
(2nd Edition)

Illustrated Solutions for Common Fire and Life Safety Code Compliance Issues

University of Vermont Graduate Program in Historic Preservation in Cooperation with The Vermont Division for Historic Preservation and The Vermont Department of Public Safety, Division of Fire Safety Revised by Joseph Hoefferle, Jr.
Preface to Second Edition

Since the first edition of *Fire Prevention and Building Code Compliance for Historic Buildings: A Field Guide* was published in 1997, there have been numerous changes to the national fire and life safety model codes and in the versions of these codes adopted by the State of Vermont. In January 2002, the Vermont Legislature's Task Force on Redevelopment of Upper Stories of Downtown Buildings, New Town Center Development Incentives and Regulatory Reform recommended that the State should ensure that the code is "applied in a predictable and flexible manner that supports state goals of downtown and village center preservation." The Task Force encouraged the State Division of Fire Safety (then called Labor and Industry) to "promote use of equivalencies, alternatives that provide equivalent safety" and proposed tax credits for sprinkler systems and other code improvements. In addition, several recent rehabilitation projects involving historic buildings in Vermont have used innovative new solutions to ensure the safety of those using the buildings while protecting the buildings’ historic character and features. This edition of the *Field Guide* attempts to update information provided in the first edition, including, among other things, code citations and excerpts, and sources of information and funding for rehabilitation of historic buildings. It also attempts to increase public awareness of innovative solutions to code compliance issues common in historic buildings by including photographs and case studies of recent examples of successful rehabilitation projects involving historic Vermont buildings.

This new edition was made possible by the support of the Vermont Department of Public Safety, Division of Fire Safety, and the Vermont Division for Historic Preservation.

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This Field Guide is designed to be used by those involved at all levels in the rehabilitation process of historic and older buildings, including: trades persons, planners, architects, engineers, and property owners. The purpose of this Field Guide is to illustrate and describe successful examples of code compliance that reconcile safety considerations with preservation goals. In addition to including pertinent code references and noting sources for further referencing, this manual also encourages and outlines the early and continued cooperation between those directly involved in the project with local code and preservation officials.

Vermont has an unusually high proportion of older buildings, many of which are historic. These buildings contribute substantially to the sense of community and place that make Vermont unique. Although structures such as house museums and public monuments have long been identified as having historical and cultural significance, the types of buildings determined worthy of our interest has expanded to include a wide variety of building types. Thousands of structures, which include everything from prominent civic buildings to relatively obscure agricultural buildings, are currently listed on the National and State Registers of Historic Places, and hundreds more are added each year.

The dilemma facing many older public buildings (see definition under Basic Terminology, page vi) involves synthesizing modern fire and safety requirements with the traditional goals of historic preservation. As part of a new or continued use, it is often necessary to make modifications to an historic building so that it complies with current fire and safety code requirements. From a preservation standpoint, it is important to integrate those changes into the building without destroying the features that contribute to its historic significance. Therefore, owners of older and historic buildings should seek the assistance of fire safety engineers and architects who specialize in the preservation of these structures (see The Secretary of the Interior's Standards, page 47, and Fundamental Requirements (of the Life Safety Code®), page iv).

One of the greatest concerns with respect to any building is the potential threat to the lives of occupants from fire. Thus, the safety of the building's occupants is of prime importance to state and local officials. Issues such as structural integrity, means of egress, the presence of hazardous materials and fire safety influence much of the decision making that characterizes the permitting process. More often than not, rehabilitation projects that involve older buildings call for the consideration of the issue of fire safety code compliance. Historic buildings rarely meet modern life safety code requirements. Making the necessary adaptations to comply with national, state and local building and life safety codes can be one of the most difficult challenges for the owner, builder or architect involved in the project. Issues such as open stairways, narrow or dead-end corridors, doors that are too narrow or swing the wrong way, or unrated materials must be dealt with in ways that satisfy the local code before the building may be occupied.

Planning is the crucial element in any rehabilitation of an historic building or structure. It is of utmost importance to include in the earliest stages of planning input from those officials dealing with the life safety code and related matters (i.e. the Vermont Division of Fire Safety) and those dealing with historic preservation and
related matters (i.e. the Vermont Division for Historic Preservation or other consulting historic preservation professionals). Official involvement at the very onset of a project assures that these extremely important issues get full and early consideration, and increases the likelihood that all possible alternatives will be considered and that the character and fabric of historic buildings and structures will be preserved to the greatest extent possible. Proceeding without official input creates the risk that costly and time consuming plan revisions will be necessary later in the rehabilitation process. Those supervising the rehabilitation of an historic building should also make sure that contractors performing work on the project understand the solutions devised by planners and the important historical features of the building that the solutions are intended to preserve, since good planning can be wasted in bad execution.

Building codes are written primarily for new construction. They establish a minimum standard for building construction through the use of prescriptive standards that specify allowable materials or techniques. They further establish performance standards that specify the level of performance that any proposed material or assembly must meet. Building codes often determine allowable construction techniques or materials by weighing the degree of safety provided by the building (known as construction classification) against the degree of hazard presented by the user (occupancy classification) and by taking into account such factors as installed fire detection and suppression systems. Codes are adopted as law based on specific standards prepared by independent associations, such as the National Fire Protection Association (NFPA). These standards are typically narrow in their focus and provide detailed information about safety requirements.

The life safety code is continuously evolving as a result of the knowledge born from the historical analysis of fire loss. It remains essential to update code documents at frequent intervals in response to new safety formulas and technological advances. As a result of the continuing refinement and advancement of the code, however, building design specifications that were once considered state-of-the-art become outdated. Thus, code modifications may present challenges to the rehabilitation of historic buildings constructed prior to the adoption of the current code. These challenges typically must be addressed by local officials with the authority to approve compliance alternatives in special circumstances or through variance hearings, usually conducted at a higher level of authority.

A code review illustrates those areas where code requirements are most stringent, and exposes conflicts between code requirements and historic preservation concerns. In some instances this review might assist in determining uses and designs that cause the least damage to a structure's historic character. Typical code or life safety deficiencies found in historic and older buildings might relate to construction types, egress issues, use and occupancy, fire suppression, alarm systems, and site concerns. Some deficiencies may be addressed without any damage to the historic character of the building, while others may require innovative compromise solutions.

*NFPA 1: Uniform Fire Code*™ developed by the National Fire Protection Association includes provisions that
authorize a level of flexibility in the rehabilitation of historic buildings.\textsuperscript{1} Section 20.17.1 of NFPA 1 states that:

"The provisions of this Code relating to the construction, repair, alteration, enlargement, restoration, and moving of buildings or structures shall not be mandatory for existing buildings or structures identified and classified by the state or local government authority as historic buildings where such buildings are judged by the authority having jurisdiction to be safe and to not constitute a serious life safety hazard."

In addition, Section 4.5.2 of NFPA 1 states that "the provisions of this Code shall be permitted to be modified by the authority having jurisdiction for buildings or structures identified and classified as historic buildings, where it is evident that a reasonable degree of safety is provided.\textsuperscript{2} In adopting the standards set forth in NFPA 1, Vermont has added a provision (Section 4.5.2.1) indicating that NFPA 914: Code for Fire Protection of Historic Structures (2001 edition) will serve as guidance for the discretion exercised under Section 4.5.2 of NFPA 1. NFPA 914 outlines ways to develop fire safety plans for historic sites and includes an appendix containing fire ratings for historic ("archaic") materials and assemblies.

This \textit{Field Guide} addresses the flexibility found in the NFPA Codes, as adopted by the State of Vermont, and encourages builders, trades people, designers, and building owners to seek, with the help of code officials, life safety solutions that are effective, innovative and at the same time complementary to the historic structures with which they are dealing. The flexibility allowed under Sections 4.5.2 and 20.17.1 can be an important tool for the builder or planner, but should not be misconstrued as an excuse to undermine the intent of the life safety code.

The issues and illustrated solutions covered in this \textit{Field Guide} are frequently encountered in a typical building rehabilitation. Illustrated examples are intended to demonstrate a sympathetic solution for that particular structure and are often also the most economical. The examples are suggestions and are intended to be seen as creative solutions to fire code compliance in older and historic structures.

\textbf{Note:} This \textit{Field Guide} addresses only fire and life safety code requirements. It does not focus on handicapped accessibility in historic buildings. For more information about making historic buildings handicapped accessible, the reader is directed to \textit{Accessibility in Historic Buildings: A Field Guide}, a publication available from the Vermont Division for Historic Preservation and the Vermont Division of Fire Safety.

\begin{flushleft}
\textsuperscript{1} \textit{Uniform Fire Code}\textsuperscript{\texttrademark} is a registered trademark of the National Fire Protection Association, Inc., Quincy MA 02169
\textsuperscript{2} \textit{NFPA 101: Life Safety Code} \textsuperscript{\textregistered} developed by the National Fire Protection Association and adopted by the State of Vermont as part of Vermont's Fire & Building Safety Code contains an identical provision at Section 4.6.3.
\end{flushleft}
The goals of the *Life Safety Code®* (the *Code*)³ are to ensure a reasonable level of safety in building design and arrangement. These objectives, as stated in the *Life Safety Code® Handbook* are:

1. **To provide for adequate safety without dependence on any single safeguard:**

   The design of every building or structure intended for human occupancy shall be such that reliance for safety to life does not depend solely on any single safeguard. An additional safeguard(s) shall be provided for life safety in case any single safeguard is ineffective due to inappropriate human actions or system failure.

2. **To provide an appropriate degree of life safety considering the size, shape, and nature of the occupancy:**

   Every building or structure shall be provided with means of egress and other safeguards of the kinds, numbers, locations, and capacities appropriate to the individual building or structure, with due regard to the following: (1) Character of the occupancy, (2) Capabilities of the occupants, (3) Number of persons exposed, (4) Fire protection available, (5) Height and type of construction of the building or structure, [and] (6) Other factors necessary to provide all occupants with a reasonable degree of safety.

3. **To provide for backup or redundant egress arrangements:**

   Two means of egress, as a minimum, shall be provided in every building or structure, section, and area where size, occupancy, and arrangement endanger occupants attempting to use a single means of egress that is blocked by fire and smoke. The two means of egress shall be arranged to minimize the possibility that both may be rendered impassable by the same emergency condition.

