

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

BEVERLY HILLS SUPPER CLUB FIRE

Southgate, KY

May 28, 1977

Includes:

Tragedy in Kentucky by Richard L. Best.
Fire Journal (1978) 72 #1: 18-22, 27-35, 41-44.

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Fire Journal (1978) 72 #1: 21, 36-40.

Human Behavior in the Beverly Hills Fire by Joseph A. Swartz.
Fire Journal (1979) 73 #3: 73-74, 108.



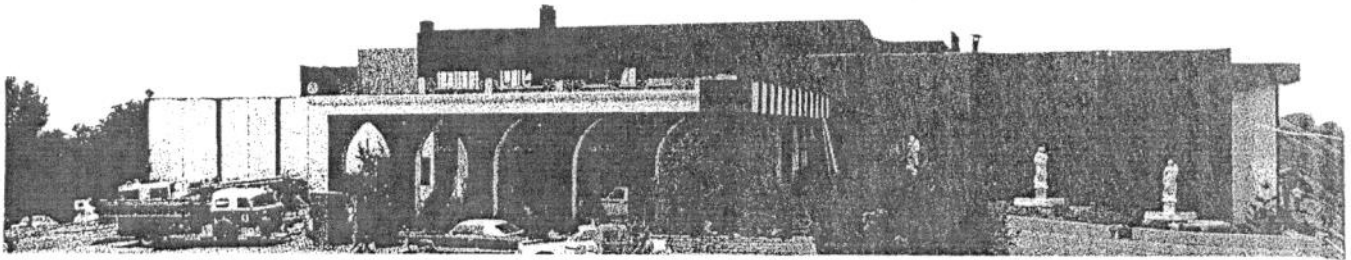
FIRE INVESTIGATIONS

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NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:



TRAGEDY IN KENTUCKY

RICHARD L. BEST

The NFPA Fire Investigations Department, in cooperation with the National Bureau of Standards (NBS) and the National Fire Prevention and Control Administration (NFPCA), investigated the Beverly Hills Supper Club¹ fire to document and analyze significant factors responsible for the tragic, large loss of life at the Beverly Hills Supper Club. The NFPA was notified of the fire on Sunday morning, May 29, 1977, and dispatched two investigators to the scene that day. A total of five NFPA specialists participated in the two-week on-site investigation and the subsequent data collection and analysis over a five-month period. This report, compiled in October, presents findings from these efforts. Additionally, NFPA investigators participated in the Commonwealth of Kentucky's investigation of the fire.

The full NFPA report on this fire is available from the NFPA Publications Department. The

Mr. Best is a member of the NFPA Fire Investigations Department. He acknowledges the cooperation and assistance of the Kentucky State Police and the Kentucky State Fire Marshal's Office. The assistance of NFPA personnel is also gratefully acknowledged: James Lathrop, Fire Analysis Specialist; John Sharry, *Life Safety Code* specialist; Joseph Ross, Electrical Specialist; and Joseph Swartz, Research Division Director. The assistance of Dr. John Bryan, Professor and Head of the Fire Protection Curriculum, University of Maryland, is also gratefully appreciated. Excerpts from *Beverly Hills Supper Club Fire, Southgate, Kentucky, May 28, 1977 — An Analysis of the Development and Spread of Fire from the Room of Fire Origin (Zebra Room) to the Cabaret Room*, by Richard G. Bright of the National Bureau of Standards, have been utilized in various sections of this report.

¹ This is not necessarily the official title of the Club. The Club was advertised as the Beverly Hills Country Club, and the Beverly Hills, "Showplace of the Nation." However, for the purposes of this report, the term Beverly Hills Supper Club will be used to identify the Club.

title of the full report is *Reconstruction of a Tragedy, The Beverly Hills Supper Club Fire, Southgate, Kentucky, May 28, 1977*. For ordering purposes, the Publication Number is LS-2. This Fire Journal report is a summary of the full report. For a description of fire department operations during the fire, see the January 1978 issue of *Fire Command*.

The quotations used in both the full report and this summary, unless otherwise noted, are taken from the transcripts compiled by the Kentucky State Police. The real names of the individuals have been changed in all but a few instances, and these changes to and comments on the quoted material are enclosed in parentheses.

The illustrations of the Beverly Hills Supper Club included in this report are as accurate as possible and are compiled from a careful analysis of building plans, on-site examination, actual dimensions when available, and patron and employee statements. However, illustrations may contain minor inaccuracies in some areas due to: 1) the nearly complete destruction of portions of the Club by the fire, and 2) the fact that a complete set of "as-built" plans of the Club apparently does not exist.

Some areas of the building were not shown on the existing building plans, and in some instances, on-site examination revealed areas that were not constructed as shown on building plans. There was conflicting evidence concerning the swing of the double doors at the northeast corner of the Cabaret Room. Since this was an important detail in the means of egress analysis, two possible arrangements are presented in the report.

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

On Saturday, May 28, 1977, a disastrous fire occurred at the Beverly Hills Supper Club in Southgate, Kentucky, that claimed the lives of 164 patrons and employees, and injured some 70 other people. This fire was the worst multiple-death building fire in the United States since the Cocoanut Grove night club burned in Boston, Massachusetts, on November 28, 1942, taking 492 lives.

The Beverly Hills Supper Club, classified according to the NFPA *Life Safety Code*, NFPA 101, as a place of assembly, was a sprawling, mostly one-story restaurant and night club that covered an area of about 1½ acres. A small part of the building was two stories high, and there was a basement under approximately half of the complex. The original two-story portion was constructed in 1937 and additions were added at various times; a major rebuilding of the Beverly Hills Supper Club took place following a fire in 1970. There were no deaths in that 1970 fire.

The building was basically of unprotected, noncombustible construction and did not have automatic sprinkler protection or a fire detection and alarm system. The Club was occupied by about 2,400 to 2,800 people on the night of the fire, with approximately 1,200 to 1,300 people attending a show in the Cabaret Room, a large showroom that featured well-known entertainers. Nearly all of those who died had been in the Cabaret Room when the fire broke out.

The fire originated in the Zebra Room, a small, unoccupied function room on the opposite end of the Club

from the Cabaret Room, and burned for a considerable time before it was discovered. The probable cause was determined to be electrical in nature; combustible material in a concealed space in the ceiling of the Zebra Room was the first material ignited. When the fire was discovered, the Beverly Hills Supper Club staff unsuccessfully attempted to fight the fire before notifying the fire department or alerting occupants to leave the building. Most of the patrons were evacuated with the assistance of employees. However, by the time the Cabaret Room occupants were made aware of the fire emergency, they did not have adequate time to escape. Even if they had been notified sooner, there was not sufficient egress capacity provided for occupants to escape. Many were overcome by fire gases and smoke.

Following the fire, an examination and analysis of the facts revealed many facility and operational deviations from national consensus fire codes and standards.

The major factors contributing to the large loss of life in this fire include the following:

- The fire in the Zebra Room developed for a considerable time before discovery. The presence of concealed, combustible ceiling tile and wood materials used for supports provided a fuel supply for continued spread of the fire through the original ceiling and other concealed spaces.

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

- The Beverly Hills Supper Club staff attempted to extinguish the fire before notifying occupants to leave the building and before calling the fire department. There was no evacuation plan establishing fire emergency procedures for the Beverly Hills Supper Club, and employees were not schooled or drilled in duties that they were to perform in case of fire.

- The number of people in the Cabaret Room far exceeded the number of occupants that the room could safely accommodate according to codes and standards in effect at the time. Also, the number of occupants in the Beverly Hills Supper Club (total building) on the night of the fire exceeded by about double the number of people that the building could safely accommodate.

- The capacity of the means of egress for the Club, and especially for the Cabaret Room, was not adequate for the occupant load, based on required square feet per occupant according to the NFPA *Life Safety Code*, or for the actual number of occupants that were in the building at the time of the fire.

- The interior finish in the main north-south corridor exceeded the flame spread allowed for places of assem-

bly in the *Life Safety Code*, and contributed to the rapid spread of fire from the Zebra Room to the Cabaret Room.

- The Beverly Hills Supper Club was not provided with automatic sprinkler protection as required by codes in effect in Kentucky at the time of the fire.

The Building

The Beverly Hills Supper Club advertised 18 rooms that offered accommodations for 20 to 1,000 persons. The building actually contained five main dining rooms in addition to the large Cabaret Room where performers entertained nightly, a small function room known as the Zebra Room, and the Directoire Lounge, which is referred to in this report as the main bar. Three of the large dining rooms could be subdivided into smaller rooms by the use of folding partitions, thereby forming 18 separate dining areas in addition to the main bar. The main dining room, which was also referred to as the Cafe dining room, was called the Cafe Frontenac. A beautiful

“. . . People Weren't Screaming Anymore . . . Smoke Had Covered Them All Up”

How was the devastating fire at the Beverly Hills Supper Club discovered, and what were the reactions of the employees and patrons once the fire was discovered?

To find out, the Kentucky State Police interviewed, over several months, many of the people who were at the Club on the night of the fire. The transcripts provide a description of the events that took place inside the Club from the time the fire was discovered until the last few survivors escaped. What follows is a re-creation of the events of the fire through the use of selected quotes from those transcripts. The quotes have not been edited, but the names used are fictitious.

A female reservation clerk sitting in a cubbyhole outside the side doors of the Zebra Room smelled smoke and investigated its source. The time was between 8:45 pm and 8:50 pm. She opened the

doors to the Zebra Room and saw enough smoke to make her eyes tear. She immediately closed the door, she later said, and notified a bartender of the fire.

“. . . I ran out to the desk and I said, '(Ken) my God, there's a fire' . . . (Ken) ran in and saw what I saw. He quickly closed the door because it was so devastating . . . The next thing I saw was (Sammy) with a fire extinguisher. He was one of the bartenders . . . I went back in the cubbyhole. My first thought was to pick up the (reservation) book. . . . All I saw was smoke . . . Hot, hot, hot . . . it (the heat) singed my hair a little bit.”

At approximately the same time that the reservationist discovered the fire, two waitresses, who were sisters, were serving patrons in the Viennese Rooms. There were not enough tray stands available, so they went to the Zebra Room to get more tray stands. One of the waitresses later said:

“I saw some smoke in the front bar, and thought it was peculiar, but I went on to the Zebra Room anyway. When I opened the doors, the smoke just

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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

hallway lined with mirrors, appropriately called the Hallway of the Mirrors, had an open, curved stairway, known as the Cinderella Stairway, which was lavishly decorated.

The Club operated six days a week, from Tuesday through Sunday. All show patrons and dining room patrons were admitted by reservation only. A cubbyhole located on one side of the front bar outside the Zebra Room was the location where the reservation clerk sat. This area was concealed from the bar by a curtain hung over the opening.

Club Expansion and Renovation

The original, two-story Beverly Hills Supper Club was constructed in 1937 and was approximately 56 feet by 164 feet. The building was purchased by the 4-R Corporation in 1969, and a substantial remodeling of the building was undertaken at that time. Before the remodeling was completed, a fire occurred in the structure on June 21, 1970, that caused damage to a large area of the building presently identified as the Empire Room and adjoining areas.

Following that 1970 fire, a permit to rebuild was issued to the Club by the Southgate building inspector in December 1970.

In July 1974, a building permit was issued by the city of Southgate for expansion of the Cabaret Room. Additional building permits were issued by the city of Southgate for additions and remodeling, although some additions and remodeling were completed without building permits.

