3rd floor using the exterior fire escape following a report of another victim in Room 306. Tanker 17E changed cylinders at Tanker 17 and then went to the 3rd floor with Assistant Chief 24-2 via the internal stairwell. As they entered the lobby, the smoke was completely banked down to the floor with minimal visibility. The smoke was also banked down on the 3rd floor. Tanker 17D, Captain 12, Tanker 17E, and Assistant Chief 24-2 were assigned to locate and rescue the occupant of Room 306. The time was approximately 01:24 hours. Tanker 17D and Captain 12 got the male occupant to the doorway. The firefighters went into the hallway and moved towards the fire escape on Side Bravo. Between 01:27 and 01:45 hours, their End-of-Service Time Indicator (EOSTI) alarms began to sound starting with Assistant Chief 24-2 who left via the internal stairwell to get a new cylinder. Captain 12 moved towards the exterior fire escape to gauge their distance from the exit while Tanker 17E moved the male occupant down the hallway until he ran completely out of air. He was approximately 30 feet from the exit on Side Bravo. At the same time, Tanker 17D called a Mayday from Room 306 indicating he was out of air. The time was approximately 01:46 hours. The evacuation tones were sounded. Tanker 17E did not call a Mayday due to Tanker 17D's Mayday. A Firefighter Assist and Search Team (FAST) got Tanker 17E outside at approximately 01:53 hours with Command receiving notification minutes later that Tanker 17E was not the Mayday. The civilian victim was taken outside at 01:59 hours. Another FAST tried to reenter the 3rd floor to find Tanker 17D. Due to fire conditions, they were unable to enter the structure, which collapsed minutes later. At 02:17 hours, Command changed the strategy to defensive operations. The incident action plan was to knock down the fire from exterior locations. Defensive operations were continued until Command declared the fire under control at 10:00 hours. At 23:50 hours, Tanker 17D was located and pronounced deceased at 00:20 hours on March 24. He was removed from the structure and transported to the county medical examiner's office at 01:40 hours. All fire departments cleared the scene at 16:07 hours on March 24.

Contributing Factors

- *Cultural cleansing ceremony conducted in the dairy kitchen*
- *Building fire alarm system was off-line to the county dispatch center*
- *Lack of a fire sprinkler system throughout the facility*
- *Lack of enforcement of fire and building safety codes*
- *Lack of available water supply for the sprinkler system and fire suppression*
- *Lack of pre-incident planning*
- *Lack of crew integrity*
- *Inadequate personnel accountability system*
- *Inadequate tactical and task level management*
- *Lack of a Command Safety and Mayday management*
- *Inadequate FAST operations*

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Key Recommendations

Fire departments should:

- *Develop a pre-incident plan for high-risk occupancies, including low frequency/high risk scenarios such as assisted living facilities, that is supported by national standards*
- *Ensure that company officers and firefighters maintain crew integrity when operating in the hazard zone*
- *Use a functional personnel accountability system, requiring a designated accountability officer or resource status officer*
- *Ensure that the Incident Command System (ICS) general staff functions are expanded during Type IV incidents when they extend to multiple operational periods*
- *Establish divisions/groups to provide an effective incident management organizational framework for the expansion of the incident action plan (IAP)*
- *Incorporate the principles of command safety into the incident management system during the initial assumption of command*
- *Ensure that a rapid intervention crew (RIC) or firefighter assist and search team (FAST) is dedicated, assigned, and in place before interior firefighting operations begin and throughout an incident*
- *Ensure that all firefighters and fire officers are trained in fireground survival procedures and Mayday operations*
- *Provide a Mayday tactical worksheet for incident commanders (ICs) in the event of a Mayday*
- *Ensure that all members engaged in emergency operations receive annual proficiency training and evaluation on fireground operations, including live fire training*
- *Ensure adequate incident scene rehabilitation is established in accordance with NFPA 1584, Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*
- *Have Standard Operating Procedure (SOP)/Standard Operating Guidelines (SOG) to ensure that water supply is established during initial fireground operations, particularly in areas with limited water pressure, limited hydrants, or no hydrants*
- *Consider maintaining resources and protocols to address occupational exposure to potentially traumatic events for their members*

Additionally, governing municipalities (federal, state, regional/county, and local) should:

- *Ensure that when the applicable fire code is not enforced by the fire department, the delegated authority shares information with the fire department which may affect fire department operations*
- *Ensure the water agency/authority responsible for municipal water supply shares information on hydrant testing and flow capabilities with the local fire departments*
- *Have an operational procedure when cultural cleansing ceremonies with live fire are performed inside a structure or facility.*
- *Ensure that facilities have operational procedures when the facility's fire alarm system cannot transmit an alarm to a designated fire alarm monitoring service*

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For further information, visit the program website at www.cdc.gov/niosh/fire or call toll free 1-800-CDC-INFO (1-800-232-4636).

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Introduction

On March 23, 2021, a 35-year-old volunteer firefighter died after becoming trapped while operating at a structure fire in an assisted living facility. On March 25, 2021, the U.S. Fire Administration notified the National Institute for Occupational Safety and Health (NIOSH) of this incident. Due to the COVID-19 pandemic, this investigation was started virtually. On May 4, 2022, the county fire coordinator requested a field investigation of this line of duty death. On May 10-17, 2023, the two investigators representing the NIOSH Fire Fighter Fatality Investigation and Prevention Program traveled to New York state to investigate this incident. The NIOSH investigators visited the site of the assisted living facility and took photographs. The NIOSH investigators conducted interviews with command officers, fire officers, firefighters, and other emergency personnel who were on-scene at the time of the incident. Also, NIOSH investigators met with the county fire coordinator, the county's chief medical examiner, and the county district attorney who was in charge of the criminal investigation. The investigators reviewed fire department SOPs/SOGs, training records, dispatch records, witness statements, state fire marshal and county district attorney's office investigation documents, and the county medical examiner's autopsy report.

Fire Department

The volunteer fire department (Fire Department 17) is comprised of three fire companies (in four firehouses) with 120 members. The companies are:

- Hook & Ladder Company (Station 17-100)
- Hook & Ladder Company 1 (Station 17-101)
- Columbian Fire Engine Company (Station 17-103)
- East Village (Station 17-104).

Fire Department 17 serves a population of approximately 33,000 within an area of approximately 2.5 square miles. Fire Department 17 responds to approximately 1,200 incidents annually and does not provide EMS. The volunteer fire department operates 13 pieces of apparatus. This includes three engine companies, one engine-tanker, two ladder companies, one rescue engine, a light rescue, a mobile cascade vehicle, a transport van, and three Chief vehicles.

The volunteer fire department's leadership structure for firefighters includes a chief of the department, a deputy chief, a battalion chief, three captains, eight lieutenants, four safety officers, and an infection control officer. The volunteer fire department also includes fire police officers who are led by a captain

and two lieutenants. Additionally, Fire Department 17 maintains a certified FAST dedicated to providing immediate assistance to and rescuing firefighters who are lost, missing, or trapped at an incident.

The volunteer fire department has one set of written policies and procedures that govern all fire companies. The policies and procedures provide direction for fireground operations, a personnel accountability system, safety and health requirements, and a medical examination policy. However, each of the three fire companies maintain their own bylaws which are compatible with the overall volunteer fire department bylaws. The bylaws direct the operation of the fire companies as well as provide procedures for new members and the annual selection of fire officers.

Training, Education, and Professional Development

The state of New York has no mandatory minimum training requirements to become a volunteer firefighter. However, the volunteer fire department in this incident maintains written policies and procedures listing minimum training requirements by assigning specific courses for each position. Each position incorporates and builds upon the training requirements of the previous position in a manner consistent with a tiered system. All training courses required by the policies and procedures can be completed at the fire academy within the county where the volunteer fire department is located (**See Table 1**).

Table 1. Volunteer Fire Department 17's training requirements by position or function.

Position or Function	Training Requirements
Exterior Firefighter	• Scene Support Operations • Proper Radio Procedures
Interior Firefighter	• NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, Firefighter I & Firefighter II • Basic First Aid • HazMat Awareness • IS-100.C: *Introduction to the Incident Command System* • IS-700.B: *An Introduction to the National Incident Management System* • Self-Contained Breathing Apparatus (SCBA) Confidence Course • Firefighter Survival and Bail-Out
Driver/Operator for Engine and Heavy Rescue Apparatus	• NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, Chapter 5: *Apparatus Equipped with Fire Pump* • Emergency Vehicle Operations Course • Highway Safety for Emergency Responders
Driver/Operator for Aerial Apparatus (Tower and Quint)	• NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, Chapter 6: *Apparatus Equipped with an Aerial Device*

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Lieutenant	• Fire Incident Reporting • Thermal Imaging • Basic Structural Collapse • Accident Victim Extrication • HazMat Operations • Confined Space Awareness • Engine Company Operations • Truck Company Operations • Introduction to Fire Officer
Captain	• Fire Behavior • Arson Awareness • HazMat Incident Command • Fire Officer I, Weapons of Mass Destruction Awareness • Flammable & Combustible Liquid Emergencies • Principles of Building Construction/Non-Combustible
Chief Officer	• Public Safety Critical Incident Management • New York State Fire Mutual Aid Resource Management • Live fire training evolutions • Annual training seminar offered by county Chief's association
Safety Officer	• National Fire Academy's Incident Safety Officer • National Fallen Fire Fighters Foundation: *Courage to be Safe*
FAST Member	• Search and Rescue • Forcible Entry • K-12 Saw • Ropes and Knots • Lifts and Carries • Flashover training • Confined Space Awareness • One FAST drill or training each month
Fire Police Officer	• New York State Fire Police course

Regardless of position, every member is required to take a 10-hour annual Occupational Safety and Health Administration refresher training consisting of 10 topics: *General Hazard Recognition, Fire Station Safety, Response Safety, Fire Science Safety, Protective Clothing, SCBA, Tools and Equipment Safety, Recent Developments in Fire Safety, Sexual Harassment & Violence in the Workplace, and Bloodborne Pathogens*. All interior firefighters are required to attend an annual Bail-Out refresher course. Additionally, all members are required to attend training drills at least twice a month at their fire company. The fire department holds four drill nights each month: three drills that each fire company trains individually and one drill that all fire companies train together at one firehouse.

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The deceased volunteer firefighter (Tanker 17D) joined the fire department as a volunteer firefighter in 2005. He served on an engine company and was a fire officer for three years (2nd Lieutenant and then 1st Lieutenant). He was not a fire officer at the time of this incident. The volunteer firefighter attended multiple training courses in fireground strategy and tactics, fire apparatus operations, firefighter safety, building construction, technical rescue, and fire officer development. His training totaled 434 hours from 46 courses.

The IC (Chief 17-1) had over 22 years of total firefighting experience, all at this fire department. He was a fourth-generation volunteer firefighter and had served in all fire officer positions before becoming chief of the department in 2021. He was the fire chief of Fire Department 17 at the time of this incident. His training included various courses on fireground strategy and tactics, the incident management system, special operations, firefighter safety, building construction, technical rescue, fire administration, and fire officer development. His training totaled 472 hours from 61 courses.

Apparatus, Staffing, and Communications

Fire Department 17 responded with Tanker 17 with a crew of five and Chief 17-1 on the initial alarm to the assisted living facility. As Command requested additional resources throughout the incident, 17 Tower and several pumpers were staffed and responded. The volunteer fire department requires each piece of apparatus that responds to have a minimum staffing of one officer and three firefighters.

The county 9-1-1 and dispatch center is a division of the county's sheriff's office. The Communications Division dispatches for fire, EMS, and state law enforcement (state police, county park police, and highway emergency safety patrol). The Communications Division (identified as 44 Control) maintains 18 full-time radio operators, three supervisory radio operators, three part-time radio operators, a medical director (medical doctor) for the emergency medical dispatch process, a communications coordinator, and the chief of communications. In 2021, 44 Control answered 269,335 calls and dispatched 25,509 emergency incidents (fire 9,597; EMS 5,155; state law enforcement 10,757).

The Communications Division operates six tactical channels on ultra-high frequency (UHF) on 464 or 465 megahertz (MHz). Fire departments are dispatched on a trunked system on 700 MHz frequency (**See Photo 1**). Portable radios that operate on the 700 MHz have an emergency alert button (EAB). When the EAB is activated, the radio channel is programmed to go to the fire dispatch channel (i.e., Fire 1). Most of the fire departments use an APX 6000 portable radio with a scan function. The majority of portable radios operate on the fireground tactical channels only and are not programmed to talk on Fire 1. Throughout the county, the Communications Division operates 12 repeater towers and 100+ buildings distribute antennas.

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Photo 1. The radio console in the cab of Tanker 17 showing the UHF mobile radio and 700 MHz mobile radio.
(*NIOSH Photograph*)

Building Construction

New York State Department of Health records indicate that the facility maintained an operating license as an assisted living facility. The National Fire Protection Association (NFPA) *Fire Protection Handbook* (FPH) notes that the term *assisted living facility* is often used to describe a type of residential board and care occupancy. This type of facility is used for lodging four or more occupants for the purpose of providing personal care services, including assistance with activities of daily living such as help with nutrition, bathing, dressing, and toileting [NFPA FPH 2023].

At the time of the fire, the assisted living facility had four staff members on-duty who cared for 113 occupants, who included both ambulatory and non-ambulatory patients. Per facility protocol, some occupants were sedated by medication overnight. The original facility buildings were built in the early 1920's as a local hotel and resort. Multiple additions and renovations were undertaken at the facility with various building construction materials used. However, records of these renovations and the original

building construction were limited or non-existent. This includes the overall plot plan of the facility and dimensions of the buildings. The original set of buildings were wood frame (Type V) building construction (**See Photo 2 and Photo 3**).

Photo 2. Side Alpha of the assisted living facility.
(Photo courtesy of the New York Post)

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Photo 3. An aerial photograph of the assisted living facility. The red dot at the bottom of the picture indicates the closest fire hydrant.
(Photo courtesy of the county Fire Academy)

According to interviews conducted by the NIOSH investigators, Fire Department 17 was routinely called to the facility for false alarms, including those caused by occupants who had smoking or cooking mishaps. Firefighters had a familiarity with the various facility buildings.

The original facility consisted of a 3-story residential building, kitchens, offices, and dining room (**See Diagram 1**). There was a swimming pool in the basement of the 3-story residential building, but it was non-functional. It is unknown when the hotel and resort closed and the assisted living facility became operational. The 2½-story and 2-story buildings were added later. There was a firewall between the 2½-story and 2-story buildings which prevented fire spread during this incident. According to state investigation documents and interviews, the 3-story residential building maintained a fire suppression sprinkler system in the kitchens and dining area/hallway. During the incident, the sprinkler system was activated but ineffective because the fire extended up the wall behind appliances, into the ceiling and roof of the dairy kitchen, and above the sprinkler systems.

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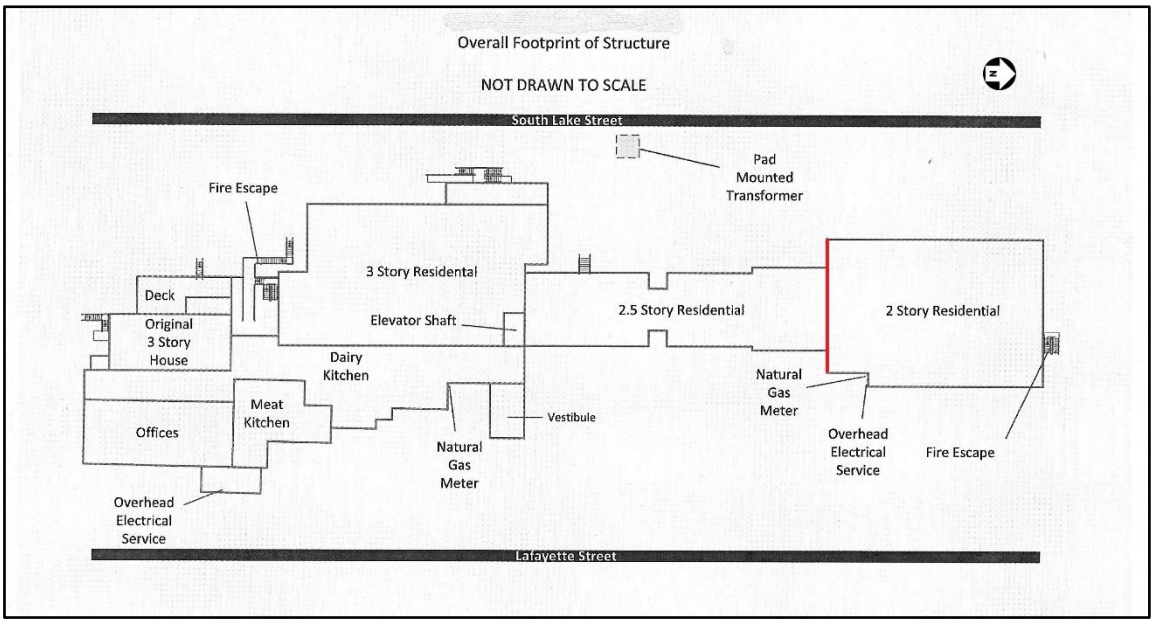

Diagram 1. The site plan of the assisted living facility. The red line indicates the firewall between the 2½-story and 2-story buildings which prevented fire spread.
(Photo courtesy of the NY Office of the State Fire Marshal)

Incident Timeline

The following timeline is a summary of events that occurred as the incident evolved shortly after midnight on Tuesday, March 23, 2021. Not all incident events are included in this timeline. The times to the second, were taken from the county's fire dispatch log and from various fire departments' *National Fire Incident Reporting System* (NFIRS) fire reports.

Time	Fireground Operations, Response, and Details
March 22, 2021	
1700 – 2300 Hours	• Cultural cleansing ceremony occurred in dairy kitchen of the assisted living facility. ○ Fire alarm system place in "Test" mode at 1712 hours.
March 23, 2021	
00:43 Hours	• Smoke and fire in the kitchen activate the assisted living facility's fire alarm system. Also, an alarm pull station was pulled. The fire alarm system was off-line and the alarm was not transmitted to 44 Control.

