

Complex Operations at Collapse and Rescue on 38th Street in Manhattan

By Deputy Chief Nicholas Corrado

On Friday, October 30, 2015, at 1028 hours, units in Manhattan were dispatched to Box 0751, reporting a ceiling collapse at 25 West 38th Street. On arrival, units encountered a collapse that trapped two construction workers at a construction site. One worker already was deceased and the other survived, following a successful removal that required more than three hours of collapse operations, including extensive shoring.

The building at 25 West 38th Street was an eight-story, 25- by 100-foot, class 3 hotel that was being demolished. At the time of the incident, the top three levels had been removed. Exposure #2 was 27 West 38th Street, a four-story, class 3 building with the same dimensions and also part of the demolition. Scaffolding was erected in front of both buildings, making size-up difficult. Construction workers were using the 25 West 38th Street address but, in fact, the collapse had occurred at the 27 West 38th Street address. The address was verified, but no Critical Information Dispatch System (CIDS) information was available for that address. Four floors of the rear portion of the building had collapsed in a combination V-shape and cantilever.

Terrorism and collapse due to gas explosion are critical size-up considerations. It was determined that the collapse was due to demolition of the building. The initial size-up also must include the threat of secondary collapse. This assessment must be done by all members and then be reassessed periodically by Chief Officers as the incident progresses. Safety at the scene of a collapse is the single most important consideration during operations.

Battalion Chief Joseph Downey, Rescue Battalion, had arrived second-due to the Box. All six sides of the area (front, rear, sides, basement and floor above) were checked. It was determined that the remaining debris and portions of floors above were hanging over members in the area of initial shoring operations. Members were operating under portions of the floors and debris during removal operations, but shored this area so members would be protected in case of a secondary collapse. Meters were deployed

to detect natural gas and none was found. When Deputy Chief Nicholas Corrado, Division 3, arrived on-scene, Chief Downey assured him that members had assessed the possibility of secondary collapse and all were comfortable moving forward with a shoring operation.

It is implausible for a Chief arriving at a confirmed collapse to remember all tactics, procedures and safety considerations. He/she must prioritize several critical tasks. Acronyms are a great tool for remembering critical tasks at fires and emergencies. After the initial size-up, the author used the acronym, SCLUFS, to help prioritize and manage this collapse operation.

Signal

A recent change in response matrix for a report of a ceiling collapse calls for a response of one engine, one truck and a Battalion. Engine 65, Ladder 24 and Battalion 8 were assigned on the Box. An initial signal must be given to have appropriate resources respond once a collapse is confirmed. A 10-60 was given initially and once it was determined that it would be a prolonged operation, a 10-60 code 1 was transmitted.

Command Post

The first-arriving Chief Officer must establish and announce the location of the Command Post. The initial Command Post was located across the street, out of the collapse zone, providing a better view of the collapsed building and exposures.

Life

All workers and civilians must be accounted for at collapse operations. Shortly after his arrival, Acting Battalion Chief (recently promoted to Battalion Chief) Sean Murphy, Battalion 8, consulted with workers at the scene and received information that 19 construction workers were on-site, 17 of whom were accounted for.

Utilities

FDNY procedures require the second-arriving ladder company to assure that utilities are shut down. Chief Officers must ensure

On 38th Street.

View from in front of Command Post. Front of the buildings are under demolition.



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response of utility companies to assist and confirm the control of gas, electric and water supplies. The Department of Buildings (DOB), Metropolitan Transit Authority (MTA) and New York City Emergency Management (NYCEM) also should be called to the scene.

At this incident, a senior Buildings Department engineer was dispatched. Shortly after the arrival of Chief Corrado, a brief inter-agency meeting was conducted. At this meeting, the engineer agreed that members were working in a safe area and that he would continue to help assess the situation as operations progressed. The MTA official responded to stop subway traffic to prevent vibration from moving trains. Engine 21, commanded by Captain Peter Kearney, and Ladder 4, led by Lieutenant Patrick Brady, were tasked by Acting Battalion Chief Murphy to confirm that gas, electric and water were shut down.

Front

Street management is important. It is necessary to leave room in front for special units to establish cutting stations and place a tower ladder for observation and use of large-caliber streams. Engine 65, commanded by Lieutenant David Delahanty, allowed room in front of the building and then ordered members to stretch a 2 1/2-inch line to the building. A review of audio tapes (which should be done by all Officers after fires and emergencies) revealed several attempts from members of Ladders 24 and 4 and Engine 16 to position Tower Ladder 7 in front. This proved unsuccessful due to heavy midtown traffic.