The standards of safety of the Commonwealth of Kentucky, in effect from the time of the 1970 substantial remodeling until May 28, 1977, are outlined in Table I.1. In addition to these codes, cities were allowed to adopt local ordinances that were effective to the extent

Comparing The Club With The Code

During their investigation of the Beverly Hills Supper Club fire, NFPA staff compared the conditions at the club with the requirements outlined in the 1976 edition of the *Life Safety Code*. NFPA staff also recognized that the 1976 edition of the *Life Safety Code* was not in effect in Kentucky at the time during construction phases of expansion of the Beverly Hills Supper Club. The 1970 edition of the *Code* was in effect. The number in parentheses that will be found throughout this report refer to paragraphs and sections of the *Code*.

The *Life Safety Code* covers construction, protection, and occupancy features to minimize danger to life from fire, smoke, fumes, or panic

before buildings are vacated. The *Code* specifies the number, size, and arrangement of exit facilities sufficient to permit prompt escape of occupants from buildings in case of fire.

Occupant Load

The Beverly Hills Supper Club would have been classified as a Class A place of assembly according to NFPA 101—1976, which means that it would have had a capacity of 1,000 persons or more.

However, the Beverly Hills Supper Club was

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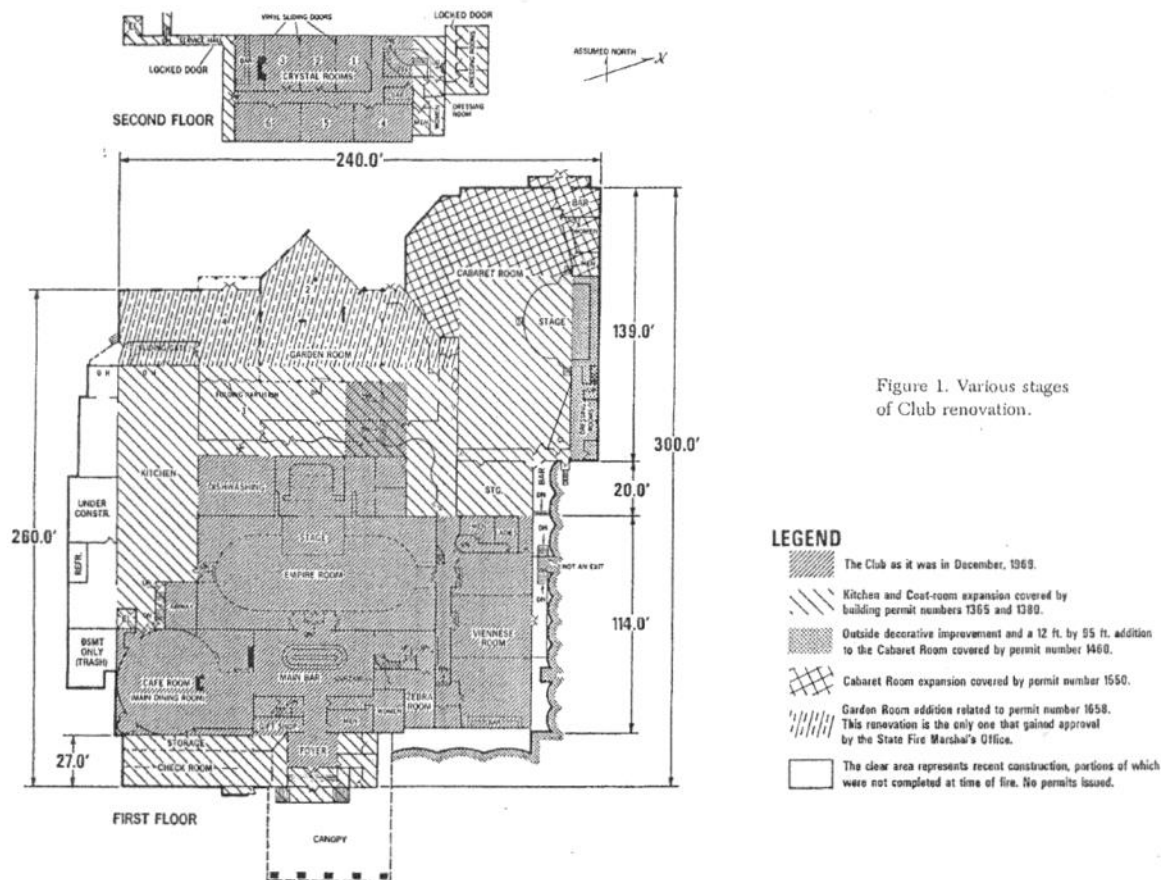


Figure 1. Various stages of Club renovation.

that they were at least as stringent as the state standards of safety. The city of Southgate did adopt a building code in 1947 that dealt with areas covered by the standards of safety, and did adopt local ordinances.

Table 1.1.
The Standards of Safety for The Commonwealth of Kentucky

	Standard ¹	Effective Date
1. 1963 SS	National Building Code (NBC), 1955 Edition with 1957 and 1963 amendments; National Electrical Code (NEC), 1962 Edition.	March 15, 1963
2. 1972 SS	NBC, 1967 Edition; National Fire Codes (NFC), Vols. 1 to 10, 1970-71 Edition; NEC, 1968 Edition.	January 14, 1972
3. 1973 SS	NBC, 1967 Edition; NFC, Vols. 1 to 10, 1972-73 Edition; NEC, 1971 Edition.	November 7, 1973
4. 1974 SS	NBC, 1967 Edition; NFC, Vols. 1 to 10, 1973-74 Edition; NEC, 1971 Edition.	November 20, 1974
5. 1977 SS	NBC, 1976 Edition; NFC, Vols. 1 to 16, 1976 Edition; NEC, 1975 Edition.	April 6, 1977

¹ The NFPA National Fire Codes for various years contain the following editions of NFPA 101, the Life Safety Code: 1970-71 National Fire Codes, 1967 Edition of the Life Safety Code; 1972-73 National Fire Codes, 1970 Edition of the Life Safety Code; 1973-74 and 1976 National Fire Codes, 1973 Edition of the Life Safety Code.

Construction Features of the Club

The Beverly Hills Supper Club was an irregularly-shaped building approximately 240 feet by 260 feet. Except for a basement area under approximately one-half of the building (the front portion or south side), and a small second-floor area over the main bar at the south side of the building, the building was essentially one-story high.

Basically, the building had an unprotected, noncombustible construction. However, the nearly complete destruction of the building made it extremely difficult for investigators to determine construction details for all areas. In addition, the fire resistance rating of the roof-ceiling and floor-ceiling assemblies was not determined, but investigation showed that many areas, such as the basement, had no suspended ceilings and no protection of the exposed steel columns and beams. Many areas of the complex had recessed light fixtures that penetrated the suspended ceilings in numerous places.

The two-story-and-basement section of the building was approximately 56 feet by 164 feet and was the oldest part of the Club. It was constructed of steel column and beam framing. Outside walls were of brick and concrete-block, with poured concrete basement walls; the first and second floors were of poured concrete on steel mesh on steel bar joists; and the basement floor was poured concrete. The roof construction was a built-up

(Continued on page 27)

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

type on steel-deck on steel bar joists. There were suspended ceilings through all areas of the first and second floors consisting of plaster on metal lath, 12-inch-by-12-inch and 2-foot-by-4-foot suspended ceiling tiles. Many areas had suspended ceilings installed below the original plaster-on-metal-lath ceilings.

The 1970 expansion and renovation and other expansion projects consisted of the addition of a new kitchen, the Garden Rooms, the Cabaret Room, and a small storage room. All additions except the kitchen were one story high, with concrete-block and brick walls. A glassed-in area 60 feet long was located at the rear of the Garden Rooms. Floors were of concrete, and roofs consisted of a built-up roof cover on steel deck on steel bar joists.

The kitchen consisted of one story and a basement; its construction was similar to other additions north of the two-story original building. Walls were of concrete-block and poured concrete. The first-floor was constructed of poured-concrete-on-steel-deck-on-12-inch steel trusses.

The coatroom was 27 feet by 82 feet, was at the southwest corner of the Club, and was one-story high with a garage-like storage area underneath. The walls of the storage area were of concrete-block. The first-floor level of the coatroom was of wood-frame construction, with wood-joist floor supports, interior wood framing, and aluminum siding on the west outside wall.

The second floor over the Zebra Room was of inferior construction for this type of occupancy, with interior wood framing, plywood flooring, and a wood roof. Many of these small areas appeared to be of ordinary construction (concrete-block or brick exterior bearing walls, with floors and interior framing wholly or partly of wood).

There were no intermediate roof supports in any of the various rooms at the Beverly Hills Supper Club, with the possible exception of the Garden Rooms. Those intermediate supports are believed to have been the walls of older sections that were left in place when the Garden Rooms were expanded. The roof spans in the various showrooms and other rooms extended from wall to wall. The piecemeal construction of the Club, with rooms and groups of rooms being added at different times, resulted in a structure with no common ceiling space. In other words, the walls between rooms, in most cases,² were outside walls at one time. They were extended to the roof or above the roof with no opening between rooms above the suspended ceilings. Where additions were made to existing buildings, window openings were not sealed with a masonry material to provide some degree of fire cutoff between rooms, and no attempt was made to protect door openings or to provide smoke or fire partitions. Likewise, the boiler room and kitchen were not separated from other parts of the build-

² For example: The wall between the Zebra Room and the Viennese Rooms, or on the second floor between the Crystal Rooms and the toilet area over the Zebra Room.

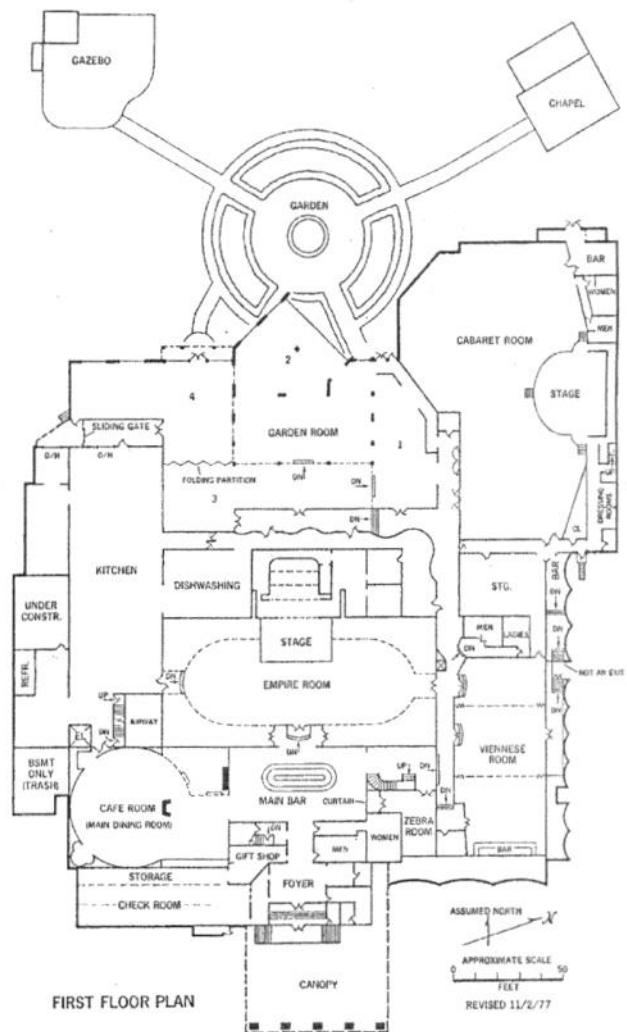
ing with enclosures having a fire-resistance rating and with openings protected by self-closing or automatic-closing fire-rated assemblies.

Openings Between Floors

The main, curved stairway between the first and second floors was of metal construction. The stairs were open from the first floor to the second floor, with no stairway enclosure and no doors at openings to the stairway from the main bar or Viennese Room on the first floor, or from the corridor on the second floor.

