

**BED AND BREAKFAST
ALLENSTOWN, NH
JULY 17, 2001**



**FIRE
INVESTIGATIONS**

NATIONAL FIRE PROTECTION ASSOCIATION

1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101 USA
Telephone: 1-617-984-7263 E-mail: investigations@nfpa.org

Bed and Breakfast

Allenstown, NH
July 17, 2001

1 Fatality

Prepared by

Robert F. Duval
Senior Fire Investigator
National Fire Protection Association

ABSTRACT

In the early morning hours of July 17, 2001, a fire broke out in a small inn in Allenstown, NH. This fire would claim the life of the innkeeper who was asleep in an attic bedroom. At the time of the fire, six guests and the innkeeper occupied the inn. The three-alarm fire destroyed the historic structure constructed in 1760.

An automatic fire alarm directed to the local fire department dispatch center notified the Allenstown Fire Department at 1:34 a.m. Upon arrival of the first apparatus at 1:43 a.m. there were no outward signs of a fire in the building. When the officer from the first engine went closer to the building to investigate, he discovered a fire in the rear of the first floor and three occupants on the roof of a portico calling for help. A second alarm was requested as more resources began to arrive. The three occupants on the roof were rescued over ground ladders, as units began searching for other occupants and the seat of the fire.

Two more occupants were found on the second floor and were removed over ladders, as the search continued for the final guest and the innkeeper. The last guest was found near his room on the second floor and was removed via the interior staircase. He collapsed at the front door of the building and had to be resuscitated by paramedics that were standing by.

The fire continued to spread into the second floor and attic of the building despite the efforts of approximately 90 fire fighters from 13 fire departments. Fire fighters were evacuated from the building at 2:56 a.m. due to deteriorating conditions.

The fire was placed under control at 4:25 a.m.

The body of the innkeeper was located at approximately 10:00 a.m. in the attic bedroom of the building.

It was determined that the origin of the fire was in the first floor kitchen area. The cause was determined to be accidental.

Based on the fire investigation and analysis, NFPA has determined that the following significant factors played a role in this incident:

- Single path of escape from attic bedroom
- Lack of functioning fire alarm / smoke detectors
- Unprotected vertical openings

**NFPA
Fire Investigations
Department**
One Batterymarch Park
Quincy, MA 02169
USA

Phone:
617-984-7263

Fax:
617-984-7110

Email:
investigations@nfpa.org

Web site:
www.nfpa.org

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I. INTRODUCTION

NFPA investigated the Allenstown, NH, fire in order to document and analyze significant factors that contributed to the civilian fatality.

The study was conducted by NFPA as part of an ongoing program to investigate technically significant incidents. NFPA's Fire Investigations Department documents and analyzes incident details so that it can report lessons learned and thus prevent future life and property loss.

NFPA became aware of the Allenstown fire the day it occurred. NFPA Senior Fire Investigator Robert Duval traveled to Allenstown to meet with investigators, fire officers, and fire fighters, to view the scene, interview participants, and perform an on-site study of the incident. The information gathered during the on-site activities and subsequent analysis of that information is the basis for this report. Entry to the fire scene was made through the cooperation of the New Hampshire State Fire Marshal's Office and the Allenstown Fire Department.

This report is another of NFPA's studies of fires having particularly important educational or technical interest. It is a project of NFPA's Fire Investigations staff intended as an aid to researchers, safety specialists, and to the codes and standards development activities conducted by NFPA and other organizations. The opinions expressed and conclusions drawn are those of the NFPA staff who prepared this report and do not, therefore, necessarily represent the official position of NFPA or of the NFPA Technical Committees that develop NFPA codes and standards. (See NFPA Regulations Governing Committee Projects at 6-1.1.)

All information and details regarding the fire safety conditions gathered in this report are based on the best available data and observations made during the on-site data collection phase and on any additional information provided during the report development process. It should be remembered that the ability of NFPA Fire Investigations staff to collect all relevant facts and draw definitive conclusions may be limited by a variety of factors, including available time and access. It is not the author's intention to comprehensively document this fire incident for all purposes. The purpose of the report is not to pass judgment on or fix liability for the loss of life and property resulting from the fire. Rather, the report's purpose is to identify factors that may have contributed to the loss of life and property and to provide analysis that may serve to better the understanding of how to prevent these losses in the future.

Current codes and standards were used as criteria for this analysis so that conditions at the scene 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 the construction and operation of the building. NFPA has not analyzed the building in Allenstown regarding its compliance with the local codes and standards in existence when the building was constructed and during its operation.

The cooperation of the Allenstown Fire Department and the New Hampshire State Fire Marshal's Office is greatly appreciated. The writer would also like to extend his appreciation to New Hampshire State Fire Marshal Donald Bliss, Deputy State Fire Marshal William Degnan, and Allenstown Deputy Fire Chief Robert Martin for their assistance during the on-scene portion of the investigation and in preparing this report. The writer would also like to thank Greg Harrington, Senior Fire Protection Engineer in the Building Fire Protection and Life Safety Department at NFPA, for his assistance in preparing this report.

