BY CRAIG H. SHELLEY

In New York City and other cities throughout the country, a type of building construction exists known as "row frame." These buildings were built in rows that may contain as many as 20 or more buildings. The heights of these buildings vary from between two and five stories. They may be from 20 to 30 feet in width and have depths ranging from 40 to 60 feet. In New York City, they were constructed over a period of many years during the 1800s and early 1900s. In other cities, firefighters may find these same types of buildings or buildings very similar. New construction, such as townhouses, also may contain some of the design features of row frames; firefighting tactics will be similar.

CONSTRUCTION FEATURES

Construction features of row frames include the following:

- **Common cockloft.** This extends over all the buildings in a row that were constructed at the same time. It may vary in height from one foot to a height within which a firefighter can stand.

- **Division walls.** These walls quite frequently are no more than the equivalent of a partition wall with nogging present. This nogging often is no hindrance to fire spread. The mortar may have disintegrated due to age, leaving many spaces throughout which fire can travel. In newer construction, a more substantial fire wall may be present between buildings, but unless there is an unpierced masonry wall that extends through the roof, fire will spread.

- **Light and air shafts.** These may

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CRAIG H. SHELLEY, a 20-year veteran of the fire service, is a battalion chief in the City of New York (NY) Fire Department and is currently serving with the Marine Division. He is a member of the New York City Fire Chiefs Association.
or may not be present. It is imperative that fire department personnel assigned to roof operations communicate information concerning these shafts to the incident commander.

- **Cellars.** At times, the cellar runs under more than one building.
- **Vast quantities of combustible materials.** A major problem with the construction of row frames is the vast quantity of combustible materials used in construction—and the lack of firestopping.
- **Balloon-frame or braced-frame construction.** While balloon-frame construction contains an unobstructed opening between each stud in the exterior wall, allowing rapid fire travel vertically, braced-frame-constructed buildings present the greatest firefighting danger. In a two-year period, two members of the firefighting force were killed and 10 others seriously injured in four separate collapses of braced frame buildings.

**THE FIRE**

Firefighting tactics must be well thought out and operational procedures must be in place prior to firefighting in these or similar buildings. On November 29, 1992, Battalion 28 of the City of New York (NY) Fire Department was faced with a multiple-alarm fire in a group of row frames. The alarm was received at 2023 hours via an Emergency Reporting System (ERS) box indicating a structural fire. These boxes allow the caller to establish direct voice contact with a fire or police dispatcher. Two engine companies, two ladder companies, and Battalion 28 were dispatched. Almost immediately, a second source for the same alarm was received by telephone. The alarm response was upgraded to three engines, two ladders, one battalion chief, and one heavy rescue, based on the information reported by the second caller. While en route, Battalion 28 observed a large glow over three buildings at the reported location. The signal 10-75, signaling a working fire, was transmitted at 2025 hours. Upon arrival, 2026 hours, it was observed that within the row of attached frame dwellings, heavy fire was located in an apparently vacant building adjoined on two sides by occupied structures. Heavy smoke, under pressure, was emanating from the top floor windows of exposures 2 and 4, and a medium smoke condition appeared on the second floor of these same exposures. A second alarm was transmitted at this time, only three minutes after the initial alarm.

**OPERATIONS**

The initial two engine companies immediately were ordered to exposures 2 and 4, as were the initial two ladder companies. The hoselines stretched by these first engine companies were 1 1/2-inch, for the speed and mobility that this size line would afford. The handlines sent into the exposures were directed to the top floor to cover the cockloft and any interior shafts that might be present. In the area of Brooklyn where the fire operations took place, the engine companies are spaced relatively close to one another. The dispatch ticket received by Battalion 28 indicated that all of the assigned companies would be responding from quarters, indicating that three engines would arrive on the scene in rapid succession.

