At 1:51 am, on January 28, 1984, a fire at the 14-story Howard Johnson's Hotel complex in downtown Orlando, Florida, was reported to the Orlando Fire Department. At the time, there were approximately 300 guests in the hotel. Arriving fire crews found many of the guests standing on guest-room balconies; they appeared to be confused and frightened. Fire fighters rescued 10 guests over aerial apparatus and assisted approximately 100 others through exit access corridors and down stairways. The fire resulted in serious injuries to three of the estimated 35 to 40 guests on the floor of fire origin (the seventh floor) and minor injuries to an additional 31 guests and 4 fire fighters.

Fire department investigators listed the cause of the fire as suspicious and determined the point of fire origin to be in the furnished lounge area on the seventh floor. Investigators believe that an accelerant had been poured in the lounge area and then ignited.

The accelerant, combined with the combustibles in the furnished lounge area, generated sufficient heat to buckle one of the elevator shaft doors and ignite electrical insulation on cable in a vertical raceway 19 feet from

---

Mr. Timoney is a Fire Protection Specialist in the NFPA's Fire Investigations Division.

The substance of this investigation report is dedicated to the public. It may be freely reprinted with the customary crediting of the source. The author and publisher are solely responsible for the accuracy of statements or interpretations contained herein.

Left: Guests on balcony await rescue by fire fighter. Note sheet tied to railing.

*Orlando Sentinel*
Early Detection, Fire Department Notification, and Prompt Staff Actions
Save Lives and Limit Loss

BACKGROUND

Building plans for the 14-story, high-rise Howard Johnson's Hotel complex were approved by the Orlando Fire Department in October 1971, and construction of the downtown hotel was completed in the latter part of 1972.

The hotel complex was built of precast, reinforced concrete construction with floor slabs and a common built-up roof assembly supported by concrete columns. The rectangular, 14-story high-rise tower measured 170 feet by 60 feet. A 2-hour, fire-rated enclosed stairway was located at the east and west ends of the building.

The ground floor of the hotel contained the reception desk, a lounge, and an attached one-story restaurant building. The second floor featured a night club and two convention halls. Floors 3 through 13 held 22 guest rooms that opened onto a 1-hour, fire-rated, east/west exit access corridor. (See Figure 1.) The fourteenth floor contained both guest suites and conference rooms.

Approximately 57 feet from the west end of the building, a 29-foot north/south corridor provided access to a bank of three elevators. Across this corridor from the elevators, on odd-numbered floors three through thirteen, was a furnished lounge that contained two cushioned wicker chairs and a table with a lamp at each end. On even-numbered floors four through twelve, this area contained an ice-making machine and various vending machines.

Two 8-inch-by-10-inch steel raceways containing electrical cables ran vertically from the ground floor through the fourteenth floor, supplying electrical power to floors two through fourteen. These vertical raceways were enclosed with non-fire-rated construction and were located approximately 31 feet to the east and 19 feet to the west of the intersection of the elevator access corridor and the east/west corridor. (See Figure 1.)

Fire protection features of the building included 1-hour, fire-rated exit access corridors with 1¾-inch, solid wood-core guest-room doors with self-closers, a fire alarm system, single-station smoke detector protection in guest rooms, an emergency telephone network with
phones for emergency use located on each floor level in the enclosed stairways, and a standpipe system with two standpipe cabinets on each floor equipped with 1½-inch hose and a portable fire extinguisher. A 2½-inch hose connection was also provided in both enclosed stairways at each floor, supplied by the standpipe riser.

The automatic fire alarm system integrated an automatic corridor smoke detection system and manual pull stations into a zoned fire alarm annunciator panel that was located behind the hotel’s reception desk. Manual pull stations were located throughout the hotel on each floor, near the enclosed stairways. The corridor smoke detection system used photoelectric detectors uniformly spaced throughout the corridors on each floor. Activation of a corridor smoke detector or manual pull station would sound an audible alarm on the fire floor and on the floors above and below the fire floor, illuminate the zone of the alarm on the fire alarm panel, recall the elevators to the ground floor, shut down the heating, ventilating and air-conditioning (HVAC) system, and notify the fire department through a central station fire alarm monitoring service. The audible alarm would sound for 15 seconds, followed by 30 seconds of prerecorded verbal instructions telling occupants on the floors where the alarm activated to exit through the enclosed stairways and not to use the elevators. If the smoke detection system did not clear itself or the manual pull stations reset within 60 seconds, the fire alarm system in the remaining portions of the hotel would activate, sounding an alarm for 15 seconds, followed by 30 seconds of prerecorded verbal instructions.