II. BACKGROUND

Occupancy Classification

The building involved in this incident would be classified as a lodging or rooming house (Chapter 26, NFPA 101[®], *Life Safety Code*[®], 2003 edition; Chapter 23, NFPA 5000[™], *Building Construction and Safety Code*[™], 2003 edition, and Chapters 8–10, NFPA 1, *Uniform Fire Code*, 2003 edition).

This facility contained six guest rooms and accommodations for approximately 12 guests. Therefore it was considered a lodging or rooming house and not as an hotel (Chapters 28 and 29, NFPA 101[®], *Life Safety Code*[®]).

Building Details

The facility was a two-story (plus partial, finished attic), colonial style wood-frame building operated as a bed and breakfast facility. (For the purpose of code analysis this building would be considered three stories due to the attic sleeping area.) The building was reportedly constructed in 1760 and was utilized as a residence for many years for a local mill owner and his family before being modified for lodging and dining. According to town records, modifications were made to the structure in 1900, 1950, and 1998 (see Figure 1 and Photo 1).

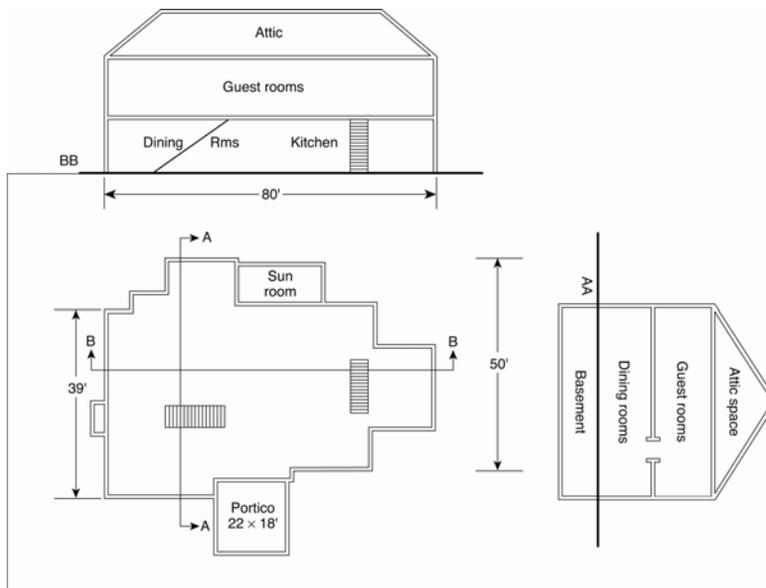


Figure 1-Building Layout and Dimensions

The exterior finish of the building was brick with an interior finish of plaster and wood lath type construction. The building contained approximately 7600 sq ft of finished floor space. The building was Type V (000) according to *NFPA 5000™ Building Construction and Safety Code™*, 2003 edition (NFPA 220, 1999 edition)¹

The first floor of the building contained three interior dining rooms and a large kitchen area. A “sun room” dining area was located adjacent to the kitchen on the southwest side of the building (see Figure 2).

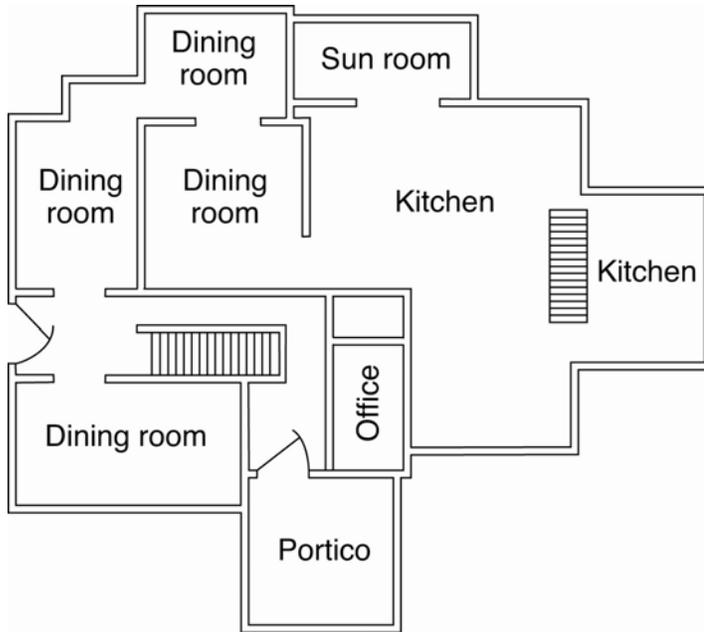


Figure 2 – First Floor Layout.

The second floor contained six guestrooms, and a guest room converted into a partial apartment area, occupied by the owner. Access to the second floor was via two stairwells. A central open stair was located adjacent to the front entrance to the building on the first floor and terminated in the center of the second floor. The other stair was located in the south portion of the building and provided access to the kitchen area from the second floor (see Figure 3/ Photos 2 and 3).

The attic space contained a sleeping area that was accessible only through the owner’s apartment area by a single staircase.

The building also contained a basement space that encompassed approximately 75% of the first floor footprint of the building. The basement was utilized for storage and also contained the fuel oil-fired boiler, and laundry equipment (washer and dryer).

