TIMES SQUARE SCAFFOLDING COLLAPSE

BY RAY DOWNEY

The Fire Department of New York (FDNY) responded to more than 450,000 alarms in 1997. Those incidents usually lasted from five minutes to a few hours. Some lasted days or longer. Imagine an occupation that lasted for 26 days. It happened in the summer of 1998 when scaffolding used for transporting workers and equipment to the upper floors of the Chrysler Building, which was under construction, collapsed. Construction on the building began in 1930 and is scheduled to be finished sometime this year. The building is rising 86 stories, with two additional floors that are to be used as machinery rooms, bringing the height of the structure to 1,046 feet above street level. Erection of the upper-floor scaffolding in Floors 49 and 50 was near completion when the accident occurred.

One woman was killed, a dozen people were injured. Thousands were evacuated from their buildings, leaving about 500 homeless for an extended period of time. The area around Times Square was
Times Square Scaffolding Collapse

The scaffolding collapse occurred on August 28, 1998, at the Times Square Improvement Project. The incident involved a scaffolding located on the roof of a building on West 43rd Street, near the intersection with Broadway. The scaffolding collapsed, causing significant damage and injuries. The collapse was investigated by the New York City Fire Department and the New York City Fire Commissioner. The incident led to increased safety measures and regulations for scaffolding operations in the city.

Scaffolding Incident:

- **Location**: Times Square, New York City
- **Date**: August 28, 1998
- **Cause**: The scaffolding collapsed due to structural failure.
- **Injuries**: Several workers were injured, with some sustaining serious injuries.
- **Response**: The New York City Fire Department and other first responders were called to the scene.
- **Investigation**: The incident was thoroughly investigated to identify the causes and prevent future occurrences.

**Tragic Loss**:

- **Victims**: Several workers lost their lives in the incident.
- **Community Impact**: The collapse had a significant impact on the community, leading to increased awareness of safety protocols.

**Safety Improvements**:

- **Regulations**: Post-incident, safety regulations were revised to prevent future accidents.
- **Training**: Workers were required to undergo additional training on scaffolding safety.
- **Inspections**: Regular inspections of scaffolding structures were implemented to ensure compliance with safety standards.

**Legal Actions**:

- **Liability**: Legal actions were taken by the affected parties to hold those responsible accountable.
- **Compensation**: Compensation was provided to the victims and their families.

**Memorial**:

- **Remembrance**: A memorial service was held to honor the victims of the scaffolding collapse.
- **Community Support**: The community came together to support the families and coworkers affected by the tragedy.

**Lessons Learned**:

- **Safety First**: The incident served as a reminder of the importance of prioritizing safety in construction work.
- **Cooperation**: The cooperation between different agencies and organizations was highlighted as crucial in managing such incidents.
- **Investigation**: The thorough investigation process was praised for its role in ensuring the safety of future construction projects.

**Conclusion**:

The Times Square Scaffolding Collapse was a tragic event that underscored the importance of safety in construction. The incident led to significant changes in safety regulations and practices, ensuring that such incidents are not repeated in the future.
workers on the street, who were unloading a construction vehicle at the base of the scaffolding, warning them that the scaffolding was about to collapse. Quickly, the workers cleared the area around the scaffolding, warning pedestrians to stay clear.

Fortunately, a street normally packed with morning traffic was empty. A truck trailer in the process of making onto 42nd Street from Sixth Avenue caused the entire block to be free of vehicles, undoubtedly saving many lives.

Seven workers on one of the two elevator cars were able to scramble off at the 32nd floor. The operator of the second elevator escaped from the car on the 18th floor. This image and tracks un-

EXPOSURES ONLocation

While awating the arival of the 10-49
units, Nadine began assigning units to
cover as many of the exposure buildings as
possible. Priority was given to the Wood-
stock Hotel, the parking garage, and a build-
ing under construction. Occupants of the
building were evacuated. Units inside the
hotel assessed the extent of the damage and
conducted a room-by-room search.

