BOARD AND CARE FACILITY FIRE
LAURINBURG, NC
March 17, 1996
FIRE INVESTIGATION REPORT

Board and Care Facility Fire
Eight Fatalities
Laurinburg, North Carolina
March 17, 1996

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ABSTRACT

At approximately 10:00 p.m. on Sunday, March 17, 1996, a fire occurred in a single-story board and care facility in Laurinburg, North Carolina. Sparks from a faulty electrical receptacle ignited bedding materials in one of the resident rooms. Even though the fire involved only one room, smoke filled the smoke compartment where this room was located. Eight residents died in this fire. Some smoke spread in to other areas when cross-corridor doors were opened during evacuation and fire suppression activities.

Both residents in the room of fire origin left the room, but only one was able to safely evacuate the building. The other resident from the room of fire origin was overcome by smoke and died in the corridor. Sixteen other residents had rooms in the compartment of fire origin. Seven of these residents died in their respective rooms, and the other nine self-evacuated. The doors to rooms in which residents died were in the open position.

In response to the operating fire alarm, the three staff members closed doors for resident rooms that were not in the fire area and they assisted the residents who were leaving the fire area. Conditions in the compartment of fire origin quickly deteriorated and prevented staff from entering that area.

The following factors contributed to the loss of life in this facility:

- Staff members inability to enter the fire area due to smoke and heat
- Occupants inability to evacuate before untenable conditions developed in the fire area
- Room doors that remained open due to the lack of door self-closing devices
- Lack of automatic sprinklers
I. Introduction

The National Fire Protection Association (NFPA) investigated the Laurinburg board and care facility fire in order to document and analyze significant factors that resulted in the loss of life. The investigation was conducted by the NFPA as part of its on-going program to investigate technically significant incidents. The NFPA's Fire Investigations Department documents and analyzes incident details to report lessons learned for life safety and property loss mitigation purposes.

The NFPA became aware of the Laurinburg board and care facility fire on the day it occurred. Michael S. Isner, Senior Fire Investigator of the NFPA Fire Investigations Department, visited the State Bureau of Investigation in Fayetteville, North Carolina and Division of Facility Services in Raleigh, North Carolina to discuss the Laurinburg board and care facility fire. The information obtained during those visits and information provided by the Laurinburg Fire Department were the basis for this report.

This report is another of the NFPA's studies of fires having particularly important educational or technical interest. All information and details regarding fire safety conditions are based on the best available data and on any additional information provided during the report development process. It is not the NFPA's intention that this report pass judgment on, or fix liability for, the loss of life during the Laurinburg board and care facility fire. Rather, the NFPA intends that its report present the findings of the NFPA data collection and analysis effort and highlight factors that contributed to the loss of life.

Current NFPA codes and standards were used as criteria for this analysis so that conditions at the Laurinburg board and care facility on the day of the fire could be compared with state-of-the-art fire protection practices. It is recognized, however, that these codes and standards may not have been in effect during construction or operation of the facility. The NFPA has not analyzed the Laurinburg board and care facility regarding its compliance with the codes and standards that were in existence when the facility was built or during its operation.

The cooperation and assistance of the North Carolina State Bureau of Investigations, the North Carolina Division of Facility Services, and the Laurinburg Fire Department are greatly appreciated.
II. BACKGROUND

The Facility

At the time of the fire, the Laurinburg facility was licensed by the state of North Carolina Department of Human Services as a "Domiciliary Home" (after July 1, 1996 revisions made to North Carolina state laws changed this occupancy classification to "Adult Care Home") with a resident capacity of 60. At the time of the fire, 58 residents lived at the facility. State officials recognized that 24-hour personal care and limited medical care were being provided at the facility. They described the level of medical care as being less than that associated with a nursing home. Residents whose medical conditions changed and required additional medical care were removed from this facility and sent to a nursing home or hospital. Based on this information, the Laurinburg facility appeared to most closely resemble an "existing large board and care facility" according to the NFPA 101, Life Safety Code, 1994 edition.

The North Carolina Division of Facility Services considered the Laurinburg facility to be an "institutional occupancy" in accordance with the 1996 North Carolina State Building Code which was based upon the 1994 edition of the Standard Building Code published by the Southern Building Code Congress International (SBCCI).

The building was constructed in 1974 and was a single-story structure with a central area and two wings (see Figure 1). The center area contained a kitchen, dining room, nurse's station, medicine room, office, a lounge, and several resident rooms. The two wings were segregated into a men's section and a women's section. The men's wing was subdivided into two parts by a smoke partition and 1 3/4-inch (44.5 mm) solid-wood, stave-core, cross-corridor doors. Ten two-bed sleeping rooms were on the north side of this wall, and a total of 18 men resided in these rooms. Five more two-bed sleeping rooms for men were located on the south side of the wall; the number of men living in these rooms was not provided. The women's wing was also subdivided into two parts. This wing was divided by the building's only fire wall. This wall had a parapet extending above the roof and had fire-rated doors protecting the corridor. The fire wall had been installed as a result of a North Carolina State Building Code requirement which limited a fire area in a single-story institutional building to a maximum of 9,000 square feet for this type of construction. The women's wing had 15 rooms on the south side of the fire wall and one room on the north side of that wall.