Sectoring

All Chief Officers must report in to the Command Post with post radios and be prepared to operate as Sector Supervisors. Sectors and a Command Channel were established. The Sectors and those supervising them included:

- Collapse Sector, supervised by Chief Downey.
- Exposure #2 Sector, supervised by Battalion Chief Patrick Tansey, Battalion 6.
- Exposure #4 Sector, supervised by Acting Battalion Chief Kenneth Danielsen, Battalion 7.
- Exposure #3 Sector, supervised by Battalion Chief James Manning, Battalion 10.

Additionally, units in exposures #2, #3 and #4 were used as look-outs for any sign of movement of the remaining structure. Finally, a staging area was established and managed by Battalion Chief James Maloney, Battalion 45.

As the incident progressed and time allowed, the collapse checklist was completed with the help of the Resource Unit Leader (RESL), Battalion Chief Thomas LaPolla, Battalion 9 (assigned to Battalion 8).

All members who operated at this incident exhibited commitment and professionalism to get the job done. As members of FDNY, we are fortunate and proud to be part of such a talented Department. ■

Technical and Dangerous V Collapse

By Battalion Chief Joseph R. Downey

Manhattan Box 0751, transmitted on October 30, 2015, at 1028 hours, for a “ceiling fell down,” turned into a complicated and dangerous collapse rescue operation for FDNY companies. The buildings located at 25 and 27 West 38th Street were both in the process of demolition, making room for a new luxury high-rise hotel. While workers were cleaning up debris on the first floor, there was a sudden and unexpected collapse of the rear portion of 27 West 38th Street.

On arrival of first-due companies, initial reports indicated one worker trapped and one worker was black-tagged. Rescue 1 was the first special unit on the scene, followed by Squad 18. By the end of the three plus hours of rescue operations, there were three rescue task forces working, in addition to numerous rescue operations support units and companies assigned on a 10-60 signal.

A rescue task force includes a rescue company, collapse rescue, squad company with second piece, SOC support ladder, rescue Paramedic unit and Haz-Tac Officer. The Rescue Battalion also is assigned to serve as the task force leader anytime the rescue task force responds. In the revised SOC unit response policy, a rescue task force responds to a “major” technical rescue. A major technical rescue includes transit incident-major, plane down or off airport, trench rescue, building collapse-major, explosion and confined space.

As first-due units perform their size-up of an incident, members of the Rescue Operations Command perform a technical rescue size-up. A 10-step technical rescue plan is used for all technical rescues and was implemented for this collapse.

Step 1, Preparation

Readiness and planning started long before Box 0751 was transmitted. Members of Rescue Operations are required to attend more than 800 hours of technical rescue classes, including collapse rescue operations. Rescue and Squad companies have transformed their firehouses to mini-training centers and are capable of performing many rescue disciplines in quarters. Hose towers, pole holes, firehouse roofs and basements have built-in props simulating collapses, confined space and high-angle emergencies. Drills are conducted each tour to keep members’ skills sharp and test equipment.

Step 2, Response

The initial assignment for a “ceiling fell



View from Above. FDNY members are positioned on the second floor, above the debris pile, monitoring the movement of the collapse.

down” was one engine, one truck and a Battalion Chief. Once it was determined that there was a significant collapse, specialized units were required. The first-arriving Battalion Chief requested the major collapse matrix signal be transmitted. This was an excellent start to get additional engines and trucks, as well as the specialized units. On a building collapse-major technical rescue, the Incident Commander (IC) will have a total of three engines, two ladders, tactical support unit, Rescue Battalion, Safety Battalion, field communications unit (FieldComm), one rescue task force, one additional rescue, SOC compressor, SOC logistics, Haz-Mat 1, Haz-Mat Battalion and Haz-Mat Tech Unit. Once the Rescue Battalion and Division Chief arrived on the scene, it was determined that a 10-60 was required, due to the scope and complexity of the incident. The transmission of a 10-60 signal following the building collapse-major response results in the balance of the appropriate 10-60 units being assigned. At this collapse, most of the units assigned were given a task that contributed to the successful rescue.