The stairway on the west side of the complex leading from the second floor to the kitchen was 44 inches wide and was concrete-block-enclosed. Three-foot-wide metal doors opened into the stair enclosure, with the door at the bottom of the stairs opening against the direction of

Figure 2. Floor plan of first floor.



Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

travel of people coming down the stairs. The stair treads and risers were of wood construction.

Zebra Room Construction

The Zebra Room was L-shaped, with the main area 15 feet by 30 feet. The smaller alcove area was 8 feet 9 inches, by 9 feet.

The south and east walls of the 15-foot-by-30-foot rectangular area of the Zebra Room were of brick. The east wall was covered with ¾-inch-by-4-inch furring boards covered with gypsumboard. Hardboard paneling on wood furring strips covered the plasterboard. The finish material on the south wall was not determined, except that a factory-built metal fireplace was located in the outside wall and was vented a few feet up the outside wall (between the exterior wall and the screen wall) with a metal stack. The fireplace contained ceramic logs and was gas-fired, but reportedly was not used.

The west wall of the Zebra Room was of nonload-bearing, two-by-six wood stud from the floor to a wide-flange steel beam at the second floor level, and was of brick wall above the beam. The wooden studding was covered with plaster on gypsumboard, and the plaster was covered with hardboard panel on wood furring.

The north Zebra Room wall was of wood stud covered with plaster-on-metal-lath on both sides. The inside wall was similar to other walls previously described, with the plaster covered with wood furring and hardboard paneling. All sides of the small Zebra Room alcove were nearly totally destroyed by the fire, but were determined to have been of wood-stud construction. Reportedly, double doors were located on the west wall, opening from the main bar.

The ceiling in the Zebra Room was a double suspended ceiling, with a combustible fiberboard tile adhered to the plaster ceiling that was nearest to the steel bar joist of the floor above. (See Figure 4.) The floor

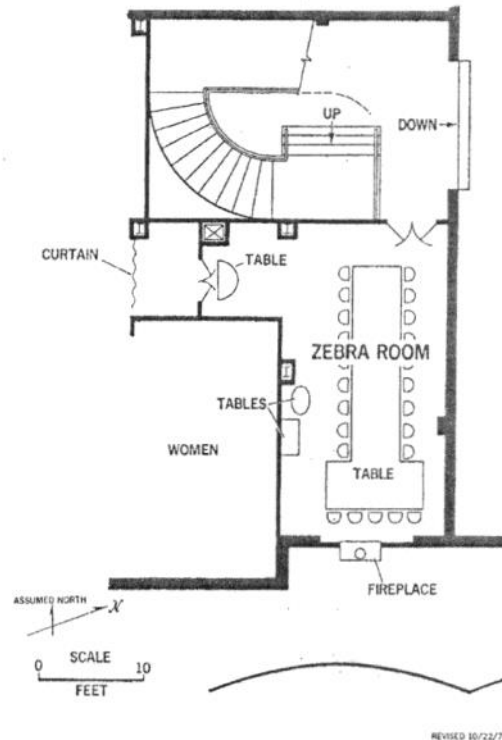


Figure 3. The Zebra Room.

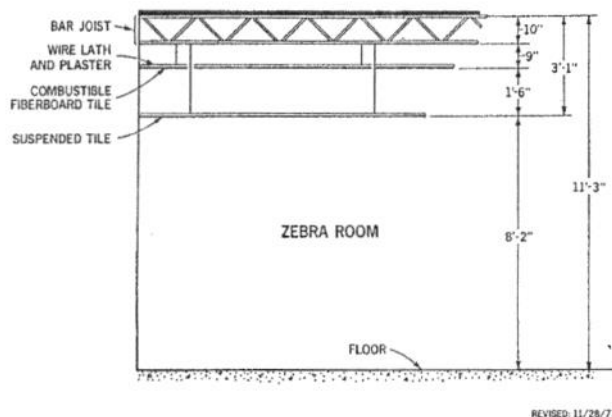
of the Zebra Room consisted of poured concrete on steel bar joist.

Interior Finish

The Beverly Hills Supper Club was decorated throughout the function facilities and showrooms with huge chandeliers, wood and hardboard paneling, carpeting, and drapes, all of which contributed to the aura of an elegant showplace. Wood framing was used in many areas for stage construction and interior wall partitions. The partitions separating the bar and toilet areas from the Cabaret Room were constructed with wood studding. The north wall of the hallway outside the Zebra Room had a wood-studded wall covered with wood paneling, plywood, and mirrors that were spaced away from the brick wall. The ceiling in this corridor was made of a mineral-type acoustical tile. The floor was carpeted with the same carpeting that was used in the Zebra Room. That carpet was identified by the National Bureau of Standards as a low-pile height nylon carpet of dense construction with an unidentified padding.

The main north-south corridor that went from the small hallway outside the Zebra Room to the Cabaret and Garden Rooms also had a ceiling of mineral-type acoustical tile. The floor was covered with a carpet that,

Figure 4. Zebra Room ceiling, sectional view.



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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

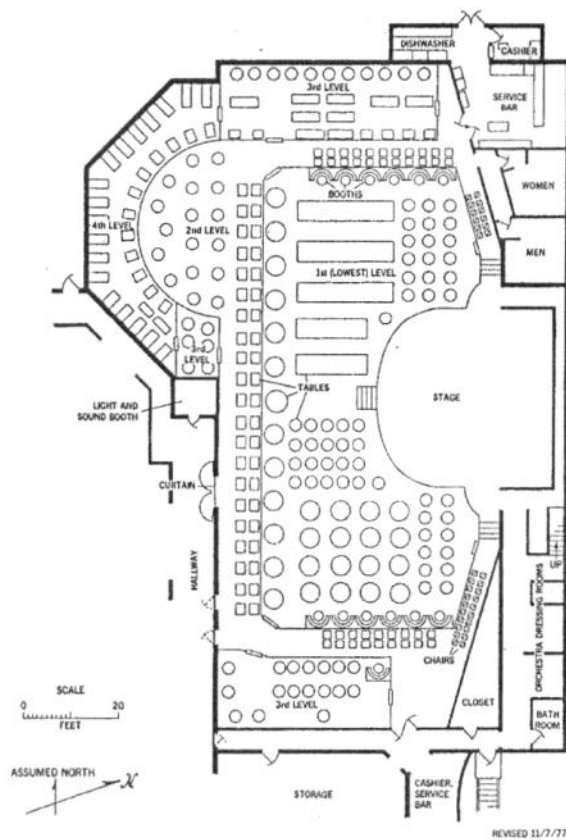


Figure 5. Cabaret Room.

according to the National Bureau of Standards, was of a woven wool construction with a small amount of acrylic fibers. The underlayment was identified as jute. The walls of this corridor were covered with hardboard paneling applied over wood furring strips. This hardboard paneling was applied on both walls of the corridor for its full length, except for the curvilinear wall at the west cross corridor, which was of exposed brick, and another section of the corridor near the Cabaret Room, which was paneled on one side with interior doors placed side by side.

Means of Egress

Exits to the outside of the building are shown in Figure 6, with a letter designation assigned to each exit. Problems regarding exit marking, exit access, locked exits, and the adequacy of exits are discussed later in this report. However, certain egress features must be mentioned here:

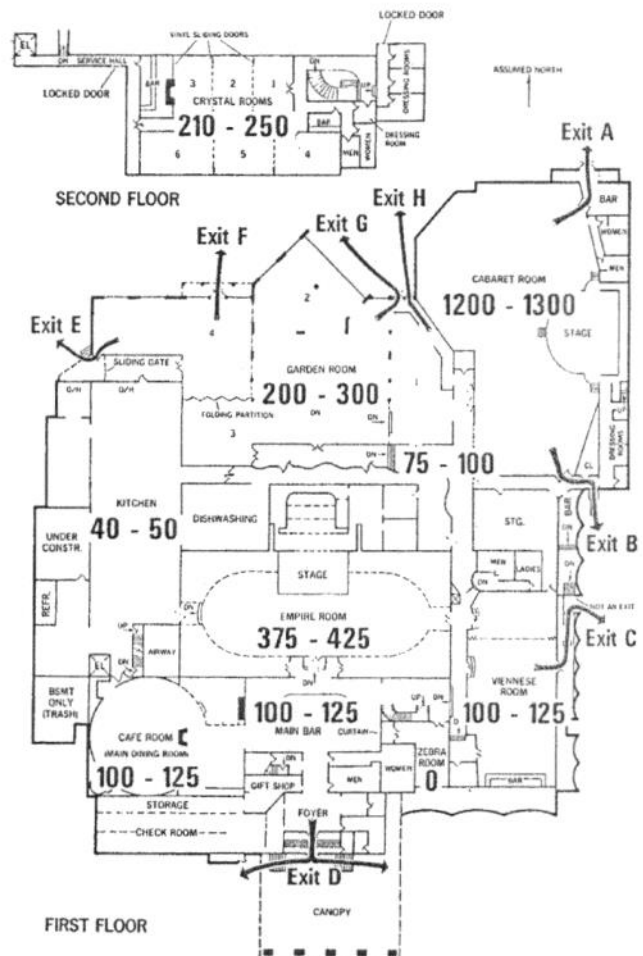
- In addition to the main, curved stairway from the second floor to the first floor and the service stairway to the kitchen, there were two doors to the roof that were

locked. There was no safe means of egress from the roof, and the doors could not be considered exits according to the *Life Safety Code*.

- The exit from the east side of the Viennese Room (Exit C) led to a concrete platform that was between the original outside wall of the building and a false front (facade) that had been constructed along the east side of the Club. The platform led to steps and to double doors opening to the outside. The door from the Viennese Room was reportedly camouflaged by drapes to look like a window. A waitress who worked in the Viennese Room later said that there was an exit sign over the curtains.

- A single exit door from the north side of the Club (Exit H) was reported to be locked at the time of the fire. The door was close to the double doors at Exit G. The operational status of the exit door from the east side of the Viennese Rooms (Exit C) at the time of the fire could not be determined. A chain and padlock were found attached to the panic hardware from one of the double doors after the fire, but the area was too severely damaged for investigators to determine if the chain had been arranged to prevent the door from opening.

Figure 6. Estimated actual occupancy at time of the fire.



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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

- The routes to exits were not clearly indicated in all areas of the Beverly Hills Supper Club. Exit signs in the Cabaret Room indicated the location of the southeast and northwest exits from the Room, but beyond the double doors there was no indication of the direction to the exits.

- The entire east side of the building was built on the edge of a very steep slope that slanted downward from the Club toward the highway. There was a narrow path along the side of the building, from Exits B and C, leading toward the front of the building.

- A sliding gate was located in the path of travel from the north end of the kitchen and the west side of the Garden Rooms. West of the gate was a concrete loading dock with narrow, concrete steps down to the driveway.

Heating, Ventilating, and Air Conditioning (HVAC)

Sufficient information regarding the heating and air-conditioning systems at the Beverly Hills Supper Club was not available following the fire to determine the arrangement and operation of the equipment.

Air-handling equipment in the basement was apparently original equipment that supplied both hot and cold air to both the first and second floors of the original building. Heat was provided by steam coils, and cold air from refrigeration coils in the air-handling system. Two main ducts went up a shaftway at the circular stairs. One duct went to the ladies room, foyer, main bar, and Zebra Room; the other duct supplied the second floor.

As additions to the Club were constructed, rooftop air-conditioning/heating units were added to handle the increased load. Approximately 11 rooftop units were found in the remains of the building after the fire. It was reported by an employee that the units controlled individual rooms and areas. There was no distribution system linking the front area of the Club with the rear Garden Rooms and Cabaret Room.