The building's exterior bearing walls were constructed of masonry block with a brick veneer. These walls supported wood trusses constructed of 2-inch by 6-inch and 2-inch by 4-inch members. Metal gusset plates were used as fasteners to hold all the trusses' joints together. The roof was gable-style covered with asphalt/fiberglass shingles. Interior walls were wood frame and were covered with a single layer of 5/8-inch (15.9 mm), Type X (fire-rated) gypsum wallboard. A single layer of 5/8-inch (15.9 mm) Type X-gypsum wallboard was also nailed to the underside of...
the roof truss's bottom chord. The interior finish of walls and ceilings was paint. Floors were concrete slabs covered with square commercial-grade asphalt tiles. North Carolina State building officials considered the building's construction to be Type V protected construction which is, at least, similar to Type III (200) construction according to NFPA 220, Standard on Types of Building Construction, 1995 edition.¹

¹ A Type III (200) structure will have a 2-hour fire rating for the exterior bearing walls (first digit); a 0-hour fire rating for structural frame or columns and girders supporting loads for more than one story (second digit); and a 0-hour fire rating for the floor construction (third digit).
According to information provided by the North Carolina State Bureau of Investigations, the living units were double-occupancy rooms. These rooms did not have bathrooms or cooking facilities. The room of fire origin had two wood-frame chairs with vinyl-covered foam pads for the seat and back. The two beds in the room were typical residential beds with metal frames, combustible head and foot boards, box springs, and mattresses. The mattresses were a coil-spring type with cotton fill material and, possibly, a small amount of foam padding materials. A representative of the North Carolina Division of Facility Services reported that the mattresses were fire retardant and complied with the requirements of Chapter 31 in the NFPA Life Safety Code. Blankets and sheets were a blend of cotton and synthetic fibers. The room of fire origin also contained a wooden night stand, a small television, a small wooden table, and one wheelchair.

Each occupant had a separate closet for hanging clothes. The closets were recessed into the room’s wood frame, gypsum wallboard covered walls. The doors for the closets were made of wood.

**Fire Protection Features**

The facility was equipped with a building-wide system of smoke and heat detectors. The ceiling-mounted, system smoke detectors were installed in the corridors and had an approximate spacing of 30 feet between detectors. One of the system smoke detectors was located approximately 6 ft (1.8 m) from the door to the room of fire origin. Heat detectors were installed in residents’ rooms. In addition, manual pull stations were provided near exit doors and other locations in the building. All smoke detectors, heat detectors, and manual pull stations were connected to a central fire alarm system that initiated a building-wide fire alarm and released magnetic door holders for the cross-corridor fire door.

The cross-corridor doors leading to the women’s wing and protecting the opening in the fire wall had a stave core (wood block interior) and were listed for a 1 1/2-hour fire-resistance rating. These doors were held open by magnetic door holders. The cross-corridor doors for the men’s wing also had stave cores and were held open by magnetic door holders, but these doors were listed for only a 20-minute fire-resistance rating. The doors separating the resident rooms and corridor were 1 3/4-inch (45-mm) thick, stave-core doors. These doors were not labeled and were not equipped with self-closing devices.

Other fire protection features included an interlock that would shut down the building’s heating, ventilation, and air conditioning (HVAC) system, a HVAC system manual shutdown control located at the nurses’ station, fire dampers protecting HVAC duct ceiling penetrations¹, emergency lighting, and 10-pound (4.5 kilograms) ABC fire extinguishers located throughout the building.

¹ Fire dampers were designed specifically for ceiling installation.
Staff and Resident Information

Three staff members were on-duty at the time of the fire. No specific information was available regarding the age, professional training, and professional certifications of these staff members. A local social services official stated that staff associated with domiciliary care facilities are only required by state laws to have a high school diploma or a GED certification. Staff need not be licensed or registered health care professionals. The social services official also stated that the Laurinburg facility had one licensed nurse who worked only the day shift. She monitored the conditions of the residents and the care that other staff were providing.

The North Carolina Department of Human Services required that the facility have a written fire safety plan approved by the local fire department. In addition, the facility is required to have 12 rehearsals of the plan each year and to maintain records regarding those rehearsals. State officials reported that the facility had a written fire evacuation plan, diagrams were posted at locations in the facility, fire safety was discussed in orientation training for new staff, and 12 rehearsals were held each year. A representative of the North Carolina Division of Facility Services stated that records at the facility indicated that all the required drills had been performed. The fire department reported that the last fire inspection was in January 1996 and the last fire drill/fire extinguisher training class occurred in February 1996.

Neither the state nor local officials could provide specific information about the fire safety training for staff and residents at this facility. Similarly, state and local officials could not provide information regarding the residents’ abilities to respond to an emergency or their performance in the rehearsals.

Weather Conditions

On the night of the fire, Laurinburg, North Carolina was experiencing normal March weather conditions. The temperature at the time of the fire was 50°F (10°C). The night was dry and there was no noticable wind.
III. THE FIRE

Fire Discovery and Occupant Response

Shortly after 10:00 p.m. on Sunday, March 17, 1996, the two residents of Room 28 were in bed. One resident observed flames coming from under his roommate’s bed. The resident who discovered the fire woke his sleeping roommate. The resident who discovered the fire then got dressed, left the room, and ran to the center core area. He told staff of the fire and left the building. The building fire alarm system operated at about this time. State investigators believed that the smoke detector in the corridor operated first and initiated the building-wide alarm system.

When facility’s three staff members heard the operating fire alarm system and the resident’s report of a fire, one staff member called the fire department and the other two began closing doors to resident rooms in the non-fire areas. The staff members also met residents who were able to leave the compartment of fire origin and brought these individuals to safe areas. By the time staff members attempted to rescue the residents still in the compartment of fire origin, the smoke condition had become so severe that they could not enter that area.

The second resident of Room 28 normally used a wheelchair but could walk slowly without it. This individual attempted to leave by walking toward the center of the building. However, he was overcome by smoke before he reached the cross-corridor doors and died in the corridor.

A total of nine residents in the compartment of fire origin responded to the operating alarms and were able to safely evacuate. Eight of these residents used the corridor to go to the building’s center area, and one resident escaped through the window in his room. For reasons that were not determined, the last seven residents on the wing were unable to escape.

The fire consumed most of the combustible furnishings and other contents of the room of fire origin. The fire also caused the exterior window to break and ignited the combustible soffit above that window. The fire breached the soffit, entered the combustible attic space, and spread into the attic.

