

# BUILDING COLLAPSE: TWO INCIDENTS



(Photos by Warren Fuchs.)

## COLLAPSE IN BROOKLYN, NEW YORK BY RAY DOWNEY

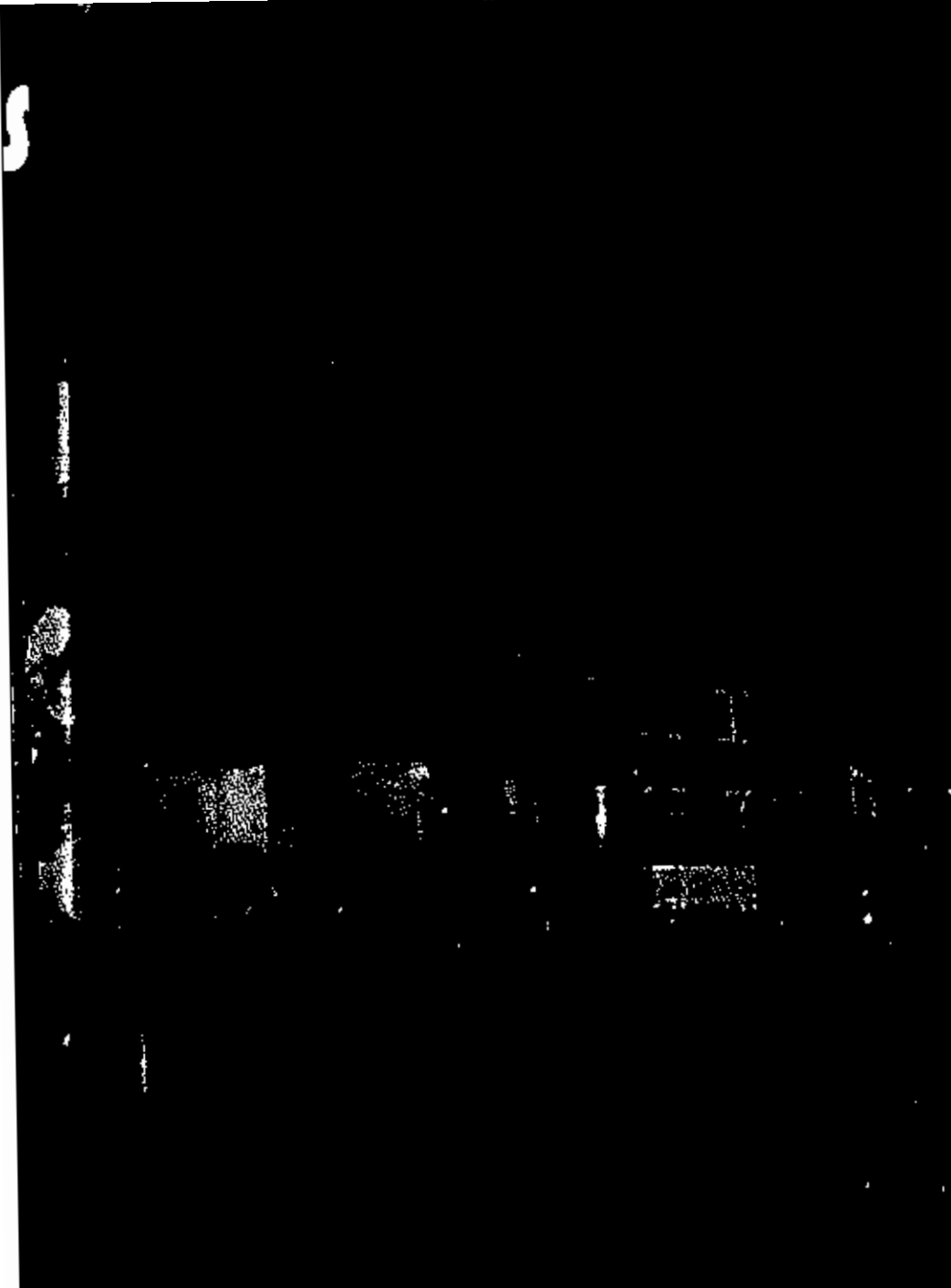
At 0330 hours on August 6, 1997, the exterior wall of the B-wing of a five-story ordinary construction H-type fully occupied multiple dwelling in Brooklyn, New York, came tumbling down.