Fire Protection

Fire protection at the Beverly Hills Supper Club consisted of portable fire extinguishers. There were no sprinkler or standpipe systems and no fixed protection of the kitchen hoods or deep-fat fryers. There was no alarm system and no fire or smoke detection systems.

The building was protected by a local fire department operated on a fully volunteer basis. The Southgate Volunteer Fire Department operates two engines out of one station located 1.1 miles from the Beverly Hills Supper Club. The Beverly Hills Supper Club location was previously graded Class 8 because of limited water supply, although it is believed that the water supply had since been improved.

The Fire

On the evening of May 28, 1977, singer John Davidson was scheduled to appear in the Cabaret Room at an 8:30 pm show and an 11:30 pm show. Two parties were scheduled in the upstairs Crystal Room.

By 8:30 pm, most of the customers there for the show had been directed to the Cabaret Room and had been seated, or were waiting in line outside the Cabaret Room to be seated. There was also a line of customers waiting to be seated in the Garden Rooms.

A wedding party that had been in the Zebra Room had left the Club at about 8:00 pm or a few minutes thereafter. A cleaning woman opened the doors to the Zebra Room and checked the room. The time that she made the check was not documented, but she reported that the show had just started. She stated that she neither saw nor smelled smoke in the Zebra Room at that time.

The fashion models in dressing rooms above the Zebra Room, who were going to be in a fashion show in the Crystal Rooms, were waiting for the other guests to finish eating before they began the fashion show. One of the models later stated that there was a separate air-conditioning unit in the room and commented that the area above the Zebra Room was unusually warm.

The crowded conditions in the Cabaret Room have been verified by numerous patron and employee statements. Tables were situated close together, aisles between tables were narrow, and chairs were located in aisles in some areas and on the ramps. A waitress in the Cabaret Room stated:

“ . . . and here I come out into the room and I had two

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trays and I had a busboy behind me carrying a third tray. Well, I couldn't get through on the second level because sometimes, they're seated six chairs up there at those tables; there were eight chairs at those tables that night, and you couldn't get through. So we had to walk across the third level to go down on the steps on the second level to go on down to the first level in order for me to serve my drinks. Well, also on the second level there were tables . . . not tables, there was just chairs there with people in them that was obstructing the way to get through, but you just had to walk through them. . . .

"The ramp leading from station eight, which (sic) in the Pit . . . That night, there were eight stations. Four on one side and four on the other. On my side, station eight, there was a ramp leading up from station eight from the stage up to the restroom area and it was just jammed full of chairs. You couldn't move through there."

Close to 9:00 pm, customers were still arriving, and lines of people were in the front foyer at the reservations desk waiting to be seated. The total number of occupants in the club is estimated to have been between 2,400 and 2,800. The total number of occupants in the Cabaret Room is estimated to have been between 1,200 and 1,300.

Discovery, Alarm, Evacuation

Between approximately 8:45 pm and 8:50 pm, Beverly Hills Supper Club employees discovered a fire in the Zebra Room. Some employees alerted the Club hostess to the fire, and other employees raced to the kitchen to notify the management. Two of the managers, in turn, ran to the Zebra Room and attempted to fight the fire with the Club's fire extinguishers. Busboys and waiters assisted in the attempt to fight the fire, and ran to the kitchen for more extinguishers.

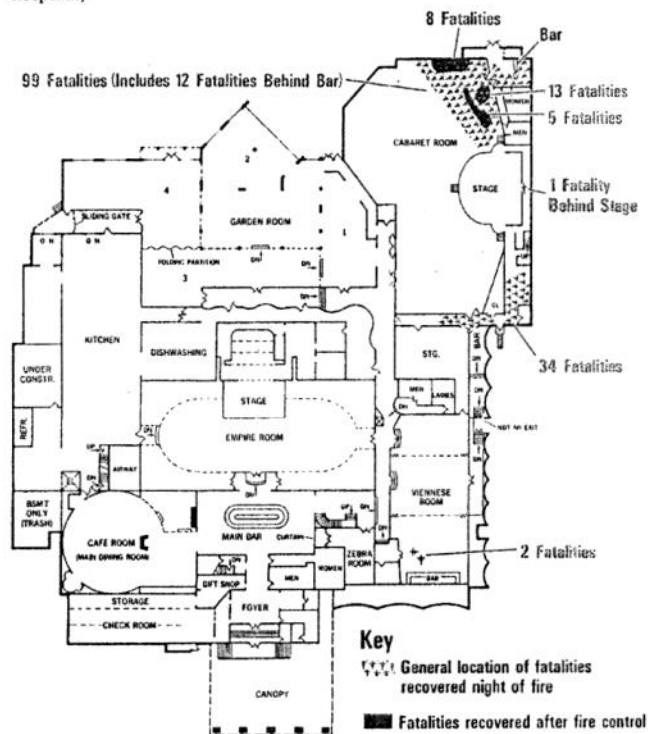
Following this activity, one of the managers ordered the Club's hostess to evacuate all the patrons. Patrons in various rooms were notified to leave the building at about 9:00 pm or a few minutes thereafter. The County Dispatch Center was notified at 9:01 pm.

Patrons in the Crystal Rooms on the second floor did not become aware of the fire until they saw smoke coming up the main, curved stairway. Once the main, curved stairway had filled with smoke, the occupants of the Crystal Rooms had only a narrow service stairway to the kitchen available for their escape; two occupants on the second floor had no alternate means of exit; they were trapped or overcome in the dressing rooms and perished.

The Cafe dining room occupants saw the smoke and left. Patrons in the Viennese Rooms, Empire Room, and Garden Rooms were notified almost simultaneously by employees and left by various exits.

The Cabaret Room occupants were not notified of the fire until the majority of the other occupants had left the

Figure 7. Location of fatalities. (Two additional people died later in the hospital.)



NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

building. Their notification came at approximately 9:06 pm when a busboy went up on the room's stage, announced the location of exits, and then told the patrons of the necessity to leave the building. Soon after his announcement, thick black smoke and flames traveled rapidly down the main north-south corridor and filled the Cabaret Room and part of the Garden Rooms. Most of the Cabaret Room occupants who had not proceeded through an exit by that time were overcome by the smoke and toxic gases, and died.

Eventually, every fire department in Campbell County, Kentucky, was involved in fighting the Beverly Hills Supper Club fire. Twenty-four fire departments sent ambulance or rescue units to the fire from Kenton, Boone, and Campbell Counties in Kentucky, and Hamilton County in Ohio. In all, approximately 522 fire fighters participated in the fire-fighting activities and rescue operations. The fire was not completely extinguished until Monday morning, May 30.

Analysis

Based on a thorough examination of physical evidence and information available through interviews of occu-

pants and employees of the Beverly Hills Supper Club, the investigation team concluded that the fire originated in a concealed space within the ceiling or within the walls of the Zebra Room. The most probable source of ignition was electrical in nature.

The precise electrical equipment (lighting fixture, switch, receptacle, outlet, or fixed wiring), or the form of heat of ignition (short circuit arc, arc from faulty contact, or heat from electrical fixture) could not be determined during two weeks of intensive investigation.

Early reports of fire cause immediately following the fire, and various other reports of fire cause and area of origin, required that the investigation team consider and examine dozens of theories. Reports that the fire was caused by a transformer explosion, that the fire started in the kitchen, that the fire originated in the basement, and that the fire was started in wiring to a pump motor in a pool under the curved stairway were explored and then ruled out. There was no evidence of a transformer explosion and positively no indication that the fire originated in the kitchen area. However, the theory that the fire originated in the basement was reasonable, and was therefore given much attention and consideration. There was evidence of fire in the basement under the main bar area, and there were small-diameter holes through the

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

concrete floor of the first floor (directly above the basement area), similar to conduit and pipe openings.

The strongest evidence disproving the theory that the fire originated in the basement was the testimony of employees who had traveled through the basement area after the fire was discovered on the first floor. Their reports that they did not smell smoke and did not see smoke or fire ruled out the theory that the fire originated in the basement.

In addition, examination of the floor openings in relation to the fire location in the basement and in the Zebra Room on the first floor did not support the basement theory.

The determination of fire cause was hampered by the degree of destruction of the building. The north, south, and west walls of the Zebra Room alcove, where the reservation clerk was located, were nearly completely destroyed. A steel column in the basement supporting this area had partially collapsed, causing floors to pitch downward and resulting in cracks and openings in the floor slab that did not exist prior to the fire.

Testimony of employees and patrons, however, was consistent in placing the fire in the Zebra Room at the time of discovery. Numerous and consistent items of information in the transcripts led investigators to the conclusion that the fire originated either in a concealed space within the walls of the Zebra Room or between suspended ceilings above the Zebra Room, and that the fire smoldered or burned for a considerable period of time before breaking through either the ceiling or the walls into the Room itself.

The only possible source of ignition that could be located within the concealed spaces was electrical in nature. By reconstructing what was left of the ceiling support system in the Zebra Room and the bar joists that supported the floor above, it was determined that combustible ceiling tile was adhered to the wire-lath-and-plaster ceiling in the Zebra Room. Fixtures believed to have been mounted in the Zebra Room were recessed 10½ inches into the ceiling. One of these had an upper portion (approximately 4 inches by 4 inches) melted away, indicating an extremely high degree of heat in this area. It was the opinion of electrical specialists on the investigation team that the short circuiting or arcing of electrical wires did not cause the melting of such a large area. The heat from the recessed ceiling lights was considered a strong possible ignition source, but the clearance between the top of the light fixture and the combustible tile was too great to make this more than a speculative theory. Another possibility was that the tiles had fallen from the ceiling after a period of time and had come in contact with the lighting fixtures.

Because the roof leaked in the area over the Crystal and Zebra Rooms, the possibility was considered that the moisture could have caused a breakdown of the asbestos insulation of the light fixture wiring, and that the bare wiring came in contact with combustible ceiling

tiles or other combustible materials. No positive evidence, however, could be found to support this theory.

Fire Development

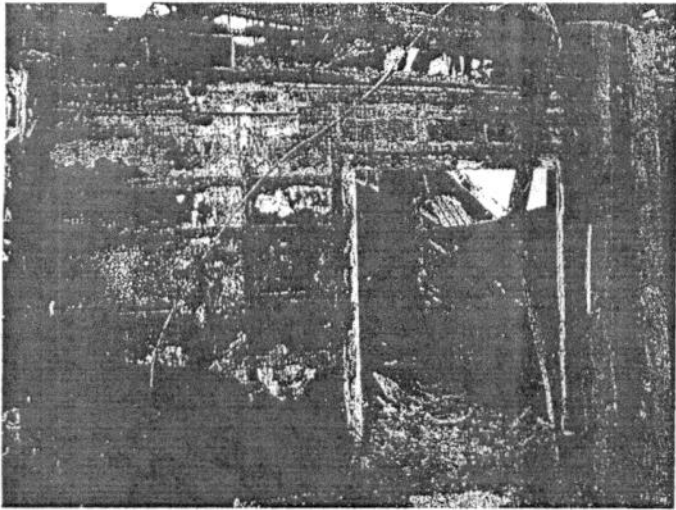
Shortly after discovery of the fire in the Zebra Room, thick, black smoke spread into the main bar area, into the immediate area around the Hallway of the Mirrors, and up the curved stairs to the Crystal Rooms. The smoke filled the front of the building, including the Cafe dining room and the front foyer. The time was about 9:05 to 9:10 pm when the smoke, gases, heat, and flames entered the Cabaret Room.