Fire Department Notification and Response

The Scotland County EMS dispatch center was the public service answering point (PSAP) servicing the City of Laurinburg. The PSAP received the call from a woman who reported that there was smoke in the building. The PSAP operator told the woman that he would transfer the call to the fire department but the caller hung up the phone. Before the call was disconnected, the PSAP operator heard operating alarms in the background. Since Scotland County has an enhanced 911 system, the PSAP operator was able to identify the location from which the original call came.
The PSAP operator called the Laurinburg Volunteer Fire Department dispatcher and reported the fire at 10:04 p.m. The PSAP operator called the facility and told them that fire department and EMS personnel were responding. After this conversation, the PSAP operator called the Laurinburg Volunteer Fire Department a second time and confirmed that there was a fire at the facility.

A fire department lieutenant responded directly from his home and was the first to arrive on the scene. There was no visible sign of fire on the front exterior (west side) of the building so the officer began to walk around the building to observe conditions. He was met by a staff person who told the officer that there were three people still in the fire area. The officer went to an exit door on the north side of the building, but was unable to open the door because it was locked against entry. He continued around the building and found the fire venting out a window. The officer went back to his vehicle to put on his protective gear.

During these activities, the first engine arrived (approximately six minutes after being dispatched) and the crew pulled a preconnected 1 1/2 - inch (38-mm) hose and brought it to the back of the building. The fire fighters extinguished the fire on the exterior of the building and then discharged water into the room quickly knocking down the fire. As more fire fighters arrived, one officer was assigned to coordinate the suppression activities and another was assigned to coordinate the search and rescue activities. Other fire personnel assisted staff personnel who were evacuating residents from the building.

County emergency medical service (EMS) personnel arrived while the staff and fire fighters were still evacuating the building. The EMS personnel established a triage area and provided first aid to one victim who was removed from the fire area. This victim was transported to a hospital where he was pronounced dead upon arrival. EMS personnel also transported the evacuated residents to a local hotel where they stayed until the residents could return to the facility. A few residents were transported from the hotel to a nursing home.

**Casualties**

In addition to the resident who died in the corridor and the resident who was pronounced dead at the hospital, six other residents died. None of these victims evacuated, and all were found in their respective rooms (see Figure 2). The doors to all of these rooms were found in the open position.

None of the evacuated residents received injuries caused by the fire or during the course of the evacuation.

**Fire Damage**

The fire heavily damaged Room 28, the room of fire origin, and caused some damage to corridor walls and the ceiling in proximity to the fire room. The fire also

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5 This door was not locked to prevent exiting.
broke the fire room's exterior window. The fire that vented out the window damaged the soffit allowing a small amount of fire to enter the attic and to cause a minimum amount of damage in the attic area.

Copious smoke from the fire room spread into the corridor and into several other rooms on the wing of fire origin because the doors to those rooms were also in the open position. Automatic-closing, cross-corridor doors in both wings operated and contained the vast majority of the smoke to the compartment of fire origin. Though, some smoke did spread into the building's center area. This smoke spread was the result of normal leakage through the small cracks around the meeting edges of the closed doors, and the movement of smoke through doors being opened during evacuation and suppression operations.
IV. Analysis

Fire Cause and Growth

A fire investigator from the North Carolina State Bureau of Investigations determined that the fire was most probably caused by sparks from a faulty electrical receptacle; those sparks ignited the coverings on the bed that was placed next to the receptacle. Over time, the fire spread from this bed to other combustible materials in the room. The state investigator reported that almost all of the combustible materials in the room had been consumed by the fire. The contents of Room 28 were the primary fuels for this fire.

At the time that the fire fighters arrived, the fire that was venting out the window had burned through the roof's soffit and was beginning to spread into the combustible concealed space between the ceiling and the roof. Fire fighters quickly extinguished the fire spreading into the concealed space. This action prevented the fire from involving the lightweight wood trusses which would have introduced additional fuel to the fire and increased the potential for more extensive damage to the building.


Several fire protection provisions in this building operated as designed. For example, smoke from the fire activated a smoke detector in the corridor which, in turn, initiated a building-wide alarm. The alarm sounded at about the time a resident was reporting the fire to staff. Automatic-closing, cross-corridor fire doors closed upon alarm operation and kept the majority of the smoke in the wing of fire origin. The fire room’s walls and ceiling which were constructed of 5/8-inch (15.9 mm) Type-X gypsum wallboard maintained their integrity and prevented the spread of fire through these assemblies.

The benefit provided by walls maintaining their integrity was compromised, however, by the lack of a self-closing device on resident room doors. The door to the room of fire origin and doors to other resident rooms in the fire wing were in the open position. Smoke generated in the fire room filled the corridor and spread to other resident rooms.

Code Analysis

The 1994 edition of the NFPA 101, Life Safety Code, and the 1992 edition of NFPA 1, Fire Prevention Code, were used as the basis for the comparison of the Laurinburg board and care facility with current NFPA codes. It was recognized, however, that these codes were not part of the legal requirements for this facility. The following discussion is not intended to be a complete description of all parts of the code that could be applied to this facility. The discussion does, however, highlight Life Safety Code and Fire Prevention Code requirements that have particular relevance to this fire. Section VII contains the full text of all code sections cited in this section.
The Laurinburg facility provided personal care and only limited medical care for its residents. Based upon this information, it would be considered an "existing large board and care facility" according to the 1994, *Life Safety Code*, or the purposes of this report, and the following requirements of Chapter 23 apply to the Laurinburg facility.

**Requirements Based on Evacuation Capability**

Detailed information regarding the mental and physical abilities of residents was not available so their actual evacuation capability could not be definitively determined. At the same time, no information suggested that the residents had any physical or mental conditions that grossly diminished their ability to evacuate.

Assuming that the residents were mobile, all residents were most likely able to travel to centralized dining facilities without continuous staff assistance. Additionally, there was continuous staffing whenever residents were in the facility. Both of these conditions satisfied the conditions discussed in appendix section 101:A-23-1.3, so the residents could be classified as having a "slow" evacuation capability.

