Increasing Life Safety and Decreasing Risks to Firefighters

Through the Political Process in Ohio

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A research project submitted to the University of Cincinnati Fire Science Program

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CERTIFICATION STATEMENT

I hereby certify that the following statements are true:

1. This paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

2. I have affirmed the use of proper spelling and grammar in this document by using the spell and grammar check functions of a word processing software program and correcting the errors as suggested by the program.

Signed: _________________________________________

Printed Name: ______________Matthew McBirney__________________
ABSTRACT

According to U.S. Fire Administration statistics, approximately 2,500 people perish each year in residential building fires in the United States. Fire prevention and life safety advocates believe that residential fire sprinkler systems are the most viable means to significantly reducing the civilian fire death toll. In 2009, a requirement for residential sprinklers in new homes was incorporated into the International Residential Code (IRC), a model code used by Ohio and other states as a starting point for drafting their own state residential building codes.

Ohio just completed an update cycle of the Residential Code of Ohio (RCO). Many in the fire service were disappointed to see the residential sprinkler requirement deleted in the process of “Ohio-ing” the 2009 IRC. Very few firefighters and fire officers are familiar with the political process involved in the drafting, revising, and the adopting of a new building code, yet the code greatly impacts the firefighters’ working environment. Few firefighters are aware of the process when decisions are being made, and fewer are involved in the process.

This research is based on accounts of persons involved in the code making process and reports the sequence of events that led to the adoption of the latest RCO, including the loss of the sprinkler requirement, and the gain of an unexpected fire protection improvement thanks to the efforts of one dedicated fire safety advocate. This research illuminates the residential code making process for firefighters who are unaware, and reveals opportunities for firefighters and fire officers to get involved in future code update cycles. This report encourages fire service personnel and fire prevention advocates to take ownership of the code process and actively participate with the goal of reducing the civilian fire death toll and reducing hazards in the firefighters’ working environment.
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INTRODUCTION

Statement of the Problem

The majority of lives lost in structure fires and the majority of firefighters killed and injured while fighting structure fires occur in residential buildings as opposed to commercial buildings. Since the report America Burning was published by the National Commission for Fire Prevention and Control in 1973, great strides have been made in reducing the loss of life, the risks to firefighters, and property losses in commercial buildings. This was largely due to improvements in commercial building and fire codes (including sprinkler requirements) and a greater emphasis on fire prevention. (Wieczorek & Perdue, 2011) The building codes governing residential construction in Ohio and across the nation have not received nearly as much attention from the fire service. (Coleman, 2009)

*The problem this study addressed is the unacceptable number of lives lost in residential fires and the hazards that fires in residential construction pose to firefighters.*

Fire prevention advocates have proposed improvements to residential building codes used across the nation; however, they have faced significant opposition to the adoption of proposed changes. (Mirkhah & Comstock, 2009) The political process involved in the proposal, modification, drafting, and adopting of building codes in Ohio is a process full of details that are largely unknown to firefighters and fire officers, yet the outcomes of these processes have a direct impact on their working environment. This study examined this problem using the evaluative research method.
Purpose of the Study

The purpose of this study was to research the building code making process in Ohio and to observe and report on the political process in action, in order to educate firefighters and fire officers and to motivate them to participate in the process themselves. Persons and groups who view code changes that increases life safety as too expensive or unneeded are well represented in the code making process, and an increase in firefighter participation in the process may help to advance proposed fire and life safety code changes that have been rejected up to now.

Research Questions

The following questions will be answered by this evaluative research:

1. What authority does State of Ohio exercise over residential building construction and how is this structured?

2. What improvements to the state residential code have been proposed by fire prevention advocates to reduce the number of fire deaths in the home?

3. How does a new edition of the state residential code come to be?

4. What can individual firefighters and fire officers do in the political arena to reduce the number of home fire deaths in Ohio and to reduce the risks faced by firefighters in residential construction?
BACKGROUND AND SIGNIFICANCE

According to the National Fire Protection Association (NFPA), an average of 373,900 residential structure fires are reported to fire departments every year. Current national statistics report an average 2,650 civilian fire fatalities and 12,890 persons injured in residential fires annually. The annual value of property damage caused by residential fires in the United States is $7.1 billion dollars. (NFPA, 2011a) In Ohio, civilian fire fatalities totaled six hundred and seventeen persons from 2008 – 2011. (Ohio Fire Marshal, 2012) Home fire sprinklers are a proven means of protecting lives from fire in the home. Sprinklers provide additional protection above and beyond smoke detectors, activating quickly and effectively in the presence of fire to save lives. Adults over age 65 and children are at the most risk and may not be physically able to quickly exit on their own from a building on fire that is equipped with smoke detectors alone.

In both residential and commercial construction, the use of lightweight construction framing members has become widespread. National statistics indicate that 30 firefighters died due to the structural collapse of buildings from 2004 to 2010. (NFPA, 2011b) Lightweight construction components rapidly lose their strength when exposed to fire, unlike the legacy construction methods and materials the preceded them. Firefighters who enter lightweight constructed buildings to extinguish a fire are exposed to the risk of a collapse that may occur much more quickly than their previous experience would indicate. In May, 2010, the Aurora Fire Department (Aurora, Ohio) had a “near miss” experience with a partial collapse of an unprotected lightweight first floor assembly that was exposed to a basement fire.