4. **To ensure that the egress paths are clear, unobstructed, and unlocked:**

   In every occupied building or structure, means of egress from all parts of the building shall be maintained free and unobstructed. No lock or fastening shall be permitted that prevents free escape from the inside of any building … [other than in health care occupancies and detention and correctional occupancies]. Means of egress shall be accessible to the extent necessary to ensure reasonable safety for occupants having impaired mobility.

5. **To ensure that the exits and egress routes are clearly marked to avoid confusion and provide the cues needed for their effective use:**
FUNDAMENTAL REQUIREMENTS

Every exit shall be clearly visible, or the route to reach every exit shall be conspicuously indicated. Each means of egress, in its entirety, shall be arranged or marked so that the way to a place of safety is indicated in a clear manner.

6. To provide adequate lighting:

Where artificial illumination is needed in a building or structure, egress facilities shall be included in the lighting design.

7. To ensure prompt occupant response by providing early warning of fire:

In every building or structure of such size, arrangement, or occupancy that a fire itself might not provide adequate occupant warning, fire alarm facilities shall be provided where necessary to warn occupants of the existence of fire.

8. To ensure the suitable enclosure of vertical openings:

Every vertical opening between floors of a building shall be suitably enclosed or protected, as necessary, to afford reasonable safety to occupants while using the means of egress and to prevent the spread of fire, smoke, or fumes through the vertical openings from floor to floor before occupants have entered exits.

9. To ensure compliance with applicable installation standards:

Any fire protection system, building service equipment, feature of protection, or safeguard provided for life safety shall be designed, installed, and approved in accordance with applicable NFPA standards.

10. To maintain all required features in proper working order:

Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this Code, such devise, equipment system, condition, arrangement, level of protection, or other feature shall thereafter be maintained unless the Code exempts such maintenance.

(Reprinted, with permission, from NFPA 101® Life Safety Code® Handbook, 9th ed. (Quincy, MA: NFPA, 2003), Copyright ©2003, National Fire Protection Association, Inc., Quincy, MA 02169. This reprinted material is not the complete and official position of the National Fire Protection Association, Inc., on the referenced subject, which is represented only by the Code in its entirety.)
Basic Terminology

For over 80 years, the National Fire Protection Association has been the developer and publisher of the Life Safety Code®. Its contents address specific requirements that directly influence life safety in new construction as well as existing buildings.

Certain basic terminology is used throughout the Code as well as in local, state, and national ordinances that address life safety in buildings. In order to more clearly comprehend the implications of these regulations included below are interpretations and brief explanations of the most essential of these terms.

(The following definitions are, for the most part, as expressed in the Code and are taken from the Code and the related commentary contained in the Life Safety Code® Handbook⁴)

1. Area of Refuge

Areas of Refuge are defined as either:

(a) a story in a building where the building is protected throughout, by an approved, supervised automatic sprinkler system and has not less than two accessible rooms or spaces separated from each other by smoke-resisting partitions; or (b) a space located in a path of travel leading to a public way that is protected from the effects of fire, either by means of separation from other spaces in the same building or by virtue of location, thereby permitting a delay in egress travel from any level.

An area of refuge has a temporary use during egress. It generally serves as a staging area that provides relative safety to its occupants while potential emergencies are assessed, decisions are made, and mitigating activities are begun. Taking refuge within such an area is, thus, a stage of the total egress process; a stage between egress from the immediately threatened area and egress to a public way. An area of refuge might be another building connected by a bridge or balcony, a compartment of a subdivided story, an elevator lobby, or an enlarged story-level exit stair landing.⁵

2. Building Construction Classification:

A common method of codifying fire protection and fire safety requirements for buildings is to classify them according to types of construction, based on the degree of fire resistance afforded by their various load-bearing and non-load bearing elements.⁶ NFPA 220, Standard on Types of Building Construction identifies five construction types commonly referred to as follows: Type I, fire resistive; Type II; noncombustible; Type III, ordinary; Type IV, heavy timber; and Type V, wood frame.

(The following descriptions are taken wholly or in part from The Fire Protection Handbook)


⁵ Ibid.

Basic Terminology

Type I Construction:
In this type of construction, all structural members (i.e. walls, columns, beams, girders, trusses, floors, and roofs) are of approved noncombustible or limited combustible materials with specified fire resistance ratings.

Type II Construction:
In this type of construction, structural members are the same as Type I, but with lower fire resistance ratings.

Type III Construction:
In this type of construction, exterior walls and structural members that are part of exterior walls are of approved noncombustible or limited combustible materials, and interior structural members are entirely or partially of wood. Post and beam frames with brick or stone veneer are primary examples of Type III construction. These structures, along with Type IV and V buildings make up the bulk of our historic buildings.

Type IV Construction:
In this type of construction, exterior and interior walls and structural members that are portions of such walls are of approved noncombustible or limited combustible materials and other interior members, including columns, floors, and roofs are of unprotected wood (whether solid or laminated). No concealed spaces are permitted in the floors and roofs or other structural members (with minor exceptions). Codes set specific minimum dimensions for the various wood structural members and minimum fire-resistive ratings for structural members of materials other than wood. Heavy timber construction was developed during the mid-18th century by insurance interests to reduce fire losses in New England's factories, mills and storage facilities. The absence of concealed spaces in walls and ceilings combined with large timbers decreased the chances of rapid fire spread and reduced the probability of serious structural damage.

Type V Construction:
In this type of construction, all structural members are entirely of wood or other approved combustible materials. Post and beam, balloon and platform framed structures are primary examples of Type V construction. Type V is probably more vulnerable to fire than any other building type. Accordingly, it is essential that greater attention be given to details of construction (such as firestopping) of this light wood frame building.

Mixed Types of Construction:
Where two or more types of construction are used in the same building, the structure is considered to be subject to the restrictions of the least fire-resistive type of construction (unless each building type is separated by adequate firewalls or area separation walls having appropriate fire resistance, in which case they may be considered separately).

3. Compartmentation:

Firefighting becomes more difficult if the fire spreads vertically or past major horizontal barriers. Unprotected vertical openings (such as open stairwells) provide
routes for the fire to spread vertically. The goal of compartmentation is to contain the fire and smoke within a given area. Fire compartments are formed with fire barriers that are continuous from outside wall to outside wall, or from one fire barrier to another, or a combination thereof, including continuity through all concealed spaces, such as those above a ceiling. To preserve the integrity of compartments, all openings for doors, ducts, and building services must be effectively closed or fitted with automatic closures.

4. Means of Egress:

A continuous and unobstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct ports: (a) the exit access, (b) the exit, and (c) the exit discharge. A means of egress comprises the vertical and horizontal travel and includes intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, elevators, enclosures, lobbies, escalators, horizontal exits, courts, and yards.

A means of egress must be accessible to or usable by a person with severe mobility impairment. This person must be able to travel unassisted through the exit access, exit, and exit discharge to a public way.

Exit Access: That portion of a means of egress that leads to an exit. The exit access includes the rooms and building spaces people occupy and the doors, aisle, corridors, unenclosed stairs, and unenclosed ramps that are traversed to reach an exit.

Exit: Exits include exterior exit doors, exit passageways, horizontal exits, exit stairs, and exit ramps. In the case of a stairway, the exit includes the stair enclosure, the door to the stair enclosure, stairs and landings inside the enclosure, the door from the stair enclosure to the outside or to the level of the exit discharge, and any exit passageway and its associated doors if such are provided to discharge the stair directly to the outside. In the case of a door leading directly from the street floor to the street or open air, the exit comprises only the door. Doors of small individual rooms, as in hotels, while constituting exit access from the room are not referred to as exits except where they lead directly to the outside of the building from the street floor.

Exit Discharge: That portion of a means of egress between termination of an exit and a public way. Because some exits do not discharge directly into a public way, the exit discharge is defined as providing building occupants with a path of travel from the termination of an exit to a public way.

5. Historic Building:

A structure or facility deemed to have historical, architectural, or cultural significance by a local, regional, or national jurisdiction. Recognition might be in an official national, regional, or local register, listing, or inventory.

Under Vermont law, 20 V.S.A. §2730 (d), "Historic Building" or "Historic Structure" means any structure which has been
listed in the National Register of Historic Places or the state register of historic properties or which has been determined to be historically significant by the Vermont advisory council on historic preservation or which meets the standards adopted by the division for historic preservation pursuant to section 723(a) of Title 22.

Information on buildings listed on the National and State Registers is available from the Vermont Division for Historic Preservation. Over 40,000 buildings are listed on the Registers, and many more are eligible.

6. Occupancy Classification:

The Life Safety Code® is occupancy specific. The Code breaks occupancy down into 12 distinct classes of use or occupancy. Code requirements differ for each classification. All buildings or structures fall into one of the following categories:

- **Assembly.** Occupancies (a) used for gatherings of 50 or more persons for purposes such as deliberation, worship, entertainment, eating, drinking, amusements, or awaiting transportation, or (b) used as a special amusement building, regardless of occupant load.
- **Educational.** Occupancies used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than 12 hours per week.
- **Day Care.** An occupancy in which four or more clients receive care, maintenance, or supervision, by other than their relatives or legal guardians, for less than 24 hours a day. This includes both child and adult day care.
- **Health Care.** Occupancy used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease, or infirmity; and for the care of infants, convalescents, or infirm aged persons. Health care occupancies involve the treatment or care of four or more occupants and are occupied by persons who are incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants control. ¹
- **Ambulatory Health Care.** Occupancy used to provide services or treatment simultaneously to at least 4 patients that provides, on an out-patient basis (a) treatments rendering the patients incapable of taking action for self-preservation without the assistance of others, (b) anesthesia rendering patients incapable of taking action for self-preservation without the assistance of others, or (c) emergency or urgent care for patients, who because of their injuries are incapable or taking action for self-preservation without the assistance of others.
- **Detention and Correctional.** Occupancies used to house individuals under varied degrees of restraint or security, where such occupants are mostly incapable of self-preservation because of security measures not under the occupants’ control. Examples include substance abuse centers, juvenile work camps, correctional institutions, and juvenile training schools.
- **Residential.** Residential occupancies are those in which sleeping accommodations are provided for purposes other than health care or detention and correction. Residential occupancies are treated

¹ Vermont has adopted an amended version of this definition, decreasing the number of occupants to three.
separately in the Code and are divided into the following groups:

(a) Hotels, motels, dormitories
(b) Apartment buildings
(c) Lodging or rooming houses
(d) One and two-family dwellings

•Residential Board and Care. An occupancy providing lodging and boarding for four or more residents (unrelated to the owners or operators) for purposes of providing personal care services. Examples are group housing for the handicapped and assisted living facilities.8

•Mercantile. These occupancies include stores, markets, small restaurants, and other rooms, buildings, or structures for the display and sale of merchandise.