**Minimum Construction Requirements.**

Paragraph 101:23-3.1.3.3 permits a one-story structure to be of fully sheathed construction. The *Life Safety Code* defines "fully sheathed" as interior surfaces being covered with lath and plaster, or materials providing a 15-minute thermal barrier (see 23-3.1.3.1). Interior walls and ceilings of this facility were covered with 5/8-inch (15.9-mm) Type-X gypsum wallboard that would have provided, at least, a 15-minute thermal barrier. This facility satisfied the minimum construction requirements of the *Life Safety Code*. Since the walls and ceiling in this building maintained its integrity and did not permit fire spread, the events in this fire corroborated the benefit of compartmentalization that fully-sheathed construction can provide.

**Automatic Sprinkler Protection**

The *Life Safety Code* does not require sprinklers in existing large board and care facilities. However, automatic sprinklers may be required depending on the type of construction and the total height of the facility used for this type of occupancy. For example, automatic sprinklers would not have been required in this facility because it was an existing fully sheathed, single-story building.

Though not required by the *Life Safety Code*, an automatic sprinkler system in the Laurinburg facility could have altered the results of this incident by controlling and possibly extinguishing the fire early in the sequence of events. An operating sprinkler system would have reduced the production of smoke by keeping the fire small or extinguishing the fire providing the staff and residents with more time to respond.
Exits

The wing on which the fire occurred had an exit leading directly to the building's exterior at the one end of its central corridor. Smoke barrier doors were located at the opposite end of the corridor, and residents using these doors had access to several exits which lead directly to the exterior of the building. As a result every resident on the wing of fire origin had access to, at least, two exits, satisfying the requirements of Paragraph 101:23-3.2.4.

Means of Egress Arrangement

The Life Safety Code limits any common path of travel to 110 feet (33.5-m) (Paragraph 101:23-3.2.5.2) and dead-end corridors to 50 feet (15-m). The building’s wings were only 130 feet (40 m) long. As a result, the common path travel from within any sleeping room to an exit did not exceed the permitted 110 ft (33.5 m) limit. In addition, the wing on which the fire occurred had no dead ends because there were exits at both ends of the wing.

Travel Distance

The sleeping rooms were approximately 15 feet (4.6 m) deep so travel distance within a sleeping room clearly did not exceed the 75-foot (22.9-m) maximum as stipulated in Paragraph 101:23-3.2.6.1. Since the wings containing the sleeping rooms were 130 feet (40-m) long and exits were at each end, travel distance from the corridor door of the sleeping rooms did not exceed the maximum travel distance of 100 feet (30-m) as permitted by Paragraph 101:23-3.2.6.2.

Fire Alarm

The building was equipped with a fire alarm system connected to the corridor smoke detectors, room heat detectors, and the manual pull stations. This system met the requirement of Paragraph 101:23-3.3.4.1. One of the residents reported the fire to staff so the staff were aware of the fire moments before the building’s fire alarm system operated. Still, the operating alarm system alerted residents providing them with time to respond before conditions became untenable.

Smoke Detection

Paragraph 101:23-3.3.4.5 requires that each sleeping room be provided with an approved, single-station smoke detector powered from the building electrical system. However, Exception No. 2 to this requirement states that facilities having an existing corridor smoke detection system connected to the building fire alarm system are exempt from this requirement. Since this facility had a corridor smoke detection system connected to the building’s fire alarm system, the facility was consistent with the exception and would not have had to have smoke detectors in the sleeping rooms.
A heat detector was installed in every sleeping room at the facility. The *Life Safety Code* does not recognize the use of heat detectors as early warning devices in each sleeping rooms.

Paragraph 101:23-3.3.4.6 requires that all living areas and corridors be provided with smoke detectors arranged to initiate an alarm that is audible in all sleeping areas. The system smoke detectors in the facility’s corridors exceeded *Life Safety Code* requirement.

**Doors**

The 1994 edition of the *Life Safety Code* requires that all doors in walls separating sleeping rooms from corridors be automatic closing (Paragraph 23-3.3.6.6) in an existing large board and care facility. Since the solid-core doors between the sleeping rooms and the corridors were not equipped with self-closing devices, the Laurinburg facility did not meet this *Life Safety Code* requirement. This was a significant deviation from *Life Safety Code* requirements because the open doors allowed smoke to fill the resident rooms on the wing of fire origin, and smoke inhalation was determined to be the cause of death for all victims.

NFPA has documented many other board and care facility fires during which open doors have contributed to the loss of life. Those incidents include the February 8, 1996, fire in Shelby County - four fatalities, Tennessee; the March 21, 1995, fire in Mississauga, Ontario - eight fatalities; the December 1, 1994, fire in Broward County - six fatalities, Florida; and the June 2, 1992, fire in Detroit, Michigan - ten fatalities. (See section VI. Abstracts.)

**Emergency Plan/Resident Training**

Though it was reported that the facility had a fire safety plan and that fire exit drills were being performed, specific information and records regarding the plan and fire safety training were not available during this investigation. Similarly, no information was available regarding training that the residents received. As a result, it was not possible to determine if the Laurinburg facility’s emergency plans, staff training, and resident training was consistent with *Life Safety Code* requirements.

Staff and residents were not able to respond in a manner sufficient to protect eight residents. Often times ineffective responses during fire emergencies are a result of inadequate fire safety training of staff and residents. The lack of an effective relationship between training and response can not be ruled out at the Laurinburg facility based on the available information.
V. DISCUSSION

The *Life Safety Code* developed requirements with the understanding that residents in a board and care facility will be able to take actions during fire emergencies. This fire safety approach makes staff and residents’ response an integral part of the building’s required fire safety provisions. To ensure that staff and residents can and will take appropriate actions, the *Life Safety Code* contains requirements for an emergency plan, resident training, and fire exit drills.