There is a national consensus in favor of residential sprinklers. (Fire Sprinkler Initiative) The International Code Council (ICC) included the requirement for residential sprinklers in their 2009 International Residential Code (IRC) which serves as a national model. (ICC, 2009)
Additionally, the 2012 IRC incorporates a requirement for passive fire protection of the unfinished undersides of lightweight floor joists, which has been shown to dramatically improve their resistance to fire and collapse. (ICC, 2012) (Dalton, Van Dorpe, Backstrom, & Kerber, 2010)

The State of Ohio uses the International Residential Code as a foundation although it is often modified before it becomes the official Residential Code of Ohio (RCO). Ohio was in the process of “Ohio-izing” the 2009 IRC at the time of this research and had the opportunity to adopt a residential sprinkler requirement.
LITERATURE REVIEW

In the Federal Emergency Management Agency’s (FEMA) topical fire report series Report on Civilian Fire Injuries, it was revealed that between 2008 and 2010 there were 365,500 residential building fires that resulted in 2,560 civilian fatalities and 13,000 injuries. Civilian fire injuries in residential buildings represented seventy-six percent of all fire injuries. (USFA, 2012)

In Ohio, there were 1004 civilian fire injuries and 175 fatalities in 2008, there were 883 civilian fire injuries and 147 fatalities in 2009, and there were 873 civilian fire injuries and 147 fatalities in 2010. (Ohio Fire Marshal, 2011)

The National Fire Protection Association (NFPA) published the first release of NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings in 1975, and in 1980 San Clemente, California became the first community to enact a local residential sprinkler requirement. (Jenelewicz) Since that time, several other communities have implemented sprinkler requirements and their track records are a tribute to the effectiveness of the residential sprinkler concept.

Scottsdale, Arizona adopted a residential sprinkler ordinance in 1985 and studied its effectiveness after fifteen years in force. They attributed a fifty percent reduction in fatalities and the saving of 13 lives directly to the performance of residential sprinkler systems. In ninety-two percent of cases, one or two sprinkler heads effectively controlled the fire, and average fire property loss in sprinklered homes was ninety percent less than in unprotected homes. Initially the cost to add sprinkler systems to new homes was $1.14 per square foot, and fifteen years later that cost had dropped to between $0.55 and $0.75 per square foot. (Ford, 2001)

Prince George’s County, Maryland, adopted its own residential sprinkler ordinance in 1992. They collected statistics and studied the effectiveness of the sprinklers after fifteen years in
service. During those first fifteen years, 101 persons perished and 328 were injured in fires in homes without sprinklers, while during that same period there were no deaths and only six injuries in sprinkler protected homes. Prince George’s County recorded 245 instances of residential fire sprinkler activation in fifteen years, and 446 persons were in protected homes when the fire occurred. Fire property loss in sprinkler protected homes averaged $4,883, nearly half of the $9,983 average for fire damage in unprotected homes. Contractors in Maryland reported also that the installation cost had dropped below two dollars per square foot in 2007. (Weatherby, 2009)

Six suburban and rural fire districts in Bucks County, Pennsylvania also adopted residential fire sprinkler ordinances at different points over several decades. From 1988 to 2010 in Bucks County, PA there were ninety fire deaths in unprotected residential structures while there were no fire deaths in sprinkler protected homes. In five cases, fire sprinklers were documented to have saved a life. In unprotected home structure that experienced a fire, the average property loss was $179,896 and the fire required an average or nearly 6000 gallons of water to extinguish it. In sprinkler protected residences that experienced an outbreak of fire, on average the fire was extinguished with only 340 gallons of water and the value of property lost averaged $14,000. (Fire Planning Associates, Inc., 2011)

John R. Hall, Jr. of the National Fire Protection Association studied the effectiveness of fire sprinklers in the United States and found that the effective reliability of wet pipe sprinkler systems was ninety-seven percent. Effectiveness in his study was defined as confining the fire to its room of origin. Instances when sprinklers were ineffective were relative to poor maintenance, damaged components, manual defeating intervention, and lack of sufficient water supply. (NFPA, 2007)
The NFPA completed a study of twenty communities with residential sprinkler ordinances to evaluate the integration of these systems with the local water supply system. The NFPA researchers found that residences did not require dual water supply lines, that communities developed practical solutions to connection and metering concerns, and that there were no insurmountable obstacles to adding residential sprinklers to the existing water supply. (NFPA, 2009)

Fire prevention advocates successfully made their case for home sprinkler systems to the International Code Council (ICC), and a residential sprinkler requirement was incorporated into the 2009 International Residential Code (IRC) (ICC, 2009). Codes promulgated by the ICC do not carry the force of law, but are recommended minimum standards. Forty-eight states use ICC codes as a basis for their own codes, although they are often modified or amended before state level adoption. Representatives of the National Association of Home Builders (NAHB) strenuously objected to this new requirement and attempted to reverse it through an ICC appeals board. After failing at that level, they have concentrated their efforts on state and local legislation preempting the adoption of residential codes that require sprinklers. (Mirkhah & Comstock, Jr., 2009) California, Maryland, and South Carolina have adopted statewide residential sprinkler requirements, while NAHB lobbying in fourteen other states considering adoption of the sprinkler mandate has led to the specific preemption of a sprinkler requirement by legislative or executive action. (Fire Sprinkler Initiative)

Another aspect of modern residential construction that poses a life safety threat to occupants and to firefighters is the widespread use of lightweight engineered wood building components. One of the greatest hazards associated with lightweight engineered wood building products is manifest when trusses or engineered wood I-beams are utilized for the first floor
assembly and the basement ceiling below is unfinished. In August, 2010, researchers from Underwriters Laboratories and the Chicago Fire Department published key results of extensive scientific testing of lightweight residential floor and roof assemblies. One of the assemblies tested was constructed of unprotected wood I-beams. This assembly failed and allowed the floor to collapse after only six minutes of a simulated basement fire exposure from below.

