On July 26, 1980, a late-evening fire in a licensed hotel in the resort town of Bradley Beach, New Jersey, was responsible for the deaths of 24 of the 38 residents of the facility. Most of the residents were elderly and mentally impaired, and many of them had been referred to the hotel by state mental health care institutions or by the county welfare department.

The fire, most probably of electrical origin, started in a concealed space above the ceiling of a basement recreation room and spread to upper floors by means of an open door from the basement and a three-story stairway.

Factors that contributed to the fatalities were: a delayed alarm caused by fire ignition in a concealed space, the lack of an early-warning fire detection system, unprotected vertical openings, lack of a second means of egress from upper floors, presence of louvers on guest-room doors, and a basement door that was left open.

24 Die In New Jersey Hotel Fire

JAMES R. BELL

The Brinley Inn was a 55-year-old, three-story-with-basement structure of ordinary construction. The exterior masonry walls of the 32-by-100-foot structure were covered with stucco. There was a 32-foot-by-40-foot, L-shaped open porch on the front (south side) of the structure (see Photo 1), and a one-story, 22-foot-by-32-foot kitchen extension on the rear (north side) of the building.

The interior finish throughout the upper floors consisted of plaster on wood lath. There was limited wood trim around windows and doors. Basement recreation areas had tongue-and-groove pine paneling, and low-density, combustible fiberboard ceiling tile on 1-inch wood lath was attached to the 2-by-12-inch floor joists.

Wooden stairways and corridor floors were covered with an undetermined type of tight-weave carpeting material on foam rubber carpet padding.

A recreation room and television lounge were located in the south end of the basement. The rest of the rooms in the basement were vacant or were used for storage. The boiler room and a kitchen storage area were located in the north end of the basement. The area beneath the porch was used for storage and was separated from the recreation area by masonry walls with windows. A ¾-inch plywood panel door at the top of the south stairway led from the basement to the first floor. The door did not have a self-closing device.

The first floor contained a lobby, desk area, manager's

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Mr. Bell, NFPA Fire Analysis Specialist, traveled to Bradley Beach to document facts related to this fire. This report was prepared by Mr. Bell and David P. Demers, Manager of the NFPA Fire Investigations Department, based on a four-day, on-site study and subsequent analysis conducted by the NFPA.

The cooperation of Alexander Lehrer, Monmouth County Prosecutor; Bruce Newman, Investigator, Monmouth County Prosecutor's Office; and Ted Bianchi, Chief of the Bradley Beach Fire Department, is greatly appreciated. The assistance of David Holton, Chief Investigator, Committee on Aging, US House of Representatives; Dr. Norman Grover, Center for Fire Research of the National Bureau of Standards; and Robert Kelly, Electrical Investigator, Consumer Products Safety Commission, is also acknowledged.

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residential room, a second residential room, a dining room, and kitchen facilities. The lobby was furnished with vinyl-covered, plastic foam-padded furniture that was distributed throughout the room.

An open stairway ran from the first to the third floors on the south end of the building. It connected 80-foot-long corridors on the second and third floors. There was no stairway on the north end to connect the two upper floors.

On the upper floors, guest rooms adjoined shared common bathrooms and there was a small connecting vestibule between each room. Some guest rooms had 3%-inch plywood panel corridor doors with a 14-by-15-inch or 14-by-19-inch metal louver located 12 to 15 inches from the floor. Five of the 33 guest rooms on the second and third floors had 1%-inch solid-core wood doors. The solid doors were randomly distributed.

The corridor on the second floor had an exit door at the north end that led to the flat roof of the one-story kitchen extension. A very steep metal fire escape provided the second means of escape from the third-floor corridor to the kitchen roof (see Photo 2). An 18-foot vertical metal ladder attached to this building provided the only access from the kitchen-roof area to the street level below.

The building contained a fire alarm system in the public areas, corridors, kitchen, and some storage areas. Detection devices were combination, fixed-temperature (136°F) and rate-of-rise heat detectors. The boiler room was equipped with a 180°F combination heat detector.

The fire alarm system control panel and an annunciator panel were located in the desk area of the lobby, next to the manager’s room. The annunciator displayed four positions, with indicator lights that corresponded to the basement, first, second and third floors.