•Business. Business occupancies are those used for the keeping of accounts and records or the transaction of non-mercantile business. Examples of these occupancies are: offices, some college and university buildings, city halls, courthouses, doctors and dentist's offices, and town halls.

•Industrial. Industrial occupancies are those in which products are manufactured or in which processing, assembly, mixing, packaging, finishing, decorating, or repair operations are conducted, and include factories, dry cleaning plants, food processing plants, power plants, laundries and saw mills.

•Storage. These occupancies include all buildings or structures utilized primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

These include: barns, bulk oil storage, freight terminals, parking structures, stables, and warehouses.

•Mixed Occupancies. When two or more classes of occupancy occur in the same building or structure and are intermingled so that separate safeguards are impracticable, safeguards shall comply with the more restrictive of the requirements of the occupancies involved.

7. Public Buildings

(From 20 V.S.A. §2730.)

(a) As used in this subchapter, "public building" means:
   (1)(A) a building owned or occupied by a public utility; hospital; school; house of worship; convalescent center or home for the aged, infirm, or disabled; nursery; kindergarten; or day care;
   (B) a building in which two or more persons are employed, or occasionally enter as part of their employment or are entertained, including private clubs and societies;
   (C) a cooperative or condominium;
   (D) a building in which people rent accommodations, whether overnight or for a longer term;
   (E) a restaurant, retail outlet, office or office building, hotel, tent or other structure for public assembly, including outdoor assembly, such as a grandstand;
   (F) a building owned or occupied by the state of Vermont, a county, a municipality, a village or any public entity, including a school or fire district.

8 Vermont has adopted an amended version of this definition, decreasing the number of occupants to three.
(2) Use of any portion of a building in a manner described in this subsection shall make entire building a "public building" for purposes of this subsection. …

(b) The term "public building" does not include:

1. an owner-occupied single family residence, unless used for a purpose described in subsection (a) of this section;
2. a family residence registered as a day care home under Chapter 35 of Title 33, or specifically exempted from registration by subdivision 3502(b)(1) of Title 33;
3. farm buildings on a working farm or farms. …;
4. a single family residence with an accessory dwelling unit as permitted under subdivision 4406(4)(D) of Title 24.

(From 20 V.S.A. §2729(d).)

Any condominium or multiple unit dwelling using a common roof, or row houses so-called, or other residential buildings in which people sleep, including hotels, motels and tourist homes, excluding single family owner-occupied houses and premises, whether the units are owned or leased or rented, shall be subject to the rules adopted under this subchapter. …

8. Fire Resistance Rating

The measure of a building material's ability to withstand fire, it is the time, in minutes or hours, that the material has withstood a fire exposure as determined by tests prescribed by the Code. A door, wall, floor, or ceiling that is rated at 90 minutes must be able to resist burning through for 90 minutes. In the case of doors, all parts including the jamb, hinges, and latch as well as the door itself must be capable of resisting failure for the rated interval.

9. Separation

Barriers, such as walls, partitions, and floors, separate building spaces. These barriers also delay or prevent fire from propagating from one space to another. In addition, barriers are important features in any fire fighting operation. Construction details and barrier penetrations modify a barrier's effectiveness. A rating can be completely voided by inappropriate modifications to designed barriers. The fire resistance of a rated wall is lost when a door is left open.
The Code grants an authority having jurisdiction the flexibility to deviate from the terms of the Code when the authority concludes that an equivalent level of safety can be achieved in the case of an historic building. This flexibility reflects a practical attitude that recognizes that every structure is characterized by different features and circumstances and that one can take these features and circumstances into account and still achieve the ultimate goal of safety. Consider, for example, an historic building with a window opening that is a few inches too small to be a “secondary means of escape” according to the exact requirements of the Code. Under a rigid application of the Code, the window would need to be enlarged to the necessary size, even if it is at great cost to the owner and the historic character of the building. The flexibility built into the Code permits the authority having jurisdiction to take into account, among other things, the existence of a fire detection system in the building and the fact that the window is at grade, and conclude that enlargement of the window is unnecessary because the overall level of safety in the building is already very high, and enlarging the window would not materially increase the level of safety. To be sure, life safety remains the paramount goal - but if the authority having jurisdiction is comfortable that equivalent levels of safety may be achieved either by working with or by altering historic features, then why should not the option that does the least damage to historic features (and has the added benefit of saving the owner unnecessary cost) be chosen?

That solutions like the ones highlighted in this Field Guide can achieve an equivalent level of safety is shown by a recent example. The Wilder Block, a 130-year old, four story building located in downtown Brattleboro was rehabilitated over the course of several years in the 1990s. During the rehabilitation, fire safety officials evaluated the building’s features and layout and came up with solutions that helped preserve the building’s historic character while achieving an equivalent level of safety. For example, the doorways to the building’s units had glass transoms and were not self closing, so that they would not have provided a reliable barrier preventing smoke and fire from spreading into or out of the units. Instead of requiring that the doorways and transoms be ripped out and replaced with modern, self-closing, transom-less doors, and thereby destroying the historic character of the building’s hallways, fire safety officials devised a solution that permitted the doors to be retained subject to the addition of automatic door closers, and the transoms to be retained so long as they were backed with plywood. The closers increased the likelihood that doors would be closed in the case of a fire, and the plywood backing had the effect of increasing the time required for smoke or fire to penetrate the transom, and thus raised the fire rating of the transoms to the required level. A factor that made this solution a feasible one in the eyes of the fire safety officials was that the building had an installed fire detection system that would give the building’s occupants early notice of a fire in the building so that they could escape before the fire had much time to spread.

In early December 2004, the Wilder Block was
the scene of a five-alarm fire caused by a cigarette. The alarm system activated and all of the building’s occupants were able to escape the building without loss of life. As fire engulfed the building’s upper stories, the doorways of those units where the transoms had been backed (and where the door closers had not been disabled by human intervention) served as reliable barriers, as intended, and prevented the spread of fire and smoke into those units.

The Wilder Block is currently slated for restoration and will continue to contribute to the character and vitality of downtown Brattleboro.
Figure 1: The balcony railings are placed at the end of the aisles and are as wide as the stairs.

Figure 2: The removable railings are installed anytime the balconies are occupied.

**Issue**  Height of Railing at the End of Balcony Aisles

**NFPA 101 Code Reference**

13.2.11.1(1) The fasciae of boxes, balconies, and galleries shall rise not less than 26 in. above the adjacent floor or shall have substantial railings not less than 26 in. above the adjacent floor.

13.2.11.1(2) (a) Railings at the ends of aisles shall be not less than 36 in. high for the full width of the aisle. (b) Railings at the end of aisles shall be not less than 42 in. high for the width of the aisle where steps occur. (c) Existing railings 36 in. high at the ends of aisles where steps occur shall be permitted to be continued to be used.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Vermont State House
Montpelier, Vermont

**Use**  Assembly

**Notes**

1) Historic railing to low to satisfy code requirements for a minimum height of 42” at the end of the aisle where the steps occur.

2) A removable railing allows the House Chamber to be exhibited in its existing restored condition, when it is not being used for legislative proceedings.

3) Figure 2 illustration excerpted from State House Fire Safety Consultants Report Outline, 10/31/96; Jack Watts, Fire Safety Institute; Nick Artim, Fire Safety Network.
**Issue**  Height of Railing at the End of Balcony Aisles

**NFPA 101 Code Reference**

13.2.11.1(1) The fasciae of boxes, balconies, and galleries shall rise not less than 26 inches above the adjacent floor or shall have substantial railings not less than 26 inches above the adjacent floor.

13.2.11.1(2) (a) Railings at the ends of aisles shall be not less than 36 inches high for the full width of the aisle. 
(b) Railings at the end of aisles shall be not less than 42 inches high for the width of the aisle where steps occur.
(c) Existing railings 36 inches high at the ends of aisles where steps occur shall be permitted to be continued to be used.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Barre Opera House  
Barre, Vermont

**Use**  Assembly

**Notes**

1) Pipe railing was attached to existing wood railing, raising the height to the required 42 inches at the end of the aisles.

2) Historic wood railing was retained; Minimal visual impact on the balcony.

3) Theatre-goers view of the stage is not affected.
Figure 1: Windows were added to these replicated doors to provide visibility for walk-through traffic. Original casings were saved and reinstalled over steel jambs.

Figure 2: Moldings simulate raised paneling. Makes reference to historic door in background.

**Issue**  Fire Rated Doors

**NFPA 101 Code Reference**

8.6.5 The fire resistance rating for the enclosure of floor openings shall not be less than as follows (see 7.1.3.2.1 for enclosure of exits): …

3) Enclosures in existing buildings – 1/2 hour fire barriers ….

(1, 2, 5, and 6 refer to new construction, and 4 refers to lodging and rooming houses.)

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Vergennes Opera House

**Use**  Vergennes, Vermont

**Notes**

1) Doors have hardwood veneer over fire-rated core.

2) In order to warranty a fire-rating, molding profiles were installed at the factory. Any work done to the door after delivery would void the manufacturer’s fire-rating.

3) New doors on double unit match the measurements of the original doors. Therefore, altering the existing opening and adjacent historic woodwork is unnecessary.
### Issue
Fire Rated Doors

#### NFPA 101 Code Reference

8.6.5 The fire resistance rating for the enclosure of floor openings shall not be less than as follows (see 7.1.3.2.1 for enclosure of exits): …

3) Enclosures in existing buildings – 1/2 hour fire barriers ….

(Subsections 1, 2, 5, and 6 refer to new construction, and 4 refers to lodging and rooming houses.)

#### Vermont Code Requirements
Same as NFPA 101.

#### Building
Vermont State House  
Montpelier, Vermont

#### Use
Assembly

#### Notes
1) Door has a fire-rated core with paintable wood veneer.
2) Panel configuration matches that of historic door on the right.
3) Steel door jamb painted white and trimmed with matching wood molding.
**Issue**  Fire Rated Doors

**NFPA 101 Code Reference**

8.6.5 The fire resistance rating for the enclosure of floor openings shall not be less than as follows (see 7.1.3.2.1 for enclosure of exits): …

3) Enclosures in existing buildings – 1/2 hour fire barriers ….

(Subsections 1, 2, 5, and 6 refer to new construction, and 4 refers to lodging and rooming houses.)

