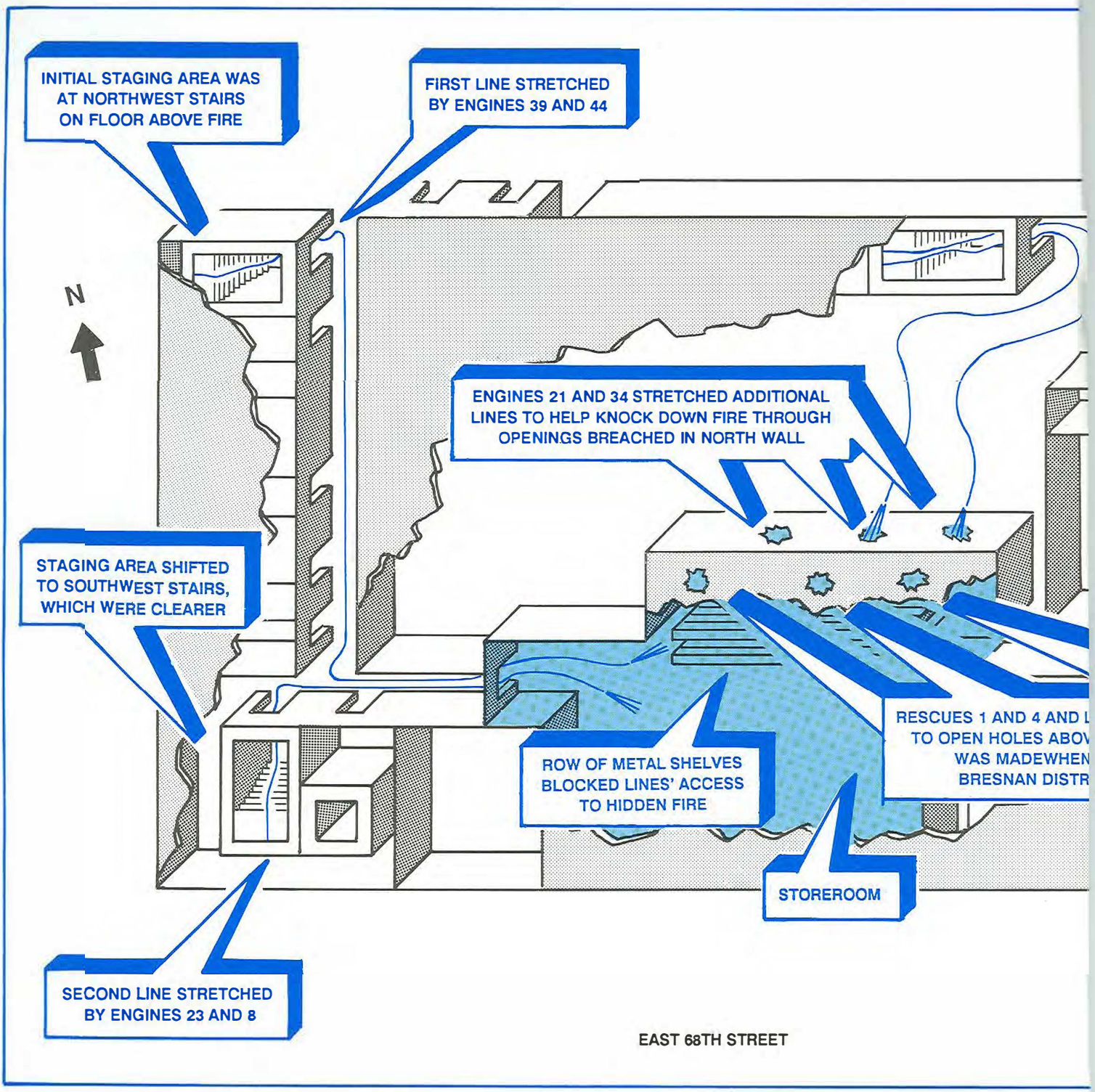
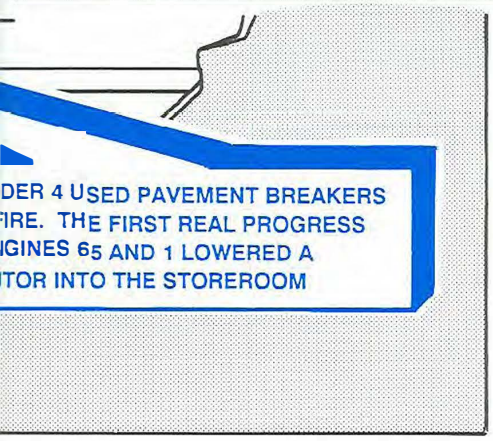