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Time	Fireground Operations, Response, and Details
00:48 Hours	• The sprinkler system on the 1st floor and in the dairy kitchen activated. ○ Melted and flexible ceiling tiles started falling onto the floor in the 1st floor hallway next to the kitchen. • Assisted living facility staff began to evacuate occupants and called 9-1-1 reporting a fire in the facility.
00:52 Hours	• The village police department received a phone call requesting a fire response to the assisted living facility.
00:53 Hours	• 44 Control dispatched Fire Department 17 for a structure fire at an assisted living facility.
00:55 Hours	• The village law enforcement arrived on-scene and assisted with the evacuation.
00:59 Hours	• The fire vented through the roof of the one-story building housing the dairy kitchen
01:00 Hours	• Chief 17-1 arrived on-scene and assumed Command. ○ Heavy black smoke was coming out of the Lobby (main entrance) door. • The 44 Control dispatched Fire Department 6.
01:01 Hours	• 9-1-1 call received at 44 Control from an assisted living facility occupant located in Room 306. ○ The occupant reported smoke in the building. The occupant stayed on the telephone with the dispatcher.
01:02 Hours	• 44 Control dispatched Fire Departments 8, 12, and 7 to assisted living facility.
01:05 Hours	• Due to the reports of multiple victims, 44 Control transmitted a request for additional EMS units to respond. • The county fire coordinator (44-1) arrived on-scene.
01:08 Hours	• The dispatcher prompts a response from the occupant in Room 306. ○ There was no response from the occupant, only an open phone line.
01:09 Hours	• Chief 17-1 transferred Command to 44-1 to enter the assisted living facility to investigate conditions. • The 1st floor sprinkler system in the dairy kitchen is operating with heavy smoke showing, but no visible fire.

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Time	Fireground Operations, Response, and Details
01:11 Hours	• 6EQ (equipment truck) arrived on-scene and staged at the Side Bravo/Side Charlie corner. ○ 6EQ reported to Command that multiple victims were on the Side Bravo fire escape of the 3-story building.

01:12 Hours	• Command requested four additional fire departments be dispatched. This request was due to the number of victims.
	• 44 Control received another 9-1-1 call from an occupant in Room 306.
	  ○ The occupant requested help to get himself and a female occupant out of the building.
	• Tanker 17 arrived on-scene.
	  ○ Tanker 17's driver dry-stretched a 5-inch supply line to the hydrant on Side Alpha and a 3-inch hoseline with a gated wye dry-stretched to the 2nd floor with a high-rise pack left in the lobby.
	  ○ Tanker 17A and Tanker 17E to perform rescue.
	  ○ Tanker 17C and Tanker 17D ordered to perform fire suppression with a 1¾-inch hoseline stretched into the dairy kitchen.
	  ○ Tanker 17's driver placed a 14-foot ground ladder to the roof of the dairy kitchen on Side Alpha.

01:13 Hours	• Village law enforcement advised Command the 1st floor was all-clear of victims.
01:14 Hours	• 6EQ crew was divided into two interior search groups for search and rescue on the 2nd floor. • Tanker 17D and Tanker 17E with firefighters from Engine 24-1750 performed interior searches.
01:15 Hours	• Visible fire was reported on the 2nd floor.
01:19 Hours	• Search crew from 6EQ entered a 2nd floor room facing Side Alpha as the conditions worsened on the 2nd floor.
01:20 Hours	• 6EQ firefighters had to bail out the 2nd floor room through a window onto the dairy kitchen roof due to the fire entering the room from the hallway.
01:21 Hours	• The search crew from 6EQ on the 3rd floor called Command for help removing a victim from Room 304. ○ The conditions on the 3rd floor were hot and with no visibility.
01:24 Hours	• Command radioed Operations (Operations Section Chief) that 44 Control received calls from Room 306 for a trapped victim.

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Time	Fireground Operations, Response, and Details

	• Tanker 17D, Tanker 17E, Captain 12 and Assistant Chief 24-2 were assigned to rescue the occupant of Room 306.
	• Firefighters entered the 3rd floor from an exterior fire escape and interior stairwell.
	  ○ They found the occupant in Room 306 and moved him to the hallway.
	  ○ The firefighters were having trouble moving the occupant, who was unconscious, as the hallway carpet was melting.

01:27 Hours	• 6EQ officer called Operations and stated that searches had been completed on the 2nd floor. • Operations ordered all firefighters off the 2nd floor. ○ Operations advised by Command there was no available water for firefighting operations. • The EOSTI went off for the Assistant Chief 24-2. He advised the other firefighters he was exiting the building.
01:29 Hours	• Assistant Chief 8-3 reported a victim had been found on the 3rd floor and requested firefighters to help with rescue. ○ Command advised that a group of assistant county fire coordinators were coming up to assist. • Command advised all firefighters to get off the roof of the dairy kitchen.
01:30 Hours	• The Assistant Chief 24-2 met with Command to provide an update on search and rescue operations on the 3rd floor.
01:31 Hours	• 44 Control notified Command of the 30-minute time mark.
01:34 Hours	• Tanker 17D, Tanker 17E, and Captain 12 were trying to get the occupant from Room 306 off the 3rd floor and to the fire escape.
01:35 – 01:45 Hours	• The EOSTIs for Tanker 17D, Tanker 17E, and Captain 12 were all sounding. • The assistant county fire coordinators could not make it to the 3rd floor from the interior stairs due to heavy fire conditions.
01:46 Hours	• Tanker 17E ran out of air and became immobilized. • Tanker 17D called a Mayday noting "Mayday, Room 306." This was his last known location before the building collapsed. • Firefighters from Fire Departments 9 and 24 entered the building from the fire escape to locate the occupant and other firefighters.
01:47 Hours	• Command ordered an evacuation of the building.

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Time	Fireground Operations, Response, and Details
	○ Evacuation was indicated by the air horns sounding from the fire apparatus on-scene.
01:48 Hours	• Tanker 17D transmitted a radio message stating, "Out of air, Room 306". ○ Command requested emergency traffic only. • Firefighters from Fire Departments 9 and 24 worked their way down the 3rd floor hallway and listened for a personal alert safety system (PASS) alarm. • A firefighter from Fire Department 9 heard, "I am out of air" in a struggling voice. • Tanker 17E found with firefighters from Fire Department 24. ○ They moved Tanker 17E towards the fire escape on the Side Bravo/Side Charlie corner to exit the structure.
01:50 Hours	• Command ordered ground ladders be placed on Side Alpha of the dairy kitchen roof to reach Room 306. • Firefighters from Tanker 17, 6EQ, Fire Department 8, and several assistant county fire coordinators began to place ground ladders and break windows on the 3rd floor. ○ A request was made for Quint 17 to break windows on the 3rd floor. • While trying to break the assisted living facility windows, firefighters discovered the windows were made of plexiglass. ○ Firefighters were eventually able to break a window believed to be in Room 306.
01:53 Hours	• The FAST from Fire Department 24 (FAST 24) advised they had the Mayday firefighter and were bringing him out. ○ Command acknowledged and asked for the condition of the Mayday firefighter who was on the Side Bravo fire escape. • As FAST 24 exited the structure, Captain 12 told them and firefighters from Fire Department 9 that "someone is still inside."
01:55 Hours	• Command asked FAST 24 if the Mayday firefighter was clear of the structure. ○ FAST 24 responded that they were trying to get the firefighter (Tanker 17E) down the fire escape. • Command requested all fire departments on-scene to perform a personnel accountability report (PAR).
01:56 Hours	• A firefighter from Fire Department 17 advised Command that one firefighter from Tanker 17 was unaccounted for at this time. ○ FAST 24 advised Command that the firefighter removed from the structure (Tanker 17E) was not the firefighter that called the Maydays.

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Time	Fireground Operations, Response, and Details
	○ The missing firefighter was near or in Room 306 on the 3rd floor.
01:57 Hours	• Firefighters from Fire Department 9 found the occupant from Room 306 and began to move him towards the fire escape on the Side Bravo/Side Charlie corner.
01:58 Hours	• Command requested again all units to clear the air. ○ Command asked about the status of the missing firefighter from Fire Department 17. • FAST 24 advised Command they lost water to their hoseline. ○ They were operating on the roof of the dairy kitchen.
01:59 Hours	• The missing firefighter was confirmed to be Tanker 17D. • Firefighters were bringing the occupant of Room 306 out of the building via the fire escape on the Side Bravo/Side Charlie corner. • Command requested again for all chiefs on-scene to perform a PAR. • Command called Tanker 17D on the radio with no answer. ○ Command requested to be notified if anyone has contact with Tanker 17D.
02:00 Hours	• Command radioed Tanker 17D with no response. • FAST 24 reported they needed water on their hoseline. ○ Multiple fire departments were trying to locate a different fire hydrant to establish an effective water supply. • Fire was now visible from the 2nd floor windows and the fire escape door. • Firefighters from Fire Department 9 descended the fire escape with the occupant of Room 306. • Firefighters on the dairy kitchen roof finally got water back on their hoseline. ○ They were directed to use a hoseline to protect the firefighters coming down the fire escape with the civilian victim from the 3rd floor.
02:01 Hours	• 44 Control notified Command of the 60-minute time mark.
02:04 Hours	• The 2nd floor of the assisted living facility collapsed due to the amount of fire on Side Bravo.
02:05 Hours	• Fire departments on-scene established a secure water supply using water relay operations. • 44 Control advised Command that Fire Departments 17, 6, 7, 8, 9, 12, 19, 20, 24, 25, 13, and 15 were operating on-scene.

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Time	Fireground Operations, Response, and Details
	• Command advised Control 44 that one firefighter had not been accounted for at this time and was missing.
02:07 Hours	• An *Urgent* was transmitted from the west side of the structure (Side Charlie). The *Urgent* advised the building was collapsing.
02:08 Hours	• A cantilever collapse occurred on Side Bravo/Side Charlie of all three floors.
02:10 Hours	• Command requested again for all chiefs on-scene to perform a PAR.
02:12 Hours	• Fire Departments 12, 9, 19, 25, 24, 10, and 6 advised Command they were all PAR.
02:16 Hours	• The water company notified 44 Control that they boosted water pressure to the area. ○ The water company would be sending a supervisor to the scene within an hour.
02:17 Hours	• Command advised 44 Control that strategy was changed to defensive operations. ○ The IAP was to knock down the fire from the exterior.
10:00 Hours	• Command advised 44 Control that the fire was under control. ○ Crews were rotated to overhaul and extinguish the fire throughout the day. • County and state fire investigators were on-scene initiating their investigation.

21:00 Hours	• Command advised 44 Control that the fire was out.
	• Command initiated a search for the missing firefighter (Tanker 17D).
	  ○ This process consisted of searching with construction equipment removing building materials while firefighters searched for Tanker 17D.
	  ○ Command also utilized a state urban search and rescue team, including the use of cadaver dogs for recovery purposes.

23:50 Hours	• A state urban search & rescue team confirmed the location of Tanker 17D in the basement. ○ Tanker 17D was located in the basement of the facility. The area where Tanker 17D was located would be in relation to Room 306 and how the building shifted during collapse.

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Time	Fireground Operations, Response, and Details
March 24, 2021	
00:20 Hours	• Investigators from the county's Office of the Chief Medical Examiner arrived on-scene. • Tanker 17D was declared deceased.
01:40 Hours	• Tanker 17D was removed from the structure. ○ Tanker 17D was transported to the county's medical examiner's office.
16:07 Hours	• Command advised 44 Control that all fire departments were clear from the scene. ○ Command advised that fire investigators remained on-scene.

Personal Protective Equipment

The turnout gear and NIOSH Approved® SCBA worn by Tanker 17D firefighter was destroyed by the fire when the building collapsed.

Weather Conditions

At 00:56 hours on March 23, 2021, the outdoor temperature was 37 °F, dewpoint was 34 °F, the humidity was 89%, the wind was out of the NW at 5 mph, the barometric pressure was 28.91 inches, there had been no precipitation in the last 24 hours, and conditions were fair [Weather Underground 2021].

Investigation

On March 23, 2021, at 00:43 hours, smoke and fire activated the fire alarm system at an assisted living facility. No automatic notification was made to the county communication center due to the fire alarm system being placed into test mode at 17:12 hours on March 22, 2021 (the evening prior). With the fire alarm system in the test mode, no alarm was transmitted to the fire alarm system monitoring agency (44 Control). When employees heard the fire alarm within the facility, they began to investigate the location of the fire alarm activation. An employee observed smoke coming from the internal dairy kitchen door. The employee notified other staff to evacuate the occupants and placed a telephone call to 9-1-1. At 00:48 hours, the sprinkler system in the dairy kitchen activated. The ceiling tiles had melted and started falling onto the floor. Also, there was fire showing in the hallway of the structure that borders the dairy kitchen. At 00:52 hours, a 9-1-1 telephone call was received by the village police department of a fire at the assisted living facility. Law enforcement was dispatched to the assisted living facility. 44 Control alerted Fire Department 17 of the fire at the assisted living facility at 00:53 hours. At 00:55 hours, village law enforcement arrived on-scene and reported that heavy black smoke was showing from the Side Alpha/Side Bravo corner of the facility. The village law enforcement began to assist staff members

with evacuation of the occupants. At 00:59 hours, village law enforcement on-scene reported active fire burning on the roof of the dairy kitchen.

At approximately 01:00 hours, Chief 17-1 arrived on-scene at the assisted living facility. Chief 17-1 assumed Command and reported a multi-story structure with smoke showing. He reported heavy smoke coming out of the main entrance/lobby area as well as fire showing on the roof of the kitchen. Command requested Fire Department 6 respond with Tower 6-75 and additional staffing. 44 Control received a 9-1-1 telephone call from an occupant in Room 306 at 01:01 hours reporting smoke in the building. Command advised the county fire dispatcher of heavy fire conditions and trapped occupants at 01:02 hours. 44 Control dispatched Fire Department 8 to respond their FAST, Fire Department 12 to respond their heavy rescue, and Fire Department 7 to respond an additional engine company. Due to the reports of multiple victims, 44 Control transmitted a request for additional EMS units to respond at 01:05 hours.

44-1 responded and was on-scene at approximately 01:05 hours. He reported to Command. At 01:08 hours, 44 Control tried to contact the occupant in Room 306, who still had an open telephone line. The male occupant did not answer. At 01:09 hours, Chief 17-1 transferred Command to 44-1. Chief 17-1 donned his personal protective equipment (PPE) and SCBA and went inside the assisted living facility to investigate. Chief 17-1 entered the lobby and observed the sprinkler system activated and heavy smoke, but no visible fire. He then went to the 2nd floor of the facility via the internal stairwell to continue his investigation.

At 01:10 hours, Chief 17-1 requested that upon arrival, Tanker 17 dry stretched a 3-inch hoseline with a gated wye up the stairwell to the 2nd floor of the facility. He also requested crews bring a high-rise pack to be connected to the gated wye and stretched to the 3rd floor (**See Photo 4**).

6EQ arrived on-scene and parked on the street behind the assisted living facility near the Side Bravo/Side Charlie corner. 6EQ reported that multiple victims were on the fire escape of the 3-story residential building. The crew from 6EQ began to assist EMS with getting victims off the fire escape and away from the structure. At the same time, Chief 17-1 was dragging a victim to the fire escape on Side Bravo on the 2nd floor. Chief 17-1 acknowledged 6EQ's radio report. The time was approximately 01:11 hours. Chief 17-1 requested 44 Control transmit a special call for four additional fire departments to respond. The request was due to the significant number of victims that needed to be evacuated from the building. Chief 17-1 also requested all assistant county fire coordinators be dispatched.

44 Control received another 9-1-1 telephone call from an occupant in Room 306 at 01:12 hours who noted he and a female occupant were trapped in Room 306. The male occupant stated his room was filling with smoke and they were unable to get off the floor. The information was relayed to units on-scene that there was a report of two victims trapped in Room 306.

From the fire escape, Chief 17-1 walked onto the roof of the dairy kitchen and observed fire where the roof met the 3-story residential building. He then returned to Side Alpha and assumed Command from 44-1. At 01:12 hours, Tanker 17 arrived on-scene. Tanker 17's driver began to dry stretch a 5-inch supply line to the hydrant on Side Alpha. Tanker 17A assigned himself and Tanker 17E to perform rescue while Tanker 17C and 17D were assigned to firefighting operations.

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Photo 4. Photograph of smoke condition observed in the lobby. The 3-inch hoseline from Tanker 17 was stretched up the stairwell to the 2nd floor. The time was approximately 01:12 hours.
(Photograph courtesy of Kenneth Flynn)

Tanker 17's crews entered the main entrance lobby via the vestibule on Side Alpha of the facility. Those assigned to fire suppression dry stretched a 1¾-inch hoseline (green hose) to the exterior dairy kitchen door on Side Alpha. Tanker 17's driver stretched a 3-inch hoseline (purple hose) with gated wye up the internal stairwell to the 2nd floor (division) of the facility. Crews left the high-rise pack (orange hose) in the lobby. When the hydrant was opened and flowing, Tanker 17's intake pressure was only 30 - 40 lbs. Tanker 17's driver placed a 14-foot ground ladder on Side Alpha to the dairy kitchen roof while crews forced the exterior dairy kitchen door. The 1¾-inch hoseline (green hose) was charged, and Tanker 17C took the hoseline onto the dairy kitchen roof to try and knock down the fire.

