Vermont Fire & Building Safety Code – 2007

Summary of Important Changes – 2005 & 2007

- **Carbon monoxide -** This *Code* was expanded in scope in 2005 to include requirements to prevent carbon monoxide poisoning, based on new legislation. Carbon Monoxide alarms (detectors) are now required in all buildings where people sleep. Existing buildings were permitted to have until October 1, 2007, to install CO alarms (detectors) powered by the building electrical system. For those buildings that have not yet installed CO alarms (detectors) most dwelling units will need 1 or 2 CO alarms (detectors) at an installed wired in cost of $65-$180. Periodic inspections for gas fired heating appliances were initially proposed for this *Code* in 2005. The requirement was focused on gas appliances because testimony at the time indicated fuel oil installers generally provided yearly cleaning and burner tune up. However, during the comment period, and since that time, the concept has been expanded to include all types of fuel fired heating appliances, because all types of fuel burning would have the potential to generate and leak carbon monoxide into a building. The cost for the inspection by a qualified technician every two years will be $50-$150 plus replacement parts. The installation of CO alarms (detectors) in buildings where people sleep has been an unqualified success story saving numerous lives and identifying unhealthy levels of CO in hundreds of buildings. The common use of CO alarms (detectors) helped to identify this past winter the need to place “through wall vents” for heating appliances at a higher level to avoid being blocked by snow. The proposal to extend the venting for a typical new heating appliance would include vent pipe extensions with an approximate cost of $90 - $280. Costs may also be incurred to improve the appearance of the vent pipes selected for use. Although periodic inspections will now be required for fuel fire heating appliances by qualified technicians, the frequency of inspections of boilers by insurance company inspectors was extended under the 2005 *Code* reducing indirect costs. Costs may also be reduced for fuel companies and customers by periodic inspections that may extend the useful life of an appliance and by avoiding service calls, including service calls for vents blocked by snow.
- **Consistency of code application -** This *Code* remains consistent with other codes adopted for public buildings in Vermont by referencing the codes and standards adopted by other authorities including the Electrician Licensing Board, the Access Board and the Elevator Safety Review Board. This reduces the number of codes affecting owner/managers, builders and designers, saving the cost of separate code documents. This *Code* also remains consistent with the other New England States in adoption of the Life Safety Code, Uniform Fire Code, National Board Inspection Code and International Building Code. Construction in Vermont will be able to benefit by using the latest advances in technology by updating this *Code.* This *Code* is designed to promote consistency with code enforcement within the division and with municipal officials.
- **Historic buildings -** The Code for Fire Protection of Historic Structures remains the same as adopted in October of 2005 – allowing users to retain the use of the codes that were developed in concert with the historic preservation community. This *Code* gives broad consideration of alternative solutions for safety and now will have more prescriptive alternatives listed in the new section 43.10 in the Life Safety Code. For example; section 43.10.4.8 permits the use of existing wood lath and plaster construction that is in good condition, for 1-hour fire resistance rated construction. This alternative saves the historic fabric of the building, saves indirect costs of planning and design as well as the direct cost of demolition and construction to refinish the fire resistance rated construction with drywall material, taping and paint.

- **Smoke and fire alarms –** Public safety is improved within residential dwelling units by requiring that newly installed smoke alarms, installed outside of and adjacent to bedrooms, be the photoelectric type to improve the detection of smoldering fires. Photoelectric smoke alarms currently cost an additional $15 to $30 per device but the cost may be reduced after the units become more commonplace. The cost of notification offsite for a fire alarm is reduced under this *Code* for certain installations by permitting the use of a digital alarm communicator transmitter without a secondary transmission means.
- **Height and area limitations -** A significant consideration to owners, designers and builders is the maximum height and area a building can be built using a certain type of construction. This *Code* retains the allowances for larger buildings to be built with less costly types of construction that were established in 2005. The benefits of using one type of construction over another might include the need for large open areas, material cost changes, availability of skilled labor or other considerations. The savings could be considerable. To balance the allowable increase in the size of buildings the performance of firewalls was improved in 2005 for all types of buildings. Under this C*ode* the requirements for firewall performance are reduced, with accompanying savings for most buildings, except for high importance buildings such as buildings containing toxic gases, health care facilities, fire, rescue and police stations, emergency preparedness buildings, power generating facilities, water and sewer facilities, and telecommunication centers.
- **Fire Protection for multi-family dwellings with direct access to the outside-** All new multi-family dwellings with three or more units must be protected with a fire sprinkler system under the current code. Dwelling units with direct exit access to the outside, often known as town house units, are exempted from the requirement to provide sprinkler protection in new construction under the current code, but will be required to provide sprinkler protection for new dwelling units under the proposed rule. Improving protection for the occupants of these multi-family dwellings in Vermont is not a new idea. During the rulemaking for the Vermont Fire Prevention & Building Code, in 1999, the Vermont Career Fire Chiefs Association proposed to require sprinkler protection for town house units. The response on March 1, 2000, summarized in a letter to the Secretary of State, was to "*provide education and incentives to contractors and developers with the intent of removing the exception for the installation of fire sprinkler systems for rental housing with direct access to the outside, during the next code update process."* During the next code update for the Vermont Fire & Building Safety Code - 2005, it was proposed to eliminate the exception for dwelling units with direct exit access to the outside. The proposal was eventually withdrawn from the Vermont Fire & Building Safety Code - 2005 because confusion on the issue was delaying the implementation of the rule blocking many important safety changes such as the requirement for carbon monoxide alarms (detectors). Since that time the newer editions of the codes adopted under this rule have had considerable discussion and debate regarding residential sprinkler protection including one & two family dwellings. The Life Safety Code now requires fire sprinkler protection in new one and two family dwellings and it makes safety sense to extend this protection to townhouse units as well. In accordance with 20 V.S.A. chapter 173 this *Code* does not apply to owner occupied single-family dwellings.