About half of the second- and third-floor guest rooms were equipped with single-station, battery-powered smoke detectors.
Manual pull stations were located at both ends of the corridors on the second and third floors, and were distributed at various points throughout the basement and first floor. A 10-inch alarm bell was centrally located on each of the upper floors. Internally lighted exit signs and battery-powered emergency lighting units were distributed throughout each floor. Pressurized water and dry-chemical extinguishers were also distributed throughout the building.

Heat was provided by a gas-fired boiler and steam heat that was distributed to radiators in each room. There was no central air-conditioning system in the structure, and investigators found no individual-unit air conditioners.

The electrical service entered at the north end of the building. The main electrical panel was located in the basement, beneath the kitchen. A subpanel in the desk area off the lobby supplied branch circuits in the front (south) portion of the building. The subpanel was connected to the main panel by a No. 14 AWG, 3 insulated-conductor (copper), Type AC cable. The final 15 feet of that sub-feeder was run in the concealed space above the low-density fiberboard tile ceiling in the recreation room. The cable then turned upward through the floor and ran inside a partition to connect with the subpanel on the floor above. The cable did not have a bare conductor installed within the armor. The primary purpose of this conductor is to reduce the impedance of the armor.

Some of the residents did know that they could use the rear (north) exit doors, and may have been trained by the building’s owners to use those facilities.

**Licensing and Inspections**

The Brinley Inn was licensed as a hotel by both the borough of Bradley Beach and the New Jersey Department of Community Affairs. As a hotel, it was subject to inspection every three years. The building apparently complied with the state requirements for a hotel occupancy. The owners at the time of the fire, RAP, Inc., had purchased the building in 1976. They had petitioned the state for permission to turn the hotel into a “shelter-care facility.” The petition had been dropped when the state required that the Inn’s owners make extensive improvements in order to meet the licensing requirements. According to New Jersey law, “shelter-care” is a classification given to facilities that provide room, board, and a minimum amount of supportive care.

**Public Protection**

The borough of Bradley Beach, a northern New Jersey resort community, has a year-round population of about 5,000. During the summer months, the population swells to 25,000. The Bradley Beach Volunteer Fire Department provides public fire protection from three stations, with a total all-volunteer force of approximately 100 fire fighters. The Department has two 1,000-gpm pumps, one 1,500-gpm pumper, a 75-foot aerial ladder, and a utility vehicle. Three hydrants in the immediate area of the Brinley Inn were fed from 12-inch mains of the Bradley Beach public water system.

Because two small, unrelated fires had occurred during the previous year, fire fighters were familiar with the layout and occupancy of the Inn.

**THE FIRE**

**Discovery of the Fire**

The weekend manager watched television until about 10:30 pm, then locked the front door and went to bed. Shortly before 11:00 pm, the fire alarm system activated. After first checking the kitchen in the north end of the building, the manager returned to the front of the building and saw a light haze of smoke around an exit light in the dining room. The lights in the south end of the building were out. She walked through the lobby to the basement-stairway door, opened the door, and saw heavy smoke in the basement. As she stood at the doorway, heavy smoke poured through the door and into the lobby area. She left the door open and retreated from the smoke, which quickly began to fill the first floor.
darkness, she was unable to find the telephone to call the fire department. As she looked for the phone, she shouted to the residents, telling them to get out of the building.

Fire Growth and Development

Neighbors sitting on the front porch of a house across the street noticed smoke coming from the building and heard the alarm bells activate. At 11:02 pm, they called the Fire Department to report the fire. Two police officers in the station at the time proceeded the six blocks to the Brinley Inn. On their arrival, they saw heavy smoke billowing from the second and third floors at the front of the building. One officer headed for the front porch. A female resident ran past him to the street as he started up the stairs to the porch. When he reached the front door, he found the manager standing in the lobby, near the doorway. She told him that all the residents were still in the building. Looking through the lobby and out the east windows, the officer could see flames rolling up onto the porch on the east side of the building. The lobby was filled with heavy black smoke, so he pulled the manager out of the doorway and across the porch, and they started to go down the porch stairs.