Step 3, Assessment

On arrival, members performed a size-up and collected information to provide to the IC. Some of the initial concerns were

cause of collapse, number of workers trapped and structural integrity of the building. Workers on the scene were able to provide accountability and communicate to FDNY members that two workers were trapped. Members were able to identify and locate both workers quickly. Unfortunately, one worker was black-tagged. Rescuers left this worker in place and it was determined the rescuers should concentrate on the worker who was alive, but pinned under the collapse. Companies were assigned to the floors above and exposures to evaluate conditions above rescuers and trapped workers. Rescuers then had to devise a plan regarding how to extricate the viable worker and provide medical care until he could be removed.

Step 4, Hazard Control

The stability of the building had to be assessed immediately because rescuers would be operating in a very dangerous area, while extricating the trapped workers. The main hazard at this point was secondary collapse. Due to the amount of debris hanging from the collapsed floors directly above the pinned worker, companies were positioned on the upper floors and exposures as lookouts. These companies were positioned to identify possible shifting of the unstable floors and collapse pile. It was decided early in



Collapse Factors. Workers stacked bricks on the roof for removal into shafts. Heavy brick piles overloaded the rear of the roof (left). The Safety Chief on the roof was assigned to assist with monitoring the stability of the collapse building (right).

the operation that no one would disturb conditions above the collapse. All overhanging debris was left untouched, while rescuers worked under the collapse to free the worker. Although the floors above were hanging dangerously over the rescuers and trapped worker, the decision was to leave it alone and not cause additional collapse. Shoring was built and Paratech struts were placed on the first floor in the area where the rescuers were working to stabilize the collapse area from below. The shoring and struts were positioned to provide the rescuers and trapped worker protection in the event of a secondary collapse.

Step 5, Support Operations

This incident turned out to be manpower-intensive and a rescue branch was established to manage additional resources. Support operations played a critical role in providing manpower and equipment. The rescue and squad companies handled the technical rescue and removal of the trapped workers, while other units were assigned support roles. SOC logistics responded with its new box truck and provided tools, equipment, replacement batteries, blades and five-gallon buckets to assist with removal of debris. SOC support ladders worked the cutting stations and transported tools and equipment to stabilize the collapse and safely shore debris surrounding the collapse. Ladder companies assisted with the placement of struts outside the collapse area and helped erect shoring. Engine companies stretched precautionary lines and helped move garbage containers so companies could access the collapsed area, as well as post members in adjoining buildings. A third rescue task force was requested to be used as a FAST unit in case of a secondary collapse with rescuers becoming trapped. FDNY Paramedics assessed the worker while he was pinned and started advanced medical care in the collapsed area. It was truly a team effort by all companies that responded.

Step 6, Gaining Access

This act proved to be extremely challenging for the rescuers. The area where the worker was trapped had very limited access and the location was extremely dangerous due to the numerous twisted and broken floor joists and beams hanging from the floors above. Rescuers had to tunnel through the precariously positioned collapse pile and operate, at times, on their stomachs in voids that were only 12 to 15 inches high. The jagged and splintered wood was directly over the rescuers as they carefully traversed in the narrow voids around the trapped worker. A two-sided approach was taken with the rescuers working from the front and rear of the building. Each move was calculated and controlled and everyone operating in the collapse area was knowledgeable regarding the rescue plan. This proved extremely beneficial because the worker was pinned by debris that could be accessed only from both positions.

Step 7, Disentanglement

The worker was trapped under three floors of construction materials and rescuers had to cut, remove, shore and lift debris on and around the worker. This required a tremendous amount of coordination and specialized rescue equipment. Most of the actual rescue operations for this incident occurred during this part of the plan. Rescuers operated for more than three hours to free the worker from underneath the collapse without disturbing the unstable debris pile and possibly causing a secondary collapse and injuring the worker or rescuers. Rescuers carefully cut, lifted and stabilized repeatedly with specialized tools until the worker was cleared and enough clearance was obtained to extract him from underneath the collapse.

Step 8, Packaging

The worker had to be removed from beneath the collapse before he could be packaged appropriately. Webbing initially was placed around the worker and used to pull him from under the collapse to

an area where a backboard and stokes could be used. Once the worker was freed and removed from the void, he was stabilized and handed off to FDNY EMS. EMS personnel provided medical care in a safe area within the building outside the collapsed area. Crush syndrome care was provided and the worker was examined by an EMS doctor before he was moved to an ambulance. It was important to have EMS work on the injured worker as soon as he was removed from the collapse.

Step 9, Removal

Once FDNY EMS treated the worker within the building, he was transported to an ambulance and provided continual care from extrication to arrival at the hospital. The second worker who was pronounced dead on arrival was extricated by rescuers who had to cut one joist that pinned his head against a garbage container. This removal took less than a minute and the second worker was packaged by rescuers for transportation by the coroner.