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Putney Cares
Putney, Vermont

**Use**  Residential

**Notes**

1) Material added to panels on one side increases fire rating.

2) Sympathetic treatment still allows for retention of door’s historic character.

3) New panel inserts added over existing panels in historic door.
Figure 1: Wood panels are painted to match existing doors and moldings.

Figure 2: Close-up, unfinished side. Edges of new pine panel are chamfered to ease the transition from new to old material.

**Issue**  Fire Rated Doors

**NFPA 101 Code Reference**

8.6.5 The fire resistance rating for the enclosure of floor openings shall not be less than as follows (see 7.1.3.2.1 for enclosure of exits): …

3) Enclosures in existing buildings – 1/2 hour fire barriers ….

(Subsections 1, 2, 5, and 6 refer to new construction, and 4 refers to lodging and rooming houses.)

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Putney Cares
Putney, Vermont

**Use**  Residential

**Notes**

1) Material added to panels on one side increases fire rating.

2) Sympathetic treatment still allows for retention of door’s historic character.

3) New panel inserts added over existing panels in historic door.
Figure 1: The fire rating of this historic door was increased as a result of the application of an intumescent paint coating. (Also note unobtrusive automatic door closer.)

Figure 2: The increase in fire rating did not require the addition of extra material to the door’s paneling, and the door’s characteristic thin profile was able to be retained.

**Issue**  Fire Rated Doors; Reuse of Existing Doors; Separation

**NFPA 101 Code Reference**

8.6.5 The fire resistance rating for the enclosure of floor openings shall not be less than as follows (see 7.1.3.2.1 for enclosure of exits): …

3) Enclosures in existing buildings – 1/2 hour fire barriers ….  
(Subsections 1, 2, 5, and 6 refer to new construction, and 4 refers to lodging and rooming houses.)

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Florona Grange Hall  
Monkton, Vermont

**Use**  Business; Assembly

**Notes**

1) Application of intumescent paint to thin profile historic door increases the door’s fire rating without the addition of new material to the door’s panels. When activated by heat or fire, the paint forms a dense carbon char that shields the substrate.

2) Intumescent paint applies like latex paint, and appears only slightly thicker than latex paint. (Clear intumescent finishes are also available.) After application, door retains its historic character.

3) An example of an intumescent coating is Contego Fire Barrier Latex (www.contegointernational.com). Firefree (www.firefree.com) makes a paintable ceramic coating with similar benefits.
Issue  Second Means of Egress Required

NFPA 101 Code Reference

7.4.1.1  The number of means of egress from any balcony, mezzanine, story, or portion thereof shall be not less than two [unless addressed by exceptions in occupancy chapters].

Vermont Code Requirements

Same as NFPA 101.

Building  Plainfield Town Hall/Opera House
Plainfield, Vermont

Use  Assembly

Notes

1)  Assembly area on the second floor required a second means of egress.

2)  The rear of the building, on the second floor, was at grade.

3)  A second doorway to the outside was installed at grade at the rear, the least visible side of the building.
Figure 1: The windows were rehung after the top and bottom sash were joined, and they now function as doors leading to fire escape stairs.

Figure 2: These changes were made on the least significant façade of the building (rear).

**Issue**  Second Means of Egress Required

**NFPA 101 Code Reference**

7.4.1.1 The number of means of egress from any balcony, mezzanine, story, or portion thereof shall be not less than two [unless addressed by exceptions in occupancy chapters].

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Weathersfield Meeting House
Weathersfield, Vermont

**Use**  Assembly

**Notes**

1) The top and bottom sash were joined to form one panel.
2) The window was re-hung to swing outward and allow egress to the fire escape stairs.
3) This method allows the existing windows to be retained and aesthetically compatible with the building while meeting the requirements of the code.
4) The windows used here are replacements for those destroyed in an earlier fire, but historic sash could be similarly treated.
Figure 1: The small businesses that now occupy different floors in this historic building require only one exit each.

**Issue**  
Single Unenclosed Exit Stairs Permitted for Small Business Use

**NFPA 101 Code Reference**

39.2.4.4(1) … [A single exit] shall be permitted only where the total travel distance to the outside of the building does not exceed 100 feet and where the exit is enclosed ….  
39.3.1.1 Vertical openings shall be enclosed or protected in accordance with Section 8.6 …. 

**Vermont Code Requirements**

39.2.4.2.1 Single Exit for Existing Small Business: A single exit shall be permitted to be unenclosed in two-story buildings when the travel distance does not exceed 75 feet and all areas opening to the exit access stairs are provided with smoke alarms in accordance with 9.6.2.10.  
39.3.1.1(4) Exception for Protection of Vertical Openings for Existing Small Business: Exit stairs shall be permitted to be unenclosed in two-story buildings when the travel distance does not exceed 75 feet and all areas opening to the exit access stairs are provided with smoke alarms in accordance with 9.6.2.10.

**Building**

97 State Street, Montpelier, Vermont

**Use**

Business

**Notes**

1) Historic building subdivided into business spaces.  
2) Code permits each business space to have only one unenclosed exit/exit stair because travel distance from all areas of business space to exit is short, and it is highly likely that occupants will be able to reach exit/exit stair and exit the building if the occupants have early enough warning of fire.  
3) Code-mandated smoke alarms provide early warning of fire.  
4) This Code exception may help to preserve historic floor-plans.
**Issue**  Sympathetic Additions

**NFPA 101 Code Reference**

7.2.5.1 Every ramp used as a component in a means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.5.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Vergennes Opera House  
Vergennes, Vermont

**Use**  Assembly

**Notes**

1) This assembly space required a second egress from the main hall directly outside.

2) Design also addresses A.D.A. compliance issues.

3) Discharge area empties onto cantilevered ramp that travels to the back of the building where it meets grade.
**Issue**  Reuse of Existing Fixtures

**NFPA 101 Code Reference**

7.9.1.1 Emergency lighting facilities for means of egress shall be provided in accordance with Section 7.9 for the following:

(1) Buildings or structures where required in Chapter 11 through Chapter 42 …

**Vermont Code Requirements**

Same as NFPA 101.

<table>
<thead>
<tr>
<th>Building</th>
<th>Vermont State House Montpelier, Vermont</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td>Assembly</td>
</tr>
</tbody>
</table>

**Notes**

1) Installing modern, emergency light fixtures will disrupt the historic integrity and continuity of the restored House Chamber.

2) Existing historic wall sconces are rewired and used as emergency lighting.

3) Acting as emergency lights, these sconces are wired separately. They remain on, powered by remotely located batteries, in the event of a power loss.
**Issue**  Unobtrusive Fixtures

**NFPA 101 Code Reference**

7.9.1.1 Emergency lighting facilities for means of egress shall be provided in accordance with Section 7.9 for the following:

(1) Buildings or structures where required in Chapter 11 through Chapter 42 …

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  
Fig. 1) Fairfield St. Apartments, St. Albans, VT  
Fig. 2) Middlebury College, Middlebury, Vermont

**Use**  
Fig. 1) Residential  
Fig. 2) Educational

**Notes**

1) Slim-profile units are unobtrusive.
2) Fixture color matches existing walls and ceilings.
3) Units mounted away from moldings and other historic features.
4) Flush-mounted emergency lights are also available with white frosted glass.
**EMERGENCY LIGHTING**

**Issue**  Unobtrusive Fixtures

**NFPA 101 Code Reference**

7.9.1.1 Emergency lighting facilities for means of egress shall be provided in accordance with Section 7.9 for the following:

1) Buildings or structures where required in Chapter 11 through Chapter 42 …

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Follett House  Burlington, Vermont

**Use**  Business

**Notes**

1) Slim-profile units are unobtrusive.

2) Fixture color matches existing walls and ceilings.

3) Units mounted away from moldings and other historic features.

4) These remote heads have a separate power supply; this allows for greater flexibility in placement of the heads.
**EXIT SIGNS**

**Issue**  
Unobtrusive Fixtures

**NFPA 101 Code Reference**

7.10.1.2 Exits, other than main exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or other appropriate wording shall be used: EXIT.

7.10.5.1 Every sign required by 7.10.1.2 or 7.10.1.5 … shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  
Fig. 1) Johnson School, Johnson, Vermont  
Fig. 2) Fairfield St. Apartments, St. Albans, VT

**Use**  
1) Educational  
2) Residential

**Notes**

1) This educational building utilizes an unobtrusive exit sign.  
2) This model replaces the more imposing box-style unit that often detracts from the historic feel of any building's interior.  
3) This flat unit blends in with the wall and clearly marks the exit with internally illuminated letters.
Issue: Unobtrusive Fixtures

NFPA 101 Code Reference

7.10.1.2 Exits, other than main exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or other appropriate wording shall be used: EXIT.

7.10.5.1 Every sign required by 7.10.1.2 or 7.10.1.5 … shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

Vermont Code Requirements

Same as NFPA 101.

Building: Old Chapel, Middlebury College
Middlebury, Vermont

Use: Assembly

Notes

1) This building utilizes a less obtrusive exit sign.

2) Housing unit trimmed in white, without exposed or unpainted metal, blends in better with wall and moldings.

3) This flatter unit blends in with the wall and clearly marks the exit with internally illuminated letters.
**Issue** Unobtrusive Fixtures

**NFPA 101 Code Reference**

7.10.1.2 Exits, other than main exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or other appropriate wording shall be used: EXIT.

7.10.5.1 Every sign required by 7.10.1.2 or 7.10.1.5 … shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**

Middlebury Congregational Church
Middlebury, Vermont

**Use**

Assembly

**Notes**

1) The requirements of the code are met by a black and white painted sign on a wooden panel, illuminated from above by a brass fixture with an incandescent bulb.

2) The exit is marked without using a larger plastic sign that could detract from the church’s aesthetic qualities.

3) Emergency Exit signs should be made legible by the use of contrasting colors such as the black and white used in this sign.
Figure 1: Low-profile unit, suspended from ceiling, lacks bulk of older models.

Figure 2: Translucent lexan panel causes only minimum interference with sightlines.

**Issue**  Unobtrusive Fixtures

**NFPA 101 Code Reference**

7.10.1.2 Exits, other than main exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or other appropriate wording shall be used: EXIT.

7.10.5.1 Every sign required by 7.10.1.2 or 7.10.1.5 … shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  St. Johnsbury Athenaeum  
St. Johnsbury, Vermont

**Use**  Assembly

**Notes**

1) This cultural landmark utilizes less obtrusive exit signage.