  Many code requirements for town house units are similar to one and two family dwellings because they both have direct individual exit access to the outside of the building. Even dwelling units with a direct access to the outside in multi-family dwellings share a common wall, and share common risks, with their neighbors. In Vermont, most fire deaths occur in dwelling units with direct access to the outside, whether called one and two family, small apartment buildings or town house units. Opposition against fire sprinkler protection has primarily been focused on cost and the perceived effectiveness of fire sprinkler systems. The primary opposition at the national level has been from the National Association of Home Builders (NAHB).

The primary proponents at the national level have been the International Association of Fire Chiefs (IAFC) and the National Association of State Fire Marshals (NASFM).

In 2005 the Homebuilders and Remodelers Association of Vermont (HBRAV) provided information from the National Association of Homebuilders that the estimated cost of adding sprinkler protection to town house units would be $5,000 and that the increase in cost would price 690 households in northwestern Vermont out of the housing market. The cost of a fire sprinkler system may contribute to an increase in the overall cost of a dwelling unit to the consumer when a “cost-plus” system of pricing is used, but would not contribute to the end cost to the consumer when the price is based on market analysis, in which case the profit to the builder would be reduced. HBRAV also indicated that if the cost were financed through a 30 year, 6% mortgage, the cost would then be $13,489.89. The estimated cost for adding sprinkler protection to town house units in 2007 provided by NAHB is $4,800 based on an average 2,400 square foot dwelling. In a similar example provided by IAFC/NASFM the cost of the fire sprinkler protection was $4.37 a month for a $300,000 dwelling unit, financed at 6.5%, with a credit of 5% on a $2,000 insurance payment and mortgage related deductions, using a combined federal/state tax rate of 33%. It is important to consider the cost of protection from fire sprinklers in the long term, just as people consider the durability of the roof and energy conservation for the long term. The cost of sprinkler protection for town house units will vary depending on the number of units that can share the costs of control valves, construction details such as cathedral ceilings and the type of water supply available. Information provided to the Division of Fire Safety on the cost to provide sprinkler protection for a town house unit ranges from $2,000 to $6,000 per unit where a public water system is available. There are additional costs for a pump and water storage if a public water system is not available. This proposed rule already addresses the concern for the costs of a pump and water storage by permitting town house buildings to use a less stringent domestic sprinkler standard (13D) rather than a residential standard (13R) resulting in significant savings. Significant savings may also be realized for 13D fire sprinkler systems when a multipurpose system is used, combining the domestic and fire protection needs into one water system. Information from a survey provided by IAFC/NASFM indicates that the added cost for a 1,250 square foot dwelling unit was $.30 a square foot for materials and less than 8 hours of additional labor. There are a number of costs savings under this *Code* for a builder when sprinkler protection is provided, such as using smaller size windows. Additional cost incentives may even include the design of access roads to the building or savings to the municipality for changes in fire protection planning, equipment or personnel.

The National Fire Incident Reporting System (NFIRS) used by Vermont does not separate out fire deaths and injuries in town house units compared to other multi family housing. The NFIRS system does not record the age of buildings where fires occur. Vermont is addressing that question by supplementing the NFIRS system by the addition of a new data field. The Massachusetts Fire Incident Reporting System has tracked the age of buildings where a fire occurs. According to U.S. census data Massachusetts has the highest percentage of dwelling units more than 50 years old and Vermont has the second highest percentage of dwelling units more than 50 years old. For a total of 561 fatal fires from 1986 – 2005, Massachusetts reported that 65% of the buildings were built before 1975 and 12% were reported as being built after 1975, with 24% of the fires not reporting the age of the building. While newer dwellings do have more fire safety features built in, newer buildings still have fires. Dwelling units build this year will age and have similar maintenance problems in the future as existing buildings have today. It is overly simplistic to correlate the age of buildings with the number of fires that occur, without including the socioeconomic status of the occupants, the age of the occupants, the presence of working smoke alarms (detectors), the waking

effectiveness of the alarms and the ability of the occupants to respond to an emergency because of age (very young or very old), medication or alcohol.