At 01:13 hours, village law enforcement notified firefighters that the 1st floor was clear of victims. They also noted that they could no longer enter the building due to the amount of smoke and poor visibility in the lobby. They began evacuation of occupants from the 2½-story residential building which was clear of smoke. At this time, Tanker 17 and Quint 17 were in the driveway on Side Alpha. Tower 6-75 was on the street at the Side Alpha/Side Bravo corner. An additional engine from Fire Department 17 was on the

street on Side Alpha. 6EQ was on the Side Bravo/Side Charlie corner. Additionally, a mobile cascade from Fire Department 17 was stationed on Side Alpha. Multiple assistant county fire coordinators arrived on-scene and were assigned various assignments. These assignments included serving as an incident command technician, serving as a liaison to the staff of the assisted living facility, serving as a liaison to the various utility company representatives on-scene, and serving as division group supervisors (Division Bravo, Division Charlie, and Division Delta) of the structure to perform an ongoing 360-degree size-up for Chief 17-1.

At 01:14 hours, Engine 7-1 arrived on-scene while 44 Control dispatched all assistant county fire coordinators, EMS coordinators, and Fire Departments 9, 25, and 20 to the scene. Fire Department 8 arrived on-scene in Engine 8-1750, 8-SRV (transport pick-up), and 8-MP (mini pumper). They assumed the role as FAST and staged their resources on Side Alpha. They were requested by Chief 17-1 to disband as FAST and perform rescue of victims, splitting their crews into two interior search teams for 2nd and 3rd floors. At the same time, a member of 6EQ radioed that they would be operating on Side Bravo, 2nd floor of the facility, performing an interior search. They found that both fire escape doors on the 2nd and 3rd floor were locked. They forced the door on the 2nd floor and 6EQ's officer assigned the 6EQ's driver to serve as safety officer. 6EQ's driver waited at the fire escape door while the other 6EQ firefighters were broken into two interior search groups for both lefthand (Side Charlie) and righthand (Side Alpha) searches. They noted that smoke was banked to the floor upon entry into the 2nd floor. Tanker 17's crews and firefighters from Engine 24-1750 also began to perform interior searches.

At 01:15 hours, Chief 17-1 requested primary and secondary searches on Side Charlie for both the 2nd and 3rd floors. At the same time, 6EQ's driver radioed to his crew and requested they exit the structure through the fire escape door on Side Bravo, 2nd floor. In response, 6EQ's officer radioed back and advised the fire was visible on the 2nd floor. 6EQ crews then requested a hoseline to the 2nd floor. 6EQ's driver advised Command to send an engine company and truck company to the Side Alpha/Side Bravo corner to provide a hoseline to the 2nd floor. At this same time, 9-Rescue arrived on-scene with 11 firefighters. They staged at the fire escape on the Side Bravo/Side Charlie corner and then assigned to search the 2nd floor.

An urgent radio transmission at 01:17 hours requested a hoseline to the 3rd floor. Another radio transmission notified Command that the natural gas supply had been secured to the building. 6EQ's officer observed fire coming out of walls on the 2nd floor on Side Alpha. At 01:18 hours, 6EQ's driver attempted to raise 6EQ's officer on the radio, asking for his location. 6EQ's officer searched a room and noticed the floor was hot and soft. At the same time, interior crews requested the hoseline to the 3rd floor be charged. Another radio transmission was made requesting Tanker 17 charge the red hoseline. Firefighters were using this hoseline to attack the fire at the exterior dairy kitchen door and then onto the dairy kitchen roof. Chief 17-1 requested Tanker 17 to report where they were operating hoselines at 01:19 hours. 12 Rescue arrived on-scene with seven firefighters. They staged at the fire escape on the Side Bravo/Side Charlie corner. Then they were assigned to search the 3rd floor. At the same time, two 6EQ firefighters entered a room facing Side Alpha for search. They observed the floor was hot and tacky. One of the 6EQ firefighters stayed next to the window while the other firefighter moved back towards the hallway. He noticed that the door frame leading to the hallway was on fire. They decided to escape through the window onto the dairy kitchen roof.

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At 01:20 hours, 6EQ's driver again attempted to contact 6EQ's officer on the radio, asking for his location. 6EQ officer responded they were outside of the structure. The 6EQ officer met Chief 17-1 at the command post to provide an update about conditions on the 2nd floor. Firefighters from 9 Rescue exited the structure via the fire escape from the 2nd floor. 9 Rescue advised the interior conditions were worsening. Command then requested a PAR. At this time, Tanker 17C operating on the dairy kitchen roof broke out windows of the 2nd floor. Two 6EQ firefighters bailed out one of the broken windows onto the dairy kitchen roof as they were impinged by fire. Control 44 dispatched Fire Departments 10 and 19 to standby at Fire Department 17's firehouses.

At 01:21 hours, 6EQ crews radioed they were in Room 304 and needed assistance removing a victim. Chief 17-1 ordered additional firefighters from Fire Department 6 to report to Room 304. Firefighters from Fire Department 6 entered through the fire escape after forcing the 3rd floor door open and assisted with extricating the victim. They continued to search rooms for victims noting conditions as hot with no visibility. At 01:22 hours, firefighters from 6EQ radioed Command requesting EMS meet them on the 3rd floor fire escape. 6EQ was removing the victim from Room 304. Chief 17-1 then radioed at 01:23 hours asking if the 3-inch hoseline (purple hose) was in place.

At 01:24 hours, Command radioed Operations that 44 Control was receiving calls from Room 306 for a trapped victim. Tanker 17D, Tanker 17E, Captain 12, and Assistant Chief 24-2 used the fire escape and interior stairwell to reach Room 306. They encountered high heat and poor visibility on the 3rd floor. They could only see the floor of the hallway. Assistant Chief 8-3 stayed on the fire escape to perform accountability. Upon arrival to Room 306, Tanker 17D and Captain 12 pulled the trapped victim into the hallway. Assistant Chief 24-2 and Tanker 17E were in the hallway. The four firefighters discussed which way they would exit the structure with the victim. A firefighter attempted to slip webbing around the victim to assist with moving the victim. The firefighters stated they thought the victim was stuck to the hallway carpet, which was melting, and the victim would not move.

At 01:27 hours, 6EQ officer radioed Operations that searches were completed for the 2nd floor of the facility. Operations ordered all firefighters still on the 2nd floor to leave as they had no water to fight the fire. While still attempting to rescue the victim from Room 306, the EOSTI alarm went off for Assistant Chief 24-2. He communicated to the two Tanker 17 firefighters and Captain 12 that he was exiting the structure. He was almost out of air but would have additional firefighters come to the 3rd floor to assist them with the rescue. He exited the hallway using the interior stairwell. At 01:29 hours, Assistant Chief 8-3 radioed reporting a victim had been found on the 3rd floor and requested firefighters to assist with removal. Command responded that a group of assistant county fire coordinators were coming up to the 3rd floor to assist.

Command then radioed requesting that all units get off of the dairy kitchen roof. At 01:30 hours, Command radioed all interior companies that "conditions are changing." Command and Tanker 17's driver observed smoke now entering the main entrance/lobby. Also, turbulent smoke was observed coming from the exterior dairy kitchen door (**See Photo 5**). Assistant Chief 24-2 arrived at the command post. He advised Command of the conditions on the 3rd floor and the status of the victim from Room 306. At 01:31 hours, 44 Control radioed that departments had been operating on-scene for 30 minutes. At 01:35 hours, Fire Department 20 arrived on-scene and was assigned the role of FAST. At 01:42

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Photo 5. The smoke conditions from the exterior dairy kitchen door on Side Alpha. The 1¾-inch hoseline was from Tanker 17. The time is approximately 01:40 hours.
(Photo courtesy of Kenneth Flynn)

hours, 44 Control dispatched a bus from the county transportation department for ambulatory patients from the assisted living facility. Command requested a representative from the local water authority and the American Red Cross respond to the command post.

Between 01:35 and 01:45 hours, the EOSTI alarms for the Tanker 17D, Tanker 17E, and Captain 12 sounded. Tanker 17E began to pull the victim from Room 306 towards the fire escape on the Side Bravo/Side Charlie corner. Captain 12 crawled towards the fire escape at the same time to gauge the distance to the exit. Also, Captain 12 tried to find another firefighter who might be on the fire escape to assist with the victim removal. While pulling the victim from Room 306, Tanker 17E ran out of air. He removed his SCBA facepiece and pulled his protective hood over his mouth and nose to filter breathe. Upon taking in his first breath, the smoke felt like "burning razor blades" in his lungs. Tanker 17E became immobilized in the hallway. At this same time, 01:46 hours, Tanker 17D called a Mayday noting "Mayday, Room 306." Tanker 17E did not call a Mayday as he did not want to divert resources from the Mayday firefighter.

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At 01:46 hours, Command, not knowing who called the Mayday, requested the firefighter calling the Mayday advise his location. Firefighters from 6EQ were staged on the fire escape and saw turbulent black smoke emanating from the 3rd floor fire escape door. Firefighters from Fire Departments 9 and 24 entered the 3rd floor using the fire escape while one firefighter stayed at the fire escape door. Additional firefighters from the group of assistant county fire coordinators attempted to reach the 3rd floor using the internal stairwell. They could not enter the 3rd floor hallway due to heavy smoke and high heat. Command ordered all firefighters at 01:47 hours to evacuate the building due to these conditions. Evacuation tones were sounded by fire apparatus activating their air horns. At 01:48 hours, another Mayday was transmitted noting, "Out of air, Room 306." Command then requested emergency traffic only. Firefighters from Fire Departments 9 and 24 worked their way down the hallway and checked rooms on the 3rd floor. They were listening for any PASS alarms as there was zero visibility. A firefighter from Fire Department 9 heard "I am out of air" in a struggling voice and found Tanker 17E. Along with firefighters from FAST 24, they extricated Tanker 17E to the fire escape on the Side Bravo/Side Charlie corner.

At 01:50 hours, Command requested ground ladders be placed on the Side Alpha of the dairy kitchen roof to reach Room 306. Firefighters from Tanker 17, 6EQ, Fire Department 8, as well as assistant county fire coordinators began to place ladders and attempt to break windows on the 3rd floor. They requested Quint 17 to break 3rd floor windows. At this time, it was discovered that the windows were made of plexiglass and not window glass. Firefighters were eventually able to break windows believed to be Room 306. Turbulent black smoke began to come from the window. An assistant county fire coordinator yelled into the room and listened for any possible answer from the Mayday firefighter. At this time, 6EQ's officer witnessed the floor of the 2nd floor collapse through the broken windows from the dairy kitchen roof. Another radio transmission stated fire was coming out of the Side Charlie windows of the 3-story residential building as Fire Department 19 arrived on-scene (**See Photo 6**).

At 01:53 hours, Command, still not knowing who called the Mayday, radioed to the firefighter calling the Mayday asking for an identifier and his location. FAST 24 radioed they had the Mayday firefighter and were bringing him out. Command acknowledged and asked for the condition of the Mayday firefighter. FAST 24 requested EMS to Side Bravo fire escape to get the Mayday firefighter. As they exited the structure, Captain 12 reached the fire escape door and notified firefighters from FAST 24 and Fire Department 9 that "someone is still inside."

Two firefighters from Fire Department 9 entered the structure to search for the additional person inside the building. Another firefighter stayed at the fire escape door making noise (pounding on door) to indicate the direction back to the fire escape due to zero visibility conditions. Command radioed FAST 24 at 01:55 hours and asked if the Mayday firefighter was out of the structure. FAST 24 responded they were trying to get the Mayday firefighter down the fire escape. Command requested all fire departments on-scene perform a PAR. At 01:56 hours, 17-6 radioed to Command that one firefighter was unaccounted for and missing. FAST 24 then radioed Command that the firefighter they extricated (Tanker 17E) was not the firefighter who called the Maydays.

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Photo 6. Firefighters using a ground ladder and Quint 17 trying to reach the occupant in Room 306. The time is approximately 01:51 hours.
(Photo courtesy of Kenneth Flynn)

At 01:57 hours, crews from Fire Department 17 radioed to Command that they were on the dairy kitchen roof with a hoseline into the 2nd floor. There was also a fire showing from the natural gas line, which was located on the dairy kitchen roof. They requested either a 2½-inch hoseline or a ladder pipe from the truck to hit the kitchen fire. At this time, firefighters from Fire Department 9 found the civilian victim from Room 306 and began to move him towards the fire escape on the Side Bravo/Side Charlie corner. At 01:58 hours, Command requested all units to clear the radio and asked if anyone had seen the missing firefighter from Fire Department 17 (Tanker 17D). FAST 24 radioed Command they had lost water to the hoseline on the dairy kitchen roof. At 01:59 hours, a firefighter from FAST 24 radioed that the missing firefighter was Tanker 17D. Fire Department 9 firefighters had the civilian victim from the 3rd floor at the Side Bravo/Side Charlie corner. They requested EMS meet them at the bottom of the fire escape. Command requested all chiefs on-scene to perform a PAR of their individual fire departments. Command radioed Tanker 17D and then requested all units on-scene to report if they see Tanker 17D. At 02:00 hours, FAST 24 made another request for water. Other units radioed that they were trying to locate a different fire hydrant to establish a water supply. At this point, fire was visible from the 2nd floor fire escape door and windows. Firefighters from Fire Department 9 descended the fire escape with the civilian victim from Room 306. Firefighters on the dairy kitchen roof were directed to use a hoseline to protect the firefighters coming down the fire escape (**See Photo 7**).

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Photo 7. Firefighters on dairy kitchen roof using a hoseline to protect firefighters coming down from fire escape, 02:00 hours.
(Photo Courtesy of Kenneth Flynn)

At 02:01 hours, Command again requested if anyone on the fireground had seen Tanker 17D. 44 Control radioed Command that all fire departments had been operating on-scene for 60 minutes. At 02:04 hours, units radioed that they were still trying to establish water from the hydrant as 17-4 reported to Chief 17-1 that the 2nd floor of the facility had collapsed. Tanker 17A is thrown from the collapsing dairy kitchen roof and subsequently transported to a local hospital for medical treatment. At 02:05 hours, Fire Department 15 arrived on-scene. 44 Control advised the following fire departments were on-scene: 17, 6, 7, 8, 9, 12, 19, 20, 24, 25, 13, and 15. Command acknowledged and advised that one firefighter was unaccounted for and missing. At 02:07 hours, an *Urgent* was called for a major collapse on Side Bravo and Side Charlie of the facility. A cantilever collapse was witnessed with part of Side Charlie of the structure remaining standing (**See Photo 8**).

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Photo 8. The cantilever collapse of Side Bravo/Side Charlie corner of the original building. The time was approximately 02:08 hours.
(Photo Courtesy of Kenneth Flynn)

At 02:10 hours, Command requested all chiefs on-scene perform a PAR. Two minutes later, Fire Departments 12, 9, 19, 25, 24, 10, and 6 advised Command their crews completed a PAR check with all members accounted for. The local water authority notified 44 Control that they had boosted water pressure and would be sending a supervisor to the scene within an hour. Firefighters on-scene utilized 3,500-feet of 5-inch supply line and three relay engines to establish a secured water supply for fire suppression operations.

Once a secured water supply was established, Command advised all departments and resources operating at the assisted living facility that the strategy was changing to defensive operations. The IAP was to utilize master streams, get firefighters to rehab, and determine the need for heavy equipment to assist with controlling the fire and locating Tanker 17D. The time was approximately 02:17 hours.

At 10:00 hours, Command advised the county fire dispatcher the fire at the assisted living facility was under control. Command started rotating fire departments off the fireground. Heavy equipment was on-scene pulling the main fire building down to locate pockets of fire throughout the day. Also, Command had requested a state urban search and rescue team, which included cadaver dogs, to help locate Tanker

17D. Divers were deployed into the swimming pool of the basement of the 3-story residential building to search for Tanker 17D while drones were deployed for aerial view. At 21:00 hours, Command advised 44 Control that the fire was out.

At 23:50 hours, members of a state urban search and rescue team located Tanker 17D. Tanker 17D was located in the basement of the facility. The area where Tanker 17D was located would be in relation to Room 306 and how the building shifted during collapse.

At 00:20 hours on March 24, investigators from the county's Office of the Chief Medical Examiner pronounced Tanker 17D deceased and documented his location. At 01:40 hours, Tanker 17D was removed from the structure and transported to the county's office of the medical examiner facility. At 16:07 hours, Command advised that all fire units were cleared from the scene while fire investigators remained.

In total, all 113 occupants and four staff members were rescued from the structure. One occupant was pronounced deceased (male victim from Room 306) upon arrival at a local hospital. Multiple occupants from the assisted living facility were treated and transported for various injuries. Two firefighters were injured and transported to local hospitals for treatment. Over 40 other firefighters sustained injuries which were treated on-scene. Of the 26 fire departments in the county, 25 were involved in the incident as well as fire departments from New Jersey. The incident response lasted over 40 hours. Following the termination of the incident, 44-1 activated a critical incident stress management (CISM) response to provide mental health resources and services to the firefighters and other first responders involved in this incident.

Fire Origin and Cause

The New York State Division of Homeland Security and Emergency Services Office of Fire Prevention and Control (OFPC) led the investigation in determining the origin and cause of the fire at the assisted living facility. The investigation report by OFPC stated that the fire originated in the dairy kitchen in the one-story kitchen area.

The assisted living facility hired two individuals to perform a cultural cleansing practice on March 22. The OFPC investigation report stated that these individuals directed the assisted living facility staff to call the county's communication center at 17:12 hours on March 22. This was to place the fire alarm system in test mode to avoid a false activation. It is unknown if the staff assigned a fire watch in the facility due to the fire alarm system being off-line. With the fire alarm system in test mode, the fire alarm system would not send an emergency notification to the monitoring facility, which was located at 44 Control.

In the evening on March 22, the individuals used a propane torch and hot charcoal between 21:00 and 23:00 hours. These items were used to heat metal kitchen appliances such as the sink, griddle, and pot warmer. The heat from the torch was then transferred from the appliances into the wall causing fire in the building materials. The fire extended up the wall behind the appliances and into the ceiling and roof of the dairy kitchen, above the sprinkler system.