Step 10, Termination

Once both workers were removed from the collapsed area, companies recovered their equipment. Some shoring was left in place because rescuers did not want to disrupt the debris pile or put members in danger. Rescuers took some time to review operations and conduct an informal debriefing at the scene. Two weeks after the collapse, a formal after action review was conducted with the Chief and company Officers of companies that responded.

Conclusion

All FDNY members who operated at the collapse on 27 West 38th Street worked cooperatively and showed tremendous professionalism when faced with a challenging rescue. The worker trapped for more than three hours survived due to the commitment and dedication of all the rescuers who responded to Box 0751. ■

Workers Pinned: SOC Operations

By Captain James W. Kiesling



Overview. Several floors of the building collapsed, one on top of the other, dumping into the funnel formed at the base. (Inset) Aerial view of both buildings under demolition showing collapse in the rear section of the building.

Rescue 1 had just finished operating at a multi-car accident with multiple injuries and was returning to quarters when a call came over the radio, redirecting members to a reported ceiling collapse. This collapse initially was designated as a minor incident, but soon was upgraded with reports of two victims. One of the victims was a reported fatality, but the other was described as trapped and in serious condition. As the apparatus turned onto the street, Rescue 1 was waved into the block to a position in front of the building by members of the NYPD. On arrival, Captain James Kiesling, the Rescue 1 Officer, reported in to the 8th Battalion, along with FF Michael Cioffi, the Rescue 1 extinguisher Firefighter. Acting Battalion Chief Sean Murphy, 8th Battalion, confirmed reports of two trapped victims (one already deceased and one in serious condition) and assigned Rescue 1 to the extrication of the viable victim.

Captain Kiesling and FF Cioffi proceeded, along with Chief Murphy, to the collapse area and conducted a rapid structural assessment, observing that the victim was pinned under elements of the structure, as well as several floors of debris. The entire area immediately surrounding the collapsed area was compromised. The collapse pattern was very complex, consisting of a V-shaped collapse with multiple structural members forming lean-tos and unsupported lean-tos that, together, formed a

funnel with several collapsed floors of debris (much of it loose brick) poured into it. This funnel started from the upper floors and ended with the mouth of the funnel over the center of the victim's back. The initial assessment indicated that the collapse zone and the surrounding area would require a large variety of shoring to support ongoing operations.

Due to the compromised nature of the structure and the complicated nature of the extrication, no one was operating in the immediate vicinity of the victim, who was not moving. Captain Kiesling and FF Cioffi entered the area to perform a patient assessment. The victim was lying prone, pinned by debris and structural elements up to his armpits. The Officer made patient contact and found that the worker was warm, his grip strong and he was verbally responsive. While his chief complaint was back pain, of immediate concern was that he exhibited signs of respiratory distress. The victim was assured that FDNY members would get him out.

A rapid initial assessment of both the structure and the victim indicated that extrication had to start immediately in order to maximize the chance for a successful conclusion. The initial phase of the extrication was going to require extensive tunneling operations; involving selected debris removal, shoring and cutting structural members. This would be very time-consuming.



Inside the Collapse. Firefighter Michael Rhatigan and members of Rescue 4 take part in parallel extrication operations occurring on each side of the victim. Note, this is well into the operation. This area initially was covered by a partition and had to be reached by tunneling through the debris.

ing and the victim's condition could be expected to deteriorate. Despite the obvious danger, safing operations (making a collapse safe to enter by using various techniques and shoring) would have to be conducted simultaneously with extrication operations, as manpower and equipment became available. The removal of debris off the victim's back and away from his sides was initiated to ease his breathing, as well as to allow for a further assessment of the situation. This precipitated a (not unanticipated) localized secondary collapse, the first of many that proved unavoidable throughout the operation. Tunneling operations were begun on the victim's left side, as well as into the rubble pile on the victim's right that later would give access to the rest of the victim.

Simultaneously, FF Francis Rush, the Rescue 1 chauffeur, was establishing control of operations in the street, along with FF Dean Favarulo, the Rescue 1 roof firefighter. The chauffeur called for Collapse 1 and gave them directions for the best way to get into the block for optimal placement. He also had the ambulance on-scene moved out of the block and then backed in after Collapse 1 was in position. This allowed the collapse unit optimal access to the area of operations, as well as giving the ambulance a clear path of egress upon victim removal. They also coordinated setting up the cutting station where shoring components would be fabricated and provided the large amount of equipment that was necessary to begin the initial tunneling and extrication operations.