¹ *NFPA 5000™* and *NFPA 220, Standard on Types of Building Construction*, 1999 edition. A Type V (000) structure will have a 0-hour rating for the exterior bearing walls (first digit); a 0-hour rating for the structural frame or columns and girders supporting loads for more than one story (second digit); and a 0-hour rating for the for the floor construction (third digit).



Photo 1 – Bed and Breakfast Showing the Front Entrance from the Southeast Corner. (NFPA)

The building was equipped with a fire alarm system that was connected by an automatic dialer system to the fire department dispatch center in Concord, NH. The alarm system consisted of a series of heat and smoke detectors located throughout all levels of the building (see Figures 4 and 5).

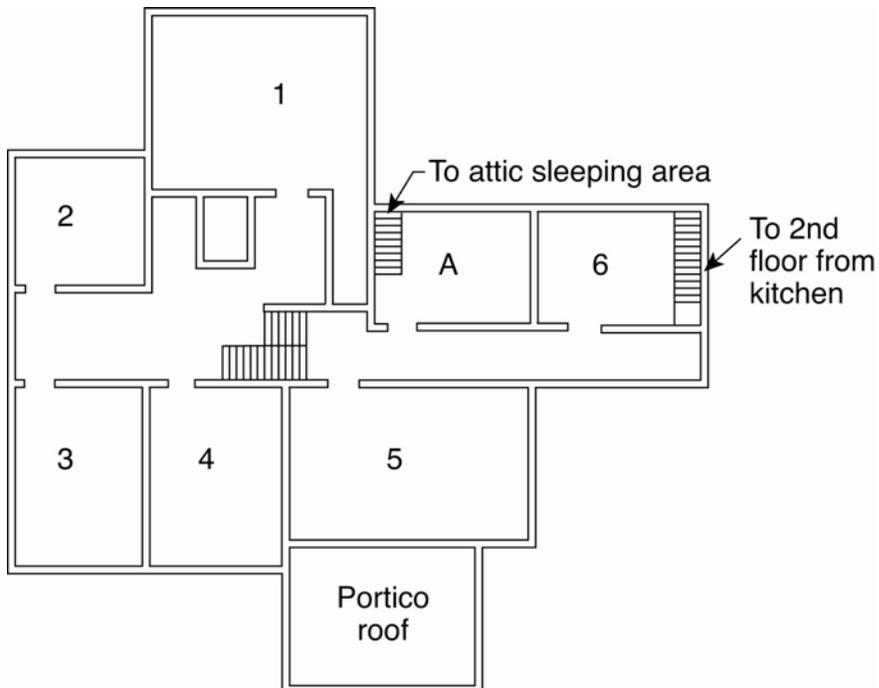


Figure 3 – Guest Room Layout-Second Floor



Photo 2-3 – Front Stairway (left) and Rear/Kitchen Stairway (right). (NFPA)

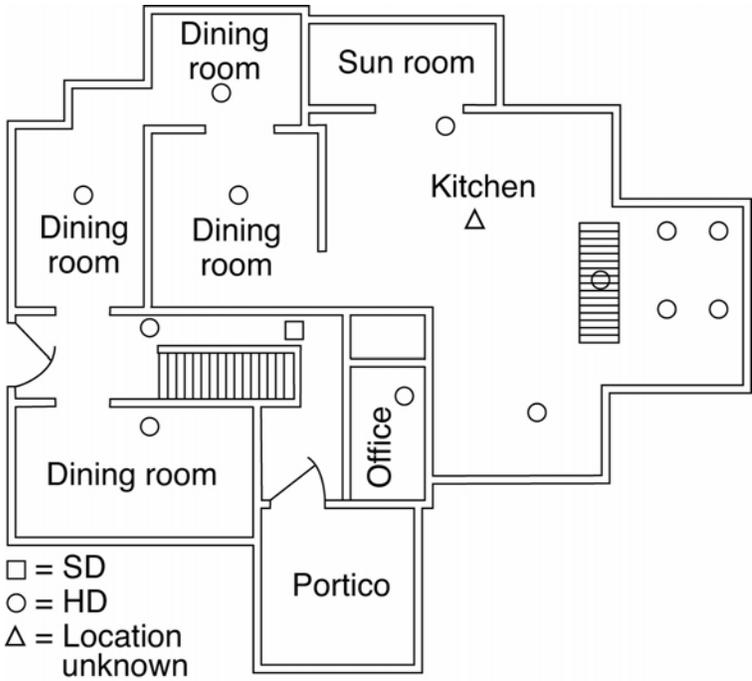


Figure 4 – Detector Locations – First Floor.