Occupants of all buildings on 32nd and
44th Streets—in the collapse zone—were
quickly evacuated. Fortunately, the only occupants of the parking garage were
workers, who exited the garage.

Despite reports that another resident
of the Woodstock Hotel was missing,
department members had to step their
search for the victim and vacate the build-
ing. (They recovered two and found the vic-
tim under debris in her room.) Each floor
of the scaffolding was estimated to weigh
about 8,000 pounds (including scaffolding,
planking for walkways, support members,
and the elevator tracks). Some floors also
had building materials and debris on them.
Taking into account the condition of the
collapsed scaffolding, the loose materials
present, the heavy weight being held basic-
ally by the lower section of the scaffold-
ing, and the uncertainty about what would
happen if the remaining scaffolding col-
lapsed, these safety measures had to be
taken. The members of Rescue Co. 3 located
the victim shortly after they had received
permission to reenter the building and
resume the search.

THE ACCIDENT SITE

Rescue Company 1 was assigned to the
Conde hotel building and gave a preliminary
report of the extent of the damage at the
10th floor. They reported that all of the al-
uminum scaffolding above the 10th floor had
dropped down at least half the distance
between floors—for example, the scaffold-
ing section labeled “Floor 35” was actually sitting
about 30 feet down from Floor 39 and
seven feet up from Floor 38. This was the

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ese with all 30 floors along the initial area of collapse. Anyone on the walkways of the scaffolding would have had to be rescued from above.

On the arrival, I was directed by Deputy Chief McBride in assessing the scaffolding and the potential for further collapse. When I reached the 12th floor by the fire escape, I was struck by the 30 floors above and the size and height of the scaffolding. I was advised by Deputy Chief McBride that the scaffolding had been erected for building renovation and was not for construction. I was assured that there were no workers on the scaffolding. After the initial inspection, the scaffolding was secured and the collapse prevented.

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folding, knew why the collapse had occurred. A number of reasons were offered. One witness reported that he saw the crane on the building's roof strike the elevator track while lifting a load of material. This report was discounted. Another possible explanation was that some nuts and bolts were missing from the horizontal hoisting system and the scaffolding was faulty, thereby causing it to fail and put intense pressure on the elevator track. The explanation getting the most attention was that some of the horizontal supports had been removed to put glass panels in place and had not been replaced by the time of the collapse. The report was still being investigated at the time this article was prepared.

SECURING THE SCAFFOLDING

Most of the first day was spent evaluating the remaining scaffolding and elevator head, examining the scaffolding's horizontal supports on each floor, and developing a plan to stabilize and then remove all scaffolding. Additional units were assigned to assist Rescue Company 1 in tearing down the remaining scaffolding. Every piece of rope and cable available was used in this effort. Officers were given to continue this operation until all the floors were covered. It was not known whether this approach would be successful in holding the scaffolding in place.

Further investigation revealed that the damage was more severe than originally had been thought. Outside construction consultants were called in to help develop an operational plan.

Trains to monitor the movement of the scaffolding were set up on the east and north sides of the incident; they remained in place until the operation was concluded. The trains provided by the FDNV tactical support and command units, which carry them. A few days into the operation, a train, provided by the construction company, was installed on the 21st floor to monitor the area where one of the elevator cars had collapsed into the scaffolding—the area considered to be one of the most unstable on the site.

Another train was placed at the 30th floor, where major damage had been sustained. Firefighters with axes were stationed at these locations at all times and were instructed to notify the command post if any movement was observed in these areas.

Precautionary measures were taken at strategic locations in case it became necessary to implement an emergency evacuation signal. During the night hours, lighting was supplied by FDNV tactical support units and industrial "Hollywood" lights. During the around-the-clock operation, FDNV Special Operations Command provided portable lighting on all floors.