■ **RAY DOWNEY** is a battalion chief, chief of rescue operations, and a 36-year veteran of the City of New York (NY) Fire Department. The former captain of Rescue Company 2, he is the USAR task force leaders representative to FEMA for all 26 teams and is a member of FEMA's Advisory Committee. Downey is also the author of the book *The Rescue Company*; the video *Rescue Operational Planning: Factors for Success*, and the video series *Collapse Rescue for the Fire Service*, published and produced by Fire Engineering Books and Videos.

With it came ceilings, walls, and furniture. Fortunately, none of the occupants came with the debris. The size of the structure, the type of occupancy, and the time of day all provided a potential for a major disaster with a large loss. But that potential was not to be realized. All 90 occupants of the building survived the collapse of an entire wing of the structure. One occupant was trapped and rescued by a rescue company (see sidebar on page 54).

The dwelling's frontage measured 100 feet; its depth was 200 feet. It was of "H" configuration, meaning that each of the arms of the "H" is considered a wing and the section of the building connecting each wing is its "throat."

Two police officers in a patrol car were passing the building



when sections of the brick wall between the second and third floors began to fall. After transmitting the alarm to the City of New York (NY) Fire Department (FDNY) for the collapsing building, they rushed into the building and evacuated the occupants of the B-wing immediately. As the first fire unit arrived on the scene, the entire five-story-high wall of the B-wing came down, bringing with it the remains of all of the apartments.

#### THE RESPONSE

The first-arriving unit transmitted the FDNY signal for "major emergency response," known as a "10-60" signal (see sidebar on page 54). This would bring additional help with resources needed for this type of incident.

Units began to assist in the evacuation of the entire building. Most of the occupants were in nightclothes and were relocated to a church basement across from the collapsed structure. The incident

commander established a command post on arrival. He then designated a collapse zone and implemented the collapse operations plan. On receiving an updated situation status from the first-arriving units, he planned a strategy and had the units implement the tactics necessary for a safe and successful operation.

The initial reports indicated that all of the occupants of the B-wing, except one, who was trapped, had been safely evacuated. The evacuation of the occupants of the A-wing was also near completion. The IC contacted Rescue 2 for a progress report. Lieutenant Dennis Mojica reported that an elderly male occupant was trapped under some furniture and debris on the third floor. (The occupant had safely evacuated his apartment but returned for a pair of pants, which almost cost him his life.) Quick action and excellent teamwork combined to effectively extricate the victim (see "Rescue Operations" on page 54).

While the rescue was in progress, the IC placed the collapse rescue plan in operation. Units were used to survey the collapse debris pile for surface victims, buried victims, and indications of further collapse. Apparatus were positioned according to the plan. Engine companies hooked up to hydrants and supplied precautionary hoselines. A tower ladder was placed in the most advantageous position for surveying the entire remaining structure. This provides an excellent observation post from which to inform the incident commander.

Other ladder companies were used to shut down utilities—an extremely important step in the rescue plan. Gas, electric, and water must be shut off to eliminate numerous potentially dangerous situations such as gas accumulations, sparking from electric sources, flooding from broken pipes, undermining of the building by flooding, and so on.

Members also used the six-sided approach to survey for victims. This method ensures that all sides and the top and bottom of the collapse area are surveyed. Fortunately, no surface victims had to be rescued. The next step was to explore all voids and accessible openings for victims. Again, the results were negative. K-9 units trained to work on collapsed debris piles were used. The dogs entered and searched voids rescuers could not access, with negative results.

Selected debris removal and general debris removal were put on hold until the IC received reports on the results of the searches and information gathering relating to the accountability for all occupants. The reports indicated that all the occupants were in the church basement, were at work, or had been otherwise accounted for.

Other units that responded on the 10-60 signal were assigned to duties as needed. The additional chiefs commanded the victim

## 10-60 MAJOR EMERGENCY RESPONSE

The 10-60 is transmitted for a collapse, an airplane crash, a train derailment, or similar emergencies with the potential for multiple casualties. The following units will respond:

- 1 deputy chief
- 4 additional battalion chiefs
- 3 rescue companies (including Rescue 3 with collapse utility truck)
- 1 tactical support unit
- Safety operating battalion
- Field communications unit
- Haz-mat I
- Squad 1 and the technical response vehicle
- Public information officer

On the transmission of a second alarm and a 10-60 signal, an additional deputy chief responds. ■

## RESCUE OPERATIONS BY DENNIS MOJICA

At 0336 hours, Rescue 2 responded to the building collapse. While monitoring the radio en route, the first fire department unit on the scene transmitted that a building wall was still collapsing in an occupied building and that police were on the scene assisting in the evacuation of the building's occupants. As the officer was transmitting this information over the air, we could actually hear the rumbling of the wall as it was collapsing. The first battalion chief on the scene was Norman Whalen from the 33 Battalion, who immediately transmitted a 10-60 signal (see box left), New York City's radio code signal for a major emergency response.