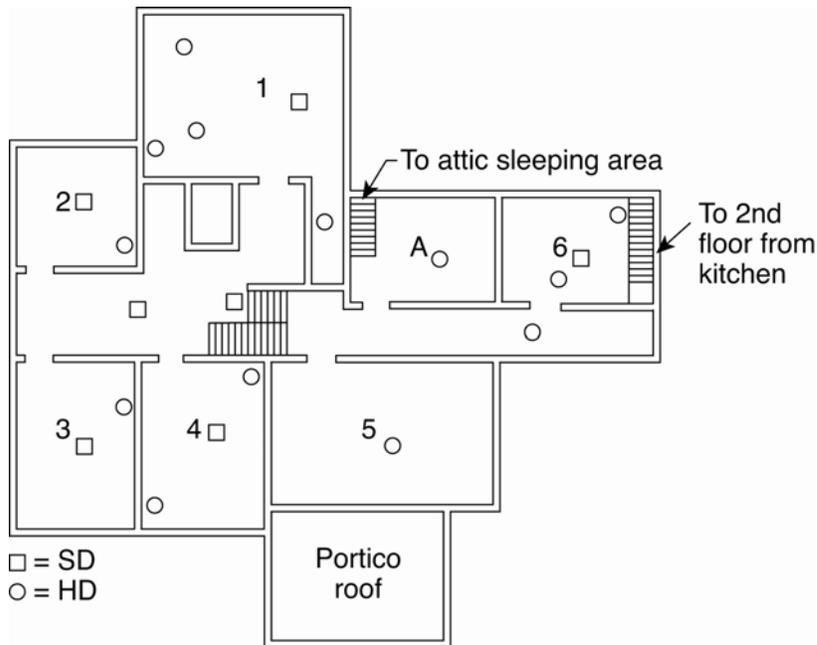


Figure 5 - Detector Locations — Second Floor.

Fire Department

The Allenstown Fire Department is a combination fire department comprised of 25 members. The department provides services to 4,980 residents of the Allenstown, NH area. The response area consists of 20.4 square miles (52.8 km²). The fire department staffs 3 engines and 7 command and support units.

In 2002, the Allenstown Fire Department responded to a total of 680 emergency incidents. Of these incidents, 280 were medical emergencies and 300 were fire-related emergencies. The remainder of the incidents consisted of hazardous materials, and other requests for assistance.

The Concord Fire Department dispatch center provides dispatch and communication service for 19 fire agencies in the area surrounding the city.

Weather

The weather at the time of the incident according to the NOAA-National Climatic Data Center for the weather reporting station in Concord, NH was:

- Temperature - 61°F (16° C)
- Wind Speed - Calm
- Relative Humidity – 93%
- Precipitation (24 hours) - 0

III. THE FIRE

Incident Description

On the evening of July 16, 2001, the inn was occupied by six guests and the owner, who lived on the premises. In the early morning hours of July 17, 2001, a fire broke out in the kitchen area on the first floor of the building.

An automatic fire alarm directed to the local fire department dispatch center notified the Allenstown Fire Department at 1:34 a.m.

Upon arrival of the first apparatus at 1:43 a.m., there were no outward signs of a fire in the building. The officer on this first apparatus reported that he did not hear or see any alarms activated. When the officer went closer to the building to investigate he discovered a fire in the rear of the first floor. At this point he also reported hearing occupants on the roof of a portico calling for help on the east side of the building.

A second alarm was requested at 1:44 a.m. as more resources began to arrive.

Ground ladders were raised to the portico roof and three occupants were removed (see Photo 4). Companies began searching for other occupants on the second floor as hose teams sought the seat of the fire on the first floor in the kitchen area. A 1 ¾ inch hose line was also advanced to the second floor via the central stairs. This hose line was advanced to the top of the stairs and then forward to the beginning of the corridor that ran toward the rear of the structure (south). Fire fighters encountered significant heat at this location and applied water to the corridor ceiling.



Photo 4 - Portico on North Side of Building Where Two Guests Were Rescued. (NFPA)

Two more occupants were found on the second floor in a room on the north side of the building. They were removed over ladders, as the search continued for the final guest and the innkeeper. The last guest was found in the corridor near his room on the second floor, and was removed by fire fighters using the interior stairs. This victim collapsed at the front door of the building and had to be resuscitated by paramedics.

The fire continued to spread into the second floor and attic of the building despite the efforts of approximately 90 fire fighters from 13 fire departments. Fire fighters were evacuated from the building at 2:56 a.m. due to deteriorating conditions.

A personnel accountability check was taken by 3:06 a.m., and all fire fighters were accounted for at that point.

A defensive fire suppression operation began at 3:07 a.m., utilizing master streams, a ladder pipe, and a tower ladder unit. The defensive operation continued until approximately 4:18 a.m.

Fire fighters re-entered the building at approximately 4:18 a.m. and the fire was declared under control at 4:25 a.m.

Causalities

The body of the innkeeper was located in the attic bedroom of the building at approximately 10:00 a.m.

One guest suffered from severe smoke inhalation and thermal burns. He was hospitalized for several days. The remaining guests suffered smoke inhalation and were treated at the scene.

Damage

The building suffered extensive damage on all levels as a result of this fire. The kitchen area, including the sun room and the southern portion of the first floor sustained heavy damage from flame spread and heat. The majority of the kitchen area was burned out. Before the fire investigation could begin, shoring had to be installed to support a structural steel beam in the kitchen area due to visible sagging in the beam from the heat of the fire. (see Photo 6) The remaining portions of the first floor (dining rooms) sustained heavy smoke and water damage.

