

Sprinklers Prevent Tragedy in Two Health Care Facility Fires

Compliance with code requirements, activation of sprinkler systems, and proper staff actions saved lives in two recent Massachusetts fires.



INVESTIGATION REPORT

The NFPA has investigated numerous fires in health care facilities where fire safety deficiencies were documented, patients died, and extensive damage occurred.

Two recent fires—at a nursing center in Woburn, Massachusetts, on October 30, 1992, and a hospital in Weymouth, Massachusetts, on January 24, 1993—were notably different from other fires documented by the NFPA. There were no fatalities at these fires, injuries were kept to a minimum, and property damage due to direct flame contact was limited. Moreover, the fire protection equipment and training programs at these facilities were consistent with current fire safety codes and standards.

Analyses of the two fires indicate that compliance with fire safety code requirements, proper training of staff members in emergency procedures, and the activation of automatic sprinklers can significantly reduce the potential for loss of life and for property losses in health care facilities.

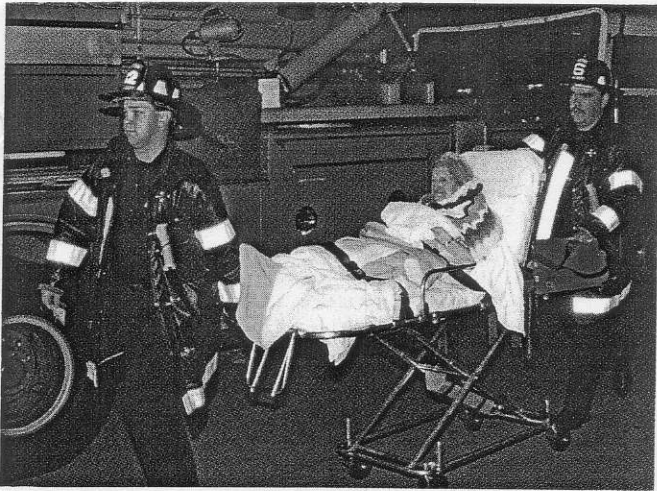
WOBURN NURSING CENTER FIRE

On Friday, October 30, 1992, an explosion and fire resulted in the total evacuation of the Woburn Nursing Center, a 101-bed facility in Woburn, Massachusetts.

The explosion occurred when natural

Firefighters evacuate a resident of the Woburn Nursing Center after leaking propane caused a fire and explosion.

DAN CUMMINGS/WOBURN ADVOCATE



The nursing center's 101 residents were safely evacuated in 15 or 20 minutes and were taken to a school that was used as a temporary shelter.



DAN CUMMINGS/WOBURN ADVOCATE PHOTOS

Emergency medical personnel check a resident's identity and vital medical data before she was transported to the temporary shelter and then to a hospital or nursing home.

gas, accidentally released during construction activities, filled combustible concealed spaces in the building's core area and was ignited by an undetermined heat source. The gas-fed fire spread vertically in the core area from the basement to the third floor and blew off part of the roof. Twenty-one sprinklers operated and controlled the fire.

Staff members evacuated all of the facility's residents with the help of construction workers, neighbors, and others who provided limited, but valuable, assistance. Because the evacuation was already in progress when first-alarm fire fighters arrived, most of them were able

to concentrate on suppressing the fire.

Twenty-one civilians and two fire fighters sustained injuries, most of them minor. Damage to the building and its contents was estimated at \$1.5 million.