Additionally at this point, FF Timothy O'Neill, the Rescue 1 irons firefighter, and FF James Cahill, the Rescue 1 hook firefighter, were conducting a quick structural assessment of the surrounding area. After conducting the assessment, both members reported in to the victim location. FF O'Neill joined tunneling operations at the victim's right, where he eventually was able to tunnel into an approximately 14-inch-high area at the victim's waist level and began extrication from that angle. FFs Favarulo and Cahill now teamed up and began shoring the area that provided access to

the front of the victim. After initiating these shoring operations, FF Cahill then joined extrication operations on the victim's right, initially providing shoring for the area of access and then entering and assisting with extrication.

At this juncture, there were two parallel operations working directly on victim removal. Operations consisted of void expansion, cutting, shoring, selected debris removal and some lifting. Captain Kiesling had called for utilities to be shut down and for response of a Rescue Medic, who arrived during this period. FF Cioffi was backed out to provide access for Dr. Dario Gonzalez, who after consulting with Captain Kiesling and assessing the victim, started an IV to be used for the treatment of crush injury syndrome (in layman's terms, if untreated, the release of the pressure on the victim when freed from the collapse allows the potentially lethal toxins that have built up in the crushed body part into the main circulatory system) and provided oxygen with a non-rebreather mask.

Using a plethora of specialized tools, cutting operations were conducted on a great variety of materials. These operations were performed slowly and methodically. Captain Kiesling remained positioned in a location within the collapse where, with minimal movement, he could see either of the parallel operations and, in some cases, was able to visually and tactilely follow some pieces of the rubble through the debris pile to help assess how operations on one side would affect the other.

By this time, numerous other Special Operations units had arrived. Rescue 4 members began supporting operations on the victim's right and Squad 18 members on the victim's left. FF Cioffi, who had been operating at the victim's upper left side since the beginning of operations, was moved into support operations in order to rotate in fresh personnel. He was replaced by FFs Rush and Cahill. Chief Joseph Downey, Rescue Battalion, arrived and coordinated the operations of all the Special Operations units.

At about this time, a FDNY doctor made his way to the patient. After withdrawing members to provide access, Captain Kiesling reported on the victim's condition. Throughout the operation, he was able to periodically re-establish contact with the victim in order to assess his current status. At this time, his grip had weakened and grown colder and he was talking a lot less. This, along with the fact that the victim was still pinned by a portion of the torso (the left hip area), as well as his legs, was reported to the doctor. The torso being pinned made the option of amputation (which was discussed as a last resort) should his condition continue to deteriorate, not viable at this time.

The final stage of operations continued with the members conducting two parallel operations. These operations consisted of multiple stages of multiple simultaneous lifts, accompanied by debris removal and cutting operations. Much of the cutting now was to facilitate the placement of the various lifting equipment. While the members conducted these operations, Captain Kiesling remained positioned to be able to supervise and coordinate both operations; announcing each lift so all members could call for work to stop and watch and

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Obviously, while members should master the “go to” tools, this is not to say that those other rarely, if ever, used tools should be neglected.

Trapped. In this picture you can see the victim (wearing the orange safety vest), pinned prone. There is a structural member running up his back, pinning his left hip. On the left, you can see a piece of lumber with a number 4 on it (arrow denotes location). This is a header installed to catch more material for lifting. On the right, you can see a battery-operated band saw that was utilized just to cut the three tubes running across the victim's back.

listen for unintended consequences of the operation.

As the final lifts were being conducted, members attached webbing to the victim to maneuver him through the restricted area of egress. When the members felt that the worker was clear of entanglements, a backboard was called for and the victim was maneuvered out of the rubble. He then was packaged and handed off for removal to the waiting ambulance, while members remained at the collapse site to break down operations.

Until the *under control* signal was transmitted, the duration of operations was three hours and 47 minutes.

The support operations for this rescue were extensive. Some of the functions performed by Special Operations included: Squad 288 operating in the basement, shoring underneath the collapse; and Rescue 3 and Squad 1 working in a reserve capacity in the event of a major secondary collapse that could trap the operating units. After the primary operations were concluded, Rescue 3 and Squad 1 then were tasked with removing the second victim, already deceased. The victim was standing, his head pinned by a single floor joist.