The southern portion of the second floor suffered serious fire damage. This area included the corridor, two guest rooms, and the owner's apartment located in and adjacent to the rear (south) corridor. The northern portion (front) of the second floor,

containing the remaining quest rooms, sustained heavy smoke and water damage. (see Photo 5)

The attic space suffered heavy fire damage and partial collapse. The stair leading from the second floor apartment to the attic was burned away.

The basement area sustained heavy water damage, and limited heat and smoke damage.



Photo 5 - Damage in Second Floor Rear Corridor. (View facing central stairway/front door). (NFPA)



Photo 6 - Damage in Kitchen Near Area of Origin. (Note: Bracing added after fire to support fire-weakened beams.)(NFPA)

IV. TIME LINE

Actual Time	Elapsed Time	Activity
1:34 a.m.	0	Alarm Received at Dispatch Center
1:35 a.m.	1 minute	Auto-Dialer Received, Allenstown FD Dispatched
1:40 a.m.	6 minutes	Allenstown Chief (50R1) Responding
1:42 a.m.	8 minutes	Engine 4 (50M4) Responding, One Unit from Pembroke Requested
1:43 a.m.	9 minutes	Engine 4 on scene, Initially reports "nothing showing"
1:44 a.m.	10 minutes	Engine 4 Officer reports working fire in the building, AFD Chief requests a 2 nd Alarm
1:44 a.m.	10 minutes	2 nd Alarm Struck w/units from: Hookset Concord Pembroke Bow Ebsom
1:45-1:50 a.m.	11-16 minutes	Three Occupants Rescued from Portico Roof via Ladder
1:50 a.m.	16 minutes	Engine 1 and AFD Chief on scene
1:50 a.m.	16 minutes	All Allenstown Units on Scene

Actual Time	Elapsed Time	Activity
2:05 a.m.	31 minutes	Two additional occupants rescued via ladder from AD corner of building
2:12 a.m.	38 minutes	3 rd Alarm Struck
2:15 a.m.	41 minutes	One occupant rescued via front stairs
2:16 a.m.	42 minutes	NH SFM Office Requested
2:56 a.m.	1 hour 22 minutes	Command Orders FFs to Evacuate the Building
3:06 a.m.	1 hour 32 minutes	All FFs Accounted For (PAR)
3:07 a.m.	1 hour 33 minutes	Defensive Operations
3:13 a.m.	1 hour 39 minutes	2 Ladder Pipes, 3 Deluge Sets in Operation
4:18 a.m.	2 hours 44 minutes	FFs re-enter the building
4:25 a.m.	2 hours 51 minutes	Fire Declared Under Control
10:00 a.m. (approx)	8 hours 34 minutes	Fatality Located in Attic Sleeping Area

V. ANALYSIS

Origin and Cause

The Fire Marshal's Office of the State of New Hampshire has determined that the fire began in the kitchen food preparation area. The cause of the fire was determined to be accidental by the New Hampshire State Fire Marshal's Office.

Fire Growth and Spread

The fire started in the kitchen area after the occupants had retired for the evening. The fire heavily damaged the kitchen area and rear corridor leading to the back stairs to the second floor. The fire spread up the rear stairs to the second floor and into the south corridor (see Photo 7). The sun room, adjacent to the kitchen/dining areas, also suffered significant fire damage.

Fire spread into the rear corridor and then into the rooms on the east side of the corridor, including the owner's apartment. Once flames had entered the owner's apartment, they continued to spread upward via the stairs to the attic sleeping area.

Flames entered the attic via the stairs and interior partitions and caused heavy damage to the attic space. The fire eventually burned through the roof structure, causing partial collapse (see Photos 8 and 9).

The most heavily damaged rooms were in the southwest portion of the second floor (Room Nos. A, 1, and 6). These rooms were situated directly above the first floor kitchen area.

Heat and smoke traveled throughout the structure. Damage from heat and smoke was visible in the front portion of the building in the form of soot staining and the melting of small objects throughout all of the dining rooms.



Photo 7 – Damage to Rear Stairway. Remains of Door are Visible on the Left of the Photo. (NFPA)



Photo 8 – View of Stairway Leading to Attic Sleeping area. Fire department Ladder was Inserted for Access to the Attic Because the Wooden Staircase was Burned Away During the Fire. (NFPA)



Photo 9 – Attic Sleeping Area. (NFPA)

Code Analysis

The 2003 edition of NFPA 101[®] *Life Safety Code*[®], was utilized for the analysis of this incident.

Means of Escape

The *Life Safety Code*[®] requires that each sleeping room in a lodging or rooming occupancy have access to a primary means of escape, which must be located to provide a safe path of travel to the outside of the building (101:26.2.1.1). A secondary means of escape is also required if the building is not sprinklered, or if the room does not have a door that opens directly to the outside of the building with access to grade or to exterior stairs.