The main body of the fire then spread steadily from the front of the Club into the center of the building. At some point after the occupants in the Cabaret Room had been overcome by the initial wave of smoke, flame, and heat, the fire vented itself through the roof of the building somewhere in the area east of the Empire Room. The smoke level throughout the building lifted at that time and allowed fire fighters and rescue workers to enter the Cabaret Room with less difficulty. The fire then continued to spread throughout all areas of the Beverly Hills Supper Club except along the west side (kitchen area) and the basement.

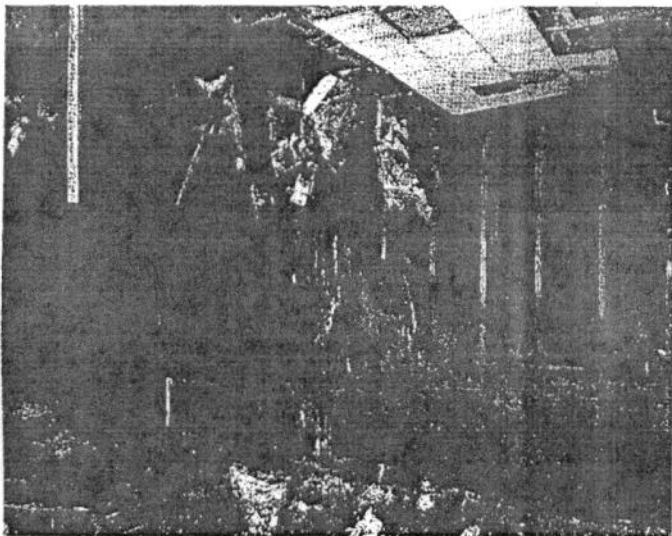
Although fire did not enter the kitchen area, heat from the fire caused the suspended ceiling in the kitchen to partially collapse. Melted glassware along the east side of the kitchen nearest to the center of the building would

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:



Interior view of Zebra Room looking at north wall, including north entrance to Zebra Room. Note wall construction. NFPA



Looking from north door of Zebra Room at wall of hallway opposite Zebra Room. Note combustible finish materials. NFPA

indicate that temperatures in the kitchen were 1400° F or higher³ at the height of the fire.

Fire Spread to the Cabaret Room

The presence of combustible ceiling tile and wood materials within the ceiling space of the Zebra Room

provided a fuel supply for the continued spread of the fire through the concealed space of fire origin and other concealed spaces. There was an intense heat buildup within the concealed space that ultimately resulted in the accumulation of smoke and hot gases within the Zebra Room itself. The fire was apparently discovered at this point, and attempts were made to extinguish it. During the time these attempts were being made, flames erupted through the doorway of the Zebra Room into the Hallway of the Mirrors, which knocked employees who were attempting to fight the fire away from the door opening. The fire within the Zebra Room continued to build until it broke out of the room through the double doors located at the north end of the room.

It is theorized that flashover occurred in the Zebra Room (simultaneous ignition of all combustible materials within the room) and the room resembled a furnace because of the simultaneous burning of room furnishings. These furnishings included several wood tables, about twenty-three chairs, and the carpet. Under these circumstances, the walls of the rooms, which were covered with $\frac{3}{16}$ -inch combustible hardboard paneling, would also have been burning and contributing to the fire.

Richard G. Bright, in his report, *Beverly Hills Supper Club Fire, Southgate, Kentucky, May 28, 1977 — An Analysis of the Development and Spread of Fire from the Room of Fire Origin (Zebra Room) to the Cabaret Room*, suggests a probable scenario for the action of the fire.⁴

"This furnace-like fire had only one immediate flue or vent available to it and this was the pair of doors at the north end of the room. From eyewitness accounts, apparently one door, the west leaf, was partially open, perhaps at 45 degrees or so (confirmed by on-site evidence). . . .

". . . The venting of the fire through this doorway resulted in the passage of smoke, flames, and heat through the upper part of the doorway at relatively high velocities, with an inrush of cold, fresh air, at lower velocities, near the floor. As the smoke, flames, and hot gases left the Zebra Room, they were propelled across the ceiling of the small corridor directly outside the Zebra Room until they hit the far wall, some 20 feet distant. Here, the flames and hot gases split, with part of the flames and hot gases turning down and part turning sideways in both directions. The thin plywood paneling, on the far wall of the small corridor, would have ignited readily under the impact of this flame and hot gas exposure.

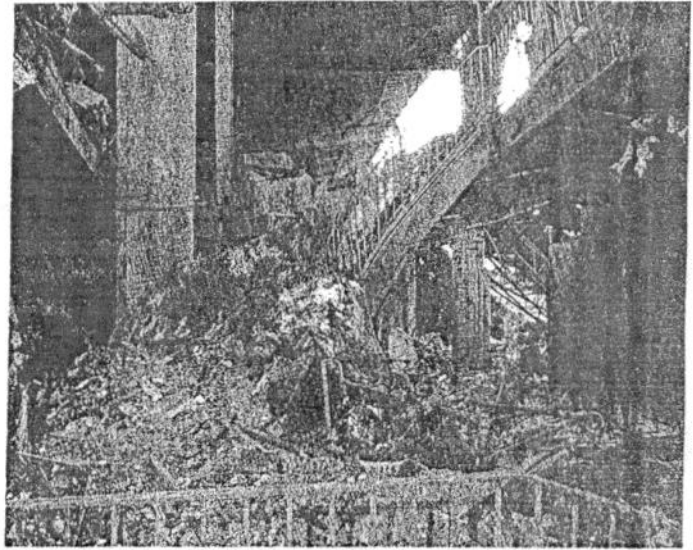
"In the meantime, the fire on the carpet in the Zebra Room would have spread through the doorway also. . . . In examination of the Zebra Room, it was found that the carpet and its padding were completely consumed, down to bare concrete, in the doorway opening, the only location in the Zebra Room with such extensive damage.

³ *Officer's Handbook for Determining Cause and Circumstances of Fire*, NFPA FIF-4 (Boston: NFPA, 1974).

⁴ Washington, D.C.: US Department of Commerce, National Bureau of Standards, September 1, 1977.

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:



View from north door of Zebra Room west toward curved stairs. Note general destruction in two-story area of building. NFPA

"The flames and hot gases leaving the Zebra Room, in addition to impinging on the plywood paneling of the small corridor wall, also were probably passing up the stairway to the west of the lobby, into the main bar to the west, and through the 15-foot opening into the main corridor to the east.

"It was apparent, from the on-site investigation, that sufficient heat was present in the stream of hot gases passing through this 15-foot opening into the main corridor to ignite . . . in this corridor . . . hardboard paneling on the walls and the carpet system on the floor.

"As the flames and hot gases entered the main corridor, the carpet and the hardboard paneling began to contribute combustible gases to the fire through the driving off of the combustible volatiles in the carpet and the paneling. This resulted in the extension of the burning down the corridor. At about this period in time, sufficient thermal radiation was being directed down on the carpet surface from the smoke and hot gas layer at the ceiling to cause the spread of the fire on the carpet from the small corridor through the 15-foot doorway, into the main corridor. Once this happened, the fire in the corridor was very nearly a self-sustaining fire, feeding on both the carpet and the paneling, with each contributing to the growth and spread of the other. Even so, energy was still being supplied into the main corridor from the fire in the Zebra Room and the small corridor outside. From this point, fire spread rapidly down the

main corridor, with visible fire rolling along underneath the ceiling and a secondary fire traveling along on the carpet face, trailing behind the ceiling fire."

Effects of Air Conditioning

It is not clear whether the air-conditioning system had contributed any adverse effects during the early stages of the fire, such as spreading or retarding the movement of smoke or of the fire. Once the fire left the Zebra Room, however, it is apparent that the fire was probably of sufficient energy to overpower the air-handling system.

Rapidity of Fire Spread

The rapidity of the spread of fire from the Zebra Room to the Cabaret Room by way of the main corridor undoubtedly was a factor in the large loss of life in the Cabaret Room. While it is not possible to give more than an educated estimate, it is postulated that once the fire had emerged from the Zebra Room and crossed over into the main corridor, it probably reached the Cabaret Room from two to five minutes later.

The fire in the main corridor ultimately blocked the west exits from the Cabaret Room, leaving the remaining occupants with only Exits A and B. \triangle

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

Comparing The Club With The Code (continued from page 21)

essentially of unprotected, noncombustible construction. This construction type is not permitted for Class A places of assembly by the *Life Safety Code*. Class A places of assembly are permitted by the *Code* on any level of a building of fire-resistive construction and (except for theaters or dance halls) on the level of exit discharge of buildings of heavy timber, protected noncombustible, protected ordinary, or protected wood-frame construction. In buildings of unprotected construction (such as the Beverly Hills Supper Club), only a Class C place of assembly is permitted by the *Code*, and then only at the level of exit discharge. A Class C place of assembly is one with a capacity of 300 persons or less.

The minimum occupant load for which exits must be provided, as required by the *Life Safety Code* in any assembly building, structure, or portion thereof, is determined by dividing the net floor area or space assigned to that use by the square feet per occupant. Square feet per occupant is based on three square feet per person for standing room or waiting space, seven square feet per person for concentrated use without fixed seats, and eleven square feet per person for an assembly area of less concentrated use, such as a dining room, drinking establishment, or lounge.

Based on the net floor area divided by the appropriate number of square feet, it was determined that the total occupant load at the Beverly Hills Supper Club would have been 2,375 persons, according to the *Life Safety Code*. Of course, because of the lack of sufficient exits, the building could not have safely accommodated that number of people. The actual number of people in the Club on the night of the fire is estimated to have been between 2,400 and 2,800, with about half of the people in the Cabaret Room.

Means of Egress Requirements

The *Life Safety Code* requires that every building or structure — new or old — designed for human occupancy shall be provided with exits sufficient to allow the prompt escape of occupants in the event of fire or other emergency. The Beverly Hills Supper Club was not provided with exits sufficient to permit the prompt escape of occupants in case of fire. According to the *Code*, every place of assembly and every individual room used as a place of assembly must have exits sufficient to provide for the total capacity (occupant load), and these must be as follows:

- No individual unit of exit width shall serve more than 100 persons.
- Doors leading outside the building at grade level, or not more than three risers above or below grade, shall serve 100 persons per exit unit.
- Stairs or other type of exit not specified above shall serve 75 persons per exit unit.

The total number of exit units required by the *Code* for the Beverly Hills Supper Club, based on 100 persons per unit of exit width (doors at grade level) and considering the occupant load based on square footage as determined above, would have been 27.5 exit units. The number of exit units required, however, would actually have been greater than this, considering that the *Code* requires a main exit that will accommodate one-half of the total occupant load, and requires other exits of sufficient width to accommodate two-thirds of the total occupant load.

The actual number of exit units that existed at the time of the fire was 16.5¹ units. Therefore, exit capacity would not have met the absolute minimum established by the *Life Safety Code*. The maximum permitted occupancy load of the building should have been limited to 1,511 persons based on the following calculations:

Table 3.2 Beverly Hills Building Exits

Exit	Main Egress Portion	Exit Units		Capacity
		Level	Stairs	
Exit A	Inside double doors	2 units	—	200
Exit B	Outside stairs	—	1 1/2 units	112
Exit C	Stairs	—	2 1/2 units	187
Exit D	Inside double doors	2 1/2 units	—	230
Exit E	Stairs	—	1 1/2 units	112
Exit F	Doors	2 1/2 units	—	230
Exit G	Doors	2 1/2 units	—	230
Exit H	Door	1 1/2 units	—	150
TOTALS		11 units	5 1/2 units	1,511

Total building exit capacity: 1,511 persons.