In the 1994 *Life Safety Code* and in previous editions of the code, the requirements for staff and resident training for this occupancy were contained in Chapter 31, Operating Features. The separation of training and other requirements from the occupancy chapters provided an opportunity for those requirements to be missed or overlooked by users of this document. The NFPA Technical Correlating Committee on Safety to Life recommended that many of the operating feature requirements for the specific occupancies be relocated from Chapter 31 to the respective occupancy chapters. This recommendation was implemented by the Committee on Safety to Life and will be incorporated into the 1997 edition of the *Life Safety Code*. This change to the *Life Safety Code* will help fire department officials, representatives of local and state agencies, and property owners to understand that adequate life safety in board and care facilities does not depend solely on building features and fire protection equipment. Adequate life safety also depends on the training and abilities of staff and residents. Only through a systematic melding and implementation of building design, construction, maintenance and fire protection features with the resident’s and staff’s ability to respond to emergencies can an adequate level of life safety in board and care facilities.

Fire code enforcers, owners and operators of board and care facilities, and anyone responsible for the safety of residents in such facilities must understand that resident and staff abilities have a direct relationship with the fire protection and life safety provisions in a board and care facility. Therefore, the capabilities of residents must be evaluated and documented in order to ensure that the fire safety provisions associated with the facility are appropriate for the type of resident. Furthermore, the effect that changes in resident evacuation capability will have on the level of life safety provided must be understood so that the appropriate modifications to the overall fire safety plan for the facility can be made.

The Laurinburg incident reveals the importance of residents and staff being able to properly respond to a fire emergency. This facility was provided with most of the fire protection provisions currently required by NFPA codes, and the fire protection equipment that was provided performed in accordance to their design. Still, 8 people died as a result of this one-room fire.

For reasons that could not be established, the victims in the facility failed to react or did not react effectively to operating alarms and to other cues during the early moments of the fire. Staff members reported that their responses were affected by deteriorating conditions. The residents who did not self-evacuate or were not
rescued remained in their rooms. The doors to the room of fire origin and to other rooms in the fire area remained open compromising the last life safety feature that could have delayed the onset of untenable conditions in the exposed rooms. Additionally, the building was not equipped with automatic sprinklers that could have controlled or extinguished the fire. Based on these findings, the following factors significantly contributed to the loss of life in the Laurinburg board and care facility:

- Staff members inability to enter the fire area due to smoke and heat
- Occupants inability to evacuate before untenable conditions developed in the fire area
- Room doors that remained open due to the lack of door self-closing devices
- Lack of automatic sprinklers

The factors cited at the Laurinburg facility are not new and have contributed to other multiple-death fires in board and care facilities. Over the years, the NFPA documented that buildings being used as board and care facilities and the occupants of those facilities were presenting unique fire safety challenges. In 1984, the NFPA prepared a memo discussing fire safety in board and care facilities and sent that memo to state fire marshals, state training directors, and provincial fire marshals. The NFPA memo contained the following description of documented board and care facility problems:

An analysis of recent fatal boarding home fires reveals the lack of basic fire protection provisions in these (board and care) buildings, including: inadequate means of egress, combustible interior finishes, unenclosed stairways, lack of automatic detection or sprinkler systems, or lack of emergency training for staff and residents. Many of the facilities were either licensed for an occupancy other than a boarding home (such as a hotel) or were unlicensed, underground “boarding homes.”

The recognition of these problems brought about the development of a new Life Safety Code occupancy chapter specifically for board and care facilities. The new chapter was added to the Life Safety Code in 1985.

The Life Safety Code requirements include evacuation capability as a basic and underlying factor affecting life safety in board and care facilities. The Life Safety Code also considers that evacuation capability is a function of both the ability of residents, the ability of residents to help each other, and the assistance that staff can provide. As a result of the Life Safety Code’s emphasis on resident and staff abilities, it is important for fire department officials, representatives of local and state agencies, and property owners to understand that adequate life safety in board and care facilities does not depend solely on building features and fire protection equipment. In large board and care facilities where residents cannot perform effectively during fire emergencies and their evacuation capability is classified as “impractical”, the Life Safety Code requires that health care requirements be applied.
Because of this relationship between residents’ abilities and fire protection features, all who are responsible for the well being of board and care facility residents must work together and share information and expertise. Fire and building officials understand local codes and fire protection philosophies. Both state officials and property owners may be able to provide information regarding the residents’ physical and mental capabilities. Consideration of this information and strict enforcement of modern fire protection standards such as the *Life Safety Code* can ensure that residents in the board and care facilities are provided with the minimum level of life safety as described by local codes and regulations.
VI. ABSTRACTS

Shelby County, Tennessee
February 8, 1996

At approximately 11:45 p.m. on February 8, 1996, a fire occurred in a Shelby County board and care facility that was housing elderly residents. The fire was caused most likely by improperly disposed smoking materials. Smoke from the apartment of fire origin spread to other apartments through open doors. Four residents died as a result of this fire.

The 20-year-old facility had six wings and a central core. All areas were of wood-frame construction, and wall and ceilings assemblies were covered with gypsum wallboard. Four of the wings contained apartments for elderly residents and two wings contained apartments for elderly residents with special needs. These two wings will be classified as board and care occupancies. All areas in the building had many fire protection provisions including smoke detectors, fire alarms, fire doors, and door self-closing devices. In addition, they had staff that were reportedly trained with regard to fire safety.

The building construction and most fire protection equipment that was provided performed well. In many areas, gypsum wallboard walls and ceilings restricted the spread of combustion products. Smoke detection and fire alarm systems operated and cross-corridor doors equipped with self-closing devices remained closed, again, restricting the spread of combustion products to the wing of fire origin.

However, self-closing devices for many apartments, including the apartment of fire origin, had been removed or deactivated allowing doors to remain open. The open doors permitted smoke to spread from the fire apartment, fill the corridor with smoke and spread into several other apartments. Thus, the open doors compromised much of the benefit afforded by the gypsum wallboard wall and ceiling assemblies.

Staff rescued the resident in the apartment of fire origin, but he died several days later from burn injuries. Two other residents suffered smoke-related injuries and died in their respective apartments. Twenty-seven days after the fire, a fourth resident also died of a smoke-related injury.