As the first two handlines were being stretched, the third engine arrived and was directed to stretch a handline (2 1/2-inch) to cover the front of the original fire building as well as a supply line to feed a tower ladder being positioned to cover the fire building. In effect, we were setting up a holding action and defining our initial perimeters. The ladder company personnel assigned to the roof position radioed to the incident commander on their arrival at the roof that the rear of the fire building had collapsed. All company officers on the scene were apprised of this fact, for relay to members under their command. In addition, the dispatcher also was notified, for relay to responding units. Units were ordered to refrain from interior and roof operations on the affected building.

Additional companies now were arriving, and ladder companies were paired with engine companies and assigned to exposures 2A and 4A. Additional handlines were stretched to exposures 2 and 4 to cover the lower floors of these buildings. Handlines also were stretched through these two exposures to the rear yard to operate on the rear of the fire building and prevent extension via...
the rear exterior siding. In fires at wood-frame buildings, this is considered the "seventh side": the combustible exterior walls. At this time it was reported to the incident commander that the rear yard was accessible for the placement of a tower ladder. A tower ladder, arriving on the second alarm, was ordered to take this position, and an engine company was assigned to supply water.

On the arrival of the division chief, a third alarm was transmitted. As companies arrived, additional engines were assigned to exposures 2A and 4A to augment the operations there; companies operating in other buildings were relieved by fresh personnel. Units operated from the exposures, directing streams through breaches into the fire building. Tower ladders were operating heavy caliber streams into the fire building from the front and rear (exposures 1 and 3). All lines were coordinated via portable radio so that streams would not hit personnel operating on the opposite side. At 2142 hours, the fire was declared under control. A total of 17 engine companies, 10 ladder companies, five battalion chiefs, and one deputy chief were assigned to fire suppression at this operation.

**LESSONS REINFORCED**

- **Incident command.** Incident command was placed in operation immediately. Battalion chiefs were assigned to exposures 2 and 4, which were designated as sectors. The following additional sectors were established:

  - Communications. Communications were handled by the Field Communications Unit, and a battalion chief was placed in overall command of this area. He assisted with the maintenance of the command board, set up a tactical and a command channel for communications, and then was responsible for monitoring the tactical channel for any emergency transmissions.

Units used the tactical channel to communicate with one another and the sector commanders. The command channel was used for communications between the sector commanders and the incident commander. When establishing a command channel, it is required that sector commanders have a radio-equipped firefighter assigned to them. This firefighter monitors the primary channel and relays messages from units in that sector to the sector commander.

- **Search.** Due to the magnitude of the fire in the original fire building, search there was not immediately initiated. It was, however, conducted in the exposures under the supervision of the battalion chiefs in command of those sectors. After the fire was knocked down on the first floor in the original building, squatters exited the cellar. They were unable to give any information regarding other possible inhabitants.

An additional sector was set up to search the building. A search of the cellar was initiated under the direct supervision of a battalion chief. An engine company with a charged hose line and members of the rescue company conducted the search.

All members of the rescue company were not committed to the interior. One half of the company's members remained outside, prepared to initiate a rescue of members inside the building should the need arise. They also maintained visual contact with the unstable building to monitor it for shifting or other signs of impending collapse.

This search of the cellar proved negative, as did a search of the first floor. Due to the probability of further collapse, all interior searches were halted and a visual search of the second and third floors was conducted from the exterior by personnel in the tower ladder baskets peering through the breaches in the walls of exposures 2 and 4. The following morning, this procedure was repeated by Battalion 28, assisted by a specialties called tower ladder. Again, this visual search proved negative.

Remember, an apparently "vacant" building may be occupied by squatters. Signs that a vacant building may be occupied are as follows: lights in the windows of some apartments, curtains, window shades, plants, and window gates; electric extension wires strung from a utility pole or through the backyard of adjoining buildings into windows of an apparently vacant building; and holes or signs of forced entry in a sealed building.

- **Early anticipation of fire spread.** Experience dictates that these buildings will have rapid fire spread. Anticipate this spread, and adopt a "proactive" strategy. Companies must be called to the scene before they are needed, and the length of time it will take them to travel to the scene must be factored in. We want to get ahead of the fire and drive it back toward the original seat rather than chase it down the block from building to building.