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Contributing Factors

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in injuries or fatalities. NIOSH investigators identified the following items as key contributing factors in this incident that ultimately led to the fatality:

- Cultural cleansing ceremony conducted in the dairy kitchen
- Building fire alarm system was off-line to the county dispatch center
- Lack of a fire sprinkler system throughout the facility
- Lack of enforcement of fire and building safety codes
- Lack of available water supply for the sprinkler system and fire suppression
- Lack of pre-incident planning
- Lack of crew integrity
- Inadequate personnel accountability system
- Inadequate tactical and task level management
- Lack of a Command Safety and Mayday management
- Inadequate FAST operations

Cause of Death

According to the medical examiner report, the cause of death of Tanker 17D was smoke and fire inhalation injuries and burns of the entire body resulting from working as a firefighter in a structure fire.

Recommendations

Fire departments should:

Recommendation #1: Develop a pre-incident plan for high-risk occupancies, including low frequency/high risk scenarios such as assisted living facilities, that is supported by national standards.

Discussion: At this incident, the fire department had a program to conduct pre-incident inspections. The fire department had not conducted a formal pre-incident inspection of this facility nor developed a formal pre-incident plan. Also, there was a delay in dispatching additional fire departments, which contributed to a lack of on-scene available staffing and dedicated FAST companies. Pre-incident planning for the occupancy in this incident may have allowed for a greater number of fire departments to be added to the initial dispatch assignment when the incident was confirmed to be a working structure fire.

NFPA 1660, *Standard for Emergency, Continuity, and Crisis Management: Preparedness, Response, and Recovery*, A.17.2.1 states, “a pre-incident plan is one of the most valuable tools available for aiding responding members in effectively controlling an emergency.” The pre-incident plan is defined as “a document developed by gathering general and detailed data that is used by responding members in effectively managing emergencies for the protection of occupants, participants, responding members, property, and the environment” [NFPA 1660 2024]. A pre-incident plan identifies deviations from normal operations and can be complex and formal, or simply a notation about a particular problem, such

as the presence of flammable liquids, explosive hazards, modifications to structural building components, or structural damage from a previous fire [NIOSH 1999].

In addition, NFPA 1660 outlines the steps involved in developing, maintaining, and using a pre-incident plan by breaking the incident down into pre-, during- and post-incident phases. In the pre-incident phase, for example, it covers factors such as physical elements and site considerations, occupant considerations, protection systems and water supplies, hydrant locations, and special hazard considerations. Building characteristics including type of construction, materials used, occupancy, fuel load, roof, and floor design, and unusual or distinguishing characteristics should be recorded, shared with other departments who provide mutual aid, and if possible, entered into the dispatcher's computer so that the information is readily available if an incident is reported at the noted address [NFPA 1660 2024].

Because many fire departments are unable to pre-plan for all the structures within their jurisdiction, departments may opt to prioritize plans for structures that have elevated or unusual fire hazards and life safety considerations. Strategies and tactics employed at an emergency incident need to match the structure. The pre-plan information can help ensure that residential fire tactics are not applied at commercial structures.

Coupled with the pre-incident planning program, the critical incident dispatch system (CIDS) program provides critical building information that may not be readily apparent to responding companies upon arrival. This program also provides accurate and consistent information for required radio progress reports and indicates where variations in SOPs would be necessary due to previously known features found at this location [FDNY 2011].

The process starts with input from the company officers who must consider all buildings in their first-due area as potential CIDS buildings. In considering a building, the company officer must look for conditions that would not be immediately apparent to arriving companies responding to the initial alarm assignment. Additionally, key building factors should automatically be included in CIDS; for example, bowstring truss, major alterations, or if a pre-incident plan exists for the building. Other examples that should be considered for inclusion in the CIDS program are [FDNY 2011]:

- Hazardous chemicals, liquids, and substances and always indicate floor and location
- High voltage equipment, including transformers containing PCBs, and always indicate floor and location of such equipment
- Interconnected odd or unusually shaped buildings and indicate which floors are interconnected
- Buildings with structural hazards or heavy fire loading
- Renovated buildings with hidden voids, or duplex apartments. Indicate which floors give access to duplex apartments
- Truss buildings (describe type of truss)
- Metal bar joist and other lightweight construction materials
- Q-deck roofs or floors, steel plated buildings
- Individuals who are handicapped, bedridden, or incapacitated (where possible, specify the location)
- Special extinguishing systems, and the location of related controls
- Siamese connection locations, if not in a normal location or readily visible

- The location of outside screw and yoke valves or alarm panels, if not located in an easily found location
- Sub-cellar levels and access locations
- Telephone numbers of knowledgeable persons, such as the owner, building engineer, or superintendent
- Vacant buildings or structures.

Company officers should be encouraged to include other items if they feel a specific condition or hazard should be identified [FDNY 2011]. Fire departments can use a variety of methods to ensure critical building information is available during an incident response. Mobile data terminals or mobile computer terminals, hand-held computers or tablets, information from station response printers, or printed pre-incident plans can provide location-specific data triggered by place, address, and/or name. This information can be a valuable tool for the fire officers and command officers, especially when the jurisdiction has a large number of defined target hazard occupancies [Fire and Rescue Departments of Northern Virginia 2013].

Additionally, when considering strategies and tactics for responding to low frequency/high risk incidents such as assisted living facilities, NFPA 1700 provides insight on key variables for the development, assessment, and evaluation of structural firefighting strategies, as well as guidance on shifting strategies based on the effectiveness of the current strategy and changing conditions. Knowing that fire conditions can change, tactics need to be adjusted during an operation. The objective is choosing the right tactics for where, how, what members, and how many operate based on these changes. NFPA 1700 reinforces the fact that fireground life safety is the priority during fire events and that fire control, search, and ventilation/non-ventilation are some of the tactics.

In Chapter 9 of NFPA 1700 [2021] – *Strategic Considerations*, it is noted that initial arrival factors should consider:

- Bystander/witness statements
- Access concerns on the property
- Building height, size, and stability
- Occupancy type
- Construction type
- Wind direction relative to the building location and configuration
- Fire location, size, extent
- Civilian and firefighter life safety
- Suspected direction of fire and smoke travel within the structure (flow path)
- Smoke and fire exposures exterior to the structure
- Presence and status of fixed fire protection systems
- Firefighter safety building marking systems
- Resources available.

Upon arrival at an incident, firefighters and officers will need to consider pre-arrival factors including:

- (9.4.1) *Existing Reference Materials* such as pre-incident plans and maps developed per NFPA 1660 that provide information regarding the structure, its contents, and occupancy.

- (9.4.2) *CAD Resources* and information such as officer details on resources, amount, estimated on-scene time, arrival order, dispatched occupancy type, and pre-existing structural hazards.
- (9.4.3) *Weather Conditions* with a focus on adverse conditions such as wind and precipitation.
- (9.4.4) *Occupancy Status* including specific factors associated with the occupancy as it concerns life safety, building types, and fire loads.
- (9.4.5) *Time of Day*.

Further, firefighters and officers should combine applicable pre-arrival factors with relevant incident factors, which are the observations and knowledge of the incident scene that help assist in determining the incident strategy. Arriving firefighters and officers should identify the most significant incident factors [NFPA 1700 2021]. They should also consider fire dynamics and building construction, have a risk management plan, and identify a fireground strategy.

A visual assessment of all four sides of the structure looking at smoke conditions, fire conditions, openings, and personnel hazards is essential to assessing the fire dynamics occurring within the building. Information obtained during the 360-degree survey should challenge and verify the initial arriving Side Alpha size-up. Changing conditions should initiate a reassessment of strategy and could change the strategy from offensive to defensive or defensive to offensive.

NFPA 1700 [2021] states the following should be considered for hospital/health institutions:

- 12.17: These fires normally involve buildings of noncombustible construction that are fully or partially sprinklered. Fire control is usually a lesser concern in fully sprinklered structures but is a critical concern in partially or non-sprinklered facilities with combustible construction. The movement and control of smoke (i.e., smoke management), conducting interior horizontal evacuation to safe area, and the control of medical gas systems are key tasks that must be considered.
- 12.17.1: When the hospital or health institution is equipped with a fire sprinkler and/or standpipe system, the first- or second-arriving engine should feed the fire department connection (FDC).
- 12.17.2: If the building is of combustible construction or not fully sprinklered, applying water to the fire area as quickly as practical from the interior or exterior is a critical task. Emphasis must be given to getting the first stream on the fire.
- 12.17.3: It is essential to have a smoke control plan to manage the smoke within the noninvolved fire areas to minimize the exposure to occupants.
- 12.17.4, Isolating or terminating the medical gases supply should be considered.
- 12.17.5: Sheltering in place is an option for patients based on fire conditions, building characteristics, and available response resources.

There are many components that must be in place when dealing with a fire in an assisted living facility including pre-incident planning plus strategy and tactics. The recommendations listed in this investigation report provide a methodical process for fire departments to effectively command and control an incident such as a fire in an assisted living facility.

Recommendation #2: Ensure that company officers and firefighters maintain crew integrity when operating in the hazard zone.

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Discussion: At this incident, firefighters from multiple fire departments entered the structure to conduct searches and rescue victims. When search crews of two firefighters would find a victim, one of the firefighters exited the structure with the victim while the other firefighter remained in the structure to continue the search. The remaining firefighter then joined firefighters from other search crews whose members exited the structure with victims.

NFPA 1550, *Standard for Emergency Responder Health and Safety* states in Paragraph 10.5.6 states, "Company officers shall maintain an ongoing awareness of the location and condition of all company members." Paragraph 10.5.7 states, "Where assigned as a company, members shall be responsible to remain under the supervision of their assigned company officer." [NFPA 1550 2024]. Examples of unique factors and breakdowns in crew integrity specific to this incident include:

- An accountability tag system was in place only on some of the apparatus
- Search crews of two firefighters found a victim
- One of the firefighters exited the structure with the victim while the other firefighter remained in the structure to continue the search
- The remaining firefighter linked up with firefighters from other search crews whose members exited the structure with victims.

Crew integrity is essential to fireground accountability. Fire departments should have a personnel accountability procedure/guideline in place to track both crews and individuals. A fire department's personnel accountability system should have the capabilities to track and identify who is operating in the hazard zone, their assignment, and their location. The collection of personal accountability tags or passports placed on an apparatus will not assist in maintaining awareness to the fireground location.

It is the responsibility of every firefighter and company officer to always stay in communication or contact with crew members by visual observation, voice, or touch while operating in the hazard zone. All firefighters should maintain the unity of command by operating under the direction of their company officer. The ultimate responsibility for crew integrity and ensuring no members get separated or lost rests with the company officer. A Mayday should be called if any member cannot be accounted for during a personnel accountability report.

One component of an incident management system is to provide rapid determination of whether any responders are missing if an area is required to be evacuated or a structural collapse or other unplanned event should occur. The incident management system should account for the degree of danger that is involved in specific activities and should provide more direct supervision over responders exposed to greater risks [NFPA 1550 2024]. By maintaining company supervision and crew integrity, initiative, and resourcefulness can be closely monitored. Incident accountability considerations should include [FIRESCOPE ICS 910; NFPA 1550 2024]:

- Possess a personnel accountability system. This specific system is often managed by the officer in charge or delegated to an individual in more complex incident.
- Follow accountability procedures which include tracking individuals regardless of their location or assignment at the incident (e.g., hazard zone, camp, incident base, etc.).
- Account for members who arrive on-scene by other means besides apparatus.

- Maintain crew integrity to avoid "freelancing" by individual crewmembers. This is overseen by the company officer.
- Provide ability for all members to communicate with assigned supervisors.
- Provide plan and ability to account for different crews by means of an "identifier" That can be used by the division or group supervisor.
- Account for all members at certain points during the incident/event, when benchmarks are met, conditions change, or assignments are complete.
- Provide a process to rapidly account for all responders on-scene.

Recommendation #3: Use a functional personnel accountability system, requiring a designated accountability officer or resource status officer.

Discussion: During this incident, firefighters from multiple departments and apparatus entered the structure to conduct searches and rescue victims. An accountability tag system was in place only on some apparatus.

A personnel accountability system is a system that readily identifies both the location and function of all members operating at an incident scene [NFPA 1550 2024]. The philosophy of the personnel accountability system starts with the same principles of an incident management system—company unity and unity of Command. It is possible to fulfill unity initially and maintain it throughout the incident by documenting the situation status and resource status on a tactical worksheet or a resource status/accountability board.

A personnel accountability system is adopted and routinely used to collect and maintain the status and location of the resources working in, or potentially working in, an IDLH environment at an incident. All members operating at an incident are responsible for understanding and participating in this system. The IC is responsible for the overall accountability for the incident. The IC may delegate the facilitation of the accountability for those resources to meet those goals, objectives, and tasks as needed. An integral part of the accountability system is to make sure that the firefighters who are assigned and operating in the hazard zone are accounted for, starting with the initial operations through the entire incident.

One of the most important functions of command safety is for the IC to initiate a personnel accountability system that includes the functional and geographical assignments at the beginning of operations until the termination of the incident. NFPA 1550 states in Paragraph 21.12.4, "The IC and members who are assigned a supervisory responsibility that involves three or more companies or crews under their command shall have an additional member(s) (e.g., staff aide) assigned to facilitate the tracking and accountability of the assigned companies or crews". An important aspect of a personnel accountability system is the personnel accountability report (PAR). PAR is an on-scene roll call in which supervisors report the status of their crew when requested by the IC [NFPA 1550 2024]. It is necessary to conduct the PAR every 15–20 minutes or when benchmarks (e.g. victim found, roof vented, water on the fire, etc.) are met. A functional personnel accountability system requires the following:

- Development and implementation of a departmental SOP/SOG
- Components and hardware, such as an accountability board, individual name tags, and company name tags

- Training for all members on the operation of the system
- Strict enforcement during emergency incidents.

A functional personnel accountability system should have the ability to identify:

- All members operating in the hazard zone (who)
- Where all members are in the hazard zone (where)
- The conditions in the hazard zone (conditions)
- What actions are in use in the hazard zone (actions)
- Paths of access and egress in and out of the hazard zone (exits)
- RICs and their assignments.

Many different methods and tools are available for resource accountability, including:

- Tactical worksheets
- Command boards
- Apparatus riding lists
- Company responding boards
- Electronic bar-coding systems
- Accountability tags or keys.

Members who are responsible for maintaining the location and status of all assigned resources at an incident should handle resource accountability. As the incident escalates, resource status should be placed under the Planning Section. This function is separate from the role of the IC. The IC is responsible for the overall command and control of the incident. Because of the importance of responder safety, the size and complexity of the incident should help determine resource status assignments. A properly initiated and enforced personnel accountability system enhances firefighter safety and survival.

Recommendation #4: Ensure that the ICS general staff functions are expanded during Type IV incidents when they extend to multiple operational periods.

Discussion: At this incident, the initial time of alarm was 00:53 hours on March 23 and concluded at 16:07 hours on March 24. The incident length was more than 40 hours, extending into multiple operational periods. When this occurs, the IC must consider how to maintain fireground operations and support firefighter safety and health. Not only is forecasting the direction of the incident a vital component, but ensuring adequate staffing, rest and rehabilitation including food and water, personal hygiene, medical care for firefighters, and specialized equipment.

Type IV incidents seldom extend beyond one or two operational periods. When an incident is going to extend to another operational period or is going to multiple alarms, the IC should recognize the need for assistance which includes those components of the ICS involved with information management that support the IC. One key to effective incident management is building a properly sized incident organization and support staff. This includes the delegation of functional and support responsibilities. This allows the IC to focus solely on managing operations in the hazard zone [SKCFTC 2023].

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The IC should begin incident operations by estimating the total length of time it will take to complete incident tactical priorities, and then estimate how long each tactical priority will take and how many people or crews it will take to accomplish them. This corresponds with the strategy and IAP that the IC implements, manages, and revises throughout the incident. This should give the IC a general idea of how many chief officers will be needed for this incident. These forecasted additional command elements need to be used when calling for additional resources.

The IC should forecast how long incident operations will last and how large the command organization needs to be based on the critical factors of the incident. This determination should occur very quickly in the operation. Time and intensity determine how long the IC can remain in charge of an event. Long, slow-moving events (e.g., burning debris piles with no exposures, defensive fires with no exposures, etc.) are often not as stressful as more complex incidents with members operating in a hazard zone. If the incident is going to last into a new operational period, this should be reflected in each operational period IAP. The IAP should include staffing rotations at all operational levels [SKCFTC 2023].

The Planning Section is responsible for gathering, assimilating, analyzing, and processing information needed for effective decision-making. The Planning Section serves as the IC's "clearinghouse" for information. This allows the IC to receive information from a single person instead of multiple information sources. Information should be used to make long-range plans to ensure a positive outcome of the incident. The Planning Section Chief's goal is to plan and identify the need for resources before they are needed (**See Figure 1**).

The roles and responsibilities of the Planning Section Chief include [NFPA 1550 2024]:

- Evaluate current strategy and plan with the IC, including alternative strategies
- Refine, recommend, and supervise the preparation of the IAP for each operational period
- Evaluate incident organization and span of control
- Forecast possible outcome(s) and provide periodic predictions on incident potential, which includes future resource requirements
- Utilize technical assistance as needed and determine need for any specialized resources in support of the incident
- Evaluate tactical priorities, specific critical factors, and safety
- Reassign out-of-service members already on site to incident management system organizational positions as appropriate
- Establish information requirements and reporting schedules for planning section units (e.g., resource and situation status units)
- Establish special information collection activities as necessary (e.g., weather, environmental, toxins)
- Report any significant changes in incident status
- Compile and display incident status information
- Oversee preparation of incident demobilization plan
- Incorporate the incident traffic plan from ground support and other supporting plans into the IAP
- Collect and process situation information about the incident to facilitate an *After-Action Review* and an *After-Action Report*
- Maintain unit log (ICS 214).