At that moment, either a backdraft explosion or a flashover occurred in the basement, causing sufficient impact to knock the police officer and the manager down the front stairs and onto the lawn. The windows of the basement were blown out. Fire quickly engulfed the basement, went up the stairway into the lobby, and then up the open stairway to the floors above (see Photos 3 and 4). Several residents from the upper floors were able to negotiate the stairway at least one floor and escape from the building. An employee who lived in Room 5 on the second floor became aware of the fire early enough to use the stairs from the second floor to the lobby in time
to escape through the front door, as the police officers arrived.

Another resident on the third floor had left his bed shortly before 11:00 pm to go to the bathroom. The smoke detector in the center of the ceiling in his room activated, and he smelled smoke. He opened his louvered panel door and as he stepped out into the hall, the alarm bell in the hallway sounded. He joined another resident who was already in the hallway and they were able to descend from the third floor to the second floor, using the front stairway. They started to descend to the first floor, and had reached the landing halfway between floors when the increasingly heavy smoke forced them to retreat up the stairway to the second-floor corridor. They then went down the corridor to the rear exit door and out onto the kitchen roof, where they were eventually rescued.

Fire Department Actions

The first Bradley Beach fire apparatus arrived shortly after the backdraft explosion (or flashover) occurred. Fire was rolling out of the basement on both the south and east sides of the building, through open areas below the porch. The lobby was also heavily involved in fire. Fire fighters initially placed two 1½-inch hoselines and one 2½-inch line into operation, attacking both the basement fire and the heavy fire in the lobby. Aware of the open stairway, fire fighters made their attack on the lobby through the window closest to the stairway. They quickly knocked down the fire in the stairway and attempted to push the fire back from the open stairway.

Residents were heard screaming and moaning in the building. Witnesses saw several residents run to the windows of their rooms and then run back into the room, repeating this action several times. Bystanders pleaded with the residents to jump, but none did. Smoke soon obliterated the window areas, and the noise from within the building ceased within five minutes.

Police officers and fire fighters helped residents who were standing on the roof at the north end of the building climb down the ladder on the side of the building to the ground. Teams of fire fighters wearing self-contained breathing apparatus entered the corridors on the second and third floors and attempted to rescue victims that they found in the corridors and in their rooms. Fire fighters kicked open doors as they moved up the halls. Other fire fighters raised ladders on both the east and west sides of the building and rescued at least three occupants down them. Some victims were revived by fire fighters performing cardiopulmonary resuscitation.

Mutual-aid companies from Avon, Ocean Grove, and Neptune City responded to assist the Bradley Beach Fire Department. Approximately 150 fire fighters were at the scene. A triage area with two doctors was set up in the parking lot area immediately adjoining the north wall of the building. Twelve first-aid squads transported victims to the area hospital.

Casualties

Twenty-four occupants died as a result of the fire (see floor plan). Two victims were located in the first-floor lobby. Eight victims were found on the second floor; five of them died in their rooms, and three died in the corridor. Three other second-floor residents were rescued and revived; two survived the fire, but one died several weeks later.

There was 13 fatalities on the third floor. Four of the victims were located in the corridor at the top of the stairs, and another was found on the stairway landing, between the second and third floors. Three other victims were found in the third-floor corridor, and bodies of five victims were found in rooms on the third floor. The fire victims ranged in age from 39 to 50 years; most of them were in their seventies.

Damage

The building suffered little structural damage, primarily because of rapid fire suppression by Bradley Beach...
fire fighters and the plaster-on-the-wood-lath interior finish on the first, second, and third floors. Heavy fire damage to interior finish, furnishings, and contents was limited to the south end of the basement, the first-floor lobby area, the stairways extending to the first, second, and third floors, and the rooms surrounding the stairway landings on the south end of the building.

ANALYSIS

Ignition Scenario

The fire was probably caused by a ground fault in which an ungrounded conductor came into contact with the metal armor of the Type AC cable. The cable ran from the main service panel beneath the kitchen in the north end of the building to a subpanel located in the desk area just off the lobby on the first floor (see Photo 5). The 100-foot cable ran approximately 80 feet in the basement before it made a 90° bend to penetrate the floor, in order to join the subpanel on the first floor. The overcurrent protective devices (circuit breakers) for the No. 14 AWG, 3-conductor cable had a rating of 30 amps on one leg and 20 amps on the other. This single cable provided electrical power to the entire front of the building.