The fire data reporting system does indicate Vermont has had a disproportionately high fire death rate based on it's population compared to other states. In 1982 Vermont had a fire death rate of 48 per million of population and in 1983 a fire death rate of 57, both years the worst in the nation. During the late 80's and early 90's Vermont's fire death rate improved at a rate far above the national average but again in 2000 and 2003 Vermont had one of the worst fire death rates in the nation with ratings of 37 and 30 for those two years. Between 1996-2005 smoke alarms did not operate in 86% of the fatal fires in Vermont. In a study provided by IAFC/NASFM only 58% of a test group of children aged 6 – 12 awakened when a standard smoke alarm sounded and only 38% were able to successfully evacuate. A critical strategy for preventing fire deaths and injuries in Vermont is to expand the use of sprinkler protection in new construction of multi-family dwellings. It is common to hear about the success stories where lives and properties in Vermont were saved by the activation of a fire sprinkler system. Fire sprinkler protection for multi-family dwellings is not a separate initiative but works with other engineering initiatives, such as the recently implemented legislation to require that fire-safe cigarettes be sold in Vermont, and education initiatives, such as the need to continue to educate the public to maintain the smoke alarms in their dwellings. The people most at risk may not be reached by educational programs but in the future may be protected by fire sprinklers in their dwelling units.

Fire sprinkler systems save both live and property. Standard 13 fire sprinkler systems have been protecting live and property here in Vermont for over 100 years and the technology for fast response residential systems has been available for over 30 years. Both 13D and 13R systems response in a manner that even a person at the point of origin of the fire can be saved.

- *The average property loss from a fire in Vermont for 2005, in a building protected by a complete fire sprinkler system was $3,092, while the average property loss from a fire in a building without sprinkler protection was $33,630.*
- *In a similar study from Scottsdale Arizona, property damage was less than $2,500 in homes with sprinklers and more than $40,000 in unsprinklered homes.*
- *The public generally supports the concept of fire sprinkler protection in their dwelling but there are still a lot of misconceptions that arise from how fire sprinkler protection is portrayed on television and in the movies. Only a fire sprinkler head exposed to sufficient heat will activate in a fire – usually just the one sprinkler head will activate, suppressing or containing the fire and allowing the residents time to evacuate the building.*
- *In a Harris poll provided by IAFC/NASFM, 45% of homeowners indicated that a sprinklered home is more desirable than an unsprinklered home and 69% said that a fire sprinkler system increased the value of a home. 48% of homeowners cited water damage as the reason they would not want to install a fire sprinkler system.*
- *The waterlines for a fire sprinkler system pose no greater risk of freezing and leaking than domestic waterlines for the shower or kitchen sink. It all depends on proper design and installation. Similar to other water lines, fire sprinkler lines can be run in interior walls, soffits and closets, to keep them out of unheated areas and can be installed inside the building insulation envelope.*
- *In a study from Scottsdale Arizona firefighters used an estimated average of 341 gallons of water where there were residential fire sprinklers compared to 2,935 gallons of water for unsprinklered residential buildings.*

- *In Vermont, municipalities like Hartford (2001) and Montpelier (2003) have local ordinances and planning procedures that require residential fire sprinkler protection for new construction.*

The cost of sprinkler protection is consistent with other common costs of construction, such as a carpet or kitchen cabinet upgrades, and will provide vital protection to the occupants of these dwelling unit now, and into the future, and provide flexibility to municipalities in the services they require. The requirements under this *Code* will likely increase competition, reduce cost and motivate cost efficient designs to further reduce the cost of residential fire sprinkler systems.

Performance based design option – Performance based design options will continue to be available for all buildings, not just historic buildings, giving building designers another option to analyze and develop solutions for an alternative means of safety. The Uniform Fire Code and the Life Safety Code integrate the requisite goals, objectives and performance based design (PBD) criteria as an option into the respective codes.

o **Dwelling unit configuration –** This *Code* proposes to retain as a Vermont amendment the allowable 7 ¾ maximum rise and 10" minimum tread for stairs within dwelling units, instead of the maximum 7" rise and a minimum 11" tread as written in the Life Safety Code. Testimony in 2005 indicated the additional length of a stair would cost $350 to $500 more for carpet grade construction, not including consideration for the additional space required in the building.