As previously mentioned, another requirement of the NFPA *Life Safety Code* for places of assembly is that every assembly occupancy shall be provided with a main exit of sufficient width to accommodate one-half of the total occupant load. The main exits from the Beverly Hills Supper Club are considered to be the front exit under the canopy, and the main north exit from the Garden Rooms.

¹ Calculations consider that the full width of the inside double doors was usable for egress (see continuing discussion).

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

The total units of exit width for the two exits equal five units, which would accommodate 500 persons each, allowing a total occupant load of 1,000 persons.

Number of Exits

Investigative information places the estimated population of the Cabaret Room on the evening of the fire at between 1,200 and 1,400 people. By definition, the Cabaret Room itself was a Class A place of assembly (1,000 persons or more). The *Life Safety Code* requires that every Class A place of assembly shall have at least four separate exits as remote from each other as practicable. The Cabaret Room should have had a fourth exit to provide the minimum number of exits.

Exit Access

Section 2-4 of the *Life Safety Code* requires that exits for places of assembly shall be arranged and maintained to provide free and unobstructed egress from all parts of the building or structure at all times when it is occupied. No lock or fastening shall be installed to prevent one escape from the inside of any building.

The *Life Safety Code* requires that means of egress be continuously maintained free of all obstructions or impediments to full instantaneous use in the case of fire or other emergency (17-1.2.1.1).

On-site investigation of the Beverly Hills Supper Club fire and interviews determined that chairs and tables were stored on the platform outside the Venness Room that led to steps to double doors in the screen wall. Further descriptions of exit access discussed evidence of chains and locks on panic hardware and locked doors.

Exit Marking

The *Life Safety Code* states that every exit in a place of assembly shall be clearly visible, or the route to reach the exit shall be conspicuously indicated in such a manner that every occupant will readily know the direction of escape from any point (2-5).

Section 5-10.1.2 requires that exits and access to exits be marked by readily visible signs in all cases where the exit or the way to reach it is not immediately visible to the occupants.

The east-west corridor south of the Cabaret Room was not visible from the north-south corridor, according to employee statements. A door to the corridor appeared to be part of the wall paneling, and was not marked as an exit. Access to Exits A and B was confusing; the way to reach the exits should have been indicated.

One part of the means-of-egress problem in the Cabaret Room that has not been previously discussed concerns the restricted aisles leading to exits. Section 17-2.6.2 of the *Life Safety Code* requires that the number of seats in places of assembly, where seats are not fastened to the floor, be restricted to not more than one seat for each 15 square feet of net floor area. The Section further requires that adequate aisles to reach exits be maintained at all times.

A large percentage of the occupants in the Cabaret Room noticed seating in the aisles, tables too close together, too many chairs, and other items indicative of restricted aisles.

Exit Discharge

Exits to the outside of the Beverly Hills Supper Club have been described briefly under "Construction Features of the Club" in the main article on the fire in this issue of *FIRE JOURNAL*. Features of some of the exits described were: 1) the steep banking to the east of the Club, and 2) the narrow concrete steps beside the loading dock at the kitchen exit (Exit E).

Although reports received soon after the fire stated that people had fallen down the steep banking on the outside of the Club after exiting, these reports could not be substantiated. However, the Newport Assistant Fire Chief described victims being dragged away from the building when it appeared that the building was about to collapse; this may be the reason that some victims were seen on the side of the slope.

There were other deviations from the means of egress requirements of the *Life Safety Code*, but the discrepancies did not have a direct bearing on the fire, and therefore will not be discussed here in detail. Briefly, the Gale dining room and the Crystal Rooms should have had at least two means of egress (8-2.4.3), and because the Gale dining room and Crystal Rooms had only one means of egress, the arrangement of means of egress was in violation (8-2.5.1). Dead-end travel in excess of 20 feet is not permitted.

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

Although a detailed analysis was not made, the travel distance from the Empire, Viennese, and Crystal Rooms to reach an exit was in excess of the 150-foot total length of travel requirement in places of assembly (8-2.6).

The illumination of means of egress was not reported to be a problem, but it is seriously doubted that illumination was provided in the space between the facade and the Viennese Rooms that led to Exit C.

Features of Fire Protection

Although complete sprinkler protection is not required by the *Life Safety Code* in places of assembly located at the level of exit discharge, Section 16-4.2.1.1 of the *Code* requires complete automatic sprinkler protection in windowless areas occupied by 100 or more persons. The Cabaret Room, Empire Room, Viennese Rooms, Cafe dining room, and Crystal Rooms were windowless areas occupied by 100 or more persons, and therefore should have been sprinklered.

Considering the type of construction of the Beverly Hills Supper Club that would limit the capacity of the building to 300 persons,² and realizing that the Club was effectively a windowless building,³ and further considering the windowless area requirement for sprinkler protection, and taking into account that the basic principles for providing complete sprinkler protection include the installation of sprinklers throughout the premises,⁴ it is considered that any authority having jurisdiction to enforce the 1976 edition of the *Life Safety Code* could have required complete automatic sprinkler protection throughout the Beverly Hills Supper Club.

The Club exceeded the height and area limitations placed on buildings of unprotected, noncombustible construction by the *National Building Code*, and automatic sprinkler protection was required by that *Code*.

Sprinkler protection in the Beverly Hills Supper Club might or might not have extinguished the fire

in the Zebra Room, depending on the system installation and the location of the concealed space where the fire originated. A properly installed and maintained sprinkler system would very likely have controlled the fire, however, and certainly would have prevented the spread of fire along the north-south corridor to the Cabaret Room.

Interior Finish

The *Life Safety Code* requires that the interior finish in all means of egress in all places of assembly be Class A. Class A interior finish includes any material classified with a flame spread of 0-25. The interior finish in the Hallway of the Mirrors and in the main north-south corridor had a flame spread greater than 25.

The corridor walls were covered with a decoratively finished, hardboard paneling applied over wood furring strips. This paneling was combustible, and although its flame spread index could not be determined, experience at the National Bureau of Standards⁵ indicates that it probably ranged somewhere between 150 and 200.⁶ This paneling was applied to both walls of the corridor for its full length, except for the curvilinear wall, at the west cross-corridor, which was of exposed brick.

Building Service Equipment

It was determined that the most probable cause of ignition was electrical in nature, as discussed in other sections of this report. The electrical service in the Beverly Hills Supper Club that was not destroyed was, therefore, thoroughly examined during the investigation, and a discussion of the results of those findings is warranted.

A great deal of time was spent investigating electrical fixtures, wiring, and electrical service at the Club to determine a possible link with the suspected origin of the fire. Due to severe or total destruction of much of the electrical wiring on the first and second floors, a detailed inspection could not be made in these areas. Electrical wiring for lights and power in the basement area was 80 per-

² See "Occupant Load."

³ With the construction of the false front, or facade, along the portions of the south and east walls of the Beverly Hills Supper Club, the building became, in effect, a windowless building. The Club was not truly windowless, as there were large window areas in the north wall in the area of the Garden Rooms and some small windows in the west wall where the kitchen was located. All showrooms and dining rooms were windowless areas, however, except for the Garden Rooms.

⁴ NFPA 13, *Standard for the Installation of Sprinkler Systems* (Boston: NFPA, 1976).

⁵ Richard C. Bright, *Beverly Hills Supper Club Fire, Southgate, Kentucky, May 28, 1977 -- An Analysis of the Development and Spread of Fire from the Room of Fire Origin (Zebra Room) to the Cabaret Room* (Washington, D.C.: US Department of Commerce, National Bureau of Standards, September 1, 1977).

⁶ For representative flame spread indices of similar materials, see *Building Materials Directory*, Underwriters Laboratories, Inc., (January 1976), p. 174.

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

cent intact, however, and damage to this area appears to have been caused by secondary fires and by heat transmitted through electrical conduit.

The dates when the original electrical wiring installation was completed are unknown, but the wiring methods that were used date to the period between 1940 and 1970. The original installation appears to have been adequate for the area and electrical load at that time. As additional demands for light and power were made, this load was increased with little or no electrical engineering employed for correct installation, supply and load factors as set forth in the NFPA's *National Electrical Code*. Wiring methods employed were also found to be in violation of the *National Electrical Code* requirements. These violations included transformer and vault room construction, subpanels, wire size, overcurrent protection, emergency power system, open junction boxes, concealed junction boxes, and securing and supporting outlet boxes, cable, and conduit.

Information as to load distributions was unknown, as subpanels were not marked or were improperly marked, and maintenance personnel or electricians with knowledge of the present system were not available.

Operating Features

Patrons and employees in the Cabaret Room did not have adequate time to exit from the building. Notification to the Cabaret Room occupants was delayed as a result of the lack of a fire alarm system in the building, the lack of an emergency evacuation plan, and the lack of employee training.

In retrospect, a fire alarm system in the Beverly Hills Supper Club could have been effective in providing an early warning to all occupants, and could have avoided the disastrous delay in alerting staff and occupants of the Cabaret Room. The *Life Safety Code* does not require an alarm system in places of assembly.

The *Life Safety Code* does require that employees be trained and drilled in the duties that they are to perform in case of fire, panic, or other emergency, in order to be of greatest service in effecting orderly exit of assembled groups. An evacuation plan of the Beverly Hills Supper Club that would have assigned specific responsibilities to employees, covering all areas of the building, and would have stressed the need to evacuate patrons immediately on the alarm of a fire, would possibly have provided the additional minutes that

would have been necessary to evacuate all occupants from the building. It was determined during the investigation of the Beverly Hills Supper Club fire that employees had not been schooled or drilled in duties to be performed during a fire or panic situation.

Other, less obvious reasons why there was not adequate warning to the Cabaret Room occupants were the physical size of the Club, the arrangement of the rooms in the Club, and the movement of employees within the complex.

Although there was no emergency plan at the Beverly Hills Supper Club by which to notify patrons, and no alarm system, the word of the fire emergency was spread rapidly throughout the Club, except in the Cabaret Room. The Cafe dining room and the main bar were close enough to the area of origin of the fire for the occupants to see smoke and hear the first reports of the fire in time to evacuate in relative safety. The Crystal Rooms on the second floor, where two occupants died, also received early notice, but those rooms were located directly above the open stairway outside the Zebra Room, and alternate means of escape were severely restricted. Occupants of other areas in the building — the Empire Room, Vietnamese Rooms, Garden Rooms, and kitchen — were notified by employees who were in the area of the Zebra Room or were in the kitchen or service halls, and saw and overheard other employees running for extinguishers or notifying the managers.

The exception to this word-of-mouth notification was the Cabaret Room, which was isolated from the rest of the Club once the smoke there was in progress. In other words, there were no waitresses, busboys, or hostesses from the Cabaret Room traveling to and from the kitchen or standing in the service halls taking a break between dining-room seatings.

Descriptions of employee actions in the transcripts indicated that employees who were attempting to notify the managers of the Club traveled through the main north-south corridor and the service halls and into the kitchen, while other persons traveled through the kitchen, main dining area, and main bar. While they were doing so, or were searching for extinguishers, occupants of the adjacent rooms were alerted and the evacuation of the building was begun.

This, however, was apparently not the case in the Cabaret Room. None of the employees there were in a position to see or hear the activity in the corridors, and they were not aware of the hazardous situation. They therefore did not alert the patrons to evacuate until the busboy entered the

Cabaret Room and made the announcement from the stage. It is interesting to note that the busboy worked in various rooms of the Club and had no permanently assigned station. Also, it should be noted that he worked in the Cabaret Room earlier that night before he went to the Vietnamese Rooms to help with a party there.