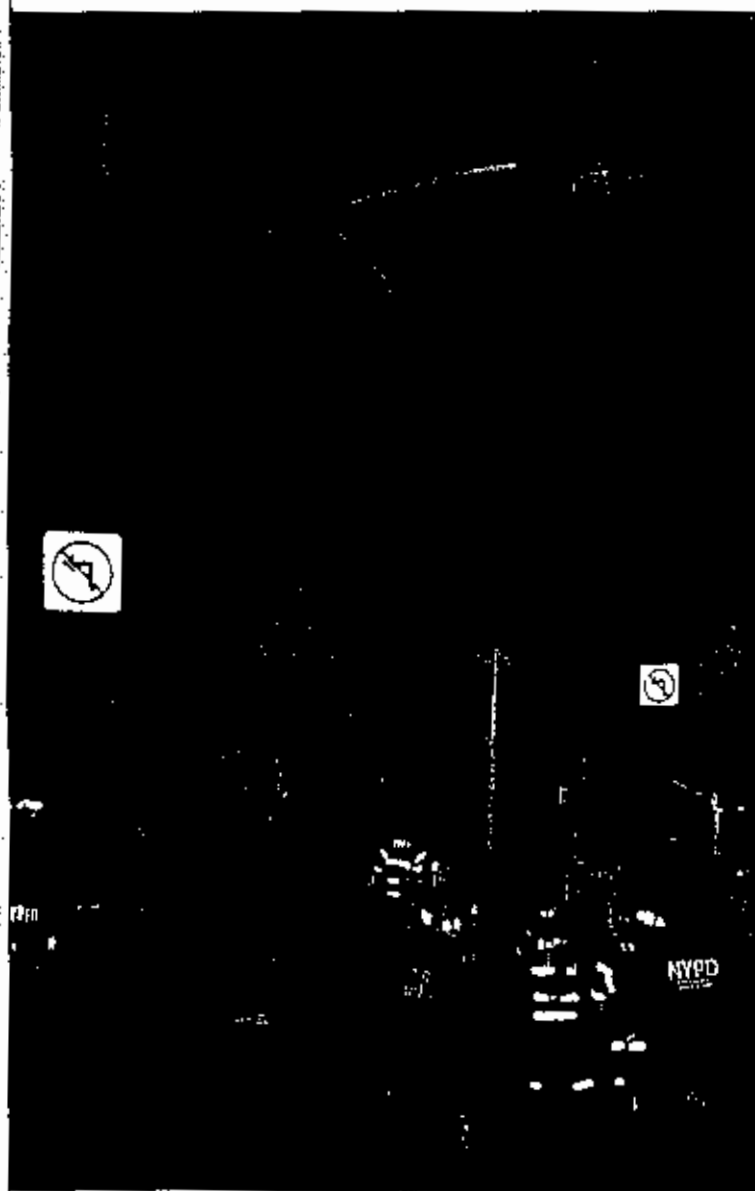
### THE OPERATION

On arrival at the scene, I conducted a rapid size-up of the building. Three-quarters of the B-wing's bearing wall had collapsed, leaving the third, fourth, and fifth floors hanging in an unsupported lean-to fashion (this type of collapse is one of the most dangerous types of situations for rescuers). The second floor had pancake collapsed onto the first floor. Chief Whalen informed the rescue officer that Ladder 159, the first ladder company on the scene, reported that a male occupant was trapped in apartment 3H.

At this time, I split the company into two teams. Firefighters Robert Galione and James Jaget and I entered the building to assess the situation and determine which tools would be needed to extricate the trapped occupant. Chauffeur Richard Evers stayed by the apparatus to provide the necessary logistics and support for the rescue operation. Firefighters David Arciere and Paul Somin were instructed to do a quick site survey and search for surface victims.