The building

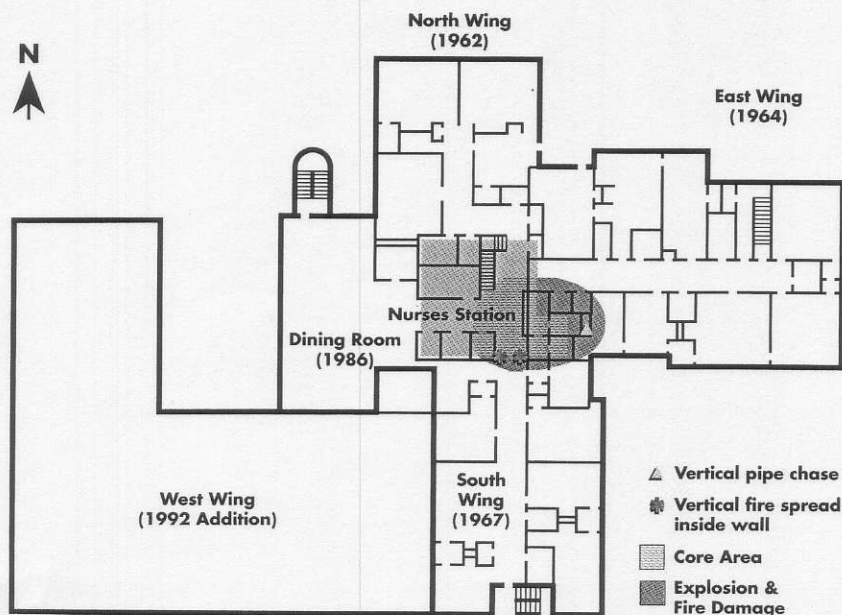
The building housing the Woburn Nursing Center varied in height from two to four stories. The original structure, built in 1905, was a two-story-plus-attic, wood-frame dwelling that was converted for use as a nursing home. Through the years, it had been expanded by the construction of five additions, the first in 1962 and the most recent in 1992. All of

the additions were of light, noncombustible construction and were so located that the original structure was surrounded by new wings. Thus, the old wood-frame structure became the core area of the facility (see Figure 1).

At the time of the fire, the residents' rooms were located in the wings, which were separated from the original structure—now the core area—by noncombustible, slab-to-slab walls. Self-closing, fire-rated doors protected the openings in these separation walls. Slab-to-slab walls also separated the residents' rooms from the corridor, and all the residents' rooms had solid-core wood doors.

FIGURE 1

Woburn Nursing Home, Floor 1

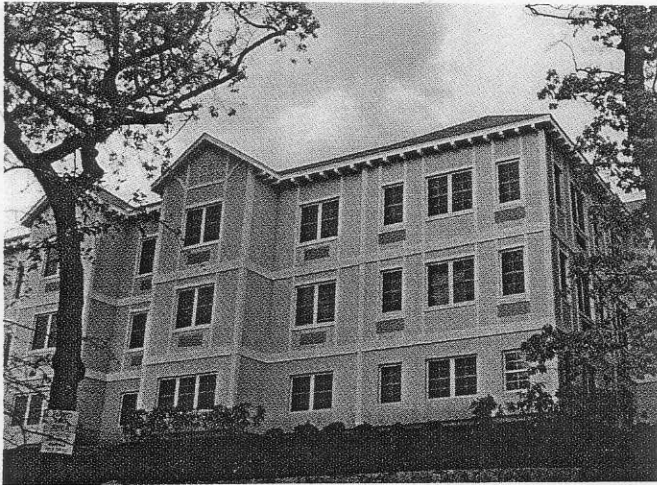


Fire protection features

The entire facility was protected by an approved automatic sprinkler system with standard 160°F sprinkler heads. Smoke detectors were installed in the residents' rooms and the corridors, and there were heat detectors in utility areas such as the electrical rooms, the laundry, and the kitchen. The operation of the sprinkler system or a smoke or heat detector initiated a building-wide alarm, automatically notified the fire department, and released magnetic hold-open devices on the fire doors.

Fire extinguishers were provided throughout the facility. Emergency lighting fixtures were connected to an emergency power system operated by a natural-gas-driven generator in the basement of the building.

The owners and administrators of the nursing center had worked closely with the Woburn Fire Department when the newest addition to the facility was designed and planned in 1992. As a result of this cooperation, they added several fire protection enhancements to the property, including a new water main, new fire hydrants, and a new access road for fire apparatus.



The fire and explosion occurred in the central core area on the first floor of the Woburn Nursing Center. Residents' room were in wings surrounding the core area.