Hidden Fire at Hunter College

The only way to get at the below-ground fire last December was to break in using brute force.

by ANGELO DeCAPRIO
Deputy Chief, Division 3

Members of Rescue 4 prepare a pavement breaker to be taken to the floor above the fire, where it was used to open holes over the hidden fire. Operating a Bresnan distributor through the holes brought the first real progress against the fire, almost four hours after the alarm. *Photo by Vic Nicastro*



FIRE AREA

Heavy smoke and high heat almost always make for slow line advance in high-rise buildings. At the Hunter College fire on December 8, 1988, the slow advance was nearly a standoff. Like a fugitive ducked behind a protective wall, part of the fire stayed out of the hose lines' reach for nearly four hours, hidden by supply stacks in a subcellar storeroom measuring 100 by 65 feet.

Firefighters scouted the fire's perimeter, jackhammered their way through a concrete floor, breached walls, and lowered a Bresnan distributor into the fire's haven before the flames surrendered.

It would turn out to be not only a tenacious fire, but a toxic one. The stacks held an array of chemical supplies for laboratories scattered on various floors of the building. This was the location—695 Park Avenue—that had drawn so much publicity seven months earlier when the New York City Department of Environmental Protection had vacated the entire building. DEP had discovered that outdated chemicals stored there had become unstable.

The first visible sign of the fire was smoke on the 11th of 16 floors, which it had reached through electrical and elevator shafts. The phone alarm for Manhattan box 993 was transmitted at 1942 hours.

Ladder Co. 16, first-due, found more smoke on the 5th and 8th floors of the fireproof building. (Finding smoke at remote locations is normal in high-rise fires. It travels through electrical and elevator shafts, and—in many post-1968 buildings—through multistory HVAC ducts.) Hearing Ladder 16's report, B.C. Henry Cartwright, Battalion 10, sent units to search the basement, cellar, and subcellar. On the lowest level, they found heavy smoke and fire behind the closed doors of a storage room.

Chief Cartwright had already transmitted a 10-75. But recognizing this fire's potential, he stepped the signal up to a 10-76, "Fire in a high-rise building," 13 minutes after the Fire Department arrived. (See "High-Rise Firefighting," page 4.)

SIDE BY SIDE

In a high-rise engine attack, two companies form up on one line to provide the personnel and relief for what's usually an extended siege. Coming in with spare Scott cylinders, the units can relieve one another, maintain the number of firefighters on the line, and continue advancing the line. That was the tactic Chief Cartwright ordered now. Engines 39 and 44 stretched to the subcellar via stairs on the East 69th Street side of the building and started water on a heavy body of fire. Engines 23 and 8 stretched a second line from the stairwell on the 68th Street side of the building to merge with the first line.

D.C. Angelo DeCaprio, Division 3, was en route on the 10-75 when he heard the 10-76. It told him 10 more units beyond the normal first-alarm assignment would be arriving, including two battalion chiefs. As the latter arrived, Chief DeCaprio organized the command structure into sectors of responsibility:

1. Anthony Adamo, Battalion 8 (who had started out on the 10-75), took the subcellar operations post.

2. James Schuppel, Battalion 12, controlled the staging area on the floor above the fire, designated the cellar. The initial location was determined by the route of the first units into the fire: the stairwell at the

northwest corner. As the operation unfolded, though, B.C. Schuppel realized that members were absorbing smoke while on standby. He found that the stairway on the southwest corner was clearer and shifted the staging area there, notifying the command post of the decision.