On reaching the third floor, the lieutenant from Ladder 159 informed us that an elderly male was pinned by furniture and debris in apartment 3H. When we entered the apartment, we immediately detected the strong odor of natural gas and could

■ **DENNIS MOJICA** is a 24-year veteran of the City of New York (NY) Fire Department, where he is a lieutenant assigned to Rescue Company 1. He is a New York certified instructor, confined space instructor, and haz-mat technician. Mojica is a member of the New York Task Force-1 and served as a FEMA IST assistant operations chief and technical advisor during the Humberto Vidal Building collapse in Puerto Rico.



A ladder tower, with its maneuverability, is an excellent tool for site assessments/surveys.

removal operation and the staging area and coordinated victim tracking and communications. These subcommands are extremely helpful to the IC when managing an incident of this proportion.

An interagency meeting was held to discuss the many issues to be resolved to conclude the operation. The Buildings Department declared the B-wing unsafe and ordered that the entire building be vacated until the structure was safe enough for occupants to return to the A-wing.

A demolition crew was brought in to begin dismantling the B-wing with heavy equipment. Before this work began, a major attempt was made to recover and retrieve as many of the occupants' personal possessions as possible. In one case, members operating from a contractor's cherry picker basket retrieved valuable baseball memorabilia from a fifth-floor apartment.



The condition of the building required rapid removal of the victim.

hear the victim pleading for us to get him out of there. I immediately transmitted this information to Chief Whalen and requested that the utilities be shut down as soon as possible and that a precautionary handline be stretched to the apartment. I then instructed Jagot to go to the apartment below and report back on the structural capability of the ceiling, walls, and floor and then to stand by to procure any tools or equipment we would need.

#### VICTIM EXTRICATION

Galione tied his personal rope around the apartment doorknob and started maneuvering his way down approximately 40 feet of severely sloped hallway floor, past a 12-foot-long section of a free-standing wall that was leaning 10 degrees out over him. He reached the victim and sized up the situation. Galione reported that the victim was on a couch that was sloped precariously down toward the street and that he needed a cordless sawzall cutting tool to cut furniture and debris that was preventing him from freeing the victim's legs. Jagot, after completing his survey of the floor below, reported that the floor on which we would be operating was unstable and that he would go get the sawzall tool. I immediately transmitted this information to the IC and requested that Squad 1, which had just arrived on the scene, shore up the

floor below apartment 3H as soon as possible. While Jagot was getting the tool, Galione, after assuring the victim that he would return, worked his way back to where I was. We quickly discussed options and rescue procedures, noting the need to avoid sparks in the gas-filled area, avoid vibrations, use minimum personnel to reduce the weight on the already overloaded floor, and cut only nonload-bearing members to avoid a secondary collapse.

Jagot returned with the tool. I directed him to remain outside the apartment along with the officer and members of L-159, who would act as a backup team to render assistance in case of a secondary collapse. Galione reentered the apartment, worked his way down to the victim, and commenced the rescue operation. The rescue officer positioned himself halfway down the apartment hallway to monitor conditions and stand by in case Galione needed assistance. Due to the extreme slope in the floor, Galione was forced to work on his knees in an extremely awkward position. While reassuring the apprehensive victim that he would get him out, Galione removed some debris from a

bookcase and shelf. Before the necessary cuts were completed, however, the building started to vibrate. A warning was given to evacuate the area. A section of the building or debris had fallen, sending vibrations throughout the building, forcing Galione to momentarily stop the rescue operation.

Realizing that the vibrations could cause a secondary collapse that would trap Galione and the victim, I worked my way to the firefighter and observed that Galione, who had just completed cutting the bookcase, was having difficulty with the victim, who was starting to slide off the sofa down toward the debris pile. Due to the rapidly deteriorating condition of the structure, I assessed the overall situation and determined that the extremely dangerous conditions demanded immediate extrication of the victim despite the risk of causing further injury or exaggerating the victim's existing injuries. I placed my arms around the victim's chest while Galione repositioned himself to avoid slipping farther down the pile. At his officer's direction, Galione grabbed the victim's waist. I then pulled the victim up over the sofa and Galione's head as Galione passed the victim hand-over-hand from the void. I then dragged the victim down the apartment hallway through the door to the awaiting members of Ladder 159, who administered first aid and removed the victim to awaiting EMS members. ■

The stability of the B-wing was always in question during the entire operation. The building was built 71 years ago and had the usual amount of wear and tear for a structure of this age. Occupants reported that some serious water leaks had affected their apartments and the exterior wall. It was assumed that a heavy rainfall the day before the collapse had weakened an already damaged exterior load-bearing wall.