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The Logistics Section is the support mechanism for the organization. The Logistics Section provides services and support to all the organizational components involved in the incident, including facilities, transportation, supplies, equipment maintenance, fueling, feeding, communications, and medical services/responder rehabilitation. The Logistics Section operates on its own radio channel.
The roles and responsibilities of the Logistics Section include [NFPA 1550 2024]:

- Provide rest and rehabilitation for firefighters and other first responders
- Manage staging
- Provide and manage any needed supplies or equipment
- Forecast and obtain future resource needs (coordinate with the Planning Section)
- Provide any needed communications equipment
- Provide fuel and needed repairs for apparatus and equipment
- Obtain specialized equipment or expertise per Command
- Provide food and associated supplies
- Secure any needed fixed or portable facilities
- Provide any other logistical needs as requested by Command
- Collect and provide information for an *After-Action Review*
- Oversee demobilization of logistics section
- Maintain unit log (ICS 214).

The management of a Type IV incident that extends into multiple operational periods should be a process that can be transitioned in a methodical manner. Type IV incidents with multiple operational periods require detailed procedures, training, and coordination to be implemented.

Also, when an incident involves multiple operational periods, the IC should implement an incident management team. Major incidents and events can create special problems related to incident organization. The potential problems can result in the need for a larger organizational framework to effectively manage the incident.

Major incidents are infrequent but create significant management problems. Major incidents generally have the following characteristics [NFPA 1550 2024]:

- Involve more than one agency (often many)
- Can involve more than one political jurisdiction
- Have more complex management and communication problems
- Require more qualified members
- Require large numbers of tactical and support resources
- Can cause more injury, illness, and death
- Cause more damage to property and the environment
- Have extreme elements of crisis/psychological trauma that diminishes human capacity to function
- Longer in duration
- Costliest to control and mitigate
- Require extensive mitigation, recovery, and rehabilitation
- Garner greater media interest
- Often require cost recovery because of declared state for federal disaster

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- Must initiate an IAP
- Might necessitate the activation of emergency operations centers or department operations centers
- Need incident logistical, planning, and other support
- Have potential for growth.

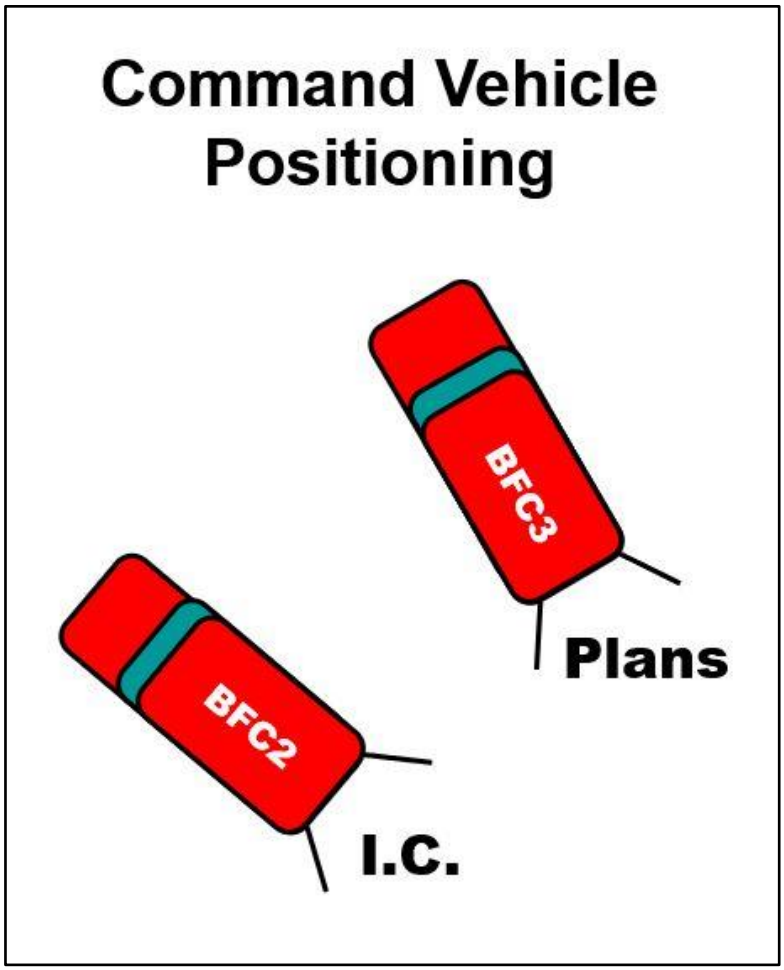

Figure 1. An example of utilizing a Planning Section Chief who is working in proximity with the IC at a Type IV incident. Also, another command vehicle can be added for the Logistics Section Chief.
(*Courtesy of the Virginia Beach Fire Department*)

Major incidents often emerge in two ways:

- They start as major incidents. These include earthquakes, hurricanes, floods, tanker spills, major hazmat situations, simultaneous civil disorders, etc., producing major incident management situations, some with little or no advance warning.

- They start as smaller incidents, then become major incidents. Smaller incidents such as fires and hazardous substance spills can become major because of wind or surface conditions, and also as a result of response time delays, lack of resources or support, or lack of adequate management.

Major incidents are often thought of as covering a large geographical area although there is virtually no geographic location that is free from the potential of having a major incident. Smaller jurisdictions can, and do, have major incidents [NFPA 1550 2024]. Major incidents can also be incidents with great complexity, requiring the application of a variety of tactics and resources to successfully bring the situation under control.

Recommendation #5: Establish divisions/groups to provide an effective incident management organizational framework for the expansion of the IAP.

Discussion: The ICS organization should develop at a pace that stays ahead of the tactical deployment of resources. For the IC to manage the incident, they must first be able to direct, control, and track the position and function of all resources. Building an ICS organization is the best support mechanism ICs can utilize to achieve the balance between managing members and incident needs. This also enhances the accountability of resources operating on-scene and into the hazard zone.
The basic configuration of command includes three levels:

- Strategic level – Overall direction of the incident
- Tactical level – Assigns operational objectives
- Task level – Specific tasks assigned to companies.

The IC is responsible for the strategic level of the ICS organization. The IAP should cover all strategic responsibilities, all tactical objectives, and all support activities needed during the entire operational period. The IAP defines where and when resources will be assigned to the incident to control the situation. This IAP is the basis for developing an incident's organization, assigning resources, and establishing tactical objectives. The tactical level directs operational activities towards specific objectives. Tactical level officers include branch directors and division/group supervisors who oversee specific resources. Tactical level officers are responsible for specific geographic areas or functions and supervising assigned members. A tactical level assignment comes with the authority to make decisions and assignments within the boundaries of the overall IAP and safety conditions. The accumulated achievements of tactical objectives should accomplish the strategy in the IAP. The task level refers to activities normally accomplished by individual companies or specific members. The task level is where the work is done. Task level activities are routinely supervised by company officers [FIRESCOPE 2015].

The IC should assign divisions/groups when [SKCFTC 2023]:

- Situations eventually involve several companies or functions, beyond the capability of the IC to directly control
- The IC can no longer effectively manage the number of companies currently involved in the operation
- Companies are involved in complex operations (e.g., large interior or geographic area, hazardous materials, technical rescues, etc.)

- Companies are operating from tactical positions that the IC has little or no direct control (e.g., out of sight)
- The situation presents special hazards and close control is required over operating companies (e.g., unstable structural conditions, hazardous materials, heavy fire load, marginal offensive situations, etc.).

An IC should initially assign division/group responsibilities to a second company officer since the first due officer has an assignment and is operating on the task level. This allows the first company officer to work with his company, focus on the assigned task, and prevent task saturation. The second company officer assigned as the division/group supervisor can operate on the tactical level, which ensures a broader view of the operations. Another benefit is that if companies are operating with limited staffing, the company officer assigned to the position of division/group supervisor can assign their crew to the initial crew to improve company operations. When assigning resources to a division/group that is already established with a company officer, the IC must include the [SKCFTC 2023]:

- Location of the assignment
- Tasks required
- Tactical objectives to be addressed.

Division/group supervisor that they will be reporting to/working under Command should then contact the division/group supervisor and inform them of the additional resources assigned to them. Company officer division/group supervisors have the same set of challenges as the fast-attacking company officer IC. The challenges include [SKCFTC 2023]:

- Difficulties communicating when wearing full PPE
- Working in a hazard zone with high heat and low visibility
- Supervising and accounting for their own crew members
- Engaging and focusing in on task level activities.

The IC should consider assigning a chief officer as a division/group supervisor when two or more companies are assigned to the division/group. If the division/group supervisor is operating in or must go into an immediately dangerous to life and health (IDLH) atmosphere (hazard zone), the division/group supervisor should operate with another firefighter. The primary function of company officers working within a division/group is to direct the operations of their individual crews in performing assigned tasks. Company officers will advise their division/group supervisor of work progress, preferably face-to-face. All requests for additional resources or assistance within a division/group need to be directed to the division/group supervisor. Division/group supervisors will communicate with the IC. When additional chief officers arrive, they should be assigned to a division or group to provide the best assessment for the IC and provide ongoing conditions, actions, and needs (CAN) reports. It is important to have visual observation of all four sides and the interior to develop and monitor the IAP. Without the observations and CAN reports, the IC's knowledge of vital information will be limited [FIRESCOPE 2015].

The early establishment of divisions/groups provides an effective incident management organization framework on which the operation can be built and expanded. One of the most important benefits of establishing divisions/groups early in the incident is that accountability is shifted to each division/group supervisor, which greatly improves the ability to track resources on the fireground. Subdividing the

incident provides tactical supervision, direction and support to units assigned when operating in the hazard zone. This delegated management also helps the IC to achieve the incident's tactical objectives safely and effectively. According to FIRESCOPE [2015], utilizing the appropriate divisions/groups and having dedicated officers directly manage and control the position and function of the operating companies assigned to them:

- Reduces the IC's span of control
- Streamlines and creates more effective incident scene communication
- Allows the IC to focus on the strategic elements of the incident from a stationary command post
- Gives the IC an array of functions to choose from and match the needs to the incident
- Improves personnel accountability
- Places strong tactical direction and leadership where the work is taking place
- Improves firefighter safety.

When establishing a division/group, the IC will assign resources to each division/group including but not limited to:

- A supervisor
- Tactical objectives
- Communications
- A radio designation (e.g., Roof Division, Division A, Rescue Group)
- Resources [FIRESCOPE 2015].

The safety of firefighting members is the primary reason for establishing divisions/groups. Each division/group supervisor needs to maintain communication with assigned companies to control both their position and function. The division/group supervisor needs to constantly monitor all hazardous situations and risks to members and make sure all companies are operating in a safe and effective manner.

Recommendation #6: Incorporate the principles of command safety into the incident management system during the initial assumption of command.

Discussion: The purpose of command safety is to provide the IC with the necessary resources on how to use, follow, and incorporate safety into the incident management system at all incidents. Command safety is used as part of the eight functions of command developed by Fire Chief Alan V. Brunacini. Command safety is designed to describe how the IC must use the regular, everyday command functions to complete the strategic level safety responsibilities during incident operations. Using the command functions creates an effective way to manage the incident and a close connection between incident safety and incident management. This also ensures the strategic-level safety responsibilities are incorporated into the command functions throughout the incident.

The functions of command of "Command Safety" differ from the eight functions of command. The functions of command safety as developed by Brunacini and Brunacini [2004] are:

1. Assumption, confirmation, and positioning of command
2. Situation evaluation
3. Communications

4. Deployment
5. Strategy and incident action planning
6. Organization
7. Review, evaluate, and revise
8. Continue, transfer, and terminate command.

The IC must address each of these functions in order without skipping or missing any function. Automatically connecting and integrating safety with command is a simple and essential way that the incident management system protects assigned resources at an incident. These functions are a practical foundation for how the IC's responsibility as the strategic-level incident manager and the overall incident safety manager.

Command safety focuses on the balance between the level of the hazards that are present in relation to the size of the standard safety system. The safety system is a component of command safety. The book refers to this term as "safety math" and guides operational position/action decisions about where firefighters can go and what they can do based on survivability. The IC can use this survivability index to make an offensive/defensive strategy decision for the incident [Brunacini and Brunacini 2004].

The IC cannot assign firefighters to positions where the safety system will not offer effective protection. If the safety system is bigger than the hazard, the IC defines an offensive strategy. If the hazard is bigger than the safety system, the IC defines a defensive strategy.

Once the overall incident strategy has been determined and the IAP developed, the IC should manage the completion of the tactical priorities for the chosen strategy. Each strategy has a different set of tactical priorities to complete. Tactical priorities provide the IC with a simple, short list of major categories that are designed to act as a practical guideline during the difficult initial stages of fireground planning. The IAP must be short and simple. A complicated IAP tends to break down during this critical time.

Generally, the IC tries to achieve the same basic objectives from one incident to the next. Tactical priorities offer a regular set of tools that the IC can utilize for tactical activities to solve incident problems. With this standard approach, the IC can manage the basic work sequence at every incident in the same manner [Brunacini and Brunacini 2004].

During most incident situations, the IC must develop an IAP based only on the critical factors they can see at the beginning of operations. Most of the time that initial information is very incomplete. The ability to identify the "known" and the "unknown" emerges when the IC uses the standard inventory of the critical factors. The IC must:

- Quickly size up what they know and what they do not know
- Identify and address critical "unknowns" during incident operations.

The two strategies create a simple, understandable plan that describes how close the emergency responders will get to the incident's hazards. The incident's overall strategic decision is based on the incident's critical factors weighed against the risk management plan (**See Diagram 2**). Declaring the incident strategy up front, as part of the initial radio report, will [SKCFTC 2023]:

- Announce the overall incident strategy to everybody
- Eliminate any questions on where firefighters will be operating on the incident scene inside the structure
- Establish that offensive and defensive strategies should not be combined.

The safety system components used to protect firefighters include [Brunacini and Brunacini 2004]:

- Adequate number of fit and trained firefighters (adequate staffing)
- Proper turnout gear and SCBA being worn
- Functional and operational equipment and apparatus
- Water
- Safety SOPs
- Incident management system.

The beginning of the safety system starts with the firefighters. Every firefighter must take responsibility for their own compliance with their department's safety plan. Brunacini and Brunacini [2004] discuss the requirements of every member:

- Understand the details, dynamics, and effects of basic firefighting hazards
- Understand the department's safety plan and its limitations
- Be physically, mentally, emotionally, and organizationally capable of doing their job
- Monitor their own safety and wellbeing
- Continually evaluate and self-adjust their own safety procedures in relation to the incident
- Directly stop any unsafe acts they can impact
- Always assist those nearby
- Actively report safety conditions throughout the incident organization
- Comply with safety orders and instructions.

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Diagram 2. This model displays the decision-making process into a standard sequence. (*Courtesy of South King County Fire Training Consortium*)

No operational level of the organization (task, tactical, or strategic) can perform the duties or responsibilities of another level. Firefighters are not absolved from their own personal responsibility to the safety system because the IC is in place; they play an integral role in the safety system to prevent injuries and losses.

Recommendation #7: Ensure that a RIC or FAST is dedicated, assigned, and in place before interior firefighting operations begin and throughout an incident.

Discussion: During this incident, Chief 17-1 radioed 44 Control at 01:02 hours to report active fire and trapped victims. 44 Control then dispatched Fire Department 8 for a FAST along with other resources. At 01:14 hours, Fire Department 8 arrived on-scene and assumed the role as FAST and staged their resources on Side Alpha. However, they were requested by Chief 17-1 to disband as FAST and perform rescue of victims with their crew split into two interior search teams for the 2nd and 3rd floors. The next dedicated FAST, Fire Department 20, arrived on-scene at 01:35 hours.

Fire departments should consistently and consciously upgrade rapid intervention equipment and tactics. Company officers should ensure that the rapid intervention equipment is in a state of readiness and is appropriate for the potential rescue situation. RIC should consider the following list of tools and equipment as a starting point [FDNY 2011; LAFD 2016; TSFRS 2014].

- Thermal imagers
- Additional RIC Kits/Escape Canisters
  - The RIC SCBA Kit consists of the following:
    - Nylon bag with sling and carrying handles, 60-minute air bottle, 1st stage pressure reducer with 20-feet of intermediate pressure hose, facepiece, 2nd stage regulator, 150-feet of drop bag line, flashlight, and escape canister.
- Quartz lights to entrances and windows identified as possible exits
- Apparatus rechargeable lights to entrances and exits of the structure
- Lightweight forcible entry tools (axe, pike pole, hook)
- Rotary saws
- Chalk
- Inside ladder (12-foot or 14-foot)
- Lighted rescue lines
- 2½-inch hoseline with straight tips to penetrate and knockdown the fire
- Mattress carrier
- Strobe lights
- Cyalume© light sticks
- Rescue SCBA (RIC pack)
- Extra SCBA cylinders
- Litter basket (Litter can be used to carry equipment to the access point)
- To reduce noise, consider electric fans used for air bags for ventilation when positive pressure ventilation is indicated and there is sufficient time available
- Tool staging tarp
- Forcible entry tools such as a Halligan bar or other pry tool
- Stokes basket
- 150-foot rope for search and rescue
- Wire cutters
- Rebar cutter
- Life belt and Elevator keys for buildings with elevators.

It is important to stage all necessary RIC staffing and equipment in an expedient manner. In cases in which the life safety exception is employed, the RIC should be established as soon as practical. The RIC officer, accompanied by one member of the RIC, should perform an incident scene survey while the remaining RIC members assemble the RIC equipment. If the size of the structure negates a 360-degree survey of the building, the IC needs to learn about this as soon as possible. This should serve as a benchmark for Command to designate another RIC to effectively cover all sides of the building. During the 360-degree survey, the RIC officer and members should look for ways in and out of the structure, including window configuration, fire escapes, and construction features. The RIC officer should note the feasibility for placement of ground ladders for rescue or escape purposes. The RIC officer should have the responsibility for setting up and securing a suitable secondary egress for interior crews. This may include placing ladders at multiple sides of the structure. Once the RIC has determined the need for an egress ladder, it is necessary to remove the window glass, but only after conferring with Command that the removal of the window will not affect firefighting operations. Placing the egress

ladder(s) at the window(s) is announced over the radio by the RIC officer [Toledo Fire & Rescue Department 2012].