The ground fault apparently occurred at the 90° bend and caused the fire in a concealed area above the combustible fiberboard ceiling.

Discussion

From the point of origin, the fire was able to travel from above the recreation room to the television lounge through an open, unobstructed joist channel. Before the weekend manager saw smoke in the dining room, smoke had risen to the first floor and lobby either by seeping past the closed door at the top of the basement stairway or by movement within the floor and wall systems. Single-station smoke detectors in guest rooms on the upper floors activated before heat detectors activated the fire alarm system.

As the heat built up, the fire was able to spread through the concealed space above the recreation room. Fire finally broke through the combustible fiberboard ceiling into the recreation room below, and the falling material and radiant energy ignited the contents and furnishings in the recreation room. The fire quickly began to build and generated sufficient heat to activate the combination fixed-temperature/rate-of-rise heat-detection devices.

The fire spread up the south stairway from the base-
the 1976 edition of NFPA 101, the Life Safety Code® (the Code), was used for analysis purposes. It is important to keep in mind that the Code was not in effect in Bradley Beach, and thus the building did not have to comply with the Code.

In classifying the occupancy of this building, the question arises as to whether it should be considered a residential custodial-care facility and treated as a health care facility, or as a hotel and reviewed as a residential occupancy. Since no regular care of any kind was provided for residents and no facilities or staff were provided for any health care, the building would be classified as a hotel, according to the Code. The occupancy classifications provided in Paragraph 11-1.3 of the Code defines a hotel as follows:

**Hotel:** Includes buildings or groups of buildings under the same management in which there are more than 15 sleeping accommodations for hire, primarily used by transients who are lodged with or without meals, whether designated as a hotel, inn, club, motel, or by any other name. So-called apartment hotels shall be classified as hotels because they are potential occupancies like that of hotels.

The following summary lists requirements from the Code that are particularly relevant to this fire. It is not intended to be a complete description of all sections of the Code that pertain to this hotel. For simplicity, these requirements are presented in order of their appearance in the Code, not necessarily in the order in which they would be applied.

**Chapter 5 — Means of Egress**

Par. 5-1.3.1: Requires the exit component of the means of egress to be separated from the building by construction having at least one hour fire resistance when the exit connects three stories or less. Any openings in the exit enclosure must be protected by an approved self-closing fire door. Openings in the exit enclosure shall be limited to those necessary for access from normally occupied spaces and for egress from the enclosure.

**Chapter 6 — Features of Fire Protection**

Par. 6-1.1.1: Requires stairways and other vertical openings between stories to be enclosed or protected to prevent the spread of fire or smoke.

The Brinley Inn had no enclosures around the south stairway.

**Chapter 11 — Residential Occupancies**

**Section 11-2 Hotels:**

Par. 11-2.2.4.1: Not less than two exits shall be accessible from every floor . . .

The Brinley Inn had only one means of egress from the upper floors, and even that single exit was deficient. Neither the steep fire escape nor the vertical ladder on the north end of the building qualified as acceptable means of egress.

Par. 11-2.2.5.2: Exits shall be so arranged that, from any corridor room door, exits will be accessible in at least two different directions.

Even though there were two potential directions of travel from room doors, one of those directions did not lead to an acceptable means of egress.

Par. 11-2.2.8.1: It is required that doors between guest rooms and corridors be self-closing . . .

Par. 11-2.3.1.1: Further requires that vertical openings shall be enclosed or protected.

Par. 11-2.3.2.1: Interior finish is limited to Class A or B in the exit access.

Par. 11-2.3.3.5: Facilities are required for immediate notification of the public fire department if there is an alarm.

Par. 11-2.3.6.2: Each guest room shall be provided with a door and frame, each having a fire resistance rating of at least 20 minutes. In existing buildings, previously approved 1¾-inch solid bonded wood-core doors and frames can remain in use.

The louvers on guest-room doors would have violated the integrity of any compartmentation provided by the door construction itself.