Construction of this nature impacts the ability of occupants to safely escape a fire and it presents great hazard to firefighters who may enter the building to extinguish the fire. The Underwriters Laboratories testing showed that simply covering the bare underside of the lightweight floor joists with a protective layer of gypsum board extended their resistance to fire and collapse by twenty minutes. The 2012 IRC model addressed this issue with a requirement for passive protection, in the form of standard gypsum board (or equivalent), to be applied as fire protection to the exposed undersides of lightweight floor joists. (Dalton, Van Dorpe, Backstrom, & Kerber, 2010) (ICC, 2012)

Government regulation of construction in the State of Ohio dates back to 1911 when there were limited rules governing construction, sanitation, and fire safety enacted by the Ohio legislature. In 1955 the legislature made these responsibilities administrative functions and created the Board of Building Standards (BBS) as the administrative agency. At this time, and until recently, one-, two-, and three-family buildings, and agricultural building were exempt from state regulation, although subject to local codes. In 2005, the Ohio legislature changed Ohio Revised Code (O.R.C.) 3781.10 and gave the BBS a mandate to create a statewide residential building code. The BBS started with the 2003 International Residential Code (IRC) as a foundation and then modified it and put forth the first Residential Code of Ohio (RCO), effective
May 27, 2006. The RCO is now the only residential building code allowed to be enforced by local governments in the State of Ohio. (Ohio Department of Commerce)

The BBS is a section of the Ohio Department of Commerce. The O.R.C. Title 37, chapter 3781 defines composition, functions, and authority of the BBS. The BBS performs functions such as certifying local municipal building inspectors, formulating rules for building construction, and advising the Ohio General Assembly on matters related to building construction. There are fifteen members that make up the board and they are gubernatorial appointments. One seat on the board is defined by law as set aside for a recognized fire service professional, while the remaining seats are filled by builders, contractors, lawyers, architects, engineers, and other professionals. O.R.C. 3781.10 paragraph 12H specifies that a nine member Residential Construction Advisory Committee (RCAC) shall provide the BBS with a proposal for a residential building code, and that upon receiving a recommendation from the committee, the BBS will adopt it as the state residential building code. The members of the RCAC are appointed by the Director of the Ohio Department of Commerce and professionally apportioned in a manner similar to the BBS with one seat set aside for a fire service professional. (Ohio Revised Code, 2012)

Pat Morrison writing in the International Fire Fighter magazine stated that many firefighters do not understand how great of an impact building codes have on their safety. Much effort is directed into improving workplace safety around the fire station, on the apparatus, and in training, but many fail to appreciate that when operating inside a burning building, that building is now the workplace. Working to promote improved fire safety in building codes is not just to save civilian lives, but also to reduce firefighter injuries and deaths on the job. For firefighters, taking ownership of the building code process may require digging into technical and laborious
subject matter. Organizations such as the International Association of Fire Fighters (IAFF), the NFPA, the International Association of Fire Chiefs (IAFC), and others are working, often against well-funded and coordinated lobbying efforts of the building industry, to move the ball forward, and they are seeking firefighters who are willing immerse themselves in the subject matter of the building codes and leverage their relationships with community leaders to build support for code changes that enhance life safety. (Morrison, 2012)
PROCEDURES

A literature review was conducted to learn about the current state of the residential fire problem, the means proposed to reduce the number of deaths in residential fires, and the experiences of other cities and states outside of Ohio that have faced similar challenges. Information about Ohio government laws and agencies related to building codes was accessed online, including two years of meeting minutes from the Ohio Residential Construction Advisory Committee (RCAC). From the meeting minutes, a list of persons involved in the process was created and personal interviews were conducted by telephone. Persons interviewed included the regional director of the Central Region Office of the NFPA, the Ohio Board of Building Standards (BBS) staff fire protection engineer, the Ohio BBS executive secretary, the chairman and the vice chairman of the RCAC, an NFPA public education adviser, and a fire officer who frequented the RCAC meetings in order speak during public comment periods.
**RESULTS**

Debbie Ohler, a Staff Engineer with the Ohio BBS, was the first person contacted in the quest for first-hand inside knowledge of the inner working of the code making process. She started by relating a history that started with HB175 passage by the Ohio General Assembly in 2005, which created the RCAC and charged the BBS with creating the first Residential Code of Ohio (RCO). Ms. Ohler explained that, at the time of this interview, the RCAC was nearing the completion of their efforts to “Ohio-ize” the 2009 IRC. By this time, the residential fire sprinkler feature of the 2009 IRC had already been debated and deleted from the proposed RCO by the RCAC members, but she related an interesting account about Cleveland Fire Department Battalion Chief Sean DeCrane who often attended the RCAC meetings, and who had not given up after the loss of the sprinkler provisions. Battalion Chief (B/C) DeCrane had convinced the RCAC members to incorporate a requirement to protect the unfinished undersides of lightweight floor joists with gypsum board (or other equivalent material). (D. Ohler, personal communication, April 22, 2012)