For rooms above or below the level of exit discharge (in this case the ground floor), the primary means of escape should be an enclosed interior stair, an exterior stair, a horizontal exit, or an existing fire escape stair arranged in accordance with Chapter 7 Means of Egress, of the *Life Safety Code*[®].

The guest rooms in this facility were located on the second floor. The two primary means of escape from the guest rooms were open stairs. The central stairs were located directly inside the front entrance to the building. The second set of stairs was located at the end of the rear (south) corridor. Neither stair was enclosed. A door was installed on the bottom of the south stair at the kitchen level. No door was installed at the top of this stair. Smoke and heat traveled up both sets of stairs to the second floor as the fire spread in the kitchen area. Flames spread up the rear stair from the kitchen and through the rear corridor.

The attic sleeping area was arranged with a single means of escape, an unenclosed stair that terminated in the owner's apartment. The apartment was a converted guest room on the south portion of the second floor. There was no secondary means of escape from the attic sleeping area. This arrangement did not meet the requirements of the *Life Safety Code*[®].

***NFPA 101*[®] – *Life Safety Code*[®] - *Primary Means of Escape*
101: 26.2.1.1 Primary Means of Escape.**

26.2.1.1.1 Every sleeping room and living area shall have access to a primary means of escape complying with Chapter 24 (One and Two Family Dwellings) and located to provide a safe path of travel to the outside.

26.2.1.1.2 Where the sleeping room is above or below the level of exit discharge, the primary means of escape shall be an interior stair in accordance with 26.2.2, an exterior stair, a horizontal exit in accordance with 7.2.4, or an existing fire escape stair in accordance with 7.2.8.

26.2.1.2 Secondary Means of Escape. In addition to the primary route, each sleeping room and living area shall have a second means of escape in accordance with 24.2.2, unless the sleeping room or living area has a door leading directly outside the building with access to grade or to a stairway that meets the requirements for exterior stairs in 26.2.1.1.

26.2.1.3 Two Primary Means of Escape. In other than existing buildings and those protected throughout by an approved, supervised automatic sprinkler system in accordance with 26.3.5, every story more than 185 m² (2000 ft²) in area or with travel distance to the primary means of escape more than 23 m (75 ft) shall be provided with two primary means of escape remotely located from each other.

26.2.2 Stairways.

26.2.2.1 Interior stairways, other than those in accordance with 26.2.2.2 or 26.2.2.3, shall comply with 7.2.2.5.3 and shall be enclosed by ½-hour fire barriers with all openings protected with smoke-actuated automatic-closing or self-closing doors having a fire resistance comparable to that required for the enclosure.

26.2.2.2 Where an interior stair connects the street floor with the story next above or below only, but not with both, the interior stair shall be required to be enclosed only on the street floor.

26.2.2.3 Stairways shall be permitted to be unenclosed in accordance with 26.3.1.1.2 and 26.3.1.1.3.

26.2.2.4 Winders in accordance with 7.2.2.2.4 shall be permitted.

NFPA 101® – Life Safety Code® -Protection of Vertical Openings

101: 26.3.1 Protection of Vertical Openings.

26.3.1.1 Vertical openings shall comply with 26.3.1.1.1, 26.3.1.1.2, or 26.3.1.1.3.

26.3.1.1.1 Vertical openings shall be protected so that no primary escape route is exposed to an unprotected vertical opening.

26.3.1.1.1.1 The vertical opening shall be considered protected if the opening is cut off and enclosed in a manner that provides a smoke- and fire-resisting capability of not less than ½ hour.

26.3.1.1.1.2 Any doors or openings shall have a smoke- and fire-resisting capability equivalent to that of the enclosure and shall be automatic-closing on detection of smoke or shall be self-closing.

26.3.1.1.2 In buildings three or fewer stories in height that are protected throughout by an approved automatic sprinkler system in accordance with 26.3.5, unprotected vertical openings shall be permitted, provided that a primary means of escape from each sleeping area is provided that does not pass through a portion of a lower floor unless such portion is separated from all spaces on that floor by construction having a ½-hour fire resistance rating.

26.3.1.1.3 Stair enclosures shall not be required in buildings two or fewer stories in height where both of the following conditions exist:

- (1) The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with 26.3.5.1.
- (2) The allowance of 24.2.2.1.2 to omit a secondary means of escape is not used.

26.3.1.2* Exterior stairs shall be protected against blockage caused by fire within the building.

Fire Alarms

The fire alarm system for this building consisted of smoke and heat detectors located in the corridors, guest rooms, and the basement, and heat detectors in the kitchen and dining rooms. Manual fire alarm boxes were located throughout the building. Horn and strobe light notification appliances were located throughout the building on each level. The fire alarm control panel was located in a closet beneath the central staircase on the first floor. An alarm annunciator panel was located on the outside wall of the building adjacent to the portico entrance (west).

The system was arranged for a smoke or heat detector activation to sound the horn/strobe system throughout the building.

The alarm system was connected to the local fire department dispatch center in Concord, NH, by an automatic dialer system.

On the night of the fire no one reported hearing any audible warning horns or seeing strobe lights. The auto dialer function functioned by transmitting a signal to the fire alarm office in Concord. A manual fire alarm box was activated by a fire officer after the fire department's arrival.