The second day began with the morning meeting at which all agencies gave a morning status report. These reports covered traffic problems, train station closings, bus rerouting, the relocation of residents from hotels and apartment houses, the concerns of businesses; the needs of the utility, who had been evacuated and were unable to take their medications; returning their glassware, and rescue their pets, and so on.

THE OPERATIONS PLANS

The construction company revealed its plans, which were discussed at length and had to be approved by the Building Department, which had complete control over all operating plans. The fire department also had to approve all operational plans. Safety was the primary concern of all.

The first concern in developing the plan was to secure all scaffolding (all 50 floors) so that no debris such as wood planks and piping would fall or slide away from the structure. A number of ideas were considered. The option selected was to encase all the scaffolding in something to achieve a cushion effect. The first big question to be resolved was, How do you hold a building that would be more than 100 feet high on four sides and secure it so that it wouldn't become a giant sail?

Note: Every detail of the design was taken into consideration, including weight-bearing, the state of the support cables, and methods of securing and pulling the netting in place.

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The plan adopted involved constructing a 36-square-foot box of structural steel to support the curtain, which would be held by an A-frame, also constructed of structural steel. The unit would be fastened on the roof and an in place at a 28-degree angle over the scaffolding. The box was suspended from a ring on the A-frame by four steel cables. Ten cables to which the netting would be attached were then secured to the box. The cables were put in place in a "balanced" sequence to maintain the system's stability. The primary objective was to prevent the scaffolding and debris from becoming dislodged. Construction workers operated in bulk to secure the curtain's main line. Radios and horn signals were used to ensure workers' safety while they attached the cables to the box.

While this operation was taking place, "needle beams" that would be used to support the scaffolding were being assembled inside the building. The beams were assembled with the five-foot sections of the material used for the tracks of the elevator boxes. The sections, each of which weighed 250 pounds, were bolted together to form the beam. The needle beams were then set out and under the collapsed scaffolding, for every foot of beam out from the floor, 1 foot and a half of beam had to be kept in on the line—of 20 feet of beam were placed under the scaffolding, for example, 30 feet would be back on the floor area. The section of beam back on the floor was properly secured and shored to maintain its stability and prevent it from tipping over.
These needlehams were strategically placed on the areas of the floor from which they would provide the greatest support. Also, the building's design made it necessary to provide additional shelving for the floor area. The cown ushers were placed with care to support the additional weight of the beams.

Engineers also were concerned about the areas the collapsed scaffolding was placed on all floors. This was because the problems would not be resolved quickly. Stabilizing the scaffolding took longer than was anticipated.

During these operations, the departmental personnel were stationed in each work area, providing fire protection and life-saving capability. EMS personnel were stationed throughout the area and squad companies.

When the netting was in place, "cattle nets" were placed over 100 feet from the building, to secure the netting and prevent it from blowing in the wind. Before removing the scaffolding, the netting had to be secured by "hitching hanks." The cable was wrapped completely around sections of the scaffolding and secured to columns inside on the floor.

On the 46th floor, visual painting and a tool kit were placed on the scaffolding, causing serious concern that debris could be dislodged and fall to the street. Engineers recognized a sinister "safety" netting and progressed in the uppermost area and around the debris and secured it to the floor area, without disturbing the floor area.

Sheds were built on the sidewalk to deflect falling debris, with no damage or potential pedestrian protection when the guests were opened.


Exposures

Once the scaffolding was secured and enclosed, the surrounding structures were evaluated. A supporting leg of a large scaffold went on the roof of the Woolworth Hotel was damaged. However, an inspection of the south system revealed that the work did not require additional support. Two additional sections were assembled on the roof to provide additional safety for the scaffolding and debris. These sections came in sections and were assembled in place. These special sections were a welcomed means for the case when that had been in operation for the beginning of the incident.

As more of the scaffolding became exposed, more of the area was opened, and the guests were allowed to move back into their apartments.

Wherever possible, work on the surrounding buildings continued. The repair of the roof had to be completed. The fire escape in the case of a building on 48th Street was seriously damaged. Other means had to be provided in a secondary means of escape if the building was to be occupied.