After the above tasks are completed, the RIC equipment is put in place and then the RIC officer should inform Command that a 360-degree survey is complete and the RIC is ready to intervene, if necessary. The entire RIC should stay in an area immediately accessible to the building for rapid deployment and maintain radio contact with Command. The RIC officer should brief all RIC members with the results of the incident scene survey. The RIC should operate as one unit. The addition of more crews can support the team as necessary. When more than one company is added as part of the RIC, a rescue group is formed with a rescue group supervisor [Toledo Fire & Rescue Department, 2012]. Command should consider whether to request the response of an advanced life support (ALS) engine company or truck company as a component of the RIC. The members of an ALS company are trained to operate in a hazard zone and can function as part of the RIC. They also can provide ALS to affected firefighters [FDNY 2011].

The RIC officer and members will coordinate with Command to formulate rescue plan contingencies and to continue to monitor radio and fireground conditions. RIC protection is not a passive assignment. This is a process of ongoing information gathering and diligent scene monitoring until the unit is released by the IC. To ensure that firefighters and fire officers are properly trained to conduct RIC operations, they should meet the requirements of NFPA 1407, *Standard for Training Fire Service Rapid Intervention Crews* [NFPA 1407 2020].

The fire department involved in this incident had a "FAST Procedure" within their department. This document defined the FAST as a team of a minimum of four interior firefighters, established at an incident, and organized to take immediate action to assist other firefighters in case of an emergency. The document further notes that once the fire department's FAST has been established, its members will remain ready at their assigned area designated by the IC, while following the progress of the incident.

Recommendation #8: Ensure that all firefighters and fire officers are trained in fireground survival procedures and Mayday operations.

Discussion: At this incident, Tanker 17D called a Mayday from Room 306 in the assisted living facility. His radio transmissions noted his location and that he was "out of air." It is unknown if the firefighter was able to get out of Room 306 into the hallway or if he became trapped in Room 306. He was eventually located in the basement of the facility after the building collapsed. The area where he was located would be in relation to Room 306 and how the building shifted during the collapse. Firefighters need to be trained to recognize when they are in trouble, know how to call for help, and understand how the IC and others need to react to a responder in trouble [Jakubowski and Morton 2001]. A Mayday declaration is such an infrequent event in any firefighter's career that they need to frequently train to recognize when to declare the Mayday and what steps to take to improve their survival chances.

Calling a Mayday is a complicated behavior that includes the affective, cognitive, and psychomotor domains of learning and performance [Grossman and Christensen 2008; Clark 2005]. Any delay in

calling a Mayday reduces the chance of survival and increases the risk to other firefighters trying to rescue the downed firefighter.

Firefighters should be 100% confident in their competency to declare a Mayday for themselves. Fire departments should ensure that any members who may enter an IDLH environment meet the Mayday competency standards of the authority having jurisdiction (AHJ) throughout their active-duty service. Presently, there are no national Mayday standards for firefighters and most states do not have Mayday standards. A RIC will typically not be activated until a Mayday is declared. Any delay in calling the Mayday reduces the window of survivability and increases the risk to the RIT [IAFF 2010; IAFF 2022; Clark 2005; Clark 2008; USFA 2009].

There are no mandates on when a firefighter should call a Mayday [NFPA 1001 2019]. It is up to each AHJ to develop parameters and performance standards f. The International Association of Fire Fighters (IAFF) Fireground Survival program is another resource fire departments can use. It was developed to ensure that training for Mayday prevention and Mayday operations are consistent among all firefighters, company officers, and chief officers [IAFF 2010].

Once in distress, firefighters must immediately declare a Mayday as accurately as possible. Any Mayday communication must provide the location of the firefighter in as much detail as possible and, at a minimum, should include the division (floor) and quadrant. It is imperative that firefighters always know their location when in IDLH environments to effectively give their location in the event of a Mayday. The following example uses *LUNAR* (Location, Unit, Name, Assignment/Air, Resources needed) as a prompt: "Mayday, Mayday, Mayday, Division 1 Quadrant C, Engine 71, Smith, search/out of air/vomited, can't find exit." Once the IC and RIC know the firefighter's location, the firefighter can then try to fix the problem, such as clearing the nose cup, while the RIC is enroute for rescue [USFA 2009].

Psychological and Physiological Effects:

A firefighter who is breathing carbon monoxide quickly loses their cognitive ability to communicate correctly and can unknowingly move away from an exit and other firefighters before becoming unconscious. Without the accurate location of a downed firefighter, the speed at which the RIT can find them is diminished, and the window of survivability closes quickly because of lack of oxygen and high carbon monoxide concentrations in an IDLH environment [Clark 2005; Clark 2008].

Firefighters also need to understand the psychological and physiological effects of the extreme level of stress encountered when they become lost, disoriented, injured, trapped, or run low on air during rapid fire progression. Most fire training curriculum does not include discussion of the psychological and physiological effects of extreme stress, such as encountered in an imminently life-threatening situation, nor do they address key survival skills necessary for effective response. Understanding the psychology and physiology involved is an essential step in developing appropriate responses to life-threatening situations. Reaction to the extreme stress of a life-threatening situation, such as being trapped, can result in sensory distortions, and decreased cognitive processing capability [Grossman and Christensen 2008].

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In the book, *Stress and Performance in Diving*, the authors note: "We know that under conditions of stress, particularly when rapid problem-solving is crucial, overlearning responses is essential. The properly trained individual should have learned coping behavior so well that responses become virtually automatic requiring less stop and think performance" [Bachrach and Egstrom, 1987]. One of the most difficult situations a firefighter can face is when they realize they need to declare a Mayday [FIRESCOPE, 2015]. Recognizing that they are or about to be in a life-threatening situation is the first step in improving a firefighter's chance to survive a Mayday event. Some fire departments do not have a simple procedure for what to say when a firefighter gets into trouble—a critical situation where communications must be clear [NIOSH 2010].

Mayday Procedures:

Firefighters must understand that when they are faced with a life-threatening emergency, there is a very narrow window of survivability. Training is frequently limited to breathing apparatus emergencies, egress through small openings, and emergency window egress. It is necessary to place additional emphasis on appropriate procedures for tactical withdrawal under worsening fire conditions and structural collapse situations. Firefighter training programs should include training on such topics as air management and emergency communications; familiarity with their SCBA, radio, and PPE; crew integrity; reading smoke, fire dynamics and fire behavior; entanglement hazards; building construction; and signs of pending structural collapse. As part of emergency procedures training, firefighters need to understand that their PPE and SCBA do not provide unlimited protection. PPE that are not properly donned, worn, or activated may provide reduced protection or no protection at all. The IAFF has developed the IAFF Fire Ground Survival Program to ensure that training for Mayday prevention and Mayday operations is consistent between all firefighters, company officers, and chief officers [IAFF 2010].

Firefighters must act promptly when they become lost, disoriented, injured, low on air, or trapped [FIRESCOPE 2015; IAFF 2010, LAFD 2016; Toledo Fire & Rescue Department 2012]. After quickly assessing the sustainability of their location, a firefighter should transmit a Mayday following these procedures:

- Activate the EAB on the portable radio pushing the button for 1 to 3 seconds to activate. Note: All fireground radios should be equipped and programmed with EABs [NIOSH 2023]
- Declare the Mayday announced on the radio as "MAYDAY, MAYDAY, MAYDAY" followed by the unit designation, then a brief and concise statement of essential information
- Ensure the message is acknowledged by command and/or the dispatcher
- Ensure their PASS device is activated.

Firefighters must transmit a Mayday while still having the capability and sufficient air, noting their location if possible. Firefighters may need to move away from untenable fire conditions before calling the Mayday. The next step is to manually activate their PASS device. To conserve air while waiting for rescue, firefighters should try to stay calm and focused on their situation and avoid unnecessary physical activity.

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After initiating a Mayday, firefighters should survey their surroundings to get their bearings and determine potential escape routes, such as windows, doors, hallways, changes in flooring surfaces, etc., and stay in radio contact with the IC and other rescuers. In addition, firefighters can attract attention by maximizing the sound of their PASS device (e.g., by pointing it in an open direction), pointing their flashlight toward the ceiling or moving it around, and using a tool to make tapping noises on the floor or wall. A crew member who initiates a Mayday call for another person should quickly try to communicate with the missing member via radio and, if unsuccessful, initiate another Mayday providing relevant information on the missing firefighter's last known location. Emphasis on appropriate procedures for retreat/emergency evacuation under worsening fire conditions and/or pending building collapse is necessary. An operational retreat is designed to quickly remove firefighters from operations in an unsafe or potentially unsafe environment. The IC needs to initiate an operational retreat whenever the operational area is deemed unsafe for emergency personnel. All members operating in the unsafe area need to evacuate as the operational retreat procedures are initiated. Operational retreat needs to begin with radio traffic announcing "emergency traffic" with directions for all emergency personnel to evacuate the operational area. An emergency egress signal should sound [IAFF 2010; IAFF 2022; LAFD 2016]. For example, repeat short air horn blasts of approximately 10 seconds, followed by 10 seconds of silence. This sequence should be repeated three times.

Upon hearing an operational retreat signal, all firefighters should immediately withdraw from any operations they are performing and leave the operational area. All company officers should immediately perform a PAR, of all members they are responsible for and report the results to the IC. If firefighters find themselves in a questionable position (dangerous or not), they must be able to recognize this and know the procedures for when and how a Mayday should be called. A firefighter's knowledge, skill, and ability to declare a Mayday must be at the mastery level of performance. This performance level should be maintained throughout their career through training offered more frequently then annually [IAFF 2010; IAFF 2022; Sendelbach 2003].

Fireground Survival and Mayday Training:

As part of emergency procedures training, firefighters need to understand that their PPE and SCBA do not provide unlimited protection. PPE that is not properly donned, worn, or activated may provide reduced protection or no protection at all.

Training should include situations dealing with uncontrolled SCBA emergencies, egress through small openings, emergency window egress, building collapse, and other situations that are possibly encountered during a Mayday situation. Firefighters need to be trained to recognize when they are in trouble, know how to call for help, and understand how ICs and others need to react to a responder in trouble [Jakubowski and Morton 2001]. A Mayday declaration is such an infrequent event in any firefighter's career that they need to frequently train to recognize when to declare the Mayday and what steps to take to improve their survival chances.

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Recommendation #9: Provide a Mayday tactical worksheet for ICs in the event of a Mayday.

Discussion: At this incident, the IC did not use a Mayday tactical worksheet.

When a Mayday is transmitted, ICs have a very narrow window of opportunity to locate the lost, trapped, or injured member(s). The IC will need to restructure the strategy and tactics to include a priority rescue [NFPA 1550 2024]. A Mayday tactical worksheet serves as a guide and a tailored checklist to any fire department's Mayday procedures such as a reminder to prompt the firefighter to activate their EAB for priority radio transmissions and other important items such as PASS activation, air status and location information. This worksheet can be easily located on the back of a tactical worksheet to assist ICs in ensuring the necessary steps are taken to clear the Mayday as quickly and safely as possible. This process is too important to operate from memory and risk missing a vital step that could jeopardize the outcome of the rescue of a firefighter who is missing, trapped, or injured [IAFF 2010; IAFF 2022].

Some departments have adopted the term LUNAR—location, unit assigned, name, assistance needed, and resources needed—to gain additional information in identifying a firefighter who is in trouble and in need of assistance. The IC, division/group supervisors, company officers, and firefighters need to understand the seriousness of the situation. It is important to have the available resources on-scene and to have a plan established prior to the Mayday [Brunacini and Brunacini 2004; NFPA 1550 2024]. A checklist is provided in **Appendix One**, *Incident Commander's Tactical Worksheet for Mayday*.

A Mayday tactical worksheet can assist the IC in ensuring the necessary steps are taken to clear the Mayday as quickly and safely as possible. This structured checklist serves as a guide, and it is possible to tailor the checklist to any fire department's Mayday procedures. This process is too important to operate from memory and risk missing a vital step that could jeopardize the outcome of the rescue of a firefighter who is missing, trapped, or injured.

Recommendation #10: Ensure that all members engaged in emergency operations receive annual proficiency training and evaluation on fireground operations, including live fire training.
Discussion: To ensure the proficiency and competency of fire department members, fire departments should conduct annual skills evaluations to verify minimum professional qualifications. This annual evaluation should address the qualifications specific to the member's assignment and job description. Evaluation of skills should take place on a recurring cycle with the goal of preventing the degradation of skills and abilities and ensuring the safety of members. Proficiency evaluation and training provide an opportunity to ensure that all fire officers and firefighters are competent in fireground operation knowledge, skills, and abilities. This process should include annual live fire training.

NFPA 1550, *Standard for Emergency Responder Health and Safety*, requires a fire department to establish and maintain a training, education, and professional development program with the goal of preventing occupational deaths, injuries, and illnesses. This ensures member competencies are maintained to execute all responsibilities effectively, efficiently, and safely [NFPA 1550 2024]. This process is consistent with the organizational statement that establishes the existence of the fire department, the services the fire department is authorized and expected to perform, the fire department's

organizational structure, and the job descriptions and functions of fire department members [NFPA 1550 2024]. As members progress through various job duties and responsibilities, the department should ensure the necessary knowledge, skills, abilities, and the required ability to demonstrate competencies for the defined position. The training and education process also should provide the ongoing development of existing skills [NFPA 1550 2024].

NFPA 1410, *Standard on Training for Emergency Scene Operations*, defines basic evolutions, which are adaptable to local conditions and serves as a method for the evaluation of minimum acceptable job performance during training for fire suppression and rescue activities [NFPA 1410 2020]. Proficiency training for fireground operations and emergency incidents should occur annually. This training should include scene size-up, situational awareness, use of an incident management system, personnel accountability system, strategy and tactics, search and rescue, hoseline operations, ladder operations, ventilation, thermal imaging cameras, fireground communications, use of RITs, and Mayday operations.

Recommendation #11: Ensure adequate incident scene rehabilitation is established in accordance with NFPA 1584, Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises.

Discussion: It is essential at any working fireground incident to have a rehabilitation area. Establishing incident scene rehabilitation ensures the health and safety of firefighters during the incident. This should include a medical treatment area so firefighters can receive immediate treatment and transportation if necessary. This is especially important when an incident incorporates several operational periods for Type V and Type IV incidents.

NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*, establishes the minimum criteria for developing and implementing processes for member prehabilitation, contamination control, rehabilitation, and recovery from incident scene operations and training exercises [NFPA 1584 2022].

Incident scene rehabilitation (Rehab) is a term often used for the care given to firefighters and other responders while performing their duties at an emergency scene. It is important to monitor the physical and mental condition of members as part of the overall assessment. This ensures a firefighter's health does not deteriorate to the point that it affects the safety of other firefighters or endangers the safety and integrity of the operation. An IC should consider the circumstances of each incident and make suitable provisions for rest and Rehab of members. This process should include medical evaluation and treatment, food and fluid replenishment, and rest and relief from extreme climatic conditions.

When the size of the operation or geographic barriers limit members' access to the Rehab area, ICs should establish more than one Rehab area. The radio is used to communicate information about the establishment of a Rehab area(s), so all members know the location of Rehab or know where to report when assigned to Rehab.

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USFA [2008] offers several considerations for Rehab sites include placing them in a location that:

- Offers space for physical rest for firefighters to recuperate from the demands and hazards of an emergency incident or training evolutions
- Allows members to safely remove turnout gear and SCBA and get physical and mental rest from the stress and pressure of an emergency incident or training evolution (with provisions available for having SCBA cylinders refilled)
- Protects from prevailing environmental conditions, with a cool, shaded area during hot weather and a warm, dry area during cold weather
- Are free of exhaust fumes and noise from apparatus, vehicles, or equipment, including those involved in Rehab group operations
- Are large enough to accommodate multiple crews, based on the size of the incident
- Can be easily accessed by emergency medical service units
- Allows for prompt reentry into the emergency operation upon complete recuperation
- Requires crews assigned to Rehab to turn portable radios off and/or have radio and thermal imager portable batteries recharged or exchanged (**See Diagram 3**).

The Rehab Group supervisor should secure all necessary resources required to adequately staff and supply the Rehab area [USFA 2008]. The supplies should include the following items:

- Fluids: water, activity beverage, oral electrolyte solutions, and ice
- Food: soup, broth, or stew in hot/cold cups
- Medical devices: blood pressure cuffs, stethoscopes, oxygen administration devices, cardiac monitors, intravenous solutions, and thermometers
- Other: awnings, fans, tarps, heaters, dry clothing, extra equipment, floodlights, blankets, towels, traffic cones, and fire-line tape (to identify the entrance and exit of the Rehab area)
- Hygiene facilities to decontaminate exposed skin surfaces
- Restroom facilities.