It is unknown when the system was last serviced or tested.

NPFA 101[®] – Life Safety Code[®] - Detection, Alarm and Communication Systems

101: 26.3.3 Detection, Alarm, and Communications Systems.

26.3.3.1 General.

26.3.3.1.1 Lodging and rooming houses, other than those meeting 26.3.3.1.2, shall be provided with a fire alarm system in accordance with Section 9.6.

26.3.3.1.2 A fire alarm system in accordance with Section 9.6 shall not be required in existing lodging and rooming houses that have an existing smoke detection system meeting or exceeding the requirements of 26.3.3.5.1 where that detection system includes not less than one manual fire alarm box per floor arranged to initiate the smoke detection alarm.

26.3.3.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2, or by alarm initiation in accordance with 9.6.2.1(3) in buildings protected throughout by an approved automatic sprinkler system in accordance with 26.3.5.

26.3.3.3 Notification. Occupant notification shall be provided automatically in accordance with 9.6.3, as modified by 26.3.3.3.1 and 26.3.3.3.2.

*26.3.3.3.1** Visible signals for the hearing impaired shall not be required where the proprietor resides in the building and there are five or fewer rooms for rent.

26.3.3.3.2 Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

26.3.3.4 Detection. (Reserved)

26.3.3.5 Smoke Alarms.

26.3.3.5.1 Approved single-station smoke alarms, other than existing smoke alarms meeting 26.3.3.5.3, shall be installed in accordance with 9.6.2.10 in every sleeping room.

26.3.3.5.2 The smoke alarms required by 26.3.3.5.1 shall not be required to be interconnected.

26.3.3.5.3 Existing battery-powered smoke alarms, rather than house electric-powered smoke alarms, shall be permitted where the facility has demonstrated to the authority having jurisdiction that the testing, maintenance, and battery replacement programs will ensure reliability of power to the smoke alarms.

New vs. Existing

Chapter 26, Lodging and Rooming Houses of NFPA 101[®], *Life Safety Code*[®], 2003 edition, applies to new buildings and to existing or modified buildings according to the provisions of 1.3.1 of the *Code* (101:1.3.1 – New and Existing Buildings and Structures. The *Code* shall apply to both new construction and existing buildings and existing structures.).

New lodging or rooming houses are required by 101: 26.3.5.1 to be protected by an approved automatic sprinkler system unless every sleeping room has a door opening directly to the outside of the building at street or ground level or has a door opening directly to the outside leading to an exterior stairway that meets the requirements of 101: 26.2.11.

The design parameters for the automatic sprinkler protection are outlined in Section 9.7 and 26.3.5.3.1 through 26.3.5.3.6 of the *Code*.

This building was converted to a bed and breakfast occupancy sometime after 1990.

VI. SUMMARY

A fire that began in the kitchen area on the first floor of this bed and breakfast occupancy eventually trapped several guests on the second floor of the building and the owner in an attic sleeping area. All of the guests had to be rescued by the fire department over ladders or by being led down an interior stairway. One guest was hospitalized with severe smoke inhalation injuries, and the innkeeper was killed.

The stairways within the building were not protected against the spread of smoke and fire and served as avenues of travel for both smoke and fire during this incident. The movement of smoke, heat, and eventually flames to the upper portions of the building resulted in several occupants being trapped, some being overcome by smoke, and one occupant dying. The primary means of escape should be protected to allow occupants a safe path of travel to safety (*101: 26.2.1.1 and 26.2.2*).

The building was equipped with a fire alarm system consisting of heat detectors and smoke alarms throughout the building, connected to the fire department dispatch center in nearby Concord, NH. This system was designed to activate an audible/visual system of horns and strobe lights throughout the building in the event of a fire. However on the night of the fire, while the system detected the fire in the kitchen and sent an alarm notification to the fire department, it did not activate the horns and strobe lights within the building to notify the occupants of the fire. This lack of automatic notification resulted in all of the occupants being trapped on the upper floors of the building and requiring fire department assistance in escaping from the building. Early notification of building occupants and the fire department of a fire in the building is crucial. Early warning of a fire gives occupants time to escape and also allows the fire department to combat the fire while it is at an early stage.

Had the audible and visual alarm system activated when the fire was detected, all of the occupants (including the innkeeper) may have had sufficient time to evacuate the building safely. Instead, the fire department was faced with a serious situation on their arrival requiring the search and rescue of six guests and the search for the innkeeper.

While not required in existing lodging or rooming occupancies, *NFPA 101[®], Life Safety Code[®]* permits the installation of NFPA 13, 13 R or enhanced 13D automatic sprinkler systems in such occupancies. The early detection and suppression of a fire provided by automatic sprinkler protection limits damage from smoke, heat, and flame and also allows occupants the time needed to safely exit the building under safe conditions. New lodging and room facilities are required to have an approved automatic sprinkler system installed. (*101: 26.3.5.1*), unless certain egress requirements are met (*101:26.3.5.2*).

In conclusion, had this building met the requirements of *NFPA 101[®], Life Safety Code[®]*, with protected vertical openings and means of escape and functioning alarms systems, the outcome might have been very different.