The size of the Club obviously increased the isolation of the Cabaret Room from the rest of the building. In addition, the Cabaret Room was equipped with its own dishwashing facility and bars, this was most likely because of the distance between the Cabaret Room and other areas of the complex, including the kitchen and other bars.

NFPA Fire Investigations

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

People Weren't Screaming Anymore (continued from page 20)

roared out at me, so my sister . . . held the doors shut while I went after (two of the managers). I couldn't find them so I went running to the kitchen and told (another employee); (one of the managers) must have heard me, so him and one of the bus boys . . . grabbed the fire extinguisher and asked me where, so I told him the Zebra Room, then I went to look (for) my sister and get out."

One of the four bartenders working the main bar stated:

"We just got word that the show was about to start, which was something on to a quarter to nine or so, and then I heard this gal, waitress, came and said, 'Call the fire department.' Smoke was coming out of this hallway area, by the Zebra Room. We called the fire department. (Sammy), the bartender, he went down the hallway with the fire extinguisher, got the fire extinguisher, went down the hallway, then came back and the waitresses were coming out of the room again hollering 'Call the fire department,' which was the second time they called it. And the smoke started coming out which was hanging over the ceiling of the hallway and the bar which was sort of grey at first. We were getting the people out and then all of a sudden it just . . . people just starting coming up to the front lobby, and we got them out the front door."

(Sammy) ran to get a fire extinguisher. He later said that by the time he got back he couldn't get within 20 feet of the Zebra Room. He hollered to the other bartender, "Let's get the people out of here."

A customer who was in the main bar with a party of five remarked:

". . . Then we heard two maitre d's in the dining room, which was right behind where I was sitting, (say) 'How do we get these people out?' One said, 'Take as many out through the main entrance as we can get; take the rest through the kitchen.' I said, 'Let's get out of here.' That was my exact words, but they were a little harsher. When we looked back up toward the reservation girl, it was getting smoky."

A waitress was getting drinks at the main bar. She saw the other waitresses open up the doors to the Zebra Room and the smoke start coming out.

"They told me to get the people out of the Empire Room, so I was the one that went up to the speaker; they were in the middle of a meeting, and they were sitting there telling me to go away. I was trying to explain to them not to panic or anything,

but we didn't know whether we was gonna have to evacuate yet. But to be ready; when somebody tells you to get out, to get out. Like two seconds later, there was me and the other waitress that runs the front bar . . . and a bartender took them out. . . ."

The club hostess said that she was waiting for the dining room to be reset for the 9:00 pm reservations when someone came up to the bar and said, "Call the fire department, we have a fire."

"I immediately pick(ed) up the phone and called and reported the fire. There were people at the bar and I tur(n)ed to them and told them to please leave the building, that we had a fire. I then went directly into the Cafe (main dining room) and started telling people to leave. Before I went to the dining room, seconds after I called the department, I saw my husband (Stevie) and he shouted 'Get these people out of here, we have a fire.' When I reached the dining room, I started telling people to leave. The waitresses and other hostesses were doing the same. Some people started moving and others just sat. I repeated several times that they should leave, we had a fire. I then went through the kitchen and started telling people in there. They seemed as though they already knew."

A waiter in the main dining room was getting his silver to reset all the tables, when somebody came up to him and told him there was a fire.

"I just went about doing my work," he said. "We'd had fires there before and we didn't really think much about it. 'Cause we'd always got them out."

In this early stage of the fire, there evidently was little panic on the part of employees or patrons. There was some confusion, but despite the confusion employees managed to warn patrons in the rooms they were serving, and patrons began to leave the building.

Except the patrons in the Cabaret Room.

The Cabaret Room was at the opposite end of the building from the point of origin of the fire. Because the Room had its own dishwashing facilities and bar, and because dinner was not being served in the Room during the show, employees of the Cabaret Room had no reason to travel to the front of the building, where they would have learned of the fire. Likewise, no employees working in the front of the building had any reason to

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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

travel to the Cabaret Room, and evidently no one, except a busboy, thought to do so to warn the patrons there of the fire.

The busboy, who had no permanently assigned work station in the building, was walking down the main corridor when a waitress told him that there was a fire in the Zebra Room. He ran down the hall to the Cabaret Room and told a male employee, who was acting as a host at the head of a line of people waiting to get into the Room, to open some doors. After telling the people in line to walk down the hall toward the garden area, the busboy walked into the Cabaret Room, down the middle aisle, and went up onto the stage. One of the performers handed the busboy a microphone. The busboy later recalled that:

"The first thing I did was I asked them (the audience) to look at the exit sign, turn around and look at the back and you will see a green exit sign. I want you all to notice that exit sign, and I want you to look at the other corner of the room and there will be another exit sign, and I want you to notice that one, so I want the left side of my room to go out of the exit sign behind that I am pointing to now; I want the corner of the room, I mean my right half of the room, to go out of the other exit sign in the corner of the room, the green exit room. I said, 'There's a fire in the small room on the other side of the building on (sic) I don't think there is any reason to panic or rush; you should leave,' so I gave the microphone back to the entertainer. . . .

. . . I walked down the middle aisle and I saw some people sitting in their seats and they were staring at me like I was a nut, and . . . and a lot of people were getting up and doing what I said. Nobody was rushing, nobody was panicking or anything like that. . . .

. . . I jumped up on a couch, and ran down a green couch, and telling everyone to go out the exit; there's a long, there's a long couch down here and there's an exit. I was telling everyone to go out and told them to take a right; I told them not to go to the front of the building. . . .

. . . Panic set in when I was in the hall and I told, I went back after I told the people to turn up the lights in the light room. I went back down the main hall right here instead of going back up the hall toward the fire to see if it was put out, you know, so we could tell them that they could go back into the Cabaret to see the show, and I saw this big cloud of smoke coming down the hall at me real fast . . . and I just turned around and went to this

exit over here and there were just three doors and one was locked, and I tried to bang it open with my shoulder and it wouldn't come open. . . ."

One of the patrons in the Cabaret Room, whose group was sitting in front of the stage, stated:

". . . And these comedians were performing. They were just hilarious, and we were relaxed and enjoying it, when this busboy just came on the stage, it just didn't register with people. That's all I can say. I think the comedians said something to the effect, but people just weren't moving, and they said something to the effect that this was serious, that we'll come back in a few minutes and we'll continue where we left off."

Her group then got up to leave, and went out toward the Chapel.

". . . By that time it was crowded with people. And we could definitely smell smoke by the time we were going out of the Cabaret Room. And as we were going down this aisle, out to the Chapel that led out to the exit on the outside in the back, somebody yelled, 'Get moving!' I think it was some personnel, maybe that same boy. I looked back and then I could see the smoke coming. Then people started pushing and shoving."

Another patron in the Cabaret Room related that he and his wife left through the double doors at the north end of the main north-south corridor. The busboy had just announced to the Cabaret Room audience that he wanted everyone to start leaving as quickly as possible. This patron later said:

". . . So my wife and I started moving back toward the entrance that we had come into the Cabaret from, went into the hallway, turned right and moved along that passageway until we came out into what is known as the garden area. As we moved down the hall, when I first came into the hall from the Cabaret, there didn't appear to be any panic or a large accumulation of smoke. But as I got closer to the exit that goes out into the garden, I looked back over my shoulder and there was a tremendous amount of smoke moving down the hallway toward that exit. At that point, a man said, 'Move faster, there's people back here and smoke around us, hurry up.' So then everybody started moving at a more rapid pace. I would say at that point there was panic starting in that hallway. . . .

"Everybody was moving out fine until we got in the hallway and that man said, 'There's smoke around us and you people up front move it out' — I can't recall exactly what he said — but as we were

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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

going out we could hear the two comedians on the stage talking to the people through the mikes and saying, 'When the fire is out, we'll start the show right from the beginning again. It's probably nothing to it, don't worry about it.' They were trying to keep everybody calm. But then as we got into the hallway, we could hear the two comedians say, 'Don't come up here on the stage because there's no exit back here behind the stage.' By this time, I wanted to get out, you know?"

"... When I first came out of the Cabaret and looked to my left, which would be toward the front of the building, I didn't see, all I could see was people moving toward me. I really didn't pay attention if there was smoke around or not. I would have realized there was smoke if it had been heavy. But I moved down the hall and as we went by the Garden Room, which would be on our left as we went down the hall, there was a lot of smoke in the Garden Room and there was busboys and waiters running around like there was no set pattern what they were going to do. Everybody was just kind of moving around. I don't know if they were trying to get people out or what. Then I looked in the Garden Room and saw smoke and then I looked back behind me and there was smoke coming down the hall, and it was heavy, thick, black smoke rolling down the hall..."

This same patron said it took only 30 seconds for the smoke to reach the exits.

"I was one of the first people to leave the Cabaret Room out of that exit. . . . I said, 'There's gonna be a lot of people die in this fire.' Apparently a lot of the people behind us changed directions and went back and got out another way because there was a lot of people behind us."

Another patron in the Cabaret Room, who tried to leave through the Chapel area, had this to say:

"... I looked back and I saw people moving down below in the bottom area. Everybody seemed very slow. I looked back again after we had maybe gotten a little further than halfway, and I saw smoke coming in to the area down on the other side of the room. I said, 'Oh my gosh.' So we started walking maybe a little faster. I looked over my shoulder again and flames were pouring through that entrance where we came in. I couldn't believe my eyes. We kept walking and some man down below, I remember, hollered, 'Speed it up up there,' or 'Hurry up.' So we were pretty close to the exit by then, so we kept walking faster and faster. I knew there were a lot of people behind me. It seemed to me like maybe 200 to 300

behind me and (Clara) was getting away from me, and I was getting worried. I kind of rushed up there. I got on the top-level tier and I almost ran to catch up with her. I knew that a couple of my friends were behind me. We got through a kind of a hallway, I guess where the bar area is, and then the door going outside was single. It was fairly wide, but it was single. We got out there. I was pretty sure I was beside (Clara). After we got out, smoke started pouring out that doorway that we had just come out. I hadn't inhaled any smoke or anything, but it was pouring out right after we came out. I couldn't believe it. We weren't a minute too soon. We got out and couldn't find (Clara's) sister. We were getting so worried. We couldn't find her anywhere. She finally tumbled out later. She had been knocked out. The people after us were just falling out of the door. I mean literally falling all over the ground. It was terrible."

A bartender, who had worked in the Crystal Rooms on the second floor and had left the building, returned to one of the Cabaret Room exits. This is what he found:

"... there was a woman . . . and she was out of this thing except there was about six people, there was enough people where we couldn't get her out at this time because they were on her legs, the back of her legs. She was clear of this thing, but she had all this weight on her and we just about pulled her eyes out of their sockets and we couldn't move her. And then there was man that was (on) top, he was a heavy guy and he was reaching his arms up, and so I thought he was all right and he looked like he was on top, and that was the first thought, get him off (the) top so you can do something with the bottom ones. And anyway I had him wrap his arms around my neck and I pushed up against this door as hard as I could and I moved the guy about this far, about two feet, and about this time he was out (of) it. He didn't have much strength to help me and I didn't have enough strength to lift him and he just looked at me and shook his head, you know. There was nothing I could do. And then there was a young girl, she was (on) top and she was alive and well and everything else; she wasn't screaming or anything but she was in fine shape, and I started to walk out with her and her leg was wrapped around a table. I don't know how that table got there, but there was a table leg and her leg was wrapped around it and it was just entangled in there and she couldn't pull it loose. So that's my recollection. I can't tell you . . . the one I left there. I couldn't take any more. That's,

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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

I think, when I left there. It was terrible, just terrible.”