Staff training

As part of their initial orientation, new employees received instruction on the center's fire and disaster plan. All staff members also received regular fire safety training that included fire extinguisher operation, a review of how the alarm system operated, and techniques for evacuating the residents. In addition, quarterly fire drills were held for all shifts.

The fire safety training and fire drills were documented, and training records were reviewed periodically to ensure that all staff members received the required training. The nursing home staff worked closely with the Woburn Fire Department's fire prevention bureau in developing the fire safety programs and performing fire safety training.

Occupants of the building

At the time of the fire, all 101 beds in the nursing center were occupied and most of the residents were in their rooms, where a few were receiving visitors. There were about 22 staff members present, including nurses, aides, kitchen personnel, a receptionist, a development specialist, an activities specialist, and a maintenance person. An estimated four to six construction workers also were in the building and another four were working outside, in the general area.

The fire

At about 3:45 p.m., a plumber completed his work on a 2-inch-diameter branch line for natural gas that had been installed at a previous time. Unaware that the plumbers who installed the branch line had left an unplugged 1-inch orifice in a tee fitting, he charged the branch line with natural gas. According to reports, the natural gas branch line would not main-

tain a stable pressure, so he looked for a possible leak in the system.

After the incident, investigators estimated that the gas had flowed freely for 15 to 20 minutes while the plumber tried to find the cause of the pressure fluctuation. During this time, about 300 to 500 cubic feet of natural gas leaked out of the main and spread to various areas in the building.

When staff members smelled gas, they notified maintenance personnel, who looked for its source. As the odor became stronger, an off-duty Woburn Fire Department officer visiting his mother, who was a resident of the center, suggested that staff members open a few windows, and they did so. A few moments later, a loud explosion occurred.

Staff members immediately began to close the doors to the residents' rooms and started evacuating residents from the rooms closest to the explosion area. They were assisted by the visiting fire officer, several construction workers, and a few neighbors.

The Woburn Fire Department dispatch center received an automatic alarm from the nursing center at 4:07 p.m. and a subsequent telephone call reporting that a generator had exploded and part of the building's roof had been blown off. Three engines, a tower, and a rescue unit were dispatched. Because the initial report indicated that an explosion had occurred, the chief of the Woburn Fire Department also responded.

The officer on the first-arriving engine company immediately reported heavy smoke and flames coming from the roof. He requested a second alarm, and another engine and a truck were dispatched.

Another engine company went to the back of the building, where they saw elderly residents being helped down a fire escape. At 4:11 p.m., the officer on



Explosion and fire damage in the core area of the nursing center extended from the first floor to the third floor, shown here. Fire doors at left closed automatically.

this engine requested a third alarm, ambulances, and a bus.

The department chief arrived at this time and saw a severely burned victim—the plumber who had been working on the natural gas branch line. After the chief confirmed that there were thick smoke and flames at roof level, he received a report of heavy fire in the second-floor ceiling and ordered a fourth alarm at 4:12 p.m.

During his initial size-up of the situation, the chief had assessed the fire as quite severe, but he was aware that the nursing center's staff members were managing the evacuation of the residents. As a result, he had most of the first-alarm companies concentrate on attacking the fire and conducting a primary search of the facility.

Fire fighters advanced two handlines to the second floor, where heavy fire had been reported. They also took a third line to the third floor, because there had been a report that someone might be trapped there. Some first-alarm fire fighters were assigned to assist in the evacuation.

Second-alarm companies established the water supply for the first-alarm crews attacking the fire. They also took part in searching the building, helped attack the fire on the first and second floors and on the roof, and aided in the evacuation. One of the many mutual-aid engine companies that had responded to the third alarm advanced a hose line into the first floor to suppress the fire in that area. Other third- and fourth-alarm companies assisted in the secondary search of the building, fire suppression operations, and the evacuation of residents.

Although the fire was considered under control at 4:35 p.m., fire fighters had to open many walls and areas in the ceiling assemblies to check for fire extension in these areas. Final extinguishment was completed at about 5:15 p.m.

WOBURN FIRE DEPARTMENT PHOTOS