2) These low-profile examples utilize a lighting scheme that allows a translucent lexan panel to be illuminated from the top down, eliminating the bulk of older models and causing only minimum interference with sightlines.
Figure 1: This historic theater retained the faces of its historic exit signs, while updating their interiors.

Figure 2: The retained historic signs had finishes and styling similar to other features in the building.

**Issue**  Reuse of Existing Signage

**NFPA 101 Code Reference**

7.10.1.2 Exits, other than main exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or other appropriate wording shall be used: EXIT.

7.10.5.1 Every sign required by 7.10.1.2 or 7.10.1.5 ... shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Flynn Theater

**Burlington, Vermont**

**Use**  Assembly

**Notes**

1) Face of historic signs retained, while interior of signs updated with new wiring and power source.

2) Retaining the existing exit signs helps to retain the historic character of the building.
Figure 1: Existing fire escape at the Putney Town Clerk’s Office is in good condition and provides a safe and attractive means of egress.

Figure 2: Detail of historic, cast iron fire escape.

**Issue** Using Existing Fire Escapes

**NFPA 101 Code Reference**

7.2.8.1.1 Fire escape stairs shall comply with the provisions of 7.2.8, unless they are approved, existing fire escape stairs.

**Vermont Code Requirements**

Same as NFPA 101.

**Building** Putney Town Clerk’s Office  
Putney, Vermont

**Use** Business

**Notes**

1) The existing cast iron fire escape meets code requirements.

2) The fire escape provides a means of egress from the second story and contributes to the building’s aesthetic qualities with its intricate details.
FIRE ESCAPES AND OUTSIDE STAIRS

Issue  Adding Outside Stairs

NFPA 101 Code Reference

7.2.2.1 Stairs [whether interior or exterior] used as a component in the means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.2. unless otherwise specified in 7.2.2.1.2.

[See Section 7.2.2.6 for special provisions relating to outside stairs, including among other things, provision for separation from interior of building by fire resistant construction and minimum openness requirements to restrict the accumulation of smoke.

Vermont Code Requirements

Same as NFPA 101.

Building  Historical Society  Middletown Springs, Vermont

Use  Assembly

Notes

1) Stair system concealed in a style that complements the main building.

2) A second means of egress is provided for the second floor assembly space.

3) Materials are painted to match building.
**FIRE ESCAPES AND OUTSIDE STAIRS**

**Issue** Adding Outside Stairs

**NFPA 101 Code Reference**

7.2.2.1 Stairs [whether interior or exterior] used as a component in the means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.2. unless otherwise specified in 7.2.2.1.2.

[See Section 7.2.2.6 for special provisions relating to outside stairs, including among other things, provision for separation from interior of building by fire resistant construction and minimum openness requirements to restrict the accumulation of smoke.]

**Vermont Code Requirements**

Same as NFPA 101.

**Building** Town Hall
Wallingford, Vermont

**Use** Assembly

**Notes**

1) Outside stairs providing egress for upstairs auditorium space were added to rear facade of town hall, minimizing the stairs’ impact on historic character of building, especially for those viewing the building from the street.

2) Removable canvas awning provides protection from precipitation with only minimum alteration to historic bricks and mortar.

3) Color of awning blends with building to be less obtrusive.
Figure 1: Steel railing is mounted outside original banister. Historic fabric is left untouched.

Figure 2: Steel railing is painted brown to better blend with original railing.

**Issue**  
Insufficient Handrail Height

**NFPA 101 Code Reference**

7.2.2.4.4.1 New handrails on stairs shall be not less than 34 inches and not more than 38 inches above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

7.2.2.4.4.2 Existing required handrails shall be not less than 30 inches and not more than 38 inches above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  
Johnson Elementary School  
Johnson, Vermont

**Use**  
Educational

**Notes**

1) Historic handrail is too low to satisfy code requirements for a 30 inch minimum height.

2) Solution is to fabricate modern railing that wraps around and does not alter historic railing.

3) Time, money and historic fabric is saved by not having to remove or significantly alter historic railing.

4) Railing meets sphere requirements for openings between balusters.
Figure 1: Slender profile of railing cap creates less impact than a complete rail system. The rail on the opposite side is mounted above wainscoting at the correct height.

Figure 2: Rail cap painted with a finish color that blends in with the historic baluster.

**Issue**  Insufficient Handrail Height

**NFPA 101 Code Reference**

7.2.2.4.4.1 New handrails on stairs shall be not less than 34 inches and not more than 38 inches above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

7.2.2.4.4.2 Existing required handrails shall be not less than 30 inches and not more than 38 inches above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Vergennes Opera House

**Vergennes, Vermont**

**Use**  Assembly

**Notes**

1) Historic handrail is too low to satisfy code requirements for a 30 inch minimum height.

2) Replacing this banister with longer wood balusters would be expensive and wasteful of historic fabric.

3) Steel railing caps of flat, bar stock are mounted directly to the historic railing. This application mitigates the impact of a full modern rail system that would dominate the historic feel of the foyer space where these stairs are located.
**Issue**  Insufficient Guardrail Height

**NFPA 101 Code Reference**

7.1.8 Guards in accordance with 7.2.2.4 shall be provided at open sides of means of egress [which may include stairs, landings, balconies, corridors, passageways, floor or roof openings, ramps, aisles, porches and mezzanines] that exceed 30 inches above the floor or grade below.

7.2.2.4.5.2 Guards shall not be less than 42 inches high, except as permitted by one of the following: …

(3) Existing guards on existing stairs shall be permitted to be not less than 30 inches high. [Note that exception only applies to stairs, not landings.]

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Fairfield Street Apartments  
St. Albans, Vermont

**Use**  Residential

**Notes**

1) Historic handrail satisfied code requirements for a minimum height of 30 inches. (A new handrail at regulation height (i.e. greater than 34 inches) was added to the wall side of the stairs.)

2) Historic railing at landing did not satisfy code’s minimum height for guardrails, so it was capped with a modern guardrail to it to bring it up to necessary height.

3) With approval of code official, furniture may be permanently placed in front of low guardrail to prevent fall hazard.
RAILINGS

**Issue** Insufficient Guardrail Height

**NFPA 101 Code Reference**

7.1.8 Guards in accordance with 7.2.2.4 shall be provided at open sides of means of egress [which may include stairs, landings, balconies, corridors, passageways, floor or roof openings, ramps, aisles, porches and mezzanines] that exceed 30 inches above the floor or grade below.

7.2.2.4.5.2 Guards shall not be less than 42 inches high, except as permitted by one of the following: …

(3) Existing guards on existing stairs shall be permitted to be not less than 30 inches high. [Note that exception only applies to stairs, not landings.]

**Vermont Code Requirements**

Same as NFPA 101.

**Building** Public Library
Rutland, Vermont

**Use** Assembly

**Notes**

1) Historic guardrail at landing is too low to satisfy code requirements for a 42 inch minimum height.

2) Modern railing mimics the finish of historic handrail utilizing natural hardwood for the caps and similar paint for the steel postings.

3) Placement preserves dramatic view up stairwell.
**Figure 1**: Steel railing is mounted on back of original banister. Historic fabric is preserved. Regulation height railing is added opposite historic railing on stairs.

**Figure 2**: Thin profile and horizontality of steel railing make it unobtrusive.

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**Issue**  
Insufficient Guardrail Height

**NFPA 101 Code Reference**

*7.1.8* Guards in accordance with 7.2.2.4 shall be provided at open sides of means of egress [which may include stairs, landings, balconies, corridors, passageways, floor or roof openings, ramps, aisles, porches and mezzanines] that exceed 30 inches above the floor or grade below.

*7.2.2.4.5.2* Guards shall not be less than 42 inches high, except as permitted by one of the following: …

(3) Existing guards on existing stairs shall be permitted to be not less than 30 inches high. [Note that exception only applies to stairs, not landings.]

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  
St. Johnsbury Athenaeum  
St. Johnsbury, Vermont

**Use**  
Assembly

**Notes**

1) Historic guardrail at landing is too low to satisfy code requirements for a 42 inch minimum height.

2) On landings, thin profile iron railings are attached to the backs of historic wooden railings, adding necessary height without altering historic railing. On stairs, thin profile iron railings are added at regulation height (i.e. 34 inches) opposite historic railings, which are preserved unaltered.

3) Impact of modern railings is mitigated by thin profile and horizontality of elements, which mimic horizontality of historic railing.
Figure 1: This room will suffer no aesthetic impact from installation of air sampling detectors.

Figure 2: Air sampling points are generally of a nominal one-inch diameter. These components will be hidden from sight, mounted behind the cornice.

**SMOKE AND FIRE DETECTION**

**Issue**
Unobtrusive Fixtures

**NFPA 101 Code Reference**

9.6.1.3 A fire alarm system required for life safety shall be installed, tested, and maintained in accordance with the applicable requirements of NFPA 70 National Electrical Code® and NFPA 72® National Fire Alarm Code®, unless it is an approved existing installation, which shall be permitted to be continued in use.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**
Vermont State House
Montpelier, Vermont

**Use**
Assembly

**Notes**

1) In lieu of conventional spot detectors, and/or linear beam devices, an air sampling system is installed.

2) Air sampling smoke detection has been selected by Vermont state buildings for public spaces.

3) Air sampling detectors consist of a series of pipes or tubes that radiate throughout the protected space. The system functions by constantly drawing air from the room, then analyzing it in a separate detection chamber.
Issue  Unobtrusive Fixtures

NFPA 101 Code Reference

9.6.1.3 A fire alarm system required for life safety shall be installed, tested, and maintained in accordance with the applicable requirements of NFPA 70 National Electrical Code® and NFPA 72® National Fire Alarm Code®, unless it is an approved existing installation, which shall be permitted to be continued in use.

Vermont Code Requirements

Same as NFPA 101.

Building  Vermont State House
          Montpelier, Vermont

Use  Assembly

Notes

1) Detectors are placed along ceiling perimeters, near cornice moldings.

2) Detectors need not be centered in the ceiling.
Figure 1: The clean lines of the historic cornice remain uninterrupted.

Figure 2: Sprinkler head mounted several inches below cornice.