Based on the NFPA's investigation and analysis of this fire, the following factors were considered as having contributed to the loss of life in this incident:

- Improperly disposed smoking materials
- Lack of automatic sprinkler protection
- Ineffective response of some staff members
- Failure of occupants to respond effectively to operating fire alarms
- Room doors that remained open due to the deactivation of door self-closing devices.
Mississauga, Ontario  
March 21, 1995

On Tuesday, March 21, 1995, at approximately 7:40 p.m., a fire occurred in a one story board and care facility in Mississauga, Ontario. The fire resulted in eight fatalities and 12 injuries. Three people died at the time of the fire and one died five days later. The remaining four fatalities, determined to be related to the fire, occurred over a span of eight months.

The 70 occupants ranged in age from 60 to 101 years old. Many of the occupants had some degree of mental or physical impairment that could have impeded their ability for self rescue. Of the 70 occupants, 20 people used wheelchairs, 17 used canes or walkers, and 15 suffered from varying degrees of mental impairment.

The building was a one story structure that was partially sprinklered in the basement area only. The residents’ rooms were equipped with heat detectors, as were the hallways, which were connected to an alarm system. The alarm system was connected to an alarm-monitoring company.

The fire was determined by the Ontario Fire Marshal’s office to have been caused by smoking materials which ignited clothing in a closet in one of the rooms. The room was occupied by two people at the time of the fire, which occurred at 7:39 p.m. One of the occupants of the room called the fire department via 911 and reported the fire. She then was able to escape from the room via an exterior window. The other occupant, who was confined to a wheelchair, was not able to escape.

Six of the other fatalities were found in their rooms. One other victim, who was confined to a wheelchair, was found in the hallway, having become overcome by smoke while attempting to escape.

Smoke was able to spread to the other rooms through the void space above the rooms. The corridor walls and the walls between the individual units did extend above the ceiling to the underside of the roof diaphragm. However, smoke was able to penetrate into this void space via unprotected openings in the ceiling in the room of origin and then into the other areas through unsealed penetrations in the various walls.

In addition to the void space, smoke also penetrated into the rooms through the corridor doors to the individual units. In several of the rooms, the occupants died from smoke inhalation even though the door to their rooms were closed.

The following are considered significant factors that contributed to the outcome of this incident:

- The lack of sprinkler protection (except for the basement)
- The failure to close the door to the room of fire origin following detection of the fire
• The combustible room contents
• The lack of staff training and fire drills.

This fire is the second to have occurred in a Mississauga facility housing elderly people and with a serious loss of life. In 1980, another fire in a nursing home killed 25 occupants. There are a number of common factors between the two fires, which include lack of an automatic sprinkler system and failure to close the door to the room of origin.
Broward County, Florida
December 1, 1994

At approximately 3:45 a.m. on Thursday, December 1, 1994, an accidental fire occurred in a board and care facility in Broward County, Florida, which resulted in the deaths of six residents.

The building was a one story, single-family dwelling that had been modified for use as a board and care facility. The modifications included the construction of several bedrooms, the installation of a building-wide fire alarm system and single-station smoke detectors, and the installation of at least one exit door in every bedroom. These doors provided direct access to the building's exterior. Local fire officials were unable to secure detailed information regarding the capabilities of occupants; as a result, fire officials considered the occupants to have "slow" evacuation capabilities.

The fire, which started in a resident's bedroom, caused heavy damage in the room of origin and in an adjacent dining area. Smoke filled all the rooms throughout the building. A staff person and eight residents were able to self-evacuate, six residents had to be rescued, and four residents died in the building. Two of the rescued residents later died, one before being transported to the hospital and the other in the hospital.

The 1994 Life Safety Code anticipates various levels of resident performance and requires more stringent fire protection equipment as the abilities of the residents decrease. The facility involved in this fire had many code-required fire protection provisions for residents with moderate abilities. Therefore, the ability (or inability) of residents to perform during the actual fire emergency was a major contributing factor affecting the survival of residents.

The effect that staff and resident capabilities had on the outcome of this incident is an important lesson for fire department officials, representatives of local and state agencies, and property owners who have responsibility for life safety in board and care facilities. They must understand that adequate life safety does not depend solely on building features and fire protection equipment. The abilities of both staff and residents are integral factors that must be considered while striving for even a minimal level of life safety in a board and care facility.
Detroit, Michigan
June 2, 1992

At approximately 2:15 a.m., on Tuesday, June 2, 1992, a fire occurred at an adult foster care facility in Detroit, Michigan, and it resulted in the deaths of ten occupants. The building involved in this fire was originally a three story, two-family dwelling. However, in the early 1970s it was renovated for use as an adult foster care facility. At the time of the fire, sixteen predominantly elderly individuals lived in the facility, and some of these residents were mentally or physically handicapped. In addition to the residents, one night supervisor was in the facility.

Local investigators believe that the probable cause of the fire was smoking materials discarded in a wastebasket in a first floor kitchen. Once ignited, the fire spread to the combustible interior finish materials in that room, and then the growing fire ignited combustible finish materials in other first floor rooms. Open stairways and other unprotected vertical openings allowed the combustion products to spread rapidly throughout the building. Untenable conditions developed in the building before most of the residents could evacuate safely.

The factors that significantly contributed to the loss of life were:

- The lack of an automatic fire sprinkler system
- The presence of combustible interior finish throughout the structure
- The lack of fire safety and evacuation training for staff and residents
- The presence of open stairways and other unprotected vertical openings
- The lack of a second exit for the second floor.
VII. ADDITIONAL INFORMATION

Since 1972, NFPA has prepared 23 reports or journal articles as a result of NFPA investigations of other board and care facility fires. The following is a list of those reports and articles:

**NFPA Fire Investigation Reports**
- Shelby County, Tennessee, February 8, 1996.
- Cincinnati, Ohio, December 12, 1983.
- Pleasant Beach, New Jersey, February 3, 1981.

