MOTOR LODGE FIRE
Concord, Massachusetts
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A nighttime fire in a first-floor room of this two-story motor lodge spread to an adjoining room and filled 320 feet of the first-floor corridor with intense heat and dense black smoke. There were no fatalities, largely because occupants were able to exit directly to the outside from first-floor rooms and to balconies from the second-floor rooms. Many occupants jumped to the ground, and three of those who did so were injured. Two police officers were also injured. If occupants had been forced to exit through the interior exit-access corridors, it is highly probable that some occupants of the first floor would not have survived.

The motel layout with doors opening to the outside from each guest room is considered the most significant factor that allowed all of the occupants to evacuate safely.

The investigation of this fire was a cooperative effort by the National Bureau of Standards, the National Fire Prevention and Control Administration, and the NFPA Fire Investigations Department. The author gratefully acknowledges the assistance of Chief Matthew Cullinan, Concord Fire Department.

Above: View of west wing of two-story, U-shaped Howard Johnson’s Motor Lodge where a first-floor fire filled 320 feet of the first-floor corridor with heat and smoke. Room of fire origin can be seen at left in photo (lower floor, second from left).
Background

The Howard Johnson's Motor Lodge in Concord, Massachusetts, is a U-shaped, two-story building with an A-frame-style office building connected to it by a short corridor at the south end of the west wing. (See Figure 1.) A restaurant-and-lounge building is separate from the motor lodge, located a few hundred yards to the west.

The original L-shaped motel or motor lodge was constructed in 1963. An addition to the original building that completed the U-shape was constructed in 1969. The fire occurred in the L-shaped section of the original building (the north and west wings), and the following construction details pertain to that section.

Construction

The west wing, which was 60 feet wide by 211 feet long, was constructed of concrete-block outside walls with a load-bearing, 8-inch concrete-block wall running lengthwise (north and south) of the wing. The building was two stories high, with no basement and with a slightly pitched, peaked roof. The first floor was of concrete on grade, and the second floor was of 5-inch-thick poured-concrete-on-metal-deck-on-metal bar joist. The roof was a built-up type on steel-deck-on-metal bar joists. Roof and floor joists were supported by the outside walls and the east corridor wall. The west corridor curtain wall was of concrete block and extended to the bottom of the bar joists.

Figure 1. Detail of north and west wings of building.

Figure 2. West wing, area of fire origin.
The first- and second-floor slabs and the roof extended beyond the outside wall for about four feet, forming private balconies on the second floor and small, patio-like areas on the first floor. The concrete-block walls between rooms also extended to the outer edge of the second-floor slab, separating the balconies on each second-floor unit. There was no continuous walkway along the outside and no stairway leading from the balconies to the ground.

Enclosed stairways were located at each end of each wing. Stairway-enclosure doors were ½-hour, Class C, self-closing fire doors with 30-inch-by-34-inch wired glass windows. There were no fire doors separating the north and west corridors on the first floor, but ½-hour, self-closing metal fire doors with 30-inch-by-34-inch wired glass windows were located at about midpoint in each wing along the second-floor corridor.

Wing of Fire Origin

Individual rooms measured 13 feet by 18 feet on the west side of the west wing and 13 feet by 27 feet on the east side of that wing. A small bathroom was located on the side of each room nearest to the corridor. The larger rooms on the east side contained double beds, and the smaller rooms on the west side held single beds.

Furniture consisted of storage shelves and chairs padded with urethane foam. Mattresses were 100 percent foam latex on innerspring units that were covered with 64 percent cotton felt and 36 percent sidal pad.

Corridor doors in each room were of solid wood without closing devices. Double, sliding glass doors led to the outside from each room.

All concrete-block walls in the rooms and corridors were covered with gypsumboard on vertical wood furring strips. In the individual rooms, one wall was covered with wood paneling and the other walls were covered with wallpaper. The interior wall in each room between the bath and sleeping areas was of wood stud with gypsumboard on both sides and ceramic tile on the bath side. The sleeping-room floors were covered with shag carpeting.

Corridor walls were covered with a vinyl wallpaper, except for some areas in which a hardboard material covered the lower portion of the wall. Corridor floors were covered with a short-pile carpeting. The corridor was 6 feet wide with a 7-foot, 9-inch-high ceiling.

Ceilings throughout were of plaster on metal lath fastened directly to the metal bar joists.

Fire Protection

The motor lodge was not sprinklered. Fixed-temperature, 135°F open-circuit heat detectors in each sleeping room were located on the wall above the storage shelf, six inches down from the ceiling. Additional detectors were located in the corridor on the wall, near the ceiling. The location of the first-floor detectors could not be determined after the fire, but they were probably positioned similar to those on the second floor, with seven detectors evenly spaced on the walls along the west and north corridors.