**Issue**  Unobtrusive Application

**NFPA 101 Code Reference**

9.7.1.1 Each automatic sprinkler system required by another section of this Code shall be in accordance with one of the following:  (1) NFPA 13 Standard for the Installation of Sprinkler Systems, (2) NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, (3) NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Vermont State House
Montpelier, Vermont

**Use**  Assembly

**Notes**

1) Sprinkler head is a sidewall head mounted below the historic cornice. Sidewall heads spray water over entire room, without requiring sprinkler heads in the middle of the ceiling.

2) Escutcheon plate is painted the same color as the wall to be less obtrusive.
**Issue**  Unobtrusive Application

**NFPA 101 Code Reference**

9.7.1.1 Each automatic sprinkler system required by another section of this Code shall be in accordance with one of the following: (1) NFPA 13 Standard for the Installation of Sprinkler Systems, (2) NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, (3) NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Vermont State House
Montpelier, Vermont

**Use**  Assembly

**Notes**

1) Sprinkler point is mounted below historic cornice. Plasterwork is left untouched.

2) Escutcheon plate is painted the same color as the wall to be less obtrusive. Some manufacturers offer sprinkler heads in different colors.
Figure 1: Low ceiling interior is not adversely impacted by any exposed pipes or sprinkler heads.

Figure 2: Pop-out unit on right. Note slim-profile emergency light.

**Issue**  Unobtrusive Application

**NFPA 101 Code Reference**

9.7.1.1 Each automatic sprinkler system required by another section of this Code shall be in accordance with one of the following: (1) NFPA 13 Standard for the Installation of Sprinkler Systems, (2) NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, (3) NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Old Chapel, Middlebury College
Middlebury, Vermont

**Use**  Assembly

**Notes**

1) Flush to the ceiling, plastic disk covers sprinkler fixture. Sprinkler head is now hidden from view.

2) Mounted apart from wood cornice work, this sprinkler is a pop-out model that hides the sprinkler head in the ceiling until activated.
Figure 1: Color matched sprinkler caps and smoke detectors are less obtrusive than standard white caps and fixtures against decorated gray ceiling.

Figure 2: Sprinkler cap produced by manufacturer to match ceiling color does not distract from adjacent art deco ornamentation.

**SPRINKLERS**

**Issue**  Unobtrusive Application

**NFPA 101 Code Reference**

9.7.1.1 Each automatic sprinkler system required by another section of this Code shall be in accordance with one of the following: (1) NFPA 13 Standard for the Installation of Sprinkler Systems, (2) NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, (3) NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**

Fig. 1) St. Johnsbury Athenaeum, St. Johnsbury, VT
Fig. 2) Flynn Theater, Burlington, VT

**Use**

1) Library/Assembly
2) Assembly

**Notes**

1) Flush to the ceiling, plastic disk covers sprinkler fixture. Sprinkler head is hidden from view until activated.

2) Sprinkler cap matches color of ceiling. Cap is color matched by manufacturer, not simply painted, in order to retain necessary fire rating. Color matched caps are less obtrusive and are especially recommended in the case of ceilings with colorful historic decoration.
Figure 1: Adverse impact is mitigated by mounting pipes along the side of the beam; bottom face is left untouched.

Figure 2: Pipes are painted to further reduce visual impact.

**Issue**  
Unobtrusive Application

**NFPA 101 Code Reference**

9.7.1.1 Each automatic sprinkler system required by another section of this Code shall be in accordance with one of the following: (1) NFPA 13 Standard for the Installation of Sprinkler Systems, (2) NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, (3) NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  
Johnson Elementary School  
Johnson, Vermont

**Use**  
Educational

**Notes**

1) Historic pressed metal ceiling poses specific installation problems.

2) Sprinkler pipes and heads are mounted parallel with ceiling beam. Less expensive to install.
Issue: Inadequate Water Supply

NFPA 101 Code Reference

9.7.1.1 Each automatic sprinkler system required by another section of this Code shall be in accordance with one of the following: (1) NFPA 13 Standard for the Installation of Sprinkler Systems, (2) NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, (3) NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.

Vermont Code Requirements

Same as NFPA 101.

Building: West Main Street
Bennington, Vermont

Use: Mercantile/Residential

Notes

1) Existing connection to municipal water supply was inadequate for the water supply needs of the sprinkler system.

2) Series of 250 gallon tanks in basement provide adequate water supply to new sprinkler system.

3) May also be used in communities that do not have a municipal water supply.
Figures 1 and 2: Open foyer, staircase and landings are important to the character of the historic space.

Figure 3: Pocket doors held open by magnetic doorstops automatically close when activated by fire and smoke sensors. Glass bullseye retro-fitted with fire rated glass.

**Issue**  Open Stair

**NFPA 101 Code Reference**

7.2.2.5.1.1 All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2.

7.1.3.2.1 Where this Code requires an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.2 and the following: (1) the separation shall have not less than a 1-hour fire resistance rating where the exit connects three stories or less, (2) the separation shall have not less than a 2-hour fire resistance rating where the exit connects four or more stories … [subject to certain exceptions].

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  St. Johnsbury Athenaeum

St. Johnsbury, Vermont

**Use**  Assembly

**Notes**

1) This cultural landmark was able to retain the open space of its foyer and grand staircase. The foyer and staircase required separation from the building's other spaces by fire-rated enclosures.

2) Historic pocket doors on each landing were put to use as self-closing doors. Magnetic doorstops holding the doors in their pockets are deactivated by smoke and heat sensors, permitting the doors to slide closed automatically. Original openings in the doors were retrofitted with fire rated glass. This solution adapts an historic feature to increase the building's fire safety.

3) A significant factor permitting the retention of the open stairwell was the sprinkler system throughout the building.
STAIRS

Figure 1: View of spiral staircase on ground floor.

Figure 2: Re-mounting the continuous handrail required minimum plaster repair to the wall.

Issue

Open Stair

NFPA 101 Code Reference

7.2.2.5.1.1 All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2.

7.1.3.2.1 Where this Code requires an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.2 and the following: (1) the separation shall have not less than a 1-hour fire resistance rating where the exit connects three stories or less, (2) the separation shall have not less than a 2-hour fire resistance rating where the exit connects four or more stories … [subject to certain exceptions].

Vermont Code Requirements

Same as NFPA 101.

Building

Vermont State House
Montpelier, Vermont

Use

Assembly

Notes

1) This assembly building was able to keep the existing three floor open stairwell.
2) To meet minimum height requirements, the continuous handrail that was original to the building was simply raised and re-fastened.
3) The first floor of the State House is sprinklered above and below the ceiling; this was a significant factor permitting the retention of the open stairwell.
Issue  Open Stair

NFPA 101 Code Reference

7.2.2.5.1.1 All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2.
7.1.3.2.1 Where this Code requires an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.2 and the following: (1) the separation shall have not less than a 1-hour fire resistance rating where the exit connects three stories or less, (2) the separation shall have not less than a 2-hour fire resistance rating where the exit connects four or more stories … [subject to certain exceptions].

Vermont Code Requirements

Same as NFPA 101.

Building  Follett House
          Burlington, Vermont

Use  Business

Notes

1) This building was able to keep the existing open stairwell.
2) The continuous handrailing against the wall was installed to meet height requirements.
3) Another stairwell was built in the back of the house to provide a second means of egress, allowing the original stairwell to remain.
Figure 1: Stairwell remains open. Archway conceals automated safety doors. No visual impact.

Figure 2: Safety door hidden in the ceiling above archway. Only door gasket and slender track are visible.

**Issue**  Open Stair

**NFPA 101 Code Reference**

7.2.2.5.1.1 All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2.

7.1.3.2.1 Where this Code requires an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.2 and the following: (1) the separation shall have not less than a 1-hour fire resistance rating where the exit connects three stories or less, (2) the separation shall have not less than a 2-hour fire resistance rating where the exit connects four or more stories … [subject to certain exceptions].

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Old Chapel, Middlebury College
Middlebury, Vermont

**Use**  Assembly

**Notes**

1) This building was able to keep its three floor open stairwell by separating the stairwell from the rest of the building with fire-rated enclosures.

2) Activated by smoke and heat sensors, fire-rated steel and glass doors located behind the open-arched doorways drop down automatically. Once closed, they will not re-open and there is an exit on either side of the enclosure. The result is a protected pathway to the exit discharge.
Figure 1: First floor transom fixed with new wire-glass.

Figure 2: First floor historic door with new wire-glass.

**Issue**  Open Transom

**NFPA 101 Code Reference**

8.3.4.1 Every opening in a fire barrier shall be protected to limit the spread of fire and restrict the movement of smoke from one side of the fire barrier to the other.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  Barre Opera House

Barre, Vermont

**Use**  Assembly and Business

**Notes**

1) Passage of light retained by using wire-glass within steel frame instead of blocking transoms and door windows with panels of wood or metal.

2) Historic appearance of transom and door retained.

3) Transom is fixed in a closed position.
Figure 1: Transom is secured and unable to be opened.

Figure 2: Transom fixed with clear fire-glass using original moldings and corner blocks.

**Issue**  
Fixed Glass Panels

**NFPA 101 Code Reference**

8.3.4.1 Every opening in a fire barrier shall be protected to limit the spread of fire and restrict the movement of smoke from one side of the fire barrier to the other.

**Vermont Code Requirements**

Same as NFPA 101.

**Building**  
Fig. 1) Johnson School, Johnson, Vermont  
Fig. 2) Fairfield St. Apartments, St. Albans, VT

**Use**  
Fig. 1) Educational  
Fig. 2) Residential

**Notes**

1) Fixed glass now acts as a barrier that helps to limit fire and restrict the movement of smoke.

2) Original doorway retains historic character.

3) Securing transoms in their frames can be a simple and inexpensive solution to satisfying code requirements.
Issue  Size of Window Used as Secondary Means of Escape

NFPA 101 Code Reference

24.2.2.1  In dwellings or dwelling units of two rooms or more, every sleeping room and every living area shall have not less than one primary means of escape and one secondary means of escape.

24.2.2.3  The secondary means of escape, other than existing approved means of escape, shall be one of the means specified in 24.2.2.3(A) through 24.2.2.3(C).

24.2.2.3(C)  It shall be an outside window … operable from the inside without the use of tools, keys, or special effort and shall provide a clear opening of not less than 5.7 ft$^2$.

Vermont Code Requirements

Vermont interprets "existing approved means of escape" in Section 24.2.2.3 to include existing windows where: (a) the opening meets minimum width (20 in.) and height (24 in.) requirements, (b) the bottom height of the opening is not more than 44 inches above the floor, and (c) the size of the opening is at least 5.0 ft$^2$ in area.