B/C DeCrane is a twenty-two year veteran of the Cleveland Fire Department and he represents the International Association of Fire Fighters at the International Code Council (ICC). He served on the ICC fire code development committees for the 2009 and 2012 International Fire Codes (IFC), and he will be the chairman for the 2015 IFC. B/C DeCrane has been involved in the testing of structural performance in fire conditions and serves on the Underwriter Laboratories Fire Council. He is a State of Ohio Certified Fire Safety Inspector and Fire Instructor. From July, 2010 to January 2012, his name appears in the RCAC meeting minutes five times as a visitor in attendance. During all public RCAC meetings, members of the public are permitted an opportunity to speak as time allows, and B/C DeCrane’s input regarding
sprinklers and the protection of lightweight construction structural members is referenced in the RCAC public record meeting minutes. B/C DeCrane was contacted and interviewed for his perspective on the residential code making process in Ohio. He expressed disappointment that the RCAC had deleted the sprinkler requirement, and stressed that protection of lightweight floor joists was not an equivalent substitute or trade-off as they are separate issues. B/C DeCrane referenced the Underwriters Laboratories test results that showed a common unprotected lightweight floor assembly reached the point of collapse after only six minutes of exposure to a basement fire, and he tied this to the case of Green Bay, Wisconsin Fire Lieutenant Arnie Wolff who perished in 2006 in a collapse attributed to the failure of lightweight unprotected floor joists. He noted that the National Institute of Occupational Health and Safety (NIOSH) report on the incident that killed Lieutenant Wolff recommended that local authorities having jurisdiction should consider modifying current codes to require fire barrier protection for both the top and bottom of lightweight wood floor joists. Currently, the number of firefighters injured due to failures of lightweight construction building materials is not known due to gaps in collection of that data by the fire service. B/C DeCrane emphasized that a house on fire is the firefighter’s working environment, and all firefighters should be concerned about improving the safety of that working environment. He also noted that it was a unique situation that the RCAC was willing to entertain the inclusion of fire protection for lightweight floor joists since that particular provision just debuted in the 2012 IRC, which is not under consideration yet in Ohio. B/C DeCrane attributed this to the relationships established with reasonable members of the board who just weren’t ready to get on board with sprinklers, but who appreciate the points made by and the concerns of the fire service. B/C DeCrane would like to see more firefighters taking an interest in the codes that impact their safety, and would like them to be advocates for improved life safety
codes to community leaders and zoning boards. (S. DeCrane, personal communication, April 25, 2012)

The next person contacted for insight in the residential code making process in Ohio was John Pavlis, of Pavlis & Company, a general contractor from North Canton, Ohio. Mr. Pavlis is the current vice-chairman and appointed member of the RCAC. Mr. Pavlis was asked why he, as a general contractor and home builder, would be opposed to a requirement to install sprinklers in new homes. One of the primary objections expressed by the NAHB is the cost, especially at a time when the economy is weak and new home sales have to compete in a market loaded with used homes selling at depressed prices, but Mr. Pavlis had a different focus. He stated that the number of fire deaths in homes built after 1970 is actually very low and that smoke detectors are doing a good job at protecting people in their homes. He also said that many sprinkler heads were manufactured overseas and has poor quality control. He said he was familiar with a case in which millions of sprinkler heads were recalled at great expense, and expressed concern about the kind of liability that would incur upon the housing industry if it happened again. Mr. Pavlis was asked if he was familiar with the published results of the Underwriters Laboratories study on lightweight unprotected floor assemblies, and he affirmed that he had been shown the videos of these tests as well. He believes the engineered lightweight wood building products manufacturers know there is a problem and a liability with many of the assemblies they are selling but that they don’t want to acknowledge their responsibility. He stated that he listened to B/C DeCrane, and referred to him as a very professional and likable fellow, and stated that the average extra cost of nine hundred dollars that was calculated as the expected cost of adding gypsum board to the unprotected bottom side of the lightweight floor joists, seemed worthwhile and he agreed to include that in the new RCO. (J. Pavlis, personal communication, May 2, 2012)
Regina Hanshaw is the Ohio BBS Executive Secretary, and as such she attends all the RCAC meetings, records minutes, prepares agendas, and other duties that position her to be intimately familiar with the residential code making process. Ms. Hanshaw explained that the RCAC began work on the current cycle of the residential code making process in April 2009. At that time, the RCAC began reviewing the provisions of the 2006 and 2009 International Residential Codes (IRC) which had been published by the International Code Council (ICC) since Ohio adopted an “Ohio-ized” version of the 2003 IRC. Some subject matter was delegated to subcommittees, while other major topics, such as fire sprinklers, were considered by the whole RCAC. By November 6, 2009, RCAC members had completed their amendments and proposed revisions of the 2009 IRC base document, and a proposed draft was posted online. The BBS keeps a list of stakeholders and interested parties, and postcards were sent to interested parties requesting feedback by December 6, 2009. The RCAC received several comments regarding the elimination of a residential sprinkler requirement from the proposed Residential Code of Ohio (RCO). Written letters objecting to lack of a sprinkler requirement were submitted by Michael Dunton, Vice President of the Ohio Fire Officials Association; Russ Sanders, Central Region Manager for the NFPA; Ronald Brown, Great Lakes Region Manager of the National Fire Sprinkler Association (NFSA); Mark Crumley, Assistant Chief and Fire Marshal of the Medina Fire Department; and Battalion Chief Sean DeCrane of the Cleveland Fire Department (CFD) and the IAFF. (Appendix) The comments and feedback received on a variety of sections of the code prompted the RCAC to rework the proposed code again.