**NFPA Journal & Fire Journal Articles**
- Klem, Thomas J., “Board and Care Fire Claims Four,” *Fire Command*, December 1990.**
- “Fires in Two Boarding Facilities Kill 34 Residents,” *Fire Journal*, July/August 1982.**

** An NFPA Fire Investigation Report is also available.
• Bell, James R., “Fire in Adult Foster Care Home Kills Five Residents,” *Fire Journal*, September/October 1981.**


• Bell, James R., “Fourteen Die in Ohio Boarding Home Fire,” *Fire Journal*, July/August 1980.**


VIII. NFPA CODE SECTIONS

The following is the complete text of NFPA 1, Fire Prevention Code, 1992 edition, and NFPA 101, Life Safety Code, 1994 edition, applicable sections and paragraphs that are relevant to this incident:

NFPA 1, Fire Prevention Code

Chapter 13, Residential Board And Care Occupancies

1:13-1 General Requirements.

1:13-1.1 Application. New and existing residential board and care occupancies shall comply with this chapter and the referenced edition of NFPA 101.

1:13-2 Operating Features.

The administration of every residential board and care facility shall have in effect, and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire and for their remaining in place, for their evacuation to areas of refuge and from the building when necessary. The plan shall include special staff actions including fire protection procedures needed to ensure the safety of any resident and shall be amended or revised upon admission to the home of any resident with unusual needs. All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan. Such instruction shall be reviewed by the staff at least every two months. A copy of the plan shall be readily available at all times within the facility. (101: 31-7.1)

1:13-2.2 Resident Training.
All residents participating in the emergency plan shall be trained in the proper actions to be taken in the event of fire. This training shall include actions to be taken if the primary escape route is blocked. If the resident is given rehabilitation or habilitation training, training in fire prevention and actions to be taken in the event of a fire shall be a part of the rehabilitation training program. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk. (101: 31-7.2)

1:13-2.3 Fire Exit Drills.
Fire exit drills shall be conducted at least twelve times per year, four times a year on each shift. The drills may be announced in advance to the residents. The drill shall involve the actual evacuation of all residents to an assembly point as specified in the emergency plan and shall provide residents with experience in exiting through all exits required by this Code. Exits not used in any fire drill shall not be credited in meeting the requirements of this Code for board and care homes.
Exception No. 1: Actual exiting from windows shall not be required to meet the requirements of this section; opening the window and signaling for help shall be an acceptable alternative.

Exception No. 2: If the board and care home has an evacuation capability rating of "Impractical," those residents who cannot meaningfully assist in their own evacuation or who have special health problems need not actively participate in the drill. Section 31-4 of NFPA 101 applies in such instances. (101: 31-7.3)

1:13-2.4 Smoking. Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations. (101: 31-7.4.1)


Chapter 1, Administration

101:1-2 Purpose.

101:1-2.1 The purpose of this Code is to provide minimum requirements, with due regard to function, for the design, operation, and maintenance of buildings and structures for safety to life from fire and similar emergencies.

101:1-2.2 As related to fire safety, the objective of this Code is to protect the occupants not intimate with the initial fire development from loss of life and to improve the survivability of those who are intimate with the fire development. The protection methods assume a single fire source.

101:1-2.3 The level of safety is achieved by the combination of prevention, protection, egress, and other features enumerated in the individual occupancy chapters with due regard to the capabilities and reliability of the features involved.

101:1-2.4 The Code endeavors to avoid requirements that might involve unreasonable hardships or unnecessary inconvenience or interference with the normal use and occupancy of a building, but provides minimum requirements for fire safety consistent with the public interest.

101:1-3 Scope.

101:1-3.1 This Code addresses life safety from fire and similar emergencies.

101:1-3.2 The Code addresses those construction, protection, and occupancy features necessary to minimize danger to life from fire, smoke, fumes, or panic.

101:1-3.3 The Code identifies the minimum criteria for the design of egress facilities so as to permit prompt escape of occupants from buildings or, where desirable, into safe areas within buildings.
101:1-3.4 The Code recognizes that life safety is more than a matter of egress and, accordingly, deals with other considerations that are essential to life safety.

101:1-3.5 Where in fixed locations and occupied as buildings, vehicles, vessels, or other mobile structures shall be treated as buildings.

101:1-3.6 The Code does not attempt to address those general fire prevention or building construction features that are normally a function of fire prevention and building codes.

101:1-3.7 The prevention of accidental personal injuries during the course of normal occupancy of buildings, personal injuries incurred by an individual’s own negligence, and the preservation of property from loss by fire have not been considered as the basis for any of the provisions of this Code.

Chapter 23

Construction Requirements

101:23-3.1.3.3 The minimum construction requirement (see 6-2.1), based on the highest story normally used by board and care residents, shall be:

(a) **One- or Two-Story Facilities.** Any construction type that meets the requirements for 1-hour or greater fire resistance rating, or is Type IV(2HH), or is fully sheathed, or is protected throughout by an approved automatic sprinkler system in accordance with 23-3.3.5.

*Exception to (a): One-story prompt evacuation capability facilities having 30 or fewer residents shall be permitted to be of any construction.*

(b) **Three- to Six-Story Facilities.** Type I, Type II, or Type III construction that meets the requirements for 1-hour or greater fire resistance rating, Type IV construction that is protected throughout by an approved, automatic sprinkler system in accordance with 23-3.3.5, or any other type of construction that is both sheathed, or is protected throughout by an approved automatic sprinkler system in accordance with 23-3.3.5, other than Type V (000).

*Exception to (b): Three- to four-story facilities of Type V (000) construction that are both fully sheathed, or is protected throughout by an approved automatic sprinkler system in accordance with 23-3.3.5.*

Exits

101:23-3.2.4 **Number of Exits.** Not fewer than two exits shall be accessible from every story, including floors below the level of discharge and occupied for public purposes.
101:23-3.2.5 Arrangement of Means of Egress

101:23-3.2.5.1 Access to all required exits shall be in accordance with Section 5-5.