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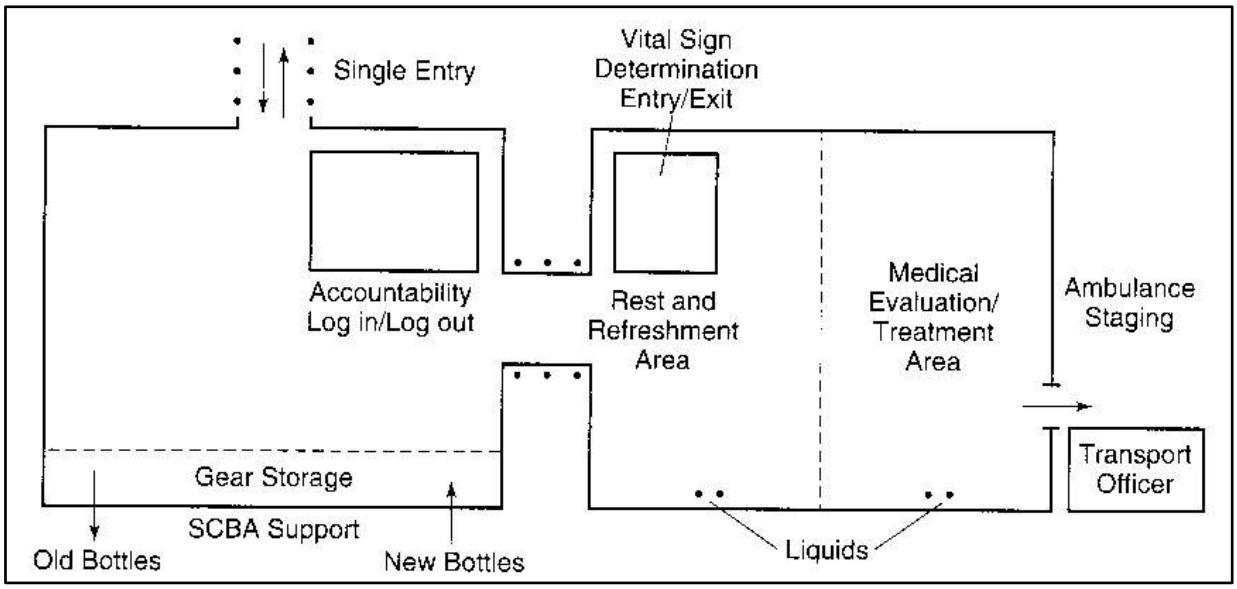

Diagram 3. An example of how a Rehab area should be organized. This is just one of many ways to establish an effective Rehab area.
(*Courtesy of U.S. Fire Administration*)

Recommendation #12: Have SOP/ SOG to ensure that water supply is established during initial fireground operations, particularly in areas with limited water pressure, limited hydrants, or no hydrants.

Discussion: At this incident, the fire department encountered a minimal water supply due both the dead-end water mains and a community water storage tank (capacity of 750,000 gallons) being out of water. Both of these water sources had been depleted due to supplying the sprinkler system at the facility. The water system in the village is privately owned. Firefighters on-scene utilized 3,500-feet of 5-inch supply line and three relay engines to establish a secured water supply from a hydrant on a 20-inch+ water main for fire suppression operations later in the incident.

The establishment of a water supply at a fireground is a critical operations benchmark. In areas with limited or no hydrants, a comprehensive preplanning process is needed. This process may include information on map book pages, case notes, or comments on the dispatch to a defined address. For non-hydrant areas, this preplan information should be assembled in a water supply preplan book and sent to applicable engine and tanker/tender companies. In addition, this information should be shared with automatic aid and mutual companies [Fire and Rescue Departments of Northern Virginia 2019].

While enroute to the fire, the first-arriving engine officer should initiate the incident's water supply plan. Using area preplans, the officer should designate dump sites, fill sites for the shuttle operation, or relay positions for in-coming units. Upon arrival, the first-arriving officer's scene size-up and risk assessment should include an estimate of the fire flow requirements on the anticipated water supply. This information allows the development of an appropriate IAP and dictates whether an offensive operation is

appropriate. The first-arriving officer should then communicate the IAP to all responding resources and dispatch.

Before committing resources in the hazard zone, the IC must ensure a sustainable water supply is available. Thus, during size-up and risk assessment, the IC should consider the following information [Wieder 2019]:

- Fire load
- Fire flow requirements for the incident
- Key tactical areas needing water
- Units needing a continuous water supply
- Number of hoselines a pumper(s) can charge and pump
- Number of large diameter openings the pumper(s) charge and pump
- Water sources
- Staffing.

It is vital that an adequate water supply is maintained throughout the incident. ICs should reassess the water supply issue regardless of whether the incident is served by fire hydrants or requires a rural water supply [Fire and Rescue Departments of Northern Virginia 2019]. When water requirements exceed the amount available from nearby hydrants or the amount of water carried by the 1st alarm apparatus, a water supply group and water supply group supervisor should be designated. All units in the water supply group will be under the management of the water supply group supervisor. The water supply group supervisor is the individual responsible for resourcing adequate water supplies required to implement the tactics outlined by the IC [FCFCA 2015].

When a hydrant is not located close enough to the scene to provide a pressurized water source, a water shuttle operation should be set up and utilized as soon as possible. Because a water shuttle operation takes place outside of the hot zone, pumping engineers and water shuttle apparatus operators should consider being placed on a separate radio channel or talk group that is managed by a water supply supervisor or water supply group supervisor. This will reduce radio traffic on the primary tactical channel.

Water shuttle operations utilizing portable water tanks and tenders represent a unique scene management challenge and should be well understood by members working in response areas that depend on these operations. The lack of, or delay in obtaining, a continuous water supply is a critical factor when making strategic decisions [Fire and Rescue Departments of Northern Virginia 2019]. The defensive strategy must be considered when adequate fire flows cannot be established early in the operation.

Recommendation #13: Consider maintaining resources and protocols to address occupational exposure to potentially traumatic events for their members.

Discussion: The incident response lasted over 40 hours total and included 25 of the 26 fire departments in the county as well as fire departments from the state of New Jersey. Tanker 17D was located almost 24 hours after the initial Mayday call. On-scene resources, including heavy equipment and a state urban search and rescue team, actively searched for Tanker 17D for almost 14 hours after the fire was declared

under control. According to interviews conducted by the NIOSH investigators, many of the responding firefighters refused to leave the incident scene when requested to clear by Command. These firefighters elected to stay on-scene to assist in the meticulous search and remained until Tanker 17D was recovered (**See Photo 9**).

Following the termination of the incident, 44-1 activated a CISM response to provide mental health resources and services (e.g. debriefing team, free sessions with licensed behavioral health specialists, and peer support) to the firefighters and other first responders involved in this incident. The provision of these resources was followed up by numerous telephone calls, emails, and meetings with agency leadership to ensure knowledge of and ease of access to the resources for their members. Many of the firefighters interviewed by NIOSH investigators noted utilizing these resources due to experiencing initial and ongoing mental health-related symptoms and struggles following their involvement in this incident.

According to NIOSH, public safety sector workers, including firefighters and EMS clinicians, are at a high risk of occupational exposure to traumatic events and stress. As such, mental health programs are critical for addressing the unique challenges these workers face including the potential health effects that may result from these exposures [Kiederer M. et al. 2024]. This includes chronic exposure to highly stressful situations as well as acute exposure to catastrophic events such as those in this incident. There is variation among people regarding their threshold for developing symptoms, how adverse events are processed, the coping strategies they use, and their willingness to seek help when their capacity to cope is challenged. These have implications on the mental health symptoms they may experience following a single exposure or cumulative exposures over time. These can also affect their overall well-being, interpersonal relationships, and job performance [National Volunteer Fire Council 2021].

Effective programs deployed by agencies should be multi-faceted, address organizational factors, and focus on building resilience, stress management, post-traumatic stress disorder awareness, and coping strategies [NIOSH 2024]. NFPA 1550, *Standard for Emergency Responder Health and Safety* provides recommendations for fire departments to prepare for and address occupational exposure to potentially traumatic events:

- Establish and maintain a relationship with an appropriately licensed behavioral health specialist that has knowledge and experience working with the fire department culture and traumatic exposure.
- Adopt and utilize a written policy outlining protocols to address exposure, including for the critical injury of a member or a line-of-duty-death.
- Ensure members are aware of and have access to a clear outline of assistance and interventions available for affected members [NFPA 1550 2024].

NFPA 1550 further notes that participation in clinically related interventions such as employee assistance programs shall be voluntary at the member's election. The member's identity should remain confidential and anonymous. Also, where specialty treatment is indicated, referral should be made to licensed specialists who are both certified to provide specialized evidence-based treatment that is

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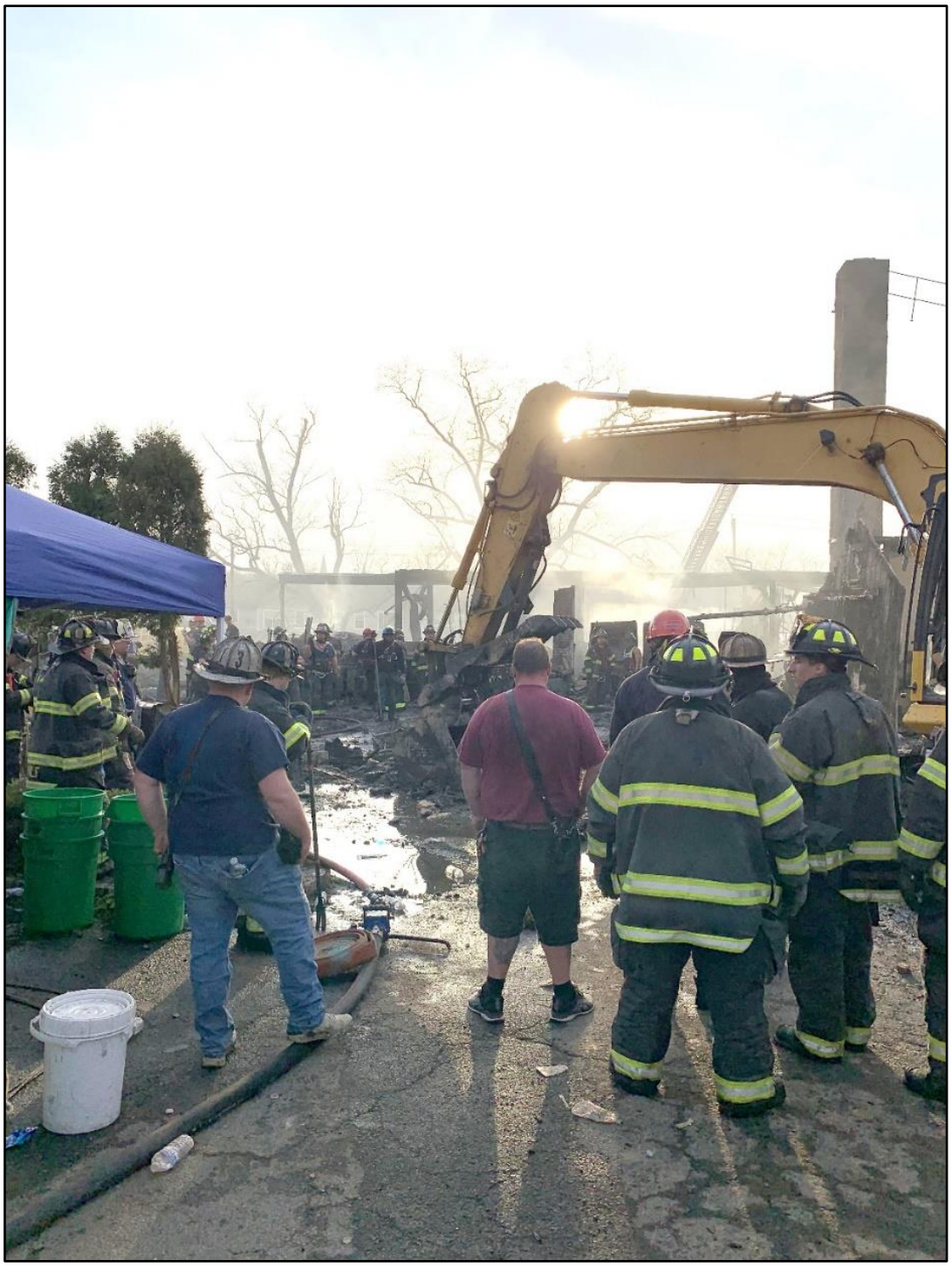

Photo 9. A photograph of firefighters surrounding heavy equipment working to locate Tanker 17D in the remains of the assisted living facility. (*Photo courtesy of the county Fire Academy*)

appropriately covered in insurance networks. Outside of these recommendations, organizations such as the National Volunteer Fire Council suggest that fire departments create and maintain an environment that promotes resilience and the ability to successfully cope with extreme work-related stressors. An environment where members feel comfortable talking about mental health and seeking help when needed is critical for managing occupational exposure to potentially traumatic events in the fire service [NVFC 2021].

Additionally, governing municipalities (federal, state, regional/county, and local) should:

Recommendation #14: Ensure that when the applicable fire code is not enforced by the fire department, the delegated authority shares information with the fire department which may affect fire department operations.

Discussion: In this incident, multiple additions and renovations were undertaken at the assisted living facility using various building construction materials. However, records of these renovations and the original building construction are limited or non-existent. During the fire department's response, things such as replacement of ordinary window glass with plexiglass were discovered, hampering response to the Mayday. Fire and building code utilization and enforcement were conducted by the AHJ in the incident, not the fire department.

The AHJ is responsible for training and certifying inspection and code enforcement personnel to ensure that the appropriate fire and building safety codes are utilized and enforced. Based upon jurisdiction, fire and life safety inspection programs may be in the fire, building, or code enforcement departments. In some fire departments, this responsibility is performed by firefighters, fire prevention divisions, or fire officers. When the authority to perform fire inspections and code enforcement is not assigned to the fire department, the fire department should develop a working relationship with the department that has this authority [IFSTA 2016].

NFPA 1201, *Standard for Providing Fire and Emergency Services to the Public*, Section 6.3 states, "the fire and emergency service organization (FESO) shall seek to establish a good working relationship with the agency or authority responsible for enforcing the building code so that the review of the design, construction, alteration, or demolition of buildings and structures can be monitored to identify fire protection concerns." This includes ensuring investigation of fires and other emergencies to assist with developing an effective hazard and risk prevention program [NFPA 1201 2020]. This also includes inspections, permits, code violations, fire protection maintenance and service, and any other vital information. When fire departments and fire leadership maintain a familiarity with their AHJ's local ordinances, this enhances their ability to have input in renovations and use group changes for occupancy types within their jurisdiction.

NFPA 1730, *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations*, Chapter 6 states that "fire prevention inspection and code enforcement shall be conducted to ensure compliance with adopted codes and standards." The AHJ shall determine the minimum resources, personnel, and equipment levels necessary to perform code enforcement and inspection activities. Additionally, NFPA 1730 [2019] states

that existing occupancy fire prevention inspection and code enforcement inspection frequencies shall not be less than those specified below for each occupancy risk classification:

- High: Annually
- Moderate: Biennially
- Low: Triennially
- Critical Infrastructure: Per AHJ.

Although the recommended inspection frequency for an occupancy such as the one in this incident is annually, fire departments, in cooperation with their AHJ, can perform additional practices to enhance their ability to identify potential compliance and emergency response issues. This includes performing monthly fire drills in high occupancy risk classifications. These do not need to be full evacuations of occupancies such as assisted living facilities. Rather, they can be limited to ensuring the fire alarm systems are functioning, staff are knowledgeable of occupancy evacuation procedures, and evaluation of fire department pre-plans.

NFPA 1030, *Standard for Professional Qualifications for Fire Prevention Program Positions*, Chapter 7 provides the job requirements for the position of Fire Inspector. It states that the duties of this position involve conducting fire and life safety inspections, to include enforcement actions, and analyses of new and existing structures and properties for construction, occupancy, fire protection, and exposures. This includes identifying occupancy classifications, evaluating fire protection systems and equipment, and recognizing hazards and deficiencies according to applicable policies, codes, and standards adopted and maintained by the AHJ [NFPA 1030 2024].

Recommendation #15: Ensure the water agency/authority responsible for municipal water supply shares information on hydrant testing and flow capabilities with the local fire departments.

Discussion: At this incident, due to the issues of municipal water supply at this incident, the State of New York Department of Public Service commission investigated and issued a report relating to the water company. The report describes the findings by the Staff of the New York Department of Public Service related to whether or not actions or inactions of the water company violated the Public Service Law.

When first responders arrived at the assisted living facility, they observed an established fire that continued to grow in intensity. Over 100 firefighters responded to the fire. During fireground operations, firefighters from multiple local fire departments connected supply lines to nearby fire hydrants. As a growing number of firefighters attempted to extinguish the fire, the water pressure provided from these hydrants, particularly the hydrant located across the street from the assisted living facility began to decrease. The decrease in pressure required a water supply group to establish a water relay from a fire hydrant on a 20-inch+ water main. After the fire, fire departments raised concerns on the sufficiency of the flow and availability of water in water distribution system.

The investigators from the Public Service Commission did not find any violations by the water company requiring further action by the Commission. The Public Service Commission developed eight

recommendations to address issues and improve the water company's operations and local communities' response to emergency incidents.

Even though these recommendations are focused on this incident, any fire department could utilize this information to improve issues or concerns related to water supply. The recommendations are:

- Water flow test records be retained for a minimum of 10 years so that at least the previous flow test records are retained until such time it is replaced by the new and/or updated flow test data and becomes the most current record.
- The water company make a good-faith effort to meet or exceed the *AWWA (American Water Works Association M17-2006: Installation, Field Testing, And Maintenance of Fire Hydrants*, 4th Edition best practice of conducting flow tests on all parts of the distribution system every 10 years.
- If development is anticipated to increase in a given portion of its service territory, flow tests should be conducted before such development is permitted by local land use regulators and before such development commences to better gauge the available flow and ensure adequate supply to meet changing demand.
- The water company develop or enhance protocols that clearly identify and communicate specific hydrant usage between the fire departments, county fire coordinators, and the water company's service territory during or immediately after fire events.
- Improve communication between the water company and local fire departments as well as the county fire coordinator(s), including infrastructure and flow data availability immediately upon request at the time of an incident and need for hook up to hydrants. The information should not just be limited to hydrant locations, but designate which hydrants share a main, and which would have greater available flow.
- Fire hydrant inspection and repair data should be readily available to fire department members upon request.
- The water company organize system orientations and trainings for fire department members on a regular basis, on a timeline and frequency that is appropriate for both water company employees and fire departments, to promote understanding of the system components and operations. Such orientations should also be made available upon reasonable request for fire departments located within the water company's service territories.
- The water company should attempt to support opportunities to educate the local governments and land use regulatory authorities within its service territories on system constraints, load, the interplay of local government fire safety inspections, development planning, and local land use along with fire protection and emergency services planning. Such education should also include promotion of conservation efforts that can assist with alleviating system constraints. Such orientations should be available upon request and held on at least an annual basis.