The RCAC allowed scheduled additional public comment on the sprinkler issue, and Terry Campbell of the NFPA, B/C Sean DeCrane of CFD and IAFF, Craig Best of the Anderson Township Fire Department and Southwest Fire Officials, Dominick Kasmauskas of the NFSA,
and Corey Roblee of the ICC all attended and spoke before the RCAC on July 21, 2010. B/C DeCrane petitioned the RCAC members to consider the passive protection of lightweight engineered wood floor assemblies even if they ultimately rejected a residential sprinkler requirement and he submitted the language he drafted for this in the 2012 IRC.

On November 17, 2010, the RCAC voted down a motion to restore the deleted sprinkler requirement, but it did accept the proposal of B/C DeCrane, who was in attendance, for the passive protection of lightweight floor joists. On January 5, 2011, the RCAC again heard additional comment from B/C DeCrane and representatives of the building industry, an AD Hoc committee was put together to iron out any wrinkles in the requirements for protecting lightweight floor assemblies. Finally, on March 23, 2011, the RCAC adopted and incorporated the lightweight floor assembly protection requirement into the proposed RCO. Since that time, the proposed RCO has been subject to further review, public comment, and revision on other non-fire protection issues. On May 7, 2012, the final proposed RCO was complete. The next step in the regulatory process was a review by the Joint Committee on Agency Rule Review (JCARR). The JCARR is made up of five state senators and five state representatives charged with reviewing new or amended rules before they go into effect. The JCARR review period for the new proposed RCO expired on May 26, 2012. (R. Hanshaw, personal communication, May 2, 2012) On May 29, 2012 the new RCO was filed, it is now being published and distributed, and will be enforceable by authority of the Ohio Revised Code effective January 1, 2013. (D. Ohler, personal communication, May 29, 2012)

Michael Boeckermann is a fire prevention officer with the Green Township Fire Department in Hamilton County and is a member and current chairman of the RCAC during this recent cycle. Mr. Boeckermann is the designated fire service representative on the committee. He
was asked about his perspective as the sole fire service member on the RCAC. Mr. Boeckermann related that there was never enough support among the other eight members of the RCAC to come close to winning a vote the retention of the 2009 IRC sprinkler requirement. He stated that the current situation reminds him of the situation in the 1970s when new home builders resisted the requirements to include smoke detectors. He also expressed disappointment at how few firefighters are participating in the code making process. He opined that if firefighters don’t get involved, they won’t see the desired reductions in deaths, injuries, and hazards to firefighters. (M. Boeckermann, personal communication, May 2, 2012)
DISCUSSION

Before researching the political process of the drafting and implementation of a building code, I had no awareness of when and where this process was going on. As a firefighter, I have been educated on the hazards posed by unprotected lightweight floor joists. In fact, we had a near miss with an engineered floor assembly failure due to a basement fire on my own fire department, and we have studied the NIOSH reports on this subject as department fire training. Training to recognize and avoid such hazards is a reactive behavior, however.

The proactive approach is to find a way to reduce the proliferation of these hazards. Of all the fire scenarios involving engineered lightweight wood building products, the basement fire in a home with lightweight first floor joists and an unfinished basement ceiling is about the most dangerous. A change in the Residential Code of Ohio that requires the passive fire protection of such floor assemblies will not remove the danger of those unfinished lightweight first floor joists currently in existence, but going forward it will pay greater dividends year after year. If only this code requirement had been enacted in the 1970s as were requirement for smoke detectors, many thousands upon thousands of homes would be safer for their occupants and would present a lesser risk to firefighters. Fire prevention advocates who are laboring and lobbying for improved fire safety in building codes are engaged in a noble effort, but there are two few of them.

RECOMMENDATIONS

Residential fire sprinklers are still the best known solution to the unacceptable number of civilian fire fatalities and injuries. Fire prevention advocates working at the state and national levels to advance the cause of residential fire sprinklers are opposed by powerful interests and lobbies, and they need help. All firefighters should invest the time and effort to learn about the advantages of residential sprinklers, how to dispel the myths about sprinklers, and should be
prepared to speak accurately and positively about sprinklers with members of the community. Firefighters are often asked for opinions about fire extinguishers, smoke or carbon monoxide detectors, or child safety seats. Residential sprinklers should be a topic we are also ready to speak about in the communities we serve.

When the proposed RCO was posted in 2009 with the sprinkler provision of the 2009 IRC deleted, five letters were sent to offer displeasure with that decision. (Appendix) The Ohio BBS maintains a list of stakeholders or parties interested in code changes. In order to amplify the voice and make known the sentiments of the fire service community, every fire department in Ohio, every fire service professional organization, and every firefighter union local should subscribe to that list, and on the next cycle of update to the RCO, the RCAC should be inundated with hundreds of letters voicing support for residential fire sprinklers.

Not every firefighter can become an individual code expert and attend years of meetings persistently pushing for change, but we can increase the public and professional awareness and support for life safety concerns in building construction through our interaction with citizens, elected leaders, and zoning boards.
REFERENCES


December 7, 2009

Gerald Stoker, Chairman
State of Ohio Residential Code Advisory Committee
6606 Tussing Road
Columbus, Ohio 43068

Mr. Stoker:

The Ohio Fire Official’s Association would like to make comments to the proposed code changes to the Ohio Residential Code based on the International Residential Code 2009.

The deletion of section R313.1 “Townhouse Automatic Fire Sprinkler System” and section R313.2 “One and Two Family Dwellings Automatic Fire Systems” would prove to be a great disservice to the residents of the State of Ohio. Our organization took a vote on Thursday, December 3, 2009 to oppose this removal and to oppose changes to Section 315.1 and 315.2 “Carbon Monoxide Alarms”. The removal and modification to the codes will cause more deaths in the State and will eventually bring in the legislation drafting laws that should be supported and adopted on the national level and brought forth to the State. We all remember the nursing home issue dealing with mandated requirements in new and existing buildings.

