PROPANE FIRE IN HOTEL
Cambridge, MA
June 6, 1990

Includes:
Another Fatal Propane Fire
By Michael S. Isner
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Fatal Propane Fire in Hotel
Cambridge, MA
June 10, 1990

One person died and 20 others were injured at the Howard Johnson Hotel in Cambridge, Massachusetts when propane gas was released accidentally from a 20 lb cylinder which was fueling a portable cooking grill in a function room. The use of propane in occupied buildings violates Cambridge city ordinances and is not permitted by NFPA 58-1989 Standard for the Storage and Handling of Liquefied Petroleum Gases or by model fire prevention code requirements. The National Fire Protection Association (NFPA), in cooperation with the Cambridge Fire Department, is documenting this significant fire.

The fire resistive, nonsprinklered hotel was constructed in the late 1960’s and contains a low-rise and high-rise portion. The three-story low-rise contains the lobby, restaurants, kitchens, meeting rooms, a large assembly hall, and other function rooms. This portion 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. The system includes heat detectors and manual pull stations which upon activation send signals to both the front desk and the fire department. In addition, single station smoke detectors are provided in all guest rooms, and corridor smoke detectors are equipped to provide alarm signals to the front desk.

A standpipe system with 2 1/2-inch fire department connections is provided in an exit stairway. In addition, cabinets containing fire extinguishers are located in the exit corridors.

The third floor function room is approximately 55 ft by 50 ft with a noncombustible suspended ceiling about 12 ft above the carpeted floors. Walls are constructed with gypsum material and are finished with a single layer of vinyl wall covering. The function room has three exits. Two of the exits, positioned at opposite ends of the same wall, discharge into a lobby leading to the decorative staircase. The third exit, across the room from the main entrance doors, opens into an enclosed exit stairway discharging directly to the building exterior.

In addition to the decorative staircase, several enclosed exits are available to occupants in the third floor lobby area. They include both enclosed exit stairways and horizontal exits. All the exits appear to have been properly marked and illuminated by emergency lighting.
A private party with approximately 90 guests was being held in the third floor function room. Entertainment included a live band, and a buffet meal was set up near a main entrance door. The setup included a propane gas-fired grill. Shortly after 10:00 p.m. many party guests had left, but 50-60 people, including the band members, still remained. While one of the employees 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 the ignition occurred.

The exit closest to the buffet area was immediately blocked by the propane-fed fire which quickly involved adjacent combustibles, including chairs, table coverings, and interior finish materials. Smoke and heat filled the room, and most occupants were able to escape through one of the exists leading to the decorative staircase. Even though one of its two doors was in the locked position, most occupants were able to escape from the room through the remaining door. Only a few occupants used the exit which was across the room and provided direct access to the enclosed stairway.

The Cambridge Fire Department received automatic notification of this fire at 10:07 p.m., and the alarm was immediately confirmed when a member of the hotel staff called the fire department. The first arriving company encountered heavy smoke, and the crew prepared for an interior attack. Equipped with SCBA and high-rise packs, the officer and two fire fighters connected a 1 3/4-inch hoseline to the standpipe and entered the second floor near the decorative staircase. The fire fighters first found hotel employees using fire extinguishers against spot fires on the carpeted decorative
staircase. After extinguishing the burning carpet and reaching the top of the decorative staircase, they found that the main body of the fire was venting into the third floor lobby area. The fire had burned through three plastic skylights above the decorative staircase, and was venting to the outside.

The fire fighters entered the function room through the doors closest to the cooking area. Another engine crew stretched a second hoseline 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 other fire fighters broke out windows for ventilation. During the overhaul operations, it was realized that the propane tank was still discharging propane, exposing the fire fighters to a secondary explosion hazard for a short period of time.

The fire resulted in the death of one person, a band member. He was found in the third floor lobby. The employee who was near the propane tank when the flash fire occurred was severely burned and was also found in the third floor lobby. In addition, approximately 20 persons from the room sustained various smoke and burn injuries. Three were reportedly admitted to the hospital with serious injuries. The remaining were transported to the hospital for observation or treatment of minor injuries and subsequently were released.

This fatal hotel fire in Cambridge illustrates the hazards of using propane for cooking inside buildings. NFPA 58-1989 Standard for the Storage and Handling of Liquefied Petroleum Gases prohibits LP-Gas containers of any
size from being used to supply appliances for residential or commercial food service in buildings. The fire prevention codes of the three model building code groups, i.e., BOCA, SBCCI, and ICBO also prohibit this use of propane containers by either referencing NFPA 58 or basing their requirements on the same criteria. Similarly, NFPA 101-1988 Life Safety Code prohibits the use of LP-Gas containers in assembly occupancies.

NFPA records contain several examples of fatalities or multiple injuries caused by the use of propane tanks inside buildings. In 1987 an employee in a San Francisco Chinatown 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 subsequent fire that injured 18 people. In 1985, a New Jersey restaurant suffered a fire in the main dining room when a flexible metal hose connecting a 20 lb propane cylinder to a steam table failed. One person was injured and the 75-80 patrons narrowly escaped the fast-growing fire. Five fire fighters and two civilians were killed during a combustion explosion that devastated a four-story industrial warehouse building in Buffalo, New York on December 27, 1983. The explosion occurred when an unauthorized 500-gal tank of propane was dropped from an industrial lift truck creating the gas leak that led to the explosion. In 1963 an explosion that left 75 dead and more than 300 persons injured occurred at the Indianapolis State Fairgrounds Coliseum. Portable radiant heaters fueled by 100 lb propane cylinders were being used to keep popcorn warm in the concession area. Escaping gas from one of the cylinders blew out the concrete structure under the seats, tossing spectators, chairs, and massive pieces of concrete into the air. The heaters apparently lacked any national testing laboratory approval, and the gas
cylinders violated the existing NFPA codes which were the basis for the state law.

National codes and standards which prohibit the use of propane inside occupied buildings need to be applied and enforced. In addition, 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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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-resistant, 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.
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-fed 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 encountered 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 1½-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,
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 fire safety 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 results 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:


2. The use of l-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.

Theodore C. Lemoff, P.E.
Gases Engineer
National Fire Protection Association


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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