Lessons Learned

Patient Care—Often in a training environment, while focusing on a specific skill set, aspects of patient care can be overlooked. This can occur when learning technical skills where the patient (mannequin) is treated as a load to be moved from point A to point B. In addition to assessing the patient's condition and providing appropriate physical care, psychological first aid (through communication) should be applied. This communication also allows members to monitor the patient's condition

during prolonged operations. This should be incorporated into training. Furthermore, in a training environment, the patient's initial condition, as well as changes to his/her condition, should be expected to stimulate a specific response. In a confined space scenario, the patient's condition could decide what manner of patient packaging should be applied. In this scenario, the patient's condition, combined with a rapid assessment of the structure and the level of entrapment, prompted the initial reaction of immediately beginning extraction and the patient's deteriorating condition accounted for the consideration of amputation as a potential option for extrication.

Realism—Training often is conducted in a very sterile environment. While this is the appropriate way to learn a skill as part of a building block approach to learning, eventually, variables should be added into the training. An example of training where this is commonly observed is in auto extrication. In this case, personnel will use hydraulic tools to perform extrication techniques on a vehicle that may not be damaged and, if damaged, the object (vehicle, tree, building, etc.) that supposedly caused the simulated damage is not in the scenario. It is simple to remove the door from a vehicle when compared to removing the same door when it is smashed around a tree trunk. Some of the most notable variables that were encountered during this collapse occurred during shoring and lifting operations. Often when training on various lifting tools, such as those used at this operation—hand pump spreaders, jacks (strut, pencil, hockey puck, bottle, etc.), duck-bill spreaders, air bags and clamshell spreaders—members lift solid objects with minimal thought to the full scenario in which this would be required. As an example of a real world application, picture trying to lift several floors of loose debris consisting largely of loose bricks with a bottle jack. The author will elaborate on this more in the next section.



Rescue Operations. Rescuers operating on both sides of the victim meet. On the left center of the picture, you can see one of the small jacks in position to lift (left arrow denotes location). On the right, you can see the victim's left hand, as well as the O2 tube (right arrow denotes location).

Tool Selection—Obviously, while members should master the “go to” tools, this is not to say that those other rarely, if ever, used tools should be neglected. When conducting training on obscure tools, the statement “I will never use that” often is verbalized. For the majority of the highly specialized gear, members might be correct, but for some of that equipment, they are wrong and for every person who makes that statement, the specific equipment that each will need in the course of his/her career will be different.

The lifting conducted at this operation provided many unique challenges and required the use of highly specialized, rarely utilized, equipment. In many of the lifts, the tool had to be of an extremely low profile in order to obtain a purchase. Generally, the FDNY tool of choice when a low-profile lifting device is needed is the air bag. In this case, they generally were not a viable option for two reasons: 1. On many of the lifts, the air bags would not have been low profile enough to gain a purchase on the material being lifted. 2. The footprint required to place an air bag was too large, both for the ability to position it and for the necessity of maintaining access to and a means of egress for the victim.

The cutting also posed special challenges. These included a large variety (metal, wood, concrete, brick, cable, etc.) of ran-

domly piled materials, all requiring different tools; the need to minimize vibrations; the potential fire hazards produced by tools—such as torches—and the excessive sparks many of the saws produce; gas-powered tools that produce a toxic atmosphere; and a very confined area of operations, just to name a few. Three of the FDNY’s main cutting tools either were not an option or only a very limited option. The hydraulic spreaders and cutters (often associated with auto extrication) were much too big. Additionally, they twist objects when they cut. The cut-off saw is big, gas-powered and can produce sparks and the reciprocating saw produces excessive vibrations.

A small sample of unique tools used included:

Shoring—Lumber, struts, cribbing
Cutting Tools—Mini-band saw (cordless), 6¼-inch circular saw (cordless), reciprocating saw (cordless), rebar cutters
Lifting Tools—Hydraulic spreaders (hand-pumped), numerous low-profile hydraulic jacks; i.e., hockey puck, strut jacks, duck-bill spreaders, clamshell spreaders, pencil jacks, bottle jacks

The operations at this collapse were highly technical and multi-faceted, requiring teamwork and cooperation among the members of Rescue 1, as well as all the other units and agencies operating at Manhattan Box 0751. ■

About the Contributors



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Captain James W. Kiesling is a 28-year veteran of the FDNY. He is assigned to the Rescue Battalion and is a member of NY-TF1. Prior assignments include Captain of

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