The Orlando Fire Department has developed a comprehensive fire prevention/education program that included high-rise hotel firesafety. Records from the Fire Prevention Division indicate that 65 employees of the Howard Johnson’s Hotel attended a one-hour training program on hotel evacuation procedures in February 1981. Two one-hour fire education programs were also presented to Howard Johnson’s employees in August 1983 and again in September 1983; these two fire education programs were attended by 194 employees and management of the hotel. The education programs incorporated basic hotel firesafety concepts such as the importance of hotel staff immediately notifying the fire department and helping guests to exit through enclosed stairways, in addition to the proper use of fire extinguishers.

(Continued on page 42)
THE FIRE

At 1:51 am on Saturday, January 28, 1984, the Orlando Fire Department received notification of a fire at the Howard Johnson's Hotel through a central station fire alarm monitoring service. Shortly thereafter, a hotel employee at the fire alarm panel called the fire department to verify a fire alarm signal in the seventh-floor smoke detector zone.

After sounding its initial cycle on the affected floors, the audible alarm sounded throughout the building and a security guard working in the first-floor area checked with the registration desk for the fire location. After learning the location of the alarm, he quickly went up the west stairway to the seventh floor. When he opened the seventh-floor stairway door, he found the corridor charged with heat and thick smoke. He located a mother and child (from Room 715) slumped against the corridor wall adjacent to the stairway exit door. The guard removed them from the corridor and took them down the stairway to the outside of the building.

First-in fire department units arrived at 1:54 am and were confronted with a large number of guests standing out on guestroom balconies, apparently confused and frightened. They observed that many of these guests had already begun to tie sheets together and, in some cases, were lowering themselves from balcony to balcony in an attempt to escape from the building. A fireground officer spoke to these guests over a public address system and instructed them to return to their rooms, where fire fighters would be coming shortly to lead them out of the building.

Fire fighters rescued 10 guests over aerial apparatus and helped approximately 100 other guests to leave their rooms through corridors and down the enclosed stairways. Fire fighters searched all the guest rooms on floors seven through fourteen. Search-and-rescue operations were slowed because the hotel had only one master key, which meant that fire fighters had to forcibly enter approximately 40 guest rooms on the seventh and eighth floors. Fire fighters did not enter guest rooms on floors three through six; instead, they knocked on the doors to alert any remaining guests, and assisted them in evacuating.

The fire-fighting crews on the seventh floor found the corridor filled with intense heat and thick, black smoke. They located a smoldering fire in the furnished lounge area across from the elevators. In this same area, fire fighters also found one unconscious male guest (from Room 719) lying in the corridor. They carried him outside the corridor, where he was revived by fire department paramedics.

Fire crews working on the eighth floor discovered that the fire had extended from the seventh floor through an unprotected electrical raceway. Simultaneously, fire crews working on the ninth floor also discovered that the fire had also extended there in the same raceway. These fire crews removed the steel plates that covered the raceways and quickly extinguished the burning cable insulation.

Damage

Fire damage on the floor of fire origin (the seventh floor) included furnishings in the lounge area, corridor carpeting, vinyl wallcovering, ceiling materials, and heat damage to several solid-core wood guest-room doors. While the area of fire involvement was limited to a portion of the furnished lounge, heat generated from this fire was severe enough to buckle one of the adjacent elevator shaft doors and migrate 19 feet west, igniting electrical cable insulation in the unprotected vertical raceway.

There was moderate smoke damage in guest rooms throughout the seventh floor. Moderate to heavy smoke damage was documented in Rooms 709, 715, 717, 719, 721, and 723. The pattern of more severe smoke damage on the south side of the building can be traced to the fire department's ventilating heat and smoke from the
seventh floor by propping open guest-room doors and opening sliding glass balcony doors. A second factor in the guest-room smoke damage pattern was the westward movement of the fire in the corridor. A third factor, which was more difficult to identify, was smoke damage in guest rooms, which resulted from guests' opening and closing their doors while attempting to evaluate conditions in the corridor and/or escape from the building.

Floors eight through fourteen received varied amounts of smoke damage in the corridors, linked to smoke movement through the unenclosed raceway and smoke migrating through the elevator shaft. Smoke also penetrated into the enclosed stairway when fire fighters helped occupants evacuate the upper floors of the building.

Injuries

The 32-year-old mother (from Room 715), who was rescued from the seventh-floor corridor by the hotel security guard, suffered burns over 25 percent of her upper body. Her 6-year-old son, also rescued by the security guard, suffered burns over 15 percent of his body. At the time this report was written, both the mother and child were successfully responding to burn treatment at a local hospital.

A female occupant of Room 717 was treated for first-degree facial burns, eye injuries, singed hair, and constriction of the throat. The occupant of Room 719, who fire fighters found lying unconscious in the corridor adjacent to the seventh-floor elevators, was revived at the scene by fire department paramedics. At the time this report was written, he remained in serious condition in the cardiac-care unit of a veterans' hospital, with severe complications stemming from his cardiac arrest.