Residents of the Woodstock Hotel were allowed to go back into the building to retrieve personal items after work had stopped for the day. Building inspectors had to inspect all the damaged structures.

Dismantling the Scaffolding

Discussion on how to dismantle the scaffolding continued. The scaffolding would be dismantled by the company that had assembled it. The dismantling process was the same as before, but many floors were in the section on the scaffolding in various places that could be dismantled. Workers on the scaffolding were assisted with safety lines. Because company members had rope systems in place, the fire escape should occur, and workers had to be reached. A secure means than for dismantling the scaffolding was drawn up and issued to all agencies and workers. Preferably work was completed on Day 14. The two decks were created.

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Light to dark, 13-hour work schedule was adopted to take the greatest advantage of the daylight and to avoid having workers exposed to the extreme dangers inherent in working from the basket and on the scaffolding at night.

The plan called for removing the debris to a pier in Brooklyn, where it would be stored pending completion of the investigation. Investigators identified the pieces and sections they wanted marked and held for laboratory testing to determine if the material had failed. Each piece and section was charted. Demolition began in attention and continued until dark. Fire department members equipped with radios were stationed at each Derrick stand and the main crane. Rescue teams were in place with the work crew. A squad stood by as a FAST, or rapid intervention, team. A 24-inch handline was in place. Personnel were stationed near the work area. Most of these personnel had attended the 40-hour collapse course given at the FDNY Division of Training Rescue School. A chief officer supervised all operations and was on the scene 24 hours a day.

Many hills and valleys were encountered during the dismantling operation. Early meetings continued, but interest waned. This was a sure sign of progress. As the scaffolding started to come down, more and more businesses and streets were opened. Businesses were opening up. Streets were opened. Trucks were moving. Issues were back on their normal routes, and issues were returning to their apartments. As the operation was approaching completion, only 43rd Street between Broadway and Sixth remained closed. Things were getting back to normal.

From the start of the incident, elevation proved the primary logistical problem. The scaffolding that collapsed was equipped with the hoist and elevator that maintained workers to all floors. The adjoining scaffolding was used mainly for materials. It is estimated to use only one tower; workers, resisters, and materials had to be brought in the upper floors a small, constant stream, a route which created logistical problems during the operation of the early stages. The picket-entrance elevators were under construction and terminated at the 15th floor. It wasn't practical or safe for the elevator to be used, and equipment to go to the 15th floor and then walk up 35 floors. Eventually, one passenger elevator that could go to the upper floors was finished.

As the work progressed, the FDNY downsized its field communications mobile command center, which was the scene for the entire 26 days. The OEM also had its command vehicle on site. Although it was an extremely difficult operation, there were no injuries, fatalities in large part to the well-coordinated method in which the agencies and construction companies worked together. Firefighters learned many construction techniques and were able to incorporate valuable skills into this operation. FDNY firefighters were not used to full capacity in every single aspect of this operation, but they certainly would have preferred more action. The workers appreciated their participation, knowing that the FDNY members were standing by and ready to spring into action if a problem arose.

Endnotes
1. The 1305 is maintained for a college, an upscale hotel, a hotel and apartment complex, and a medical emergency with the potential for multiple casualties. The following units are equipped: one heavy rescue, four additional liaison units, three rescue companies, and two service companies. The equipment is maintained and deployed with the potential for multiple casualties. The following units are equipped: one heavy rescue, four additional liaison units, three rescue companies, and two service companies. The equipment is maintained and deployed with the potential for multiple casualties.
2. The KNOX Box, named after Lawrence Tim Kelly of the FDNY Operations Department, provides portable lifeboats, breathing apparatus, a portable oxygen system, and a portable communication system. The KNOX Box can be used in any situation, including large fires, high-rise buildings, and confined spaces. The KNOX Box can be used in any situation, including large fires, high-rise buildings, and confined spaces.