There are pages of evidence to prove the efficiency of sprinkler systems in commercial and multi-family dwellings. The cost benefit to install these systems not only serves the owner if a fire were to occur by protecting life but also property. It also provides a level of safety to fire fighters in the new design of homes in light weight construction.

In closing, the Ohio Fire Officials request that the RCAC would reconsider its vote and support the sprinkler and CO monitoring. We have attached the United States Fire Administration position as well.

Sincerely,

Michael Dunton, Vice President
Ohio Fire Official’s Association

NOTE: Michael Boeckermann, President recused himself from the vote due to sitting on the RCAC as the fire official representative.
APPENDIX – LETTERS TO THE RESIDENTIAL CODE ADVISORY COMMITTEE

National Fire Protection Association
Central Regional Office
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Phone: +1 502 894-0411  Fax: +1 502 894-0519  Email: rsanders@nfpa.org

November 17, 2009

Gerald Stoker, Chair
Residential Construction Advisory Committee
Residential Code of Ohio

Re: Comments on Residential Code Proposal

Dear Chair Stoker:

My name is Russ Sanders and I am the Central Regional Manager for the National Fire Protection Association (NFPA). The mission of NFPA, which was established in 1896, is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. I am writing you today to express NFPA’s opposition to your committee’s proposal to delete the sprinkler requirements in Section 313 of the residential code and to provide your committee with important information about home fire sprinklers.

The latest NFPA statistics for fires in the United States are as follows:

- A fire occurs every 82 seconds
- There are more than 3,000 civilian fire fatalities each year
- There are nearly 17,000 civilian injuries each year
- In 2008 62% of fire ground structural fire fighting deaths occurred in residential occupancies and of that number 92% occurred in one- and two-family dwellings
- 84% of fire deaths occur in the home
- There is approximately $16 billion in direct property loss each year
- On average, eight people die in U.S. home fires every day

Ohio is no exception. The number of fire deaths across the state increased by 42 percent last year over 2007, according to the Ohio fire marshal’s office. Officials have no clear explanation for the increase to 183 fire deaths in 2008 from 129 in 2007. Congressional hearings have been scheduled and pandemics have been declared on the basis of much smaller death tolls than the home fire death toll in one year in Ohio. Clearly, most people do not believe that we are safe enough or that current death tolls from home fires are acceptable.
Smoke alarms and sprinklers both save lives from fire

Home fire sprinklers are a proven way to protect lives and property against fires at home. These life-saving systems respond quickly and effectively to the presence of a nearby fire. When sprinklers are present, they save lives. Sprinkler systems provide additional benefits, on top of the benefits already provided by smoke alarms. Further, it is important to remember that those at highest risk are children under five years of age and adults over 65. These are groups that may not be able to exit on their own even with working smoke alarms.

- Smoke alarms cut the risk of dying in a home fire by 50 percent.
- If you have a reported fire in your home, the risk of dying decreases by about 80 percent when sprinklers are present.

Home fire sprinklers are cost effective, they do not have a negative impact on development and they are green

- On September 11, 2008 a study that was released by the Fire Protection Research Foundation (an affiliate of NFPA) found that the cost of 13D systems to the homebuilder, in dollars per sprinklered square foot, ranged from $0.38 to $3.66 with the average cost being $1.61. This cost includes all costs to the builder associated with the system, including design, installation and other costs such as permits, additional equipment, increased tap and water meter fees, etc.

- On July 15, 2009 a study that was conducted for NFPA by Newport Partners compared residential construction in four counties. The study concluded that the presence of sprinkler ordinances has no negative impact on the number of homes being built. (Montgomery County, Maryland, was paired with Fairfax County, Virginia, and Prince George's County was paired with Anne Arundel County, both located in Maryland. Montgomery County and Prince George's County have sprinkler requirements; Fairfax County and Anne Arundel County do not.)

- On October 1, 2009 the HFSC partnered with FM Global to conduct full-scale fire tests to compare the environmental impact of sprinklered vs. non-sprinklered homes. Quantitative data was collected on each burn, the first time this information has been scientifically evaluated in terms of environmental impact. The study will not be final until early 2010, but preliminary observations clearly indicate that sprinklers reduce toxic, airborne and water pollutants and the water amount that typically flows through fire fighter attack lines vs. sprinklers. The research also will quantify the carbon footprint associated with rebuilding the burnt home.

- Prince George’s County, MD was the first county to adopt a one- and two-family sprinkler ordinance. In the 15 years since enforcement of the ordinance, a study, produced in cooperation with the University of Maryland, concluded that the ordinance had a significant impact on life-safety and reduction of property damage. During the 15-year period, there were 13,494 house fires with 101 deaths and 328 injuries in homes that were not protected with fire sprinklers. There were no deaths in the homes protected with home fire sprinklers. Sprinklers cut property loss in half and the average property loss after a fire with fatalities in an unsprinklered residence was 10 times more costly than a fire in homes protected with a fire sprinkler system.
APPENDIX – LETTERS TO THE RESIDENTIAL CODE ADVISORY COMMITTEE

- NFPA contracted with Newport Partners to examine detailed water supply information for 20 US communities with residential sprinkler ordinances. According to the study, which was released October 22, 2009, home fire sprinklers can be integrated with local water supply systems with ease. The study concluded that water supply integration requirements have been put into place, and there are no examples of insurmountable problems or issues. Neither design problems nor significant added costs were found in the communities surveyed. In more than half of the communities, no cost impact resulted from sprinkler-induced changes to water meter size, the need for additional water meters, or changes to tap size. These communities also did not have higher monthly service fees from the water supplier for homes with sprinklers. In those communities where one or more of these factors did add cost, the average added cost was about $400. NFPA President Jim Shannon said it best when he said, “This is another critical piece of substantiation against the myths that abound about home fire sprinklers. It is simply not true that sprinklers cannot be integrated with public water supply or significantly adds to cost. What is true is that home fire sprinklers save lives and should be required in new construction of one- and two-family homes.”