The remaining 30 guests and four fire fighters who were transported to area hospitals were treated for smoke inhalation and lacerations. Guests suffered these lacerations while smashing out the glass in sliding glass doors leading to guest-room balconies, unaware that these doors were operable.

Discussion

Investigators from the Orlando Fire Department have determined that the fire was incendiary in nature, although the exact ignition scenario is not known. Laboratory tests to identify the accelerant poured in the seventh-floor lounge and nearby corridor are still incomplete. However, fire department investigators speculate that the accelerant was poured in the lounge area and the nearby corridor and then ignited by one or more individuals standing in an elevator, who then used this means to escape or relocate in the building.

Because the fuel package ignited by the accelerant was located almost directly beneath a photoelectric smoke detector in the corridor, rapid fire detection and activation of the fire alarm system resulted. This may explain the observations of some seventh-floor guests who had entered the corridor upon hearing the fire alarm and found no evidence of a fire. Some of these guests then moved toward the elevators, where they encountered deteriorating corridor conditions created by the rapid build-up of heat and smoke.

Fire department investigators were able to gain some insight into the early growth and development of the fire from accounts given by injured guests from Rooms 715, 717, and 719. The mother in Room 715 described being alerted to the fire by the hotel's fire alarm system. She opened her guest-room door and, finding no signs of fire in the corridor, moved with her son toward the elevators. However, conditions within the corridor began to deteriorate as they continued toward the elevators. They then turned and moved toward the west stairway, but were overcome by products of combustion before they reached it.

A guest in Room 717 also heard the fire alarm and, after checking the condition of the corridor, began to move toward the elevator. She said that she saw no signs
of fire when she entered the corridor. As she moved toward the elevators, however, she encountered the fire and was forced to crawl back to her room. Firefighters later assisted her from the building.

Two guests occupying Room 719 also were alerted to the fire by the activation of the fire alarm system. When they examined the corridor, they discovered a light haze of smoke. One of the guests entered the corridor; the other guest was delayed approximately a minute before he, too, entered the corridor. The latter exiting guest described smoke and heat in the corridor. He escaped from the building by traveling through the corridor to the west stairway. Firefighters later found the other guest unconscious in the corridor, by the furnished lounge.

This fire documents the valuable contribution that a trained hotel staff can make in preventing loss of life and reducing the number of serious injuries. In this incident, the hotel staff took two significant actions: they immediately verified the receipt of a fire alarm signal with the fire department and gave the seventh-floor fire location; and they traveled through the enclosed stairway to the fire floor to assess the fire condition and lend assistance to guests. The failure of employees in other investigated hotel fires to take similar actions has been identified by the NFPA as a critical factor that contributed directly to an increased fire severity and a resulting increased loss of life.1 The credit for the prompt reaction of hotel employees to this fire belongs to the management and employees of Howard Johnson’s and the Orlando Fire Department, who worked together to see that the hotel employees had the opportunity to participate in a comprehensive fire prevention/education program.

The city of Orlando and the Fire Department have also worked closely with representatives of the hotel industry to upgrade the level of firesafety in hotels throughout the city of Orlando. The benefits of this cooperative program can be seen in this fire. When the hotel was constructed, local ordinances did not require smoke detector protection in either the corridors or in guest rooms, nor were self-closers required on guestroom doors. Since that time, however, the building was retrofitted with self-closers on all guest-room doors, automatic smoke detector protection was provided in the corridor, and single-station smoke detector protection was installed in the guest rooms. The activation of the corridor smoke detection system led to prompt detection, employee reaction, and fire department response.

The state of Florida has also become involved in hotel fire protection issues. A recently enacted Florida state law will require that this hotel and others like it be retrofitted with complete automatic sprinkler protection by the year 1990.

ANALYSIS

The two metal electrical raceways that ran vertically from the ground floor through the fourteenth floor were not enclosed in fire-rated construction nor protected at the point of penetration through each fire-rated floor assembly. Because there was no protection of the vertical electrical raceways, the fire that resulted from the ignition of cable insulation at the seventh-floor level was then able to spread in the raceway to the eighth and ninth floors before fire crews were able to extinguish it. The unprotected raceways were also a means by which smoke was able to spread to floors above the fire. The 1981 edition of the Life Safety Code® requires these raceways to be protected by one of the methods outlined in its Section 6–2.2.8 or be enclosed with fire-rated construction. The 1982 Edition of the Standard Building Code also requires that the raceways be protected by one of the methods outlined in its Section 701.1f.2

1 These fires include the Westchase Hilton Hotel in Houston, Texas, March 6, 1982; the Inn on the Park in North York, Ontario, January 17, 1981; the Howard Johnson’s Motor Lodge in Concord, Massachusetts, December 4, 1976; and the Cavalier Beachfront Hotel in Virginia Beach, Virginia, September 8, 1974.