The newer east wing did not contain corridor heat detectors, but it did have rate-of-rise heat detectors in the center of each sleeping-room ceiling. The new wing also had emergency lighting and portable extinguishers in the corridor.

The west and north corridors were equipped with battery-type emergency lighting units. There were two portable extinguishers in this part of the building.

The Fire

On the night of the fire, 62 rooms of the motel were occupied by 75 guests. The desk clerk on duty that night worked only part-time at the motor lodge. His primary occupation was as a correctional officer at the nearby state correctional institution.

Some time early Saturday morning, the desk clerk received a telephone call from one of the first-floor rooms. He thought that the call came from Room 110. The caller said that he thought that he smelled smoke.

The desk clerk went to the corridor in the west wing to investigate; as soon as he looked into the corridor, he saw smoke at ceiling level. He went back to the office, telephoned the fire department, then returned to the first-floor corridor with an extinguisher and wondered how he could determine where the fire was located. The occupant of Room 110 joined him in the corridor, and the two of them saw smoke coming from under the door of Room 108.

The clerk banged on that door. After a slight pause, he heard a call for help from inside the room. He unlocked the door, and the occupant walked out of the dense smoke, then collapsed. The clerk described black smoke in the room at waist level. He did not notice any flames.

The night clerk did not assist the occupant, but went back to the office, banging on room doors as he went. He had recognized the occupant as a person who had stayed at the lodge four or five times before and who had a drinking problem. The clerk's first reaction was anger toward the occupant and concern about other occupants. The alarm bell was ringing in the office and numerous lights on the alarm panel were lighted.

Grabbing an extinguisher, the clerk went outside the lodge to the outside door leading to Room 108 and emptied the extinguisher into the room. He believes that the left sliding door was open about one foot. The glass shattered as he reached the room, and flames erupted from the openings. Guests were jumping from

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Fire fighters on the second-arriving engine laid two hoselines into the west wing area. A 1½-inch line was used to attack the room fire from outside, and 1½-inch lines were taken into both ends of the wing. Four fire fighters wearing self-contained breathing apparatus went into the west wing corridor to search for occupants. Two of these fire fighters carried sledgehammers to break open doors.

The fire chief walked around to the back of the motel and saw an occupant going from balcony to balcony along the second floor, banging on doors. The chief asked him if he was all right, and the man replied that he was okay and would continue along the building.

Additional ambulances, rescue units, and engine and ladder companies responded from nearby towns. Police units from Acton, a nearby town to the west, and 15 units from the nearby State Police barracks assisted. The correctional institution sent two units with extra breathing apparatus. A modified disaster plan was put into effect at the nearby Emerson Hospital, and the Concord Chapter of the American Red Cross responded to the scene with its first-aid emergency unit.

A total of six engines, one ladder, a platform, four ambulances, and two rescue units from other towns assisted Concord's ladder company and three engine companies. Fire fighters made three separate searches of the building to ensure that all occupants had been evacuated. Local and state police, as well as the nursing staff at Emerson Hospital, were changing shifts at the time of the first alarm, and therefore there was an abundance of manpower available.

The 1½-inch lines controlled the fire, which was extinguished at about the time the initial evacuation was completed.

Discussion

The fire was caused by careless use of smoking materials. A circular hole was burned through the storage shelves in the room of origin. Fire officials theorized that a burning cigarette left on the shelf fell onto a chair that was below or pushed under the cabinet, igniting the chair padding or clothing on the chair.

The fire spread from the room of origin to an adjoining room through the corridor door opening. Both rooms were badly gutted, and corridor damage was heavy throughout almost all of the west-wing corridor.

The mattress and furniture in the room of origin were completely consumed, except for portions of the storage shelf along the south wall. The wall sheathing was burned off, and the ceiling was subjected to severe heat
that caused the plaster in the center of the room to calcine and fall. The shag carpeting burned, except for an area under the bed.

Room 110 suffered about the same amount of damage, with the mattress partially consumed. The corridor in the west wing was also heavily damaged, with the wall cover consumed for a distance of 60 to 70 feet, approximately 30 to 35 feet on either side of the area of origin. The corridor carpeting reportedly did not burn.

There was smoke damage throughout the first-floor corridors in the west and north wings for a total distance of 320 feet. Smoke marks were evident within two feet of the floor at the most remote end of the north corridor.

There were no fatalities. Three occupants were injured; two suffered from smoke inhalation, plus back injuries incurred when they jumped from the second-floor balcony, and the occupant of the room of fire origin suffered burns and smoke inhalation. Two police officers were also injured; one suffered from smoke inhalation, and the other was injured when he attempted to break the fall of two guests who jumped from the second-floor balcony.