3. Patrick Foley, Battalion 9, was in charge of search and evacuation.

B.C. Foley sent ladder companies to many areas. On the floors above ground, classes were in session and some of the professors had to be prodded to evacuate. On the 5th floor, the searchers unexpectedly came across animals kept for research; the firefighters had to ventilate the lab, then monitor it throughout the operation to make sure the animals were safe. If the smoke hadn't cleared on the upper floors, the animals would have been removed.

Below ground, ladder companies checked for extension on the fire floor and the floor above. They looked for other ways to get into the storage room where the fire was seated. They also searched for shafts and ductwork they could open to relieve the heavy smoke that impeded the engine companies' attack.

INFORMATION GAP

That attack faced two unknowns: the storeroom's contents and the below-ground layout. Plans were lacking (the building wasn't required to have a fire safety director or lobby command post), and knowledgeable building personnel had to be summoned from elsewhere on the Hunter College campus. It took nearly an hour to track them down.

The operations chief's first reports said a large area of fire had been knocked down, but then progress halted, even though the units never retreated. The heat and heavy smoke didn't change, and all units would obviously need relief. D.C. DeCaprio transmitted a second alarm at 2033 hours.

For the next hour, the same problems persisted. When D.A.C. Donald Burns—the citywide command chief—assumed command shortly after the second alarm, the command post was still contending with a lack of information, and attack units were still facing severe heat and smoke. Engine companies were continually rotating, operating, taking relief, returning to the lines.

Ladder 35 and Rescue 1 took smoke ejectors into the subcellar in an attempt to relieve the smoke. They shifted the fans frequently, trying to draw the smoke into stairwells, elevator shafts, and so on. Any upward movement would have helped; smoke was still the No. 1 problem.

But it wasn't the only problem. Although no fire extension had been found outside the storage area, there was little progress. Bales, drums, and other stock were impeding access to what the units recognized as a deep-seated fire over the entire storeroom, so the 2½-inch lines were reduced to 1¾-inch lines for better mobility. What we didn't know at this time was that a row of metal shelving extended across access to a rear portion of the room, from floor to ceiling. Everything on these shelves was fully involved. Even worse, this portion of the contents prevented the lines from hitting the heavy fire in stock along the north wall. It was this hidden fire that generated the heavy smoke and heat. The engine companies just couldn't get to it past the stock that had tumbled across the

SIGNALS...

A full response for a high-rise fire (one that occurs in a building taller than 75 feet) consists of:

- 4 engine companies
- 4 ladder companies
- 4 battalion chiefs
- 1 deputy chief
- 1 rescue company
- the Field Communications Unit
- the Mask Service Unit
- a command post company, and
- the High-Rise Unit.

The signal that summons this response is 10-76. Forces operating at a high-rise fire will probably use the crossband repeater to overcome the building's interference with radio traffic—and the crossband repeater uses the Fire Department's citywide frequency. Therefore, transmission of a 10-76 is an automatic notification to all units to restrict the use of the citywide radio frequency.

A second alarm transmitted after the 10-76 will result in the assignment of:

- three more engines
- two more ladders
- a satellite company
- another rescue company
- another battalion chief, and
- another deputy chief.

Readers should keep in mind that the 10-76 response has been changed as experience dictates. For example, in my article "Tower 49... An Invitation to Disaster" (*WNYF*, 2nd Issue of 1986), I explained a 10-76 different from what's now in use. The assignment described here is current up to *Department Order 52, 1988*, but the 10-76 could change again with future experience.

CYLINDERS...

Standard operating procedure at high-rise fires is for firefighters to respond wearing their masks and to bring an additional cylinder for each member into the building. Units from areas that don't have many high-rise buildings may have to be reminded of this.

The High-Rise Unit and the Mask Service Unit will each deliver about 50 one-hour cylinders. The

High-Rise Firefighting

FDNY members practice high-rise firefighting procedures during a drill in a Citibank office building in downtown Manhattan.

FDNY hasn't officially printed usage times for the one-hour cylinders. However, MSU reports that those the manufacturer rates as one-hour provide an average of 34 minutes' usage under fire conditions; "45-minute cylinders" provide 24 minutes' usage.

When MSU is at a scene, units should get replacements from MSU rather than waiting to stop at battalion depots, which may not have enough to cover such a large operation.

STAGING...