101:23-3.2.5.2 No common path of travel shall exceed 110 ft (33.5-m).

Exception: In buildings protected throughout by automatic sprinkler systems in accordance with 23-3.35, common path of travel shall not exceed 160 ft (48.8-m).

101:23-3.2.5.3 No dead-end corridor shall exceed 50 ft (15-m).

Travel Distance

101:23-3.2.6.1 Travel distance from the door within a room, suite, or living unit to a corridor shall not exceed 75 ft (23-m).

Exception: Travel distance shall not exceed 125 ft (48-m) in buildings protected throughout by an approved, automatic sprinkler system in accordance with 23-3.3.5.

101:23-3.2.6.2 Travel distance, measured in accordance with Section 5-6, from the corridor door of any room to the nearest exit shall not exceed 100 ft (30-m).

Exception No. 1: Travel distance to exits shall not exceed 200 ft (60-m) for exterior ways of exit access arranged in accordance with 5-5.3.

Exception No. 2: Travel distance to exits shall not exceed 200 ft (60-m) if the exit access and any portion of the building that is tributary to the exit access are protected throughout by approved, automatic sprinkler systems. In addition, the portion of the building in which the 200-ft (60-m) travel distance is permitted shall be separated from the remainder of the building by construction having a fire resistance rating of not less than 1 hour for buildings not more than three stories in height and 2 hours for buildings more than three stories in height.

Emergency Lighting

101:23-3.2.9 Emergency lighting in accordance with Section 5-9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each sleeping room has direct exit to the outside of the building at ground level, no emergency lighting shall be required.

101:23-3.3.4 Detection, Alarm, and Communication Systems

101:23-3.3.4.1 General. A fire alarm system in accordance with Section 7-7 shall be provided.
Exception: Where each sleeping room has exterior exit access in accordance with 5-5.3 and the building is not more than three stories in height.

101:23-3.3.4.5 Smoke Detectors. Each sleeping room shall be provided with an approved, single-station smoke detector in accordance with 7-6.2.9 powered from the building electrical system.

Exception No. 1: Existing battery-powered detectors, rather than building electrical service-powered detectors, shall be accepted where, in the opinion of the authority having jurisdiction, the facility has demonstrated testing, maintenance, and battery replacement programs that ensure the reliability of power to the detectors.

Exception No. 2: Facilities having an existing corridor smoke detection system in accordance with Section 7-6 connected to the building fire alarm system.

101:23-3.3.4.6 All living areas as defined in Section 3-2 and corridors shall be provided with smoke detectors in accordance with NFPA 72, National Fire Alarm Code, arranged to initiate an alarm that is audible in all sleeping areas.

Exception No. 1: Detectors shall not be required in common spaces in facilities protected throughout by an approved, automatic sprinkler system in accordance with 23-3.3.5.

Exception No. 2: Unenclosed corridors, passageways, balconies, colonnades, or other arrangements with one or more sides along the long dimension fully or extensively open to the exterior at all times.

Doors

101:23-3.3.6.6 Doors in walls required by 23-3.3.6.1 and 23-3.3.6.2 shall be self-closing or automatic-closing in accordance with 5-2.1.8. Doors in walls separating sleeping rooms from corridors shall be automatic-closing in accordance with 5-2.1.8.

Exception No. 1: Doors to sleeping rooms that have occupant control locks such that access is normally restricted to the occupants or staff personnel shall be permitted to be self-closing.

Exception No. 2: In buildings protected throughout by an approved, automatic sprinkler system installed in accordance with 23-3.3.5, doors, other than doors to hazardous areas, vertical openings, and exit enclosures, shall not be required to be self-closing or automatic-closing.
Chapter 31

Emergency Plan

101:31-7.1 The administration of every residential board and care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for protecting all persons in the event of fire, for keeping persons in place, and for evacuating persons to areas of refuge and from the building when necessary. The plan shall include special staff response, including fire protection procedures needed to ensure the safety of any resident, and shall be amended or revised for use upon admission to the home of any resident with unusual needs. All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan. Such instruction shall be reviewed by the staff at least every two months. A copy of the plan shall be readily available at all times within the facility.

Resident Training.

101:31-7.2 All residents participating in the emergency plan shall be trained in the proper actions to be taken in the event of fire. This training shall include actions to be taken if the primary escape route is blocked. If the resident is given rehabilitation or habitation training, training in fire prevention and actions to be taken in the event of a fire shall be a part of the training program. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk.

Fire Exit Drills.

101:31-7.3 Fire exit drills shall be conducted at least six times per year on a bi-monthly basis with a minimum of two drills conducted during the night when residents are sleeping. The drills shall be permitted to be announced in advance to the residents. The drills shall involve the actual evacuation of all residents to an assembly point as specified in the emergency plan and shall provide residents with experience in egressing through all exits and means of escape required by the Code. Exits and means of escape not used in any fire drill shall not be credited in meeting the requirements of this Code for board and care facilities.
Laurinburg, North Carolina
Eight Fatalities
March 17, 1996

At approximately 10:00 p.m. on Sunday, March 17, 1996, a fire occurred in a single-story board and care facility in Laurinburg, North Carolina. Sparks from a faulty electrical receptacle ignited bedding materials in one of the resident rooms. Even though the fire involved only one room, smoke filled the wing where this room was located and spread to other areas of the building. Eight residents died in this fire.

Both residents in that room escaped from the room, but only one safely evacuated the building. The other was overcome by smoke and died in the corridor. Approximately 18 other residents were on the wing of fire origin. Seven of these residents died in their respective rooms, and the other 11 self-evacuated. The doors to rooms in which residents died were in the open position. Staff, reportedly, were unable to enter the wing of fire origin due to severe conditions. The following factors contributed to the loss of life in this facility:

- Ineffective responses of staff members
- Failure of occupants to effectively respond to operating fire alarms
- Room doors that remained open due to the lack of door self-closing devices
- Lack of automatic sprinklers