- **Collapse.** Collapse at fires in row frames is a factor that should be considered early in the size-up. Note the following:

  - Cockloft fires cause supports to weaken, and the roof may collapse onto the top floor.

  - Front and rear walls may pull away, collapsing in one section. At this fire, the weight of the fire escape caused the rear wall to collapse into the yard.

  - Side walls may collapse where buildings in the row have been demolished and removed.

Vincent Dunn, in his book *Collapse of Burning Buildings, A Guide to Firefighter Safety*, gives some additional information on wood-frame construction. He states, "Wood frame buildings use smaller structural members to support larger structural members and the weak link in this design is the smaller structural supports, the two-by-four-inch bearing walls." He further states, "Fire burning through or against a side wall is more likely to
(Top left) Front view of building. Note section of facade removed, enabling penetration of tower ladder stream into cockloft. (Photos by author.) (Top right) View from exposure 2, top floor, toward fire building. Note brick nogging at cockloft level missing from wall in two bays and in upper portion of other bays, allowing extension of fire into exposure. (Middle right) View of rear of fire building showing collapse. Note fire escape railing in lower portion of photo. Weight of fire escape caused rear wall to pull outward. (Bottom right) Rear lots with street access provide for tower ladder placement and operation in rear. (Bottom left) View from exposure 2, top floor, toward fire building. Lath, plaster, and nogging have been removed, allowing engine companies to operate streams into main body of fire.
collapse the building than fire burning through several floors or the roof."

**Roof operations.** Roof operations should begin immediately. Access to the roof should be via aerial ladder or tower ladder basket. If the ladder is to be used for immediate rescue, the firefighter should use an adjoining building as the means of getting to the roof. Due to the construction features of row frames (attached cockloft), it would be advantageous to use a building other than the one immediately adjoining the fire building. If fire conditions prohibit the use of interior access to the roof, use a rear fire escape, if present. Do not use the immediate fire building for any of these means of access.

On arrival at the roof, immediately look over the rear of the building and check to see if any people are in distress at that location. Communicate this information, whether positive or negative, to the incident commander so that rescue operations can be initiated. Also, remember to check the yard for victims who already may have jumped.

Roof ventilation now will begin by opening up roof scuttles, skylights, and any other enclosures that can be opened. Open the returns around the openings to inspect the cockloft. Communicate any information pertaining to these operations to the incident commander. This information also will include any tasks not performed. When the fire is located on the top floor or in the cockloft, procedures should be in place to have a saw brought to the roof, and a vent hole should be initiated over the fire.

**Operations in exposures.** When pulling ceilings in exposures to check for fire in the cockloft, make an inspection hole in each room along the adjoining wall. This can be performed while awaiting a charged handline. It is a good practice to simultaneously open or remove the windows on the top floor at this time. Conditions will rapidly deteriorate if fire is located in the cockloft and handlines begin to operate. Engine companies ordered to stretch a line to the top floor of an exposure should take a six-foot pike pole with them for the purpose of pulling the ceilings in case no ladder company is available to assist them.

**Tower ladders.** The tower ladder is one of the most versatile tools the fire department has in its arsenal. At row frame fires, members operating from the basket can remove siding to expose the cockloft area. The tower ladder stream then can be operated into the cockloft for rapid extinguishment. The stream should be operated from the exposure walls back toward the center when being used for cockloft extinguishment. A properly placed 75-foot tower ladder effectively can cover up to five row frames.

Operational procedures should be in place for different types of fires in these buildings. These procedures should be directed at defining the perimeters and then placing lines in position to prevent the spread to adjoining buildings while at the same time advancing on the main seat and extinguishing the fire. Ladder company operations should be coordinated with engine company operations to achieve this goal. In addition, ladder companies are responsible for the search for life. I realize that every department has different response policies and staffing levels; specific company operations, therefore, cannot be presented here. Departments, however, should tailor the basic concepts presented to their present response and staffing levels. The time to prepare for fires in "row frames" or similarly constructed buildings is well before, not shortly after, the fire.

**Endnotes**

2. Ibid.
3. Ibid., 49.