A waitress in the Cabaret Room was just returning to the room from the bar when she heard the comedians on the stage say that there was a fire and that people should stay calm. She later recalled:

“ . . . I looked over my left shoulder, over my left shoulder, and I heard a big woosh sound . . . There was flame and smoke and it just rolled into the room and it was the blackest smoke I'd ever seen. The only way, if you could just take oil and just get it to roll in mid-air, then that was the way the smoke was. I knew at that time, I was going to die and up until that time, everybody was orderly. There wasn't any chaos, no screaming, no panicking or anything. It was when the people saw the smoke and the fire that they became panicky and they started screaming. I knew that this was it, that we were going to die. I screamed at (Rita), I said, 'My God, it's for real. There really is a fire.' The people had stopped moving. It just seemed like

they were kind of shuffling. I don't know if it was because of me wanting to get out so fast that made it seem that way or what. But, I knew if I didn't do something to get over those people, I wouldn't get out so I jumped up on the tables, that was the only thing I could see that would be a clear path to get ahead of those people, and at that time I wasn't thinking about anything but getting out of there, because the smoke was right on us. I got up to the double door, which did not lead outside; it led into another bar and I jumped down in the crowd and (Rita) jumped back into the crowd and we surged backwards and we surged forwards and when we did, I grabbed ahold a man's collar. He pulled me on through and I turned around to look because the smoke and the flames were coming, the smoke was coming out of the double doors out of the Cabaret with me, right at the back of my head. There must have been flame, because my blouse was burnt. As I came out, I turned to look and the people weren't screaming anymore. The smoke had covered them all up.” △

Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

Human Behavior In The Beverly Hills Fire

JOSEPH A. SWARTZ

Two years ago this month — on May 28, 1977 — a fire ripped through the Beverly Hills Supper Club in Southgate, Kentucky, eventually killing 165 people.

After the fire, the Kentucky State Police interviewed 630 survivors to determine, among other things, how people in the Club acted after being told of the fire. In addition, the State Police mailed a 22-item questionnaire to a large number of other individuals to find out about occurrences on the night of the fire. Of the questionnaires mailed out, 1,117 were returned to the State Police. The interviews, which were taped, and the completed questionnaires formed the basic data source for an NFPA analysis of human behavior during the Beverly Hills fire.

To conduct its analysis, the NFPA selected a random sample of 20 percent of the available interviews of building occupants (employees, patrons, and others) who were in each of the rooms of the Club on the night of the fire. To this data, the NFPA added 18 interviews of key personnel from the management and staff of the Club, and from fire officers who responded to the emergency. Statistical validity cannot be ascribed to frequencies, correlations, and ratios obtained, but questions can be asked, inferences can be drawn, and hypotheses of human behavior can be deduced.

I have studied the transcripts of interviews and the completed questionnaires, and have reached several conclusions about the behavior of the occupants of the Beverly Hills Supper Club on the night of the fire. One of my first conclusions was that the occupants of the Club felt safe not only before being notified of the fire, but after being notified, as well. They felt safe, according to the transcripts and interviews, because:

- 1) The Beverly Hills Supper Club was plush, and people tend to equate plushness with safety; and
- 2) The owners were very much in control of all of the Club's operations. Patrons had confidence that the owners could and would control any situation.

3) The staff had complete confidence that the owners and senior staff could control the emergency.

4) Patrons had complete confidence in the staff, who worked continually during the fire to reassure everyone and keep them informed.

5) Staff and patrons alike underestimated the severity of the emergency in almost every case, right up until the last seconds, or even until they were outside the building and looked back at the fire.

6) The extent of fire growth was hidden within a double-hung, false ceiling behind closed doors until discovery, at which time the spread of the fire and smoke was quite rapid.

7) Statements of staff and patrons consistently supported a feeling of security based upon both an underestimation of the energy that had been generated and the fact that the Club's Cabaret Room, where most of the patrons were, was a long way from the Club's Zebra Room, where the fire started.

Interviews were studied to determine what the people who were in the Club or who responded to the emergency perceived to be true during the fire, and what actions they took. A careful reading reveals the pervasive theme that generally, patrons and staff alike did not believe the emergency was serious. This is in contrast to what they reported on questionnaires. There is, in fact, no statement by anyone who was interviewed that they believed the emergency to be serious until they were directly confronted with thick, black, eye-irritating smoke. Even then, they moved in a quiet fashion toward exits until the last moment, when a rush of hot, searing gases and flames rolled through the Cabaret Room. Even at that moment, "panic," at least in the antisocial, aggressive, destructive sense of the word, seems not to have occurred.¹

A few quotations from the interviews should help illustrate that point:

¹ D. P. Schultz in *An Experimental Approach to Panic Behavior* (US Navy, Office of Naval Research, 1966), defined panic as "a fear-induced flight behavior which is non-rational, non-adaptive, and non-social, which serves to reduce the escape possibilities of the group as a whole." In discussing the Schultz definition, P. G. Wood notes in *The Behavior of People in Fires* (Fire Research Note No. 953, British Joint Fire Research Organization, London, November, 1972), that "He (Schultz) starts by offering a definition of the term 'panic,' making the point that the word has been and is often misused in describing the behavior of people fleeing from danger. In many cases, this flight is the only rational way in which to respond, the critical difference between rational escape behaviour and non-rational, panic, behavior being the manner in which we try to effect escape."

Mr. Swartz is NFPA's Chief of Technology Applications. This article is based on a speech he presented at the Second International Seminar on Behavior in Fire, held at the National Bureau of Standards, October 29–November 1, 1978, in Washington, D.C. Readers interested in a full description of the Beverly Hills Supper Club at the time of the fire and a description of the development of the fire are referred to the NFPA report of the fire entitled *Reconstruction of a Tragedy*, NFPA No. LS-2. In addition, see "Tragedy in Kentucky," *FIRE JOURNAL*, Vol. 72, No. 1 (January 1978), p. 18.

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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

• **Person One:**

A) "There was flame and smoke, and it just rolled into the room, and it was the blackest smoke I'd ever seen. The only way, if you could just take oil and just get it to roll in mid-air, then that was the way the smoke was. I knew at that time I was going to die, and up until that time everybody was orderly. There wasn't any chaos, no screaming, no panicking or anything. It was when the people saw the smoke and the fire that they became panicky and they started screaming. I knew that this was it, that we were going to die."

B) "So it wasn't a question of people trying to figure out why did 161, (sic) people die.² They died because there wasn't enough time to get them out. That's why they died. If there had of been three more minutes, those people could have gotten out. Not as many people could have gotten out that did get out had they been in panic. That's why I will continue to say there was no panic. The people were orderly. They got out in an orderly fashion up until the smoke and fire came, and you wouldn't have been human if you didn't scream then, because they were dying."

• **Person Two:**

A) "We weren't a minute too soon . . . The people after us were just falling out of the door. I mean literally falling all over the ground."

B) "No, I think this must have happened when the panic started, and the panic started when the flames shot through. People just started rushing for the exits. We kind of got in at the beginning of the panic, so I didn't see any of this."

• **Person Three:**

"There was very little shoving. The shoving was . . . a constructive shove. It was shoving to move people faster; you know, you can move faster if someone's pushing you a little bit, helping you out. There was no, like, destructive type of thing where you were just taking people away and going in front of them or anything like that. It was orderly."

If there was no panic until seconds before fire and smoke felled people, and there are no statements of so-called panic from any but those who witnessed the death-delivering wave of hot gases into the Cabaret Room, what might be concluded? First of all, it seems reasonable, when reading all of the statements, that it might be well to discard the term "panic" for a more descriptive term with less emotional, connotative values. That is, if people were pushing others out of the way or knocking them down and walking on them, then that action should be described exactly that way. If people were screaming, then one should state whether they were screaming for help, for loved ones, or just screaming uncontrollably and not able to help themselves or others escape from the emergency.

Second, it seems reasonable to conclude that there was a maximum occurrence of altruistic behavior. A study of the transcripts and the questionnaire returns from patrons and employees revealed interesting phenomena:

² Actually 165 eventually died from the fire, 163 that night and two at a later time.

(1) The staff respected the owners as being capable, even if tough, leaders.

(2) Staff members took care of patrons at the tables, rooms, and stations to which they were assigned.

(3) Patrons looked to the staff for guidance.

(4) Staff actions and patron actions seemed consistently different in that staff consistently took actions to assist patrons, whereas patrons followed or took a more passive role.

In order to test the hypothesis that staff actions differed from patron actions, we made the following definitions:

Other-Serving Actions — actions taken to actively assist others.

Self-Serving Actions — actions taken to remove oneself from danger.

Other Actions — actions taken to generally assist oneself and others by such things as seeking information or calling the fire department.

Random samples of 20 percent of the interviews were selected from those who had been in each room. These were augmented by all remaining staff interviews in order to include a sufficient number of staff interviews. A sample of interviews was selected by merely dividing a pile of interviews arbitrarily among three analysts, only one of whom had studied the fire. The analysts were given the definitions and a tally sheet to record the room occupied at the time of the fire and whether the interviewee was a patron or staff; they were told to mark every action that the interviewee commented upon, and record the number of times that these actions were *other-serving*, *self-serving*, or *other actions*. The tally sheets were given to a statistician who also had not been involved in studying the fire. Using the tally sheets from each of the three analysts, he did a Chi-Square test (see Figure 1) on the hypothesis that the staff exhibited predominantly "other-serving" behavior, while patrons exhibited predominantly "self-serving" behavior. The results showed staff *did* help *others* more than *self* and patrons *did* help *self* more than *others*. That is, the people involved continued to fulfill the roles they assumed prior to the fire.

What Was the Nature of the Role Assumption?

Beside the leader/follower roles assumed by staff and patron respectively, we found other interesting details of role assumption. Bartenders, busboys, waiters, waitresses, and hostesses assisted those patrons that they normally served. The following are typical examples:

(1) A waitress in the Main Dining Room who investigated the emergency, then evacuated "her" two tables.

(2) A waiter and waitress in one of the Garden Rooms who assisted and supervised the exit of the people at the two tables they were jointly serving.

(Continued on page 108)

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Courtesy—Beverly Hills Supper Club Fire, Southgate, KY, May 28, 1977:

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(3) The hostess outside the entrance to the Garden Rooms who notified only Garden Rooms II and III of the emergency because she only seated people in these two rooms, and not in Garden Rooms I and IV.

(4) The bartender and waitresses who worked together to get everyone out of the Crystal Rooms (actually, two persons were trapped and lost in dressing rooms) because they were jointly working these functions.

and directed and assisted in pulling live persons from the stack of bodies at one of the exits from the Cabaret Room.

What Was Learned of Importance?

It is my belief that this fire has taught us many things beyond the fact that one must build and maintain public places of assembly in accordance with existing building and firesafety codes. Principal among these, I would put the following:

(1) Fire reports or other accounts of fires should delete the term "panic" and report factually what happened or what people said.

(2) Firesafety plans for places of public assembly should examine the roles that people normally play, and not seek to prescribe emergency actions that are contrary to these roles.

(3) The impact of "role assumption" on expected fire emergency conduct should be examined.

(4) Firesafety education should consider and be based upon people's erroneous conceptions about distance being related to safety, and the time needed to escape from a fire emergency. △

Figure 1. Chi-Square Test of Occupant Actions

	Actions More Self-Serving		Actions More Other-Serving		Total
	Number	Percent of Total	Number	Percent Of Total	
Patron	25	92.6%	2	7.4%	27
Employee	3	15.8%	16	84.2%	19
TOTAL	28		18	100%	46

$\chi^2 = 27.65$: significant at .001.

Another interesting case was a fire officer from Cincinnati who assumed the roles of husband and father until his wife, son, and daughter-in-law to-be were outside the Club. He then assumed the role of fire officer,