The safe evacuation of all occupants was due to the arrangement of the motel, with doors leading to the outside from each first-floor room and to balconies from each second-floor room. First-floor sleeping-room doors to the corridor were deeply charred in the immediate area of the fire, but fortunately, the occupants had kept their doors closed. The doors withstood the fire, preventing all but extremely light smoke from entering the sleeping rooms.

Ventilation by the fire department of the roof area immediately over the fire, and application of a 30-degree fog pattern from a 1½-inch line into the first-floor west-wing corridor were valuable factors in the venting of smoke and heat to the outside and control of the first-floor corridor fire. These actions enabled guests to evacuate more rapidly and emergency crews to penetrate more easily for search and rescue.

The outside balconies did not constitute an approved exterior means of egress, but did allow occupants to exit from the building without using interior corridors. If the first floor of the building had been arranged without a direct means of egress to the outside, serious injuries and fatalities undoubtedly would have occurred.

The 1976 Edition of NFPA 101, the Life Safety Code, requires that doors between guest rooms and corridors be self-closing. If the doors to Rooms 108 and 110 had been provided with self-closing devices, it is possible that the fire would have been confined to the room of fire origin.

The Life Safety Code requires that a manual alarm system be provided for any hotel having accommodations for 15 or more guests, except where each guest room has a direct exit to the outside of the building and

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ner of proceeding is apparently more an a posteriori one where tents passing CPAI–S4 are put into the market for the determination of the validity of CPAI–S4 as a predictor by campers. We have recently examined two tents in the field using four moderate to high heat flux ignition sources. One tent passed both CPAI–S4 and NFPA 701, while the other passed only CPAI–S4. Both tents withstood all four ignition sources very well, although a strict comparison is not possible, since one tent was a large A-form pup tent and the other was a cabin tent. Many more field tests are needed on a wide variety of tents under the full range of use environments known to exist in camping.

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Buildings under construction require special fire prevention and fire protection measures. Foamed cellular plastic insulation should be covered and protected as it is installed to prevent the occurrence of large exposed areas. Fire protection systems, including standpipes, should be installed during construction and maintained in operating condition, and their construction should progress with the construction of the building. Sprinkler systems should be put into service as soon as feasible. Fire prevention measures should preclude the accumulation of combustibles in areas where the insulation is stored or installed.

During occupancy, care must be taken not to compromise the protected area. Fire protection systems such as the standpipes and sprinkler system must be kept in proper operating condition at all times. During repair work, extreme caution must be exercised whenever hot work is being done in the vicinity of the insulation.

In addition to being an example of a fire in exposed unprotected urethane insulation, this incident demonstrates how various groups (i.e., the fire department, building department, builder, architect, owner, and outside consultants) can work together to bring about a solution to a problem.

It is better to have that collaboration in the planning stage before ground is broken, rather than after the construction has started and the building has already experienced a fire.  

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the building is three or less stories in height. The rooms on the second floor had access to balconies, but not to an exit access, exit, or approved exit discharge, and therefore an alarm system would be required by the Life Safety Code.

The motel was not equipped with an audible alarm signaling system, and did not have manual fire alarm boxes. The automatic fire detection system was not arranged to sound an audible alarm throughout the motor lodge and did not automatically notify the public fire department, but was supervised at the clerk’s desk in the motel office.

The spot-type heat detectors in the sleeping rooms were located on the wall, six inches down from the ceiling. Six inches is the borderline between the “dead-air space” between ceiling and sidewall and an acceptable location. The heat detector in the room of origin, however, was located almost directly over the area of fire origin and was in an ideal location for early detection. The heat detector in the room of origin operated during the fire, but did not alarm until after the occupant in the adjoining room had detected the smell of smoke and alerted the desk clerk.

Because the clerk had left the office to investigate the smell of smoke, and because there was no audible alarm in the area of the sleeping rooms, the exact time that the heat detector in the room of origin activated could not be determined.

CORRECTION

In the November, 1976 issue of Fire Journal, a table on page 75 delineating the number of fireworks incidents by specific types of fireworks contained three errors in the “Minor Injury” column.

In the section of this table for Class C fireworks, it was reported that 52 minor injuries were sustained by individuals using Roman candles/fountains and 49 minor injuries by those using firecrackers ½ inches long or shorter. The correct number of minor injuries inflicted by Roman candles or fountains is 48, and the correct number of minor injuries inflicted by the ½-inch firecrackers is 52.

The table also reported that the number of minor injuries inflicted by undesignated fireworks devices was 21. The correct number of minor injuries inflicted by those devices was 121.

The Fire Investigations Department and the Journal regret these errors.