At high-rise fires and any fire where extensive operations are expected, the staging area chief has an important position. He must keep track of:

- all units sent to the staging area
- each unit's time in operation
- all units in a relief cycle (the period during which an attack company is relieved, changes cylinders, regroups, recuperates, and stands by, ready to relieve another attack unit)
- the availability for use of both fresh units and those finishing their relief cycle.

The staging area log (Figure 7-4 of *Firefighting Procedures*, volume 1, book 5, "High-Rise Office Buildings") is the tool for tracking this information. For the staging chief, clipboard, paper, pencil—even eyeglasses—also become tools of operation.

When a variety of Scott cylinder sizes are in use, the staging chief notifies the unit officer of the rated time and brings another unit into standby to relieve the operating unit within the proper period. This keeps hose line control without loss of progress.

When it becomes obvious from Handie-Talkie, command post, or Field Comm transmissions that more units will be required, the staging chief should inform the command post of the units available in staging. On greater alarms, the units will be coming from a distance, so a staging area should have at least three engine and two ladder companies available during an extended operation.

SPECIAL UNITS...

There are two command post companies, Engines 7 and 54. When one responds on a 10-76, it maintains the command post log, provides firefighters to operate and control the elevators, and assists in any other way that the chief in charge directs.

The High-Rise Unit consists of a van quartered with Engine 3. (If Engine 3 is operating elsewhere, Engine 33 drives the van to the high-rise scene.) The unit carries:

- 50 one-hour cylinders
- hardwired phones
- a Lorenzo ladder (which can be extended from a window on the floor below to reach the fire floor for rescue or for ladder pipe operation)
- a concrete core cutter for cutting floors
- two smoke ejectors with the necessary generators, and
- pressure-sensitive tape to keep broken window glass from falling outside the building.

—A.D.

aisles. Chief Burns transmitted a third alarm at 2129 hours to replace the many units that were fatigued.

When fresh units arrived, B.C. James Hanley, Battalion 7, relieved Battalion 8 at the subcellar operations post, and Chief Burns revised the strategy. Search and evacuation were complete, so B.C. Foley was shifted to the subcellar. There he had two assignments: search the storeroom perimeter more thoroughly for some other access, and investigate the report that chlorine chemicals, used for the cellar pool, were stored near the fire area. With Chief of Department Homer Bishop asssuming command shortly before 2300 hours, D.C. DeCaprio went with Foley to the lower level. About 10 minutes later, Chief Bishop joined them.

Fans were again relocated to remove some of the

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smoke that made it hard to see. The search turned up no other doors to the storeroom. The fans, meanwhile, didn't clear the cellar but did spread the smoke to the street-level auditorium, where several units were recuperating. The firefighters quickly spoke up, and the fans were immediately repositioned.

THROUGH THE FLOOR

By this time, Capt. James Rogers, Car 18B (see "The Rescue Liaison Unit," *WNYF*, 4th Issue of 1988), had gotten hold of plans for the below-ground levels. Rescues 1 and 4 were directed to go with Capt. Rogers to the floor above the fire and break through the ceiling into the storeroom. This would, at least, move the smoke one level above the fire.

After locating hot spots, the rescue companies and Ladder 4 put two pavement breakers into action. Before they broke through, B.C. Adamo, who was directing the operation, had Engines 65 and 1 stretch a precautionary line.

Because of the temperatures Battalion 8 described, Chief Bishop ordered that a Bresnan distributor be put on this line, making it an attack line. And because the fire was still a long way from extinguishment, Satellite 1 (Engine 9) was ordered to bring in its foam generator and its supply of high-expansion foam to fill the storage room from above if the distributor was ineffective. Units in the storeroom were backed out.

With all the elements in place, the teams operating the pavement breakers broke through into the storeroom. Heavy fire was visible below. They had opened up onto the hidden north-wall fire which had held the engine companies off for almost four hours.

Once the distributor was lowered into the fire, it was a different story. For the first time, firefighting forces made progress against the fire.

Additional holes were opened: above the fire in a line parallel to the north wall, and through the north wall itself. The perimeter survey had disclosed various spots along the wall that were hot to the touch. The distributor line was ordered shut down to avoid pushing heat and smoke toward a Ladder 4 team as it breached the wall. Engines 21 and 34 stretched additional lines to operate through these openings. Again, the units found a large volume of fire.