Par. 11-2.4.1.1: Requires that electrical wiring be installed in accordance with NFPA 70—1975, the National Electrical Code®. Existing installations can be continued in service, subject to approval by the authority having jurisdiction.

The electrical wiring present in the Brinley Inn that was most likely involved in the ignition scenario did not comply with the requirements of the National Electrical Code.

It is significant to note that automatic sprinklers or automatic detection devices are not required for existing hotels by the 1976 Edition of the Life Safety Code. New buildings are required to have corridor smoke detection connected to the alarm initiation system.

The application of the requirements of the Life Safety Code would have eliminated some of the factors that led to the fatalities.

During building, fire, and life safety code development, assumptions are made about the characteristics of the occupants. Mobility is one of the occupant factors considered. It is assumed that hotels will be occupied by readily mobile, average people.

This fire illustrates that the occupancy classification may not adequately reflect the functional use of the building or the characteristics of its residents. Levels of protection above the minimum standards established for an existing hotel classification may be required to adequately house the elderly and mentally or physically handicapped occupants.

State and local housing authorities, inspectors, and mental health, welfare, and other officials involved in community referral programs must provide a more critical appraisal of the fire protection and life safety features of existing buildings in light of changing use characteristics.


(Continued on page 98)
ties. The continued existence of unenclosed stairways, louvers on doors, and lack of early-warning fire detection systems have been cited for many years as factors that increase the probability of tragic fires in residential occupancies. The presence of combustible interior finish and the lack of automatic sprinkler protection have also been significant factors in these fires.

Summary

Factors that led to the deaths of 24 of the 35 occupants of the Brinley Inn were:
- a delayed alarm due to fire ignition in a concealed space;
- the lack of an early-warning fire detection system;
- the presence of unprotected vertical openings;
- lack of a second means of egress from second and third floors;
- louvers on guest-room doors, allowing smoke spread into rooms; and
- the door to the basement being left open when the fire was discovered.

The primary factor that contributed to the fatalities was the unenclosed stairway that terminated in an unprotected lobby. This, and the lack of protection at the top of the basement stairs, allowed the fire to spread quickly to the second and third floors of the structure.

The origin and propagation of the fire in the concealed space above the basement ceiling delayed response of the fixed temperature/rate-of-rise heat detection heads in the room of fire origin. A sufficient amount of smoke was able to rise within the structure to activate a smoke detector in a room near the open stairway on the third floor before the alarm was initiated by the heat detection system. However, this did not provide adequate early warning of the fire to the occupants.

Due to the delayed warning provided by the heat detection system, residents were faced with rapidly deteriorating conditions in the stairway and corridors. As the exit access ways became untenable, residents had to choose between escaping through smoke and heat or remaining in their rooms. Some residents who remained in their rooms were rescued by fire fighters. Others succumbed to the fire as a result of fire products that quickly entered the rooms through louvered doors.

Those residents who reacted rapidly enough were able to escape using the stairway or the corridors. For 26 residents (24 of whom died and 2 who were rescued), there was not enough time. When the heat detection system activated, it brought residents out of their rooms into conditions that already had deteriorated. The lack of both compartmentation and an approved second means of egress prevented escape.

INFORMATION SOUGHT ON EMERGENCY OPERATIONS IN HIGH RACK STORAGE

The Committee on Emergency Operations in High Rack Storage, formed in late 1979 by concerned users of such storage, insurance personnel, and equipment suppliers and installers, needs data and case histories on incidents, near-accidents, and problems that have occurred in automated high rack storage warehouses 35 feet in height or higher.

The Committee's ultimate goal is to distribute information on the types of problems and difficulties that can be anticipated, and approaches to the proper handling of them. Information on the following subjects is particularly sought: fires and related overhaul and salvage problems and solutions; rescue incidents — successful and unsuccessful, and how accomplished; windstorm incidents; water damage incidents; flood, sprinkler system discharge, etc.; structural damage — collapse from snow loading, product overloading, etc.; other types of incidents — equipment or power failures, etc.

Please send information on problems and solutions encountered in high rack storage to R. G. Planer, Johnson & Higgins, 95 Wall Street, New York, N.Y. 10005.