Building  Adams House, Fair Haven, Vermont

Use  Dwelling

Notes

1)  Conditions that affect the usability of an escape window include whether or not the window opens directly to grade or to an adjacent roof, the relationship between the height and width of the opening, the operation of the window sash, etc.

2)  Only the actual window opening can be considered (e.g. removable sash is not taken into account).

3)  Windows qualifying as existing approved means of escape may be preserved. Non-qualifying windows may be approved with a variance if usability warrants.
The Construction Permit Process

Section 4 of the Vermont Fire & Building Safety Code - 2005 (the Vermont Code) requires that a construction permit be obtained for construction work in any public building or premises and provides detailed information on the permit application process. Half of the applications for a construction permit received each year by the Division of Fire Safety are permitted within two weeks. However, the review of a construction permit application may take longer. Often the delay is due to incomplete or inadequate information provided by the applicant.

The construction permit application form and all of the supporting documentation are reviewed for compliance with the Vermont Code by Division of Fire Safety staff. When the proposed project complies with the Vermont Code a construction permit is issued. This permit is accompanied by a letter from the plan reviewer and contains any conditions to which the permit is subject.

For complex buildings, the Division of Fire Safety attempts to provide pre-plan review consultations to assist applicants with complying with the code. For consultations, applicants should contact the appropriate regional office of the Division of Fire Safety. As indicated in the introduction to this Field Guide, in any rehabilitation projects involving historic buildings, it is also important to consult with officials from the Division for Historic Preservation or other consulting historic preservation professionals early in the planning process. Historic preservation professionals can help identify important features in historic buildings and work with fire safety officials to come up with alternative solutions that achieve fire safety, while preserving as many of the historic features as possible.

When the project is complete, an occupancy permit will be issued.

The Application

The application requires several types of information regarding the proposed construction. The information is very important to the Division of Fire Safety and will assist the project in processing smoothly. In the case of an application for an extensive or complex project, a short one or two paragraph statement describing the purpose and scope of the work is helpful to the plan reviewer as an overview that establishes the parameters of the project. The application needs to be filled out completely and be legible.

The information required by the application concerns the following issues.

1) Site Information – the name and address of the building and the owner/lessee;
2) Project Information – information about the type of project to be undertaken and short statements describing the proposed building use and the scope of the work, in order to provide the plan reviewer with an overview that establishes the parameters of the project;
3) Project Contractor and Designer Information – names and contact information for the responsible parties on the project;
4) Building Information – information about the building type, fire protection systems, occupancy class, and building size;  
5) Information regarding Fire Alarm Systems, Sprinkler Systems, Automatic Fire Suppression Systems and Storage Tanks – where projects involve these features;  
6) Energy Conservation Certification - for publicly funded buildings only, a certification that the building meets certain standards for energy efficiency is required; and  
7) Project Valuation Information and Calculation of the Permit Fee.

Fill out the Construction Permit Application Completely!  
One thing the applicant can do to keep a project moving smoothly through the construction permit process is to fill out the construction permit application completely and accurately.

The Plan and Specifications

The Division of Fire Safety often receives questions from applicants asking how much detail and information needs to be included in the plans and specifications. There is no one answer to that question because the Division reviews projects that vary from minor renovations or equipment to multi-million dollar complexes. The answer is really contained in Section 4(d) of the Vermont Code, which indicates the plans "…shall be sufficiently clear, comprehensive, detailed and legible…” so that Division staff, who are familiar with both safety requirements and building features, can determine if the minimum requirements of the safety codes are being met. If enough information is not provided, the Division staff will not be in a position to help identify any problems during the early stages of the project when they are easier to fix.

The following documents and information need to be included in the plans and specifications:

1) Site Plans  
2) Construction Drawings  
3) Working Drawings  
4) Specifications  
5) Renovations specifications.

If an owner is requesting special consideration for an historic building, the application shall include documentation on (1) the historic designation of the building, including identification and evaluation of historic adjacent structures and site elements such as sheds, walkways, and fencing; (2) historic construction features such as sheathing, facade or roofing materials, chimneys, skylights, cornices or molding, windows or doors, wainscoting, cabinets and finishes; and (3) historic spaces such as archways, lobbies or rooms which are important to the understanding and application of the building. This information can be presented in photographs, annotated plans and/or written description.

Many historic building rehabilitations will not require professionally prepared architectural drawings, although they are encouraged, especially for complex projects.
Regional Problem Solving

The regional offices of the Division of Fire Safety are staffed with safety professionals who have training and experience in developing solutions to meet both safety and historic preservation concerns. If a solution to a problem has not been developed after plan review or inspection, the owner or designated representative should contact the regional manager for assistance. With more experience and resources to draw on, the regional manager will often develop a solution without requesting a formal variance.

Cooperative Municipal Inspection Agreements

Under Section 2736 of Title 20 of the Vermont Statutes, responsibility for enforcement of the Vermont Code may be assigned to municipalities. The Division of Fire Safety has entered into cooperative municipal inspection agreements with several Vermont cities and towns. Some agreements cover most aspects of the Vermont Code while other agreements are limited to just a part of the Vermont Code, or a certain classification of buildings such as apartment buildings. If a building to be rehabilitated is located in a cooperating municipality, permit application documentation is submitted to the appropriate municipal official.

Currently (i.e. in 2005), municipalities party to a cooperative municipal inspection agreement are as follows:

- Barre (limited)
- Bellows Falls
- Bennington
- Brattleboro
- Burlington
- Hartford
- Winooski (limited)

Regardless of whether code enforcement and permit application review is carried out by the Division of Fire Safety or a cooperating municipality, the same process for variances and exemptions applies.

Variances, Exemptions

A. General Procedure

The Vermont Fire & Building Safety Code - 2005 includes a measure of flexibility intended to provide owners or contractors engaged in an older or historic building renovation projects with alternative ways to comply with the code. Professional designers experienced in the application of the code can frequently develop alternative solutions. However, in some cases compliance is not possible. 20 V.S.A. §2731(e) provides that the Commissioner of Public Safety may grant variances and exemptions from the code where strict compliance:

- would entail practical difficulty,
- would create an unnecessary hardship, or
- is otherwise found unwarranted,

provided, among other things, that:

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9 Section 5 of the Vermont Fire & Building Safety Code – 2005 provides that the Commissioner’s power in these instances may be exercised by the Regional Managers of the Division of Fire Safety and the Chief Fire Prevention Officer.
• any such variance or exemption secures the public safety and health;
• any petitioner for such a variance or exemption can demonstrate that the methods, means, or practices proposed to be taken in lieu of compliance with the code provide, in the opinion of the Commissioner, equal protection of the public safety and health as provided by the code; and
• the portion of the code from which the variance or exemption is sought has not also been promulgated as a rule or standard under the Vermont Occupational Safety and Health Program.

20 V.S.A. §2731(h) provides that building owners and contractors renovating historic buildings may propose innovative, performance-based alternatives in lieu of strict fire and building code compliance, and that the Commissioner shall consider such alternatives and accept those that provide equivalent protection of the public health and safety.

(It should be noted that requests for variances from the requirements of the Vermont Access Rules are processed by the Vermont Access Board as established under 21 V.S.A. §271 et seq.)

B. Variances for Historic Buildings

Requests for variances and exemptions for historic buildings and structures that are not resolved under the general variance procedure described above are determined in a special variance process by the Historic Variance Appeals Board as established by 20 V.S.A. §2732. The building owner or a designated representative may request a variance or exemption by submitting a written request to Chief Fire Prevention Officer at the Division of Fire Safety’s main office in Berlin. For many historic buildings there are alternatives to the standard provisions of the code that will provide an equivalent level of safety for the people using the building. 20 V.S.A. §2732 outlines the Historic Variance Appeals Board process, and specifically permits the board to consider damage to or destruction of the historic architectural integrity of a historic building as a basis for granting a variance. When seeking a variance, the building owner or designated representative must demonstrate that the proposed alternative to the dictates of the code provides equivalent protection of the public safety and health. Often, installing a new sprinkler system in a building compensates for other code requirements that would have required damage to or removal of historic architectural features. Two other approaches to provide information on equivalent safety development are: development of a fire safety plan as described in NFPA 914 Section 11.3.2 and NFPA 909 Section 2.2; and completion of an alternatives analysis under NFPA 101A. The latter is an analysis that assigns numerical values to building conditions and safety provisions and defines minimum "scores" for approval.

The Historic Variance Appeals Board is comprised of three members: the Commissioner of Public Safety or designee; the State Historic Preservation Officer or designee; and a representative of the Vermont preservation community appointed by the Governor. A copy of the proposed rules for the Board may be found at: http://www.dps.state.vt.us/fire/historicvarprorule.htm.
The Secretary of the Interior’s Standards for Rehabilitation:

The Secretary of the Interior’s Standards for Rehabilitation (http://www.cr.nps.gov/hps/tps/standards/rehabilitation.htm) are intended to provide guidance to historic building owners and building managers, preservation consultants, architects, contractors, and project reviewers prior to treatment. Developed by the National Park Service in the 1970s the Standards have become the commonly accepted professional preservation guidelines for planning and carrying out work on historic buildings.

The Standards are further explained in Illustrated Guidelines (http://www.cr.nps.gov/hps/tps/tax/rhb/) that assist in applying the Standards to specific types of work. They are not meant to give case-specific advice or address exceptions or rare instances. Therefore, it is recommended that the advice of qualified historic preservation professionals be obtained early in the planning stage of the project. Such professionals may include architects, architectural historians, historic preservationists, and others who have experience working with historic buildings.

The following Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

The Secretary of the Interior’s Standards for Rehabilitation

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces and spatial relationships.

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other buildings, will not be undertaken.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale, and proportion, and massing to protect the integrity of the property and its environment.

10. New additions and adjacent or related new construction will be undertaken in such a manner, that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.
NFPA PUBLICATIONS
The National Fire Protection Association distributes a number of publications that focus on individual Code issues. Since these documents are updated along with the Code every three to four years their reference numbers continue to change. Listed below are some of those publications available from the National Fire Protection Association, Inc., 1 Batterymarch Park, Quincy, MA 02169-7471; phone: 1-800-344-3555; www.nfpa.org (followed by the year of the edition adopted by the State of Vermont).

NFPA 101: Life Safety Code® (2003), principally addresses the protection of people in the event of a fire or similar emergency and has different chapters for new and existing buildings, organized by building use type. It includes provisions for egress, stairs, fire escapes, flame and smoke barriers and emergency lighting.