D.C. David Corcoran, Division 1, arrived at 2320 hours and was assigned to the subcellar operations post, where he coordinated a cyclical attack: The distributor extinguished more fire, then was shut down while the attack was renewed through the breached holes in the wall. After those lines shut down, the original attack lines were manned again and the 1¾-inch lines advanced into all areas. Portable lights illuminated the way.

The three-pronged attack had finally reached every portion of the fire area. Based on reports from Division 3, the Chief of Department transmitted the "probably will hold."

The problems of overhaul and complete extinguishment remained. Many units had been operating throughout the third alarm. They had suffered exhaustion, smoke inhalation, and other injuries. Chief Bishop ordered a fourth alarm for relief at 2314 hours.

It was now a mop-up operation. The fresh companies penetrated the massive pile of burned stock to extinguish the smoldering fire. Hazardous Materials Co. 1 scanned the smoke-darkened fire area with its thermal imaging camera to pinpoint the deep-seated pockets of fire. This spared the truck companies extensive, back-breaking overhaul.

HUMAN EXPOSURE

When Division 3 made a thorough survey of the fire area after the fire was declared under control at 2341 hours, it was immediately clear that the carbon monoxide levels were still unusually high. So D.C. DeCaprio told all operating units to continue using their SCBA at all times. Carbon monoxide meters carried by the rescue companies and Haz Mat 1 verified high levels of carbon monoxide many hours later. Units responding on subsequent relief assignments were ordered, via dispatcher, to report in with masks and spare cylinders, and battalion chiefs were specifically ordered to monitor compliance.

Haz Mat 1 had been ordered to take up, but after his survey, Chief DeCaprio called the company back to check the materials that had been involved in the fire. One of the first cans he had picked up, III trichloroethane, carried a warning label: "...will break down under heat to form phosgene..." The list of other materials Haz Mat 1 found included methanol, acetone,

petroleum ether, bleach, ammonia—and bags of asbestos. Hunter College was in the process of asbestos removal by a licensed contractor.

With the quantity of chemicals and severe heat firefighters had faced, Chief DeCaprio considered it essential that CD-73 exposure reports be submitted, and he ordered all members to do so. He submitted a special report to the Chief of Department to go with the CD-73s into the members' files.

During a post-fire critique, Chief DeCaprio found a floor diagram posted in the sub-sub-cellar landing at the base of the elevator shaft. At the time of the fire, the heavy smoke had made it impossible to see the drawing. The diagram would have been of great assistance in planning strategy if it had been available at the command post when the operation began. During the critique, we emphasized to the building staff that a copy should be available at the building's security post at all times and given to FDNY units if there's a fire.

The Hunter College fire had been a long, tough battle. The heat and smoke never lifted during the entire operation. Division 3 was extremely proud of every member who participated in the attack—and attack it was, because they had never retreated. They returned again and again until they transformed a standoff with a hidden fire into extinguishment.

LESSONS ABOUT FIRE OPERATIONS

1. Staging areas and relief locations. Both should be reviewed for proper location and shifted if necessary. Hardwired communications, carried by rescue companies and some battalions, should be stretched from the command post to the staging area.

2. Extensive mask usage. Units working a distance from the actual fire may have a tendency to remove their mask facepieces, believing themselves to be in a clear area. But smoldering fires, partially extinguished fires, and fires below grade produce huge amounts of colorless, odorless carbon monoxide; all three conditions existed at this fire. In a poorly ventilated subcellar, especially, there are always pockets of carbon monoxide and other toxic fumes. Chiefs should monitor the members in their sector and make sure they use full mask protection.

3. Hazardous materials. In recent years, the Department has become increasingly aware that members may encounter haz mats in even the simplest fire. Throughout operations at fires and non-fire emergencies, the officer in command should determine if members have been exposed to any potentially toxic substances. The survey can be a roll call of units, asking what they observed, or it can be a full analysis by Haz Mat 1.

When there's evidence of possible exposure, it should be reported on CD-73s. These reports can provide the Department with valuable statistics, and also help individual members safeguard their health throughout their careers.

