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ANOTHER FATAL PROPANE FIRE

A fatal hotel fire illustrates the hazards of propane use in occupied buildings.

ONE PERSON DIED AND 20 OTHERS WERE injured at the Howard Johnson Hotel in Cambridge, Mass., when propane gas was released accidentally from a 20-pound cylinder that was fueling a portable cooking grill in a function room. This use of propane in an occupied building violates Cambridge city ordinances; NFPA 58, *Storage and Handling of Liquefied Petroleum Gases*, 1989 edition, and model fire prevention code requirements also prohibit its use. The

National Fire Protection Association (NFPA), in cooperation with the Cambridge Fire Department, is documenting this significant fire.

Hotel features

The fire-resistive, nonsprinklered hotel was constructed in the late 1960s and incorporates both low-rise and high-rise sections. The three-story low-rise section contains the lobby, restaurants, kitchens, meeting rooms, a large assembly hall and other function rooms. This part of the

building also contains a large decorative staircase that runs from the first-floor lobby to a large function room—the room of origin—on the third floor. The 11-story high-rise portion of the building contains guest rooms.

The building is equipped with a fire detection and alarm system that includes heat detectors and manual pull stations which when activated send signals to both the front desk and the fire department. All corridors are equipped with smoke detectors that alert the front desk when activated. In addition, all guest rooms have single-station smoke detectors.

A standpipe system with 2½-inch fire department connections is located in an exit stairway and all exit corridors are equipped with cabinets containing fire extinguishers.

The carpeted third-floor function room measures approximately 55 by 50 feet and has a 12-foot-high noncombustible suspended ceiling. Walls are made of gypsum and are finished with a single layer of vinyl wall covering. The function room has three exits; two of them, positioned at opposite ends of the same wall, discharge into a lobby leading to the decorative staircase. The third exit, located opposite the main entrance doors, opens into an enclosed stairway that provides direct access to the outside of the building.

In addition to the decorative staircase, several enclosed exits are available to occupants in the third-floor lobby area. They

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include both enclosed exit stairways and horizontal exits. All the exits appear to have been marked properly and illuminated by emergency lighting.

Ignition

A private party with about 90 guests was being held in the third-floor function room on the evening of the fire. A propane gas grill was set up in the function room where entertainment included a live band, and a buffet-style meal was put out near the main entrance. Soon after 10:00 p.m., many guests had left, but 50 to 60 people still remained. While a hotel employee was dismantling the grill, there was a sudden release of propane and the employee attempted to shut off the gas. Some guests smelled the propane and were beginning to evacuate when ignition occurred.

The exit closest to the buffet area was immediately blocked by the propane-fueled fire which quickly ignited adjacent combustibles such as chairs, table coverings and interior finish materials. Smoke and heat filled the room; most of the room's occupants were able to escape through one of the exits leading to the decorative staircase even though one of the exit's two doors was locked. Only a few occupants used the exit that was across the room and which provided direct access to the enclosed stairway.

Operations

The Cambridge Fire Department received automatic notification of the fire at 10:07 p.m. The alarm was confirmed immediately when a member of the hotel staff called the fire department.

The first-arriving company encoun-



The fire originated at a propane gas grill in the function room's buffet area which had been set up near the room's main entrance.

tered heavy smoke, and the crew quickly prepared for an interior attack. Equipped with SCBA and high-rise packs, the officer and two fire fighters connected a 1 3/4-inch hose line to the standpipe and entered the second floor near the decorative staircase. The fire fighters found hotel employees using fire extinguishers in an attempt to put out spot fires on the carpeted decorative staircase. After extinguishing the burning carpet and reaching the top of the decorative staircase, they found the main body of the fire was venting into the third-floor lobby area. It had burned through three plastic skylights above the decorative staircase and was venting to the outside.

Fire fighters entered the function room through the doors closest to the cooking area. Another engine crew stretched a second hose line up the decorative staircase to the function room, and the two crews were able to extinguish the fire. The residual heat and smoke in the function room dissipated quickly after fire fighters broke windows to ventilate. During overhaul, personnel discovered that the propane tank was still discharging propane, exposing fire fighters to a potential secondary explosion for a short period of time.