Beware misleading percentages on survival and death

Fire sprinkler opponents have been using a statistic of 99.45 percent to illustrate the effectiveness of smoke alarms in reducing home fire deaths. This NFPA statistic estimates the likelihood of surviving a home fire when a working smoke alarm is present. Taken completely out of context; a number like 99.45% sounds very high. But consider this:

- The total home fire death toll of roughly 3,000 deaths a year occurs in roughly 400,000 reported home fires a year. Therefore, the likelihood of surviving a home fire is over 99% without regard to the presence of smoke alarms or any other fire safety provisions. Does that mean 3,000 deaths are acceptable? Most people would say no.

- Each year, there are an estimated 12,000 deaths due to falls in homes and an estimated 11 million fall injuries in the home. The likelihood of surviving a fall is 99.9%. Does that mean 12,000 deaths are acceptable? Most people would say no.

- Each year, there are an estimated 42,000 deaths due to motor vehicle crashes and an estimated 6 million reported motor vehicle crashes. The likelihood of surviving a motor vehicle accident is 99.3%. Does that mean 42,000 deaths are acceptable? Most people would say no.

Sprinklers do more than save lives

Sprinklers do more than save lives; they also protect property from destruction by fire. In many situations, that means a family that survived a fire will also have a place to live and enough resources to continue living their lives as they did before. “Saving lives” means more than just preventing deaths. Just as there is no other fire safety technology or program that produces as great a reduction in risk of death as sprinklers, there also is no other fire safety technology or program that produces as great a reduction in property loss per fire as sprinklers.

- People in homes with sprinklers are protected against significant property loss—sprinklers reduce the average property loss by 71% per home fire.
The national consensus is in favor of sprinklers

All model safety codes now require the use of home fire sprinklers in new one- and two-family homes. Model codes are the specific expression of the shared values of Americans. In the code- and standard-development process no single interest is allowed to dominate. In terms of sprinklers, the consensus position of fire and life safety experts is clear: sprinklers save lives and should be installed in all new one- and two-family dwellings.

Sprinklers offer the highest level of fire and life safety to protect the people throughout Ohio.

- Home sprinkler systems respond quickly to reduce the heat, flames, and smoke from a fire, giving families valuable time to get to safety.
- Roughly 90% of the time, fires are contained by the operation of just one sprinkler.
- Each individual sprinkler is designed and calibrated to go off when it senses a significant heat change.
- Only the sprinkler closest to the fire will activate, spraying water directly on the fire.

Beware misleading percentages on effectiveness and reliability

It is important to recognize that home fire sprinkler systems are designed to activate to the heat of a fire that grows large enough for the temperature to reach 135°-160° F. They are not activated by smoke, nor should they be.

Opponents have cited some low percentages for what they call fire sprinkler efficiency. Such statistics improperly include as failures fires that do not produce enough heat to activate the sprinkler system, possibly because they were extinguished before heat rises to the point of activating the sprinkler system. In home fires large enough to activate an operational sprinkler, wet-pipe sprinklers operated and were effective in 98% of reported fires.

Beware false claims made for newer homes

Opponents of residential fire sprinkler systems like to boast that newer homes are safer homes and that the fire and death problem is limited to older homes. This statistical claim evaporates if you adjust for the higher risk characteristics (e.g., lower income, less education) found on average in the occupants of older homes. But in fact, newer homes are also more likely to include a threat to firefighters in the form of lightweight construction. Lightweight construction has been estimated to be used in a half to two-thirds of all new wood one- and two-family homes. Sprinklers can offset the increased dangers posed by lightweight construction and create a safer fire environment for firefighters to operate.

Home fire sprinklers – the right answer for Ohio

Sprinkler systems have been protecting many lives throughout the United States. Reducing Ohio's fire death toll, means reducing its home fire death toll. This may be achieved by adopting mandatory sprinkler requirements for all new homes. This code cycle you have the opportunity to tell Ohio residents that their lives are equally important no matter where they choose to live.
respectfully request that your committee reconsider its recommendation to remove the sprinkler requirements from Section 313 of its current proposal. Please do the right thing and vote in favor of fire and life safety...vote to require all new homes to be built with fire sprinklers.

Respectfully,

Russell E. Sanders
December 3, 2009

State of Ohio
Residential Code Advisory Committee
Mr. Gerald Stoker, Chairman
6606 Tussing Rd.
Reynoldsburg OH

Dear Mr. Stoker, RCAC Members and Other Interested State Officials:

I appreciate the opportunity to comment regarding the RCAC proposed modifications to IRC 2009 which will ultimately be approved as the latest Ohio residential construction code. My concern lies in the committee’s decision to remove the residential sprinkler requirement, R313.1 and R313.2 from the code and to indicate in the code that fire sprinklers are not required. The deletion of this section of the code ignores an extremely important life safety construction feature now recognized as a minimum life safety component of new construction in all nationally recognized residential construction codes. To remove this safety requirement places Ohio citizens who purchase new homes constructed under this proposed code at unnecessary risk of property and life loss to fire. The proposed code modification also places Ohio firefighters who may respond to these structures in the future at great and unnecessary risk of injury and death.