2 The code comparison is presented in the interest of comparing life safety problems observed in the aftermath of this incident to the latest edition of the Life Safety Code and the Standard Building Code for new construction. The areas addressed were not all inclusive of the code sections that might apply to a building of this type, but are those felt to impact the greatest on the life safety problems.
The severe conditions created in this fire by the ignition of an undetermined quantity of accelerant in combination with the furnishings in the seventh-floor lounge area quickly produced untenable conditions in the seventh-floor exit access corridor. The Standard Building Code requires the elevator lobby to be separated from the exit access corridor by 1-hour fire-resistant construction (SBC 506.6a1 and Table 700).

At the present time, the Life Safety Code does not address fuel loading in the furnished lounge area or require that this area be separated from the exit access corridor and/or protected by any other fire protection method. The Standard Building Code limits the openings allowed in the elevator lobby to those required for access to the elevators and for egress from the building (SBC 506.6a1). Therefore, the openings to the furnished lounge areas would not be permitted in the elevator lobby.

The Standard Building Code requires that all buildings greater than 12 stories or 150 feet in height be protected with complete automatic sprinkler protection. The Life Safety Code requires all hotels greater than six stories in height to be protected throughout by complete automatic sprinkler protection when such buildings are not provided with smokeproof towers.

This fire documents contributions of several fire protection components and an overall fire protection program. In this incident, the corridor smoke detection system alerted hotel staff, hotel guests, and the Orlando Fire Department to a fire condition on the seventh floor at its incipient stage. This provided hotel staff with the opportunity to rescue two guests overcome by smoke and heat in the corridor. It also allowed guests on the seventh floor, as well as guests on the remaining upper floors of the hotel, the opportunity to safely exit from the corridors to the enclosed stairways. Not all of the seventh-floor guests were able to leave their rooms and exit through the corridors before smoke and heat conditions became threatening. However, construction features such as one-hour fire-rated construction, 1/2-inch solid-cord wood doors, and operable sliding glass balcony doors enabled them to stay in their rooms until fire fighters arrived and were able to assist them.

Because the fire department was automatically notified of a fire by the hotel’s fire alarm system, first-in fire department units were on the scene approximately three minutes after the first detector activated. The immediate notification of the fire department provided fire crews with the opportunity to quickly extinguish the fire on the seventh floor and limit the extension of the fire in electrical insulation on cables in the raceway on the eighth and ninth floors. The rapid response of the fire department also gave fireground commanders time to calm and reassure frightened guests, some of whom had begun climbing down from balcony to balcony on sheets. In addition, the fire department was able to reassure other guests who were preparing to jump from their guestroom balconies.

This fire further documents the difficult problem of

(Continued on page 88)

Complimentary Sets of Fire Journal Covers

A limited number of sets of covers of the six issues of Fire Journal issued in 1983 are available without charge to NFPA members. If you wish a set, please notify the Editor of Fire Journal.
educating the public as to the proper actions to take in the event of a hotel fire. Despite large, multicolored placards on each guest-room door depicting a simple floor plan and the nearest stair tower to walk to, coupled with vocal instructions designed into the hotel’s fire alarm system that instructed occupants not to use the elevators during a fire emergency, guests still made fundamental errors such as attempting to exit by using elevators. In addition, guests on floors below the fire, who were completely unexposed to smoke or heat, in some cases chose to break the glass in operable sliding glass balcony doors and began to lower themselves to the ground using sheets, rather than exiting through uncontaminated corridors to stairways.

Howard Johnson's Hotel Fire (continued from page 45)

This report is another of the NFPA's studies of fires having particular educational or technical interest. The information presented is based on the best data available during the on-site data collection phase and further data acquired through subsequent follow-up. It is not the NFPA's intention that this report pass judgment on, or fix liability for, the cause of injury and property damage at the Howard Johnson's Hotel. This report describes fire safety conditions at the Howard Johnson's Hotel and presents findings on factors contributing to the serious injuries and loss of property based on the NFPA's analysis of collected data and observations during the investigation.

The cooperation and assistance of Assistant Chief William E. Moran, Commander, Fire Prevention Division, and Investigators John R. Hackett and Laurie Fraser of the Orlando Fire Department are greatly appreciated.

Special thanks are due Gary L. Fisher, Associate Engineer, Southern Building Code Congress International, for his on-site assistance in the data collection phase and for his input into the code analysis and the report writing process.