NFPA 1: Uniform Fire Code™ (2003), primarily addresses requirements for the maintenance and operation of buildings by use type, and includes provisions for egress, fire detection, and sprinklers.

NFPA 914: Code for Fire Protection of Historic Structures (2001) offers guidance on the importance of preserving historic building features and how to plan a project that preserves a historic building and provides for the public safety and health. Vermont recognizes NFPA 914 as guidance for treating historic buildings and as a reference for fire ratings for old materials. NFPA contains extensive charts that list the fire ratings of old doors, plaster walls and ceilings, etc.

NFPA 909: Code for the Protection of Cultural Resources (2001) describes principles and practices of fire safety for cultural properties and for those who operate, use, or visit them. It covers ongoing operation and rehabilitation and acknowledges the need to preserve historical integrity.

Other pertinent publications include:


Glossary*

Accessible Means of Egress. A means of egress that provides an accessible route to an area of refuge, a horizontal exit, or a public way.

Approved. Acceptable to the authority having jurisdiction.

Atrium. A large volume of space created by a floor opening or series of floor openings connecting two or more stories that is covered at the top of the series of openings and is used for purposes other than an enclosed stairway; an elevator hoistway; an escalator opening; or as a utility shaft used for plumbing, electrical, air-conditioning, or communications facilities.

Authority Having Jurisdiction. The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

Automatic. That which provides a function without the necessity of human intervention.

Building. Any structure used or intended for supporting or sheltering any use or occupancy. The term "building" is to be understood as if followed by the words "or portions thereof." See also Structure.

Building, Existing. A building erected or officially authorized prior to the effective date of the adoption of the Code by the agency or jurisdiction.

Collections. Prehistoric and historic objects, works of art, natural history specimens, religious objects, archival documents, archeological artifacts, library media, and cultural materials assembled according to some rational scheme and maintained for the purpose of preservation, research, study, exhibition, publication, and interpretation for public benefit.**

Combustible Material. A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn.

Combustion. A chemical process that involves oxidation sufficient to produce light or heat.

Conservation. The professional practice of examination, documentation, treatment, and preventative care devoted to the preservation of cultural property.**

Court. An open, uncovered, unoccupied space, unobstructed to the sky, bounded on three or more sides by exterior building walls.

Cultural Properties. Buildings, structures or sites, or portions thereof, that are culturally significant, or that house culturally significant collections. Such properties include, but are not limited to, museums, libraries, historic structures, and places of worship.**

Draft Stop. A continuous membrane used to subdivide a concealed space to restrict the passage of smoke and heat.

Fire Barrier. A continuous membrane or membrane with discontinuities created by protected openings with a specified fire protection rating, where such membrane is designed and
constructed with a specific fire resistance rating to limit the spread of fire, that also restricts the movement of smoke.

**Fire Compartment.** A space within a building that is enclosed by fire barriers on all sides, including the top and bottom.

**Fire Protection System.** Any fire alarm device or system, or fire extinguishing device or system, or their combination, which is designed to detect, control, or extinguish a fire.

**Fire Resistive.** Refers to properties or designs to resist the effects of any fire to which a material or structure can be expected to be subjected.

**Flame Spread.** The propagation of flame over a surface.

**Guard.** A vertical protective barrier erected along exposed edges of stairways, balconies, and similar areas.

**Handrail.** A bar, pipe, or similar member designed to furnish persons with a handhold.

**Historic Building.** A building which is designated by a local, regional, or national jurisdiction as having historical, architectural, or cultural significance. Designation could be in an official existing or future national, regional, or local register, listing, or inventory. Properties that meet the criteria for eligibility should be treated as eligible. This also includes buildings in historic districts that are not architecturally distinguished, but whose scale, proportions, materials, and details are consistent with the character of the district.

**Historic Character.** The essential quality of a historic building or space that provides its significance. The character might be determined by the historic background, including association with a significant event or person, the architecture or design, or the contents or elements and finishes of the building or space.

**Historic Fabric.** Original or added building/construction materials, features, and finishes that existed during the period deemed to be most architecturally or historically significant, or both.

**Historic Preservation.** Generic term that encompasses all aspects of the professional and public concern related to the maintenance of a historic structure, site, or element in its current condition, as originally constructed, or with the additions and alterations determined to have acquired significance over time.

**Historic Site.** A place, often with associated with structures, having historic significance.

**Historic Structure.** A building, such as a bridge, lighthouse, or ship, which is designated by a local, regional, or national jurisdiction as having historical, architectural, or cultural significance.

**Labeled.** Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

Living Area. Any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces, and similar areas.

Means of Escape. A way out of a building or structure that does not conform to the strict definition of "means of egress" but does provide an alternate way out.

Mezzanine. An intermediate level between the floor and the ceiling of any room or space.

Noncombustible Material. Refers to a material that, in the form in which it is used and under the conditions anticipated, does not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat.

Occupancy. The purpose for which a building or portion thereof is used or intended to be used.

Occupant Load. The total number of persons that might occupy a building or portion thereof at any one time.

Occupiable Story. A story occupied by people on a regular basis. Stories used exclusively for mechanical equipment rooms, elevator penthouses, and similar spaces are not occupiable stories.

Outside Stair. A stair with not less than one side open to the outer air.

Place of Worship. Any building that functions primarily as a group meeting place for the practice of religion. This includes, but is not limited to, churches, synagogues, cathedrals, temples, and meeting halls.

Preservation. The act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic building or structure.

Public. Of, pertaining to, or affecting a population or a community as a whole; open to all persons.

Public Way. A street, alley, or other similar parcel of land essentially open to the outside air deeded, dedicated, or otherwise permanently appropriated to the public for public use and having a clear width and height of not less than 3050mm (120 in.).

Rehabilitation. The act or process of returning a structure to a state of utility through repair or alteration that makes possible an efficient contemporary use, including the preservation of those portions or features of the structure that are significant to its historical, architectural, or cultural values.
**Restoration.** The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of removal of features from other periods of its history and reconstruction of missing features from the restoration period.

**Self-Closing.** Equipped with an approved device that ensures closing after opening.

**Smoke Barrier.** A continuous membrane, or a membrane with discontinuities created by protected openings, where such membrane is designed and constructed to restrict the movement of smoke. A smoke barrier might be vertically or horizontally aligned, such as a wall, floor or ceiling assembly. A smoke barrier might or might not have a fire resistance rating.

**Smoke Compartments.** A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

**Smoke Detector.** A device that senses visible or invisible particles of combustion.

**Story.** The portion of a building located between the upper surface of a floor and the upper surface of the floor or roof next above.

**Street Floor.** Any story or floor level accessible from the street or from outside the building at ground level, with the floor level at the main entrance not more than three risers above or below ground level and arranged and utilized to qualify as the main floor.

**Structure.** That which is built or constructed. The term "structure" is to be construed as if followed by the words "or portion thereof." See Building.

**Vertical Opening.** An opening through a floor or roof.

**Yard.** An open, unoccupied space other than a court, unobstructed from the ground to the sky on the lot on which a building is situated.

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Resources for further information.

Organizations

Vermont Division of Fire Safety
Main Office:
1311 U.S. Route 302 - Berlin
Suite 600
Barre, VT 05641-2351
Phone: (802) 479-7561
Toll Free: (800) 640-2106

Regional Offices:
Barre - (802) 479-4434
Rutland - (802) 786-5867
Springfield - (802) 885-8883
Williston - (802) 879-2300

Web site: http://www.vtfiresafety.org

Vermont Division for Historic Preservation
National Life Building
Drawer 20
Montpelier, VT 05620-0501
Phone: (802) 828-3045
Web site: http://www.historicvermont.org

Fire Safety Institute
Jack Watts
P.O. Box 674
Middlebury, VT 05753
Phone: (802) 462-2663
Web site: http://www.middlebury.net/firesafe/

Fire Safety Network
Nick Artim
P.O. Box 895
Middlebury, VT 05753
Phone: (802) 388-1064
E-mail: firesafe@gmavt.net

Historic Preservation Program
University of Vermont
133 South Prospect Street
Burlington, VT 05405
Phone: (802) 656-3180
Web site: http://www.uvm.edu/histpres/

Preservation Trust of Vermont
104 Church Street
Burlington, VT 05401
Phone: (802) 658-6647
Web site: http://www.ptvermont.org
**Funding Sources**

*See the publication: "Funding Directory for Historic Preservation Projects in Vermont" available from the Vermont Division for Historic Preservation and at: [http://www.historicvermont.org/financial/other.pdf](http://www.historicvermont.org/financial/other.pdf)*

**Vermont Downtown Program – Tax Credits and Other Benefits Relating to Rehabilitation and Code Improvements for Income-Producing Buildings in Designated Downtowns and Designated Village Centers, including: Vermont Rehabilitation Investment Tax Credit, and Vermont Tax Credit for the Construction of Elevators, Lifts and Sprinkler Systems in Existing Buildings in Designated Downtowns**

Contact: Vermont Downtown Program
Agency of Commerce and Community Development
National Life Building
Drawer 20
Montpelier, VT 05620-0501
Attn: Chris Cochran
Phone: (802) 828-3047
E-mail: chris.coehran@state.vt.us

**Permit Fee Rebate for the Installation of Fire Sprinkler Systems in Existing Buildings in Designated Downtowns**

Contact: Vermont Division of Fire Safety

**Cultural Facilities Grants**

Contact: Vermont Arts Council
136 State Street
Montpelier, VT 05633-6001
Phone: (802) 828-3778
E-mail: jressler@vermontartscouncil.org or jkors@vermontartscouncil.org
Website: [www.vermontartscouncil.org](http://www.vermontartscouncil.org)

**Preservation Trust of Vermont – Preservation Grants**

Contact: Preservation Trust of Vermont

**Federal Rehabilitation Investment Tax Credit**

Contact: Vermont Division for Historic Preservation
Attn: Chris Cochran
Phone: (802) 828-3047
E-mail: chris.coehran@state.vt.us

**Vermont State Historic Preservation Grants**

Contact: Vermont Division for Historic Preservation
Attn: Eric Gilbertson
Phone: (802) 828-3043
E-mail: eric.gilbertson@state.vt.us

**Barn Preservation Grants**

Contact: Vermont Division for Historic Preservation
Attn: Eric Gilbertson
Phone: (802) 828-3043
E-mail: eric.gilbertson@state.vt.us
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