VII. NFPA DOCUMENTS

NFPA 101[®], *Life Safety Code*[®] 2003 Edition

NFPA 5000[™], NFPA Building Construction and Safety Code[™], 2003 Edition

NFPA 1, *Uniform Fire Code*[™], 2003 Edition

APPENDIX

Bremerton, Washington - 11/13/97

On November 13, 1997, at approximately 6:00 a.m., a fire occurred in an occupied, four-story apartment complex in Bremerton, Washington. Four residents died in this fire, and twelve were injured.

The complex was comprised of 142 units, of which approximately 130 were occupied at the time of the fire. The main portion of the complex was a U-shaped building. The ground floor, which contained storage areas, laundries, parking areas, and utility rooms, was made of noncombustible construction. The upper three floors contained the apartment units and were constructed of wood studs covered with fire-rated gypsum wallboard on each side.

However, the exterior face of the walls was covered with 5/8-in. thick plywood that was not fire rated. A two-story building occupied the open portion of the U and was built in a similar style as the main portion of the complex.

The roof structure was comprised of wood trusses that were made up of 2-in. x 4-in. and 2-in. x 6-in. members. It was covered with plywood sheathing, which in turn was covered with asphalt shingles. Within the void space in the U-shaped portion of the building were four fire separations. However, on the sole remaining fire separation, it was noted that there were openings in the wall that had not been closed up when the separations were built.

The facility was not equipped with an automatic fire sprinkler system. Six occupant use hose stations were located on each of the three upper stories. The complex lacked a facility wide fire alarm system. There were single-station smoke detectors within the individual units. These smoke detectors sounded only within the unit.

According to investigators for the Bremerton Fire Department and the Bureau of Alcohol, Tobacco and Firearms, a fire occurred in an occupied apartment on the third level of the building in the southwest corner at approximately 6:00 a.m. The occupant of the apartment unit was not present at the time of the fire, which allowed the fire to grow undetected until the single-station smoke detector activated.

The apartment complex manager was delivering newspapers to various units when he heard the sound of the smoke detector. He entered the unit to investigate and reported that smoke had filled the unit to within a foot of the floor. He could see a body of fire in the unit's front bedroom.

The manager then exited the unit, leaving the door open, and began banging on doors in the vicinity of the fire apartment to notify other occupants of the fire.

The first unit to arrive traveled from a fire station that was located approximately ¼ mile (0.4 km) to the north. The unit had just returned from a call, and at the time of the alarm both members of the engine company were outside the station refueling the apparatus and were wearing their protective clothing. They responded immediately and reported that they could see a column of smoke coming from the apartment complex as they left the station. (This company had just returned from a call and had passed by the fire building moments earlier without observing any problems.)

Upon arrival, the officer reported that no fire was showing from the outboard side of the building. However, when he entered the courtyard, he observed smoke and fire emanating from the open door of the fire apartment and extending both laterally and vertically. The fire was being fueled by the combustible wood finish on the walls, as well as by the wood structural supports for the walkways. He immediately attempted to limit the spread of the fire by using an 1 ¾ in. (45-mm) handline from the ground level, but by this time the fire had spread to the fourth level and was into the roof structure as well.

A television traffic helicopter flew overhead very shortly after the report of the fire and provided video footage that documented the rapid spread of the fire throughout the main portion of the apartment complex. The fire appeared to have penetrated the combustible void space of the roof structure and to have spread very rapidly.

According to accounts provided by some of the residents, they were unaware of the fire until they were trapped within their units. The woman directly above the fire apartment was awake and lying in bed at the time of the fire. She reported that her window exploded inward on her and that fire entered her apartment through this window.

As additional fire fighting units arrived, many residents were on their balconies on the outboard side of the building. The immediate focus was on rescuing these residents.

One person was in such danger that he lowered a rope from his fourth floor unit and slid down it, severely burning the skin on his hands in the process. (This occupant had purchased the rope after a previous fire several years earlier.)

A large defensive fire-fighting operation was mounted, and the fire was declared under control at 7:45 a.m. An effort was made to determine if there

were any fatalities, and, based on preliminary accounts, sixteen residents were unaccounted for.

The National Response Team from the Bureau of Alcohol, Tobacco and Firearms (ATF) was requested to respond to assist in the investigation. During the three-day investigation, it was finally determined that there were four fatalities from the fire, twelve residents were injured, and over 150 residents were displaced. Approximately 117 units were damaged by the fire in varying degrees. The entire complex was declared a loss by the owners and was demolished in January of 1998.

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

- Lack of automatic fire sprinklers
- Combustible exterior wall construction
- The door to the apartment of fire origin being left open after the fire was discovered
- Inadequately protected means of egress
- Lack of proper fire separations in the combustible void space
- Lack of a complex wide fire alarm system incorporating automatic detection



**Fire Investigations Department
PO Box 9101
1 Batterymarch Park
Quincy, MA 02169 USA
(617)984-7263 (tel)
(617)984-7110 (fax)
e-mail: investigations@nfpa.org**

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