Occupants reported also that an unrepaired hole at the roof level allowed rainwater to seep through the apartment interior walls while at the same time damage the mortar that bound the bricks of the supporting wall. Many recent collapses are a result of this same type of damage. Long-term exposure to the elements is having a serious effect on the structure stability of many older buildings in cities around the country.

A major concern at this collapse was the status of the remaining structure, specifically whether the other wing of the building had

been compromised in the same manner. The structure was determined to be stable, and debris removal began.

#### DEBRIS REMOVAL

Selected debris was removed from areas determined to be safe for firefighters to work. We removed general debris resulting from the original collapse that was preventing searchers from gaining access to some areas on the floors. Firefighters used a sifting system that allowed them to retrieve any valuables that may have been in the debris. Ensuring that the valuables were returned to their proper owners necessitated a coordinated effort with law enforcement. All of the removed debris was taken to a secure location where it could be sorted so that retrieved items could be returned to the occupants. Investigators also examined the debris to determine whether the cause of the collapse might have been other than the water damage to the structure and the structure's deterioration from age.

## LESSONS LEARNED AND REINFORCED

It is hard to believe that only three occupants were injured in this incident. As is the case in all major incidents of this magnitude, valuable lessons were learned or reinforced:

- Use the incident command system. It's a great tool for managing incidents.
- Early confirmation of victim accountability leads to a much safer operation for all involved.
- Have a rescue plan, and implement it accordingly.
- Don't underestimate the collapse zone.

- If you don't have the necessary resources, get them.
- Interagency cooperation is a must.
- At these types of incidents, it's extremely important that interagency meetings be held at regular intervals to keep everyone updated on the status of the operation. The frequency of the meetings depends on the scope of the incident. It is most important that everyone understand their role in the operation. The incident command system is the tool that provides for effective management of these incidents. Unfortunately, not all agencies use the incident command system; these regularly scheduled meetings can project a clearer picture for all the agencies involved. ■

## COLLAPSE IN JERSEY CITY, NEW JERSEY BY WILLIAM C. PETERS



(Above) Looking at the roof of the discount store from a tower ladder, the large hole with scaffolding protruding is where the wall on the right side crashed through. (Photo by JCFD Arson Unit.) (Right) Inside the discount store, a large crater was formed when the heavy wall passed through carrying merchandise, store shelves, and customers into the basement. (Photo by Joe Lovaro.)



Martin Luther King Day was a cool and sunny day in Jersey City, New Jersey. Schools were closed, and many residents were off work relaxing, tending to chores, and shopping for bargains.

The city's Journal Square is a transportation hub with a large bus terminal where passengers transfer to PATH trains running to Newark, Hoboken, and New York City. John F. Kennedy Boulevard cuts a wide path through "the Square," and a variety of retail stores and service establishments take advantage of the easy public transportation that brings customers to the area.

The State Theater, once described as a palatial show house, was in the advanced stages of demolition. Numerous multiscreen cinemas springing up in the area had long since made the theater obsolete. The owners decided the property would be better used for a new retail occupancy. The theater fronted on Kennedy Boulevard;

the rear was on Sip Avenue. The demolition crew had removed the roof and most of the rear wall and had gutted the inside of the structure. The 60-foot-high sidewalls still stood, supported at each corner by a part of the rear wall. To give the workers access to the masonry work, a 40-foot-high scaffold was erected on the roof of an adjoining two-story commercial building.

Using small power and hand tools, 10 workers on the scaffold were slowly removing small sections of the wall. Sensing some unusual motions in the scaffolding and wall, the workers evacuated the area, anticipating a possible collapse.

They had just cleared the area when a 30- by 70-foot section of the thick brick wall crashed down on the roof of the commercial

■ **WILLIAM C. PETERS** is a battalion chief, supervisor of apparatus, and a 23-year veteran of the Jersey City (NJ) Fire Department. He is a member of the NFPA Technical Committee on Fire Apparatus and the *Fire Engineering* editorial advisory board. Peters is the author of *The Fire Apparatus Purchasing Handbook* (Fire Engineering Books, 1994), two chapters on apparatus in *The Fire Chief's Handbook, Fifth Edition* (Fire Engineering Books, 1995), the booklet *Final Farewell to a Fallen Firefighter: A Basic Fire Department Funeral Protocol*, and the video *Factory Inspections of New Fire Apparatus* (Fire Engineering, 1998).