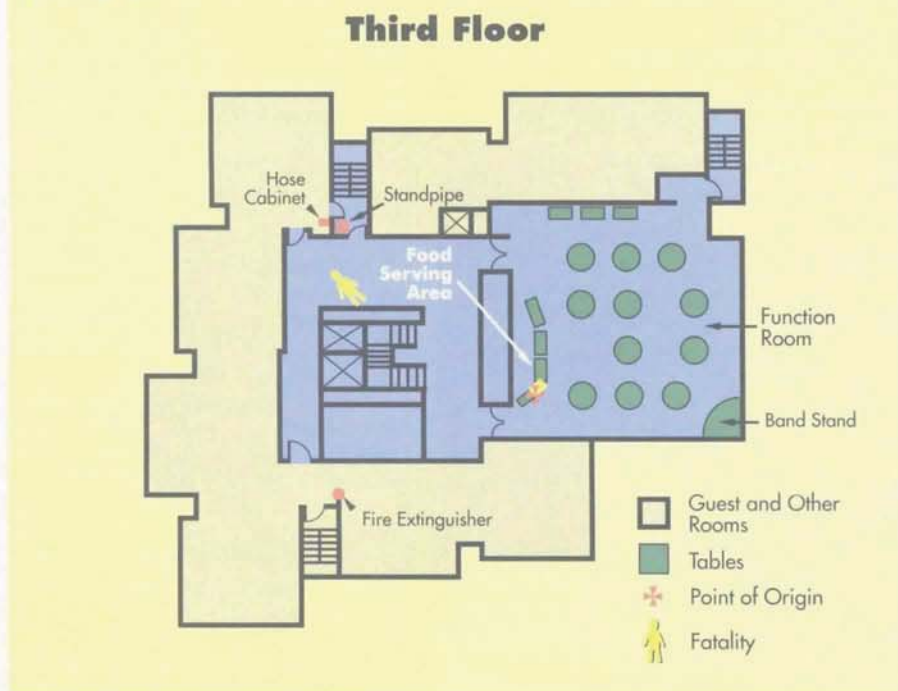
The toll

One person died as a result of the fire, a member of the band who was found in the third-floor lobby. The employee who was near the propane tank when the flash fire occurred was burned severely and also was found in the third-floor lobby. In addition, about 20 people from the room sustained various smoke and burn injuries. Three victims reportedly were admitted to the hospital with serious injuries while the remaining persons were taken to the hospital for observation or treatment for minor injuries and then released.

Analysis

This fatal hotel fire illustrates the hazards of using propane for cooking inside buildings. NFPA 58, *Storage and Handling of Liquefied Petroleum Gases*, 1989 edition, prohibits the use of liquefied petroleum gas containers of any size to supply appliances for residential or commercial food service in buildings. The fire prevention codes of the three model building code groups—Building Officials and Code Administrators (BOCA), Standard Building Code Congress International (SBCCI) and International Code of Building Officials (ICBO)—also prohibit the use of propane containers. Similarly,

FIGURE 1



NFPA STANDARDS ON THE USE OF LIQUEFIED PETROLEUM GAS CYLINDERS

"The Bayview Restaurant Fire," an article in the February 1986 issue of *FIRE COMMAND*, reported on the total destruction of a restaurant as the result of the use of a 20-pound liquefied petroleum gas cylinder in the restaurant. There was no loss of life. Part of that article addressed applicable NFPA standards which are relevant to this latest incident.

The use of liquefied petroleum gas is covered by NFPA 58, *Storage and Handling of Liquefied Petroleum Gases*, which is the basis for regulations in all 50 states. With minor exceptions, NFPA 58 prohibits the use of 20-pound LP gas cylinders in buildings. This incident clearly demonstrates the need for adequate firesafety measures when storing and handling liquefied petroleum gases. The sudden release of flammable gas in confined spaces can create an extreme hazard to life and property. Once ignited, the intense and rapid fire development that re-

sults from an accumulation of flammable gas leaves little time for occupant evacuation.

The convenience and ease of LP gas cylinder installation has led to the nonconforming, widespread use of such cylinders in restaurants and other buildings. A fire investigation report titled "The Fatal Explosion" (*FIRE COMMAND*, March 1984) detailed a combustion explosion that occurred on December 27, 1983, in a 70-year-old four-story building in East Buffalo, N.Y. Two civilians and five fire fighters died as a result of that incident, and 26 fire fighters and more than 50 civilians were injured. The explosion occurred when an unauthorized 500-gallon propane cylinder in the building was dropped from an industrial lift truck, breaking off a valve on the cylinder. Gas that accumulated from the leaking cylinder ignited, resulting in the fatal explosion just as the first fire department units arrived.

The Bayview Restaurant fire clearly demonstrated the extreme hazard that the improper use of LP gas can pose to life and property as well as the importance of compliance with the provisions of NFPA 58. Inspections of these occupancies, particularly restaurants and other facilities frequented by the public, are necessary to ensure compliance with the standard. The most commonly detected violations of the standard include:

1. The use of 20- and 200-pound LP gas cylinders in buildings.
2. The use of 1-pound cylinders for portable restaurant carts. Such use is prohibited. Cylinders of this size may be used only for approved self-contained torch assemblies or similar appliances with the exception of mobile cooking equipment.

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NFPA 101, *Life Safety Code*®, 1988 edition, specifically prohibits the use of liquefied petroleum gas containers in assembly occupancies.

National Fire Protection Association records contain several examples of fatalities or multiple injuries caused by the use of propane tanks inside buildings. In 1987, an employee of a San Francisco teahouse lost control of a propane cylinder while trying to connect or disconnect

it. When the tank came loose, the resulting gas leak led to an explosion and fire that injured 18 people.

In 1985, there was a fire in the main dining room of a New Jersey restaurant when the flexible metal hose connecting a 20-pound propane cylinder to a steam table failed. One person was injured and 75 to 80 patrons narrowly escaped the fast-growing fire.

Five fire fighters and two civilians were

killed when a combustion explosion devastated a four-story industrial warehouse in Buffalo, N.Y., on December 27, 1983. The incident occurred when an unauthorized 500-gallon propane tank was dropped accidentally from an industrial lift truck, creating a gas leak that led to the explosion.

In 1963, an explosion at the Indianapolis State Fairgrounds Coliseum left 75 dead and more than 300 persons injured when portable radiant heaters, fueled by 100-pound propane cylinders, were used to keep popcorn warm in the concession area. Escaping gas from one of the cylinders caused an explosion that blew out the concrete structure under the seats, tossing spectators, chairs and large pieces of concrete into the air. The heaters apparently lacked national laboratory testing approval, and the gas cylinders violated existing NFPA codes, which were the basis for the state law.

National codes and standards that prohibit the use of propane inside occupied buildings need to be applied and enforced. Moreover, building and fire officials responsible for code enforcement need to ensure that operators of hotels, restaurants and other assembly occupancies understand that such practices are hazardous and prohibited. ❏

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The fire quickly ignited chairs, table coverings, and interior finish and other combustible materials such as those used in the ceiling.