Twenty-seven members reported injuries as a result of the fire. The unrelenting heavy smoke—unmoved even by smoke ejectors—accounted for one third of those cases. *Photo by Vic Nicastro*

4. Communications. When communications is split between command and tactical channels, aides must stay close to their chiefs. An aide will closely monitor the channel his chief's *not* using and refer the messages from that channel to the chief.

5. Perimeter survey. The chief in command should order or make his own perimeter survey to discover some alternate access when heat, smoke, or contents limit entry to the fire area. I learned the value of this at a Fordham University bookstore fire in 1970: The fire was unreachable during a stubborn, three-hour operation. The perimeter survey led by A.C. Al Sileo resulted in companies punching through a wall and rapidly extinguishing the fire.

Openings can be made in exterior as well as interior walls; building plans can help locate a good spot. Coordination and communication among all units involved are essential, and it's important that all units operating in the fire area be backed out before the outside streams are used.

6. Distributors. Perhaps improved mask usage, which enables us to operate lines on the same floor as the fire, is the reason we rarely use distributors anymore. But when operation into a fire area is delayed or impossible, distributors are effective and should be considered early in the attack. The man-

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dated use of a gate valve with a distributor allows a rapid change to regular nozzle use.

7. New technology. The thermal imaging camera has many applications and was useful at this operation. All members should be aware, from department orders, of new equipment delivered to specific units permanently or during pilot programs. And it should become a matter of routine that special units inform the chief in command of equipment they have with them.

LESSONS ABOUT BEING PREPARED

1. Building inspections and prefire planning. An administrative unit making its annual building inspection should look for more than compliance with fire prevention laws. This is the time to make sure up-to-date floor plans are located at the command post or security station; that plans indicate unusual hazards, unique construction features, and the location of special laboratories; and that the response of supervisory building personnel to the command post is built into the fire safety plans.

The company officer should review and update CIDS (Critical Information Dispatch System) cards where necessary. He might also file newspaper clippings about structures in his response area (such as the articles about this building's earlier DEP record).

2. Sprinkler recommendations. The Fire Department reviews all below-ground levels and special storage areas. For those in which sprinklers aren't required, the Department should consider recommending them. However, sprinkler installations can be delayed for years; the records for this building indicated that a 1970 sprinkler recommendation had been rescinded because of expected new construction. When delays happen, the administrative unit must keep abreast of progress—or lack of progress.

Now, after the fact, we have added reasons to push for spinklers to be installed throughout all below-grade spaces.

3. Fire drills. State law requires three fire drills per year in college occupancies. Chiefs and local units should try to be in on these drills. In addition to teaching how to evacuate, drills can reinforce the *need* to evacuate. Some faculty members didn't understand this at the Hunter College fire; firefighters had to forcefully inform them that they had to evacuate.

Correction: Last issue's fire story, "Fog and Foam *vs.* Electricity and Oil," incorrectly stated that the Maxi-Water Unit carries foam in its booster tank. However, the Maxi-Water Unit (like all satellite hose wagons) doesn't have a booster tank. It does carry 18 five-gallon cans of high-expansion foam and another 18 five-gallon cans of 3-percent fluoroprotein foam. The companion pumper, Engine Co. 207, carries water in its booster tank.

One of the most critical assignments a firefighter can have at a building fire is the roof position. The roofman's actions have an extraordinary impact on the overall firefighting effort.

Besides a basic understanding of firefighting, building construction, and fire chemistry and physics, the roofman must possess such personal qualities as intuition, foresight, courage, and good judgment. The roofman must always be thinking and making decisions.

The responsibilities of this position cover three broad areas: life, communications, and ventilation. The roofman looks for occupants and checks for hazards in order to protect life (both civilians' and firefighters'). He recognizes the need for his fellow firefighters to know about victims, hazards, building features, and more, and communicates this information to others on the fireground. He ventilates appropriately to prevent smoke and heat from mushrooming on upper floors, and to remove from all floors smoke which would impede search and extinguishment.

Life, communications, and ventilation intertwine, and the roofman must be considering all three throughout the operation. To discuss them more clearly, however, we will address them one at a time. (The procedures described here apply to many types of non-