Recommendation #16: Have an operational procedure when cultural cleansing ceremonies with live fire are performed inside a structure or facility.

Discussion: According to the state's Office of the Fire Marshal investigation report, the fire was started when two individuals performed a cultural cleansing practice on March 22 using a propane torch and hot charcoal to heat metal kitchen appliances and surfaces. The state's investigation report further stated that

these individuals directed the assisted living facility staff to call the county communication center at 17:12 hours on March 22. This was to place the fire alarm system in test mode to avoid a false activation.

NFPA 1, *Fire Code*, 20.1.5.3 states that open flame devices shall be permitted to be used in the following situations, provided that precautions satisfactory to the AHJ are taken to prevent ignition of any combustible material or injury to occupants [NFPA 1 2024]:

- For ceremonial or religious purposes
- On stages and platforms where part of a performance
- Where candles on tables are securely supported on substantial noncombustible bases and candle flame is protected.

In this incident, the AHJ did not have a local ordinance or code that addressed the cultural cleansing practice, even though the practice was routinely used in the jurisdiction and surrounding communities. The practice utilizes a direct flame and hot charcoal to heat surfaces until all food residue is burned away. Communities surrounding the one in this incident maintain comprehensive local ordinances and codes addressing this practice to ensure life safety. These involve a collaboration with fire departments to support the development and use of operational procedures when these cultural cleansing practices occur. Some of these practices maintain the following precautions:

- Fire alarm system is immediately taken out of test mode following the completion of the cultural cleansing practice
- A fire watch is placed for the duration of the cultural cleansing practice and/or the fire department is present for the duration
- Individuals wishing to perform the cultural cleansing practice are required to apply for a permit to do so from the AHJ which includes receiving prerequisite fire prevention training from the fire department
- Individuals wishing to perform the cultural cleansing practice are required to notify the AHJ, fire department, and 9-1-1 and communication centers prior to performing the cultural cleansing practice.

Recommendation #17: Ensure that facilities have operational procedures when the facility's fire alarm system cannot transmit an alarm to a designated fire alarm monitoring service.

Discussion: In this incident, the two individuals performing the cultural cleansing practice directed the assisted living facility staff to place the facility's fire alarm system in test mode. This was done at 17:12 hours on March 22. This prevented an activation of the fire alarm system to notify the fire alarm monitoring facility of the fire.

A fire alarm system might be shut down or otherwise impaired for any number of reasons during the life of a building. Some impairments are preplanned, controlled, and of short duration, such as during periodic testing and maintenance. If the alarm system is required by the Code, or if it was installed to make use of one of the alternatives offered by the Code, it must be in operable condition for the building to be considered Code compliant.

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Instead of designating a building with an inoperative alarm system as noncompliant and prohibiting occupancy under all conditions in accordance with the provisions of 4.6.10.1 of NFPA 101, 9.6.1.6 mandates compliance with the fire alarm system impairment procedures specified by NFPA 72®. In addition to notifying the building owner any time an alarm system or portion thereof is impaired, the service provider is required to notify the AHJ when an alarm system is out of service for more than eight hours. The 8-hour criterion specified by NFPA 72 is intended to correspond with a typical work shift, such that if the alarm system remains impaired at the end of the workday, the AHJ will be notified. If the AHJ determines the alarm system will be impaired for an extended period of time, means to mitigate the associated life safety risk can be implemented. Such means might include establishing a fire watch [NFPA 101 2024; NFPA 72 2022].

It is the intent of the Code that a fire watch result in a heightened awareness of the building's operations and environment. Individuals assigned to the fire watch should be able to recognize fire hazards and understand the procedures for occupant and fire department notification and occupant evacuation in an emergency.

When developing a plan to address system impairment, it is important to consider the nature of the impairment, the location, the increased hazards that are involved, and the actions necessary to mitigate the hazards. The AHJ should be involved in the development of such a plan.

A facility with a fire alarm system should have procedures in place when the fire alarm system is out of service. A written plan needs to be available at all staff workstations. Training needs to be given to all members that may be asked to perform a fire watch. Fire watch procedures involve the assignment of a dedicated person or persons with the express purpose of notifying the fire department and the building occupants of an emergency; preventing a fire from occurring; extinguishing small fires; or protecting the public from fire or danger [NFPA 101 2024].

The fire watch process requires dedicated members, trained and familiar with the facility's fire plan, who have the responsibility to implement the fire watch rounds throughout the affected area(s). The fire watch needs to be documented with findings to include the date, time, and initials of members performing the watch. A fire watch round is a continuous activity performed by having assigned members walking the entire affected area of the system outage. During the round, members monitor the facility through direct observation for possible signs of fire.

When a fire watch is established, it should occur continuously, following the below procedures:

- Observation of fire or smoke should immediately initiate the facility's fire safety plan
- Contact the facility administrator, director of nursing, and maintenance manager when any issues or problems are encountered with the fire alarm system
- Notify the fire department that the fire alarm system is out of service or off-line
- Designate the wing, floor, or building area affected
- Performed by members solely dedicated to the fire watch and who have no other facility-related activities or responsibilities
- Ensure exit access corridors, exits, and exit discharges are unobstructed
- Ensure fire and smoke doors close properly

- Ensure unnecessary machinery running continuously is turned off
- Open and seal sprinkler valves; gauges should indicate normal pressures and sprinkler heads shall be unobstructed
- Maintenance personnel shall be available on site or on call for equipment emergency shut down situations
- Distribute additional fire extinguishers facility-wide and personnel shall be informed of their location.

This not an all-inclusive list of procedures for a fire watch. These procedures should be modified to meet each facility's unique operational needs [State of Wisconsin 2022].

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Investigator Information

This incident was investigated by Murrey E. Loflin, a Safety and Occupational Health Specialist, with the Fire Fighter Fatality Investigation and Prevention Program, Surveillance and Field Investigations Branch, Division of Safety Research, NIOSH located in Morgantown, WV and Dr. Wesley R. Attwood, a Public Health Advisor, with the Public Safety Program, Conformity Verification and Standards Development Branch, National Personal Protective Technology Laboratory, NIOSH located in Pittsburgh, PA. Dan Madrzykowski and Keith Stakes from Underwriters Laboratories, Fire Safety Research Institute provided an expert review of the investigation report. A subject matter expert review was provided by Joseph (Jay) Fleming, retired Deputy Chief with the Boston Fire Department, and Jordan J. Cramer, Chief of Fire & Emergency Services with the South Strabane Fire Department. The NFPA Public Fire Protection Division also provided a technical review.

Additional Information

Underwriters Laboratories (UL)

UL's Firefighter Safety Research Institute (FSRI) continues to work with fire departments and fire service organizations to conduct research on fire dynamics, fire safety issues, and fire ground operations. Access to reports from completed studies and information from on-going studies can be found at https://fsri.org. Access to free online training on evidence-based firefighting (more than 30 course modules in all) can be found at https://training.fsri.org.

International Association of Firefighters Fire Ground Survival Program

The IAFF Fire Ground Survival Training addresses Mayday prevention and Mayday operations for firefighters, company officers, and chief officers. Firefighters must be trained to perform potentially life-saving actions if they become lost, disoriented, injured, low on air, or trapped. Funded by the IAFF and assisted by a grant from the U.S. Department of Homeland Security through the Assistance to

Firefighters (FIRE Act) grant program, this comprehensive fireground survival training program applies the lessons learned from firefighter fatality investigations conducted by the National Institute for Occupational Safety and Health (NIOSH). It was developed by a committee of subject matter experts from the IAFF, the IAFC, and NIOSH.

NFPA 1550, *Standard for Emergency Responder Health and Safety* (2024 edition)
NFPA 1550 marks the integration of NFPA 1500, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*; NFPA 1521, *Standard for Fire Department Safety Officer Professional Qualifications*; and NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety*, into a single standard that addresses emergency responder health and safety.
NFPA 1550 maintains the chapter on "Command Safety." This chapter provides a foundation for incorporating the incident management system at all emergency incidents, especially *Type V* and *Type IV* incidents. The chapter on Command Safety clearly defines the requirements for the IC, including establishing a fixed command post, personnel accountability, the use of staff aides and rapid intervention crews, and the appointment of a safety officer and assistant safety officer(s) (as needed). The standard addresses the expectations and authority of the safety officer. Annexes cover Functional Assignments for High-Rise Building Incidents, Development of Subordinate Officers or Implementing a More Efficient Management System, Incident Management for the Fire Service on Type V or Type IV Incidents, and Structural Fire-Fighting—Risk Assessment and Operational Expectation.

NFPA 1700, Guide for Structural Fire Fighting (2021 edition)
NFPA 1700, *Guide for Structural Fire Fighting*, 2021 edition, is the first NFPA document connecting fire dynamics research and its application to strategy, tactics, and best practices for firefighters in controlling fires within a structure.

Initiated through a project request in April 2015, the Standards Council requested input by June 21, 2015, on the proposed guide. Creation of the Technical Committee on Fundamentals of Fire Control Within a Structure Utilizing Fire Dynamics, the committee responsible for NFPA 1700, was approved at the August 2015 Standards Council meeting. This technical committee was charged with developing a document outlining techniques and methods used in firefighting based on accepted scientific principles and research in fire dynamics. The technical committee includes a balance of representatives from the fire service, insurance industry, subject matter textbook publishers, special experts, and stakeholders actively engaged in fire dynamics research.

NFPA 1700 addresses fire control within a structure by establishing a basic understanding of fire science and fire dynamics. NFPA 921, *Guide for Fire and Explosion Investigations*, served as a model for how to translate fire dynamics understanding in practicable, applicable ways. Current information from recognized research efforts complements fundamental occupancy, building construction, and building service considerations. While acknowledging occupant life threats, the document further addresses the protection of firefighters from the immediately dangerous to life and health environment by reinforcing the need for personal protective equipment and methodologies for contamination control.

The focus of the document is to provide guidance to individuals and organizations on interacting within a structure on fire with proven approaches based on documented fire investigations, research, and fire

dynamics testing to achieve the most successful outcome. Chapters are dedicated to establishing strategies with tactical considerations to provide effective search, rescue, and fire suppression operations, as well as civilian and responder safety.

Disclaimer

The information in this report is based upon dispatch records, audio recordings, witness statements, and other information that was made available to the National Institute for Occupational Safety and Health (NIOSH). Information gathered from witnesses may be affected by recall bias. The facts, contributing factors, and recommendations contained in this report are based on the totality of the information gathered during the investigation process. This report was prepared after the event occurred, includes information from appropriate subject matter experts, and is not intended to place blame on those involved in the incident. Mention of any company or product does not constitute endorsement by NIOSH, Centers for Disease Control and Prevention (CDC). In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites. All web addresses referenced in this document were accessible as of the publication date. *NIOSH Approved is a certification mark of the U.S. Department of Health and Human Services (HHS) registered in the United States and several international jurisdictions.*

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Appendix One

Incident Commander's Tactical Worksheet for a Mayday

(*Courtesy of Los Angeles Fire Department*)

LOS ANGELES FIRE DEPARTMENT

MAYDAY
"IC PROCEDURES"

INITIATE EMERGENCY TRAFFIC TONES FOR 3 SECONDS
"ALL COMPANIES CLEAR THIS CHANNEL FOR A MAYDAY, MEMBER CALLING THE MAYDAY GO"
ACKNOWLEDGE AND DETERMINE (WHO WHAT WHERE)
"MEMBER CALLING MAYDAY INITIATE GRAB LIVES HELP IS ON THE WAY"
DEPLOY THE RIC/RIG
INITIATE EMERGENCY TRAFFIC TONES FOR 3 SECONDS **"ALL COMPANIES WE HAVE A MAYMAY (WHO WHAT WHERE) MAINTAIN CURRENT OPERATIONAL POSITION UNLESS REDIRECTED FOR RESCUE. CONDUCT A PAR"**
MAINTAIN COMMUNICATIONS WITH THE MEMBER DECLARING THE MAYDAY
"METRO WE HAVE A MAYDAY (WHO WHAT WHERE)"
COORDINATE THE RESCUE AND MAINTAIN SUPPRESSION EFFORTS
OBTAIN A PAR FROM EACH COMPANY ASSIGNED TO THE INCIDENT PRIOR TO RESUMING NORMAL RADIO COMMUNICATION

"MAYDAY" RESCUE WORK SHEET

"WHO" **"WHAT"**

COMPANY	CAPTAIN	ENGINEER	DOWN	MISSING	TIME MAYDAY	ASSIGN/TASK
	A/O	FF	TRAPPED	SCBA		

"WHERE"

"GRABLIVES"

RADIO CHANNEL ____	SCBA GAUGE: E ¼ ½ ¾ FULL			
ACTIVATE PASS	YES		NO	
CONTROL BREATHING	YES		NO	
STAY LOW	YES		NO	
TURN ON LIGHT	YES		NO	
MAKE NOICE	YES		NO	
EXIT/SHIELD AIRWAY	YES		NO	

RAPID INTERVENTION GROUP

- ☐ MFC NOTIFIED
- ☐ ADDITIONAL RESOURCES

COMPANIES ASSIGNED	LF___	ENG___	USAR___	BC___	RA___
RESCUE CHANNELS	TAC___	TAC___			
DEPLOYMENT TIME	1ST TEAM @___		2ND TEAM @___		

- ☐ MEMBER/COMPANY FOUND AT = ____
- ☐ MEMBER/COMPANY OUT AT = ____
- ☐ COMPLETE PAR/CAR
  - ☐ ANNOUNCE "MAYDAY" CLEARED AT = ____

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Appendix One (Continued)

Incident Commander's Tactical Mayday Worksheet Page 1

(*Courtesy of the District of Columbia Fire and Emergency Medical Services Department*)

INITIAL ACTIONS & CONSIDERATIONS	DCFD MAYDAY WORKSHEET	MAYDAY CHANNEL	TACTICAL CHANNEL	TIME OF MAYDAY
☐ 1. CONFIRM "MAYDAY" (ID problem)	"Operations to all units, a MAYDAY has been declared on the fireground. Stop all routine radio traffic and continue fire attack. The following units are assigned to the Mayday Branch (*Give units*). All other units switch to Channel ____. Prepare for an accountability roll-call."			
☐ 2. FIREGROUND ANNOUNCEMENT				
☐ 3. LOCATION OF "MAYDAY"				
☐ 4. UNIT WITH "MAYDAY"				
☐ 5. NAME OF MEMBER(S)				
☐ 6. AIR STATUS OF MEMBER(S)				
☐ 7. RESOURCES NEEDED FOR RESCUE				
☐ 8. DEPLOY RIG – RESCUE ACTION PLAN				
☐ 9. AIDE NOTIFY COMMUNICATIONS	"Command to communications, a MAYDAY has been declared by (*Unit*) at (address) for (*give nature of problem*). A MAYDAY BRANCH has been established on Channel ____. All other units will switch to Channel ____.			
☐ 10. REQUEST ADDITIONAL RESOURCES	Order the next alarm and stage them at : _____			
☐ 11. MAINTAIN FIRE ATTACK	STAGING AREA:			
☐ 12. CONDUCT ROLL-CALL	UNITS: E - _____ RS - _____			
☐ 13. ASSIGN MAYDAY BRANCH DIRECTOR	T - _____ EMS - _____			
☐ 14. ASSIGN RIG SAFETY OFFICER	BFC - MISC -			
☐ 15. LEVEL III ACCOUNTABILITY	MAYDAY BRANCH DIRECTOR:			
☐ 16. STAGE & MAINTAIN ALS RESOURCES	RIG SAFETY OFFICER:			
☐ 17. CREATE A DEFENDABLE SPACE				
☐ 18. DEVELOP ALTERNATE STRATEGIES				
☐ 19. CONTROL UNASSIGNED RESOURCES				
☐ 20. CONTROL RISK TAKING				
☐ 21. CONTROL RELEASE OF INFO.				
☐ 22. NOTIFY ALL UNITS AND OUC WHEN MAYDAY HAS BEEN CLEARED.				
☐ 23. ENSURE RIT's ARE RE-ESTABLISHED				

NAME	CO	FL	QUAD	PROBLEMS (Including air supply, & needs)

Mayday Group 1	Mayday Group 2	Mayday Group 3	Support Group	EMS Group
Supervisor: (WFD)	Supervisor:	Supervisor:	Supervisor:	Supervisor:

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Appendix One (Continued)

Incident Commander's Tactical Mayday Worksheet Page 2

(*Courtesy of the District of Columbia Fire and Emergency Medical Services Department*)

	ORIGINAL TACTICAL / MAYDAY CHANNEL	VRS CHANNELS	ALTERNATE TACTICAL CHANNEL	COMMAND / ANNOUNCEMENT CHANNEL
Talk Group 1	03	04 & 08	05	06
Talk Group 2	07	08 & 04	09	010
Talk Group 3	A3	A4 & A8	A5	A6
Talk Group 4	A7	A8 & A4	A9	A10
Talk Group 5	B3	B4 & B8	B5	B6
Talk Group 6	B7	B8 & B4	B9	B10

NOTES:

EMERGENCY IDENTIFIER SIGNALS

- 1st Digit = Type Of Unit

1	Engine Company	6	EMS Supervisor
2	Truck Company	7	Medic Unit
3	BFC	8	Ambulance
4	Haz-Mat Unit	9	Fire Boat
5	Rescue Squad	0	Fire Ops/SOD Cached Radios

0800 Fire Ops radios
0900 SOD events

- 2nd & 3rd Digits = Company Number
- 4th Digit = Riding Position On Apparatus

	ENGINE	TRUCK	BFC	HAZ MAT	SQUAD	EMS
1	OIC	OIC	BFC P1	OIC	OIC	OIC/ACIC
2	Line	Bar	BFC P2	Entry 1	Team A	ACA
3	Layout	Hook	BFC P3	Entry 2	Team B	
4	Driver	Driver	BFC P4	Research	Team B	
5		Tillerman	BFC P5	Driver	Driver	
6			BFC P6 (Aide)		Spare 1	
7					Spare 2	