In addition to the property and life safety value of fire sprinklers there are many sound public policy reason to require fire sprinklers in the residential setting. Areas of public policy concerns which warrant consideration include the government’s role in the provision of public safety, present and future cost associated with public safety service, infrastructure development and cost, present and future demand for water, environmental issues, sustainable availability of volunteer firefighters and community insurance cost to mention just a few. These public policy matters must be given very serious consideration.

I attended and testified at the RCAC meeting at which the decision to remove the fire sprinkler requirement from the code was made. Prior to the meeting I submitted written comments with attachments which I ask that you go back and review prior to your December 9, 2009 meeting. My position was to leave the fire sprinkler requirement in the code. During the course of the rather short committee discussion regarding this very important issue there were comments made by committee members that were not correct, unfounded in fact and very misleading in nature which were allowed to stand unchallenged. It was obvious little thought was given to this extremely important life safety component. Could it be that the deck was stacked against the fire sprinklers requirement before the issue was factually analyzed, thoroughly understood and properly
debated by the committee members? Based upon my observations and findings I would say the answer to that question is YES.

I found it interesting that the only fire official on the committee seemed to be expected and encouraged by committee members to make a motion to leave the fire sprinkler requirement in the code. Such a motion was not necessary. The fact is the requirement is already in the IRC 2009 code. If someone wanted to debate removing it from the code a motion to remove would have been a more appropriate a motion. My sense of the process was that the decision had already been made and that it was up to the Fire Official to make a case to reverse the committee members pre-judgment. That is unfortunate.

After the committee took action on the fire sprinkler component of the code I contacted state officials and ask for copies of letters and / or any written comments submitted to the committee regarding the sprinkler issue. Surprisingly I was told that the only submissions received by the committee were the letter and materials that I had submitted. I must ask then, what information did committee members consider to help them reach a factually based and thoroughly researched conclusion. It appears to me that this extremely important issue was decided based upon the positions taken by professional associations, unfounded and unsubstantiated beliefs, and personal emotion rather than the findings of fact. This is not what we expect from persons appointed to represent the public particularly in matters of public safety and public policy. Having gotten that off my mind,

I would like to offer the following options for RCAC consideration.

1) Replace the unamended language found in R.313.1 and R313.2 back into the code. In this case I understand some of the fire separation adjustments made would also need to be reconsidered.

2) Replace the language found in R 313.1 and R 313.2 back into the code but add an implementation date of January 1, 2012 to R 313.1 and an implementation date of January 1, 2013 to R313.2. If this option is adopted I would further recommend that a state implementation committee be established. The committees charge would be to identify and develop recommendations to deal with identified implementation obstacles including the standardization of water tap and monthly fees as well as any other associated fees and governmental costs. Again reconsideration of separation adjustments would need to be reconsidered.

3) If neither of the above options are adopted then I ask that new language be developed to provide fire sprinkler or other acceptable protection in residential construction that uses light weight or engineered construction components. The lives of Ohio Firefighters lie in the balance. Light weight construction has a very well document history of rapid deterioration under fire conditions. There are an increasing number of firefighters across the nation who are losing their lives while fighting fires in homes constructed of lightweight structural members. Let’s not allow an Ohio firefighter to become another number in that statistical column.
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As you know at the IRC Committee meeting held in Baltimore October 28, 2009 the committee voted 7 – 4 to leave the residential sprinkler requirement in the code. This action reaffirms support for the requirement from construction professionals on a national level and it indicates the sprinkler requirement is here to stay. For the sake of the safety of Ohio citizens and the lives and safety of Ohio firefighters I hope you will deal with this serious residential fire safety issue properly and now.

Thank you for your consideration of my comments.

Sincerely,

[Signature]

Ronald W. Brown
Regional Manager, Great Lakes Region
National Fire Sprinkler Association
APPENDIX – LETTERS TO THE RESIDENTIAL CODE ADVISORY COMMITTEE

Dear RCAC Members,

After review of the RCAC draft version of the RCO I would like to make the following comments.

1) Page 6 Section 102.8.1 reads as follows:

102.8.1 Fire protection systems. Non-required fire protection systems shall be installed in accordance with NFPA 13 or NFPA 13D to the extent of the intended installation.

Comment: this section should also include NFPA 13R

Reason: NFPA 13R is the standard for the Installation for Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height and Residential Code of Ohio address these types of facilities. It is mentioned in the proposed Residential Code of Ohio Section 313.1.1 Design and installation for non-required systems and section 313.2.1 Design and installation for non-required systems and in Chapter 44.

2) Page 46 & Page 47 Section 106.1.2 Residential fire protection system construction documents.

Comment: After number 3, number 4 should be added and read as follows:

4. When a certified building department receives an application for plan approval in a jurisdiction in which the local fire official has requested an opportunity to provide input to the certified building department on issues related to fire protections, the building official shall require that the applicant provide a set of relevant construction documents for the local fire official. The building official shall evaluate the local fire official’s comments related to fire protection provisions of this code that are received within the timeframe established by the building official and section 3791.04 of the Revised Code prior to issuing the plan approval certification.

Reason: This will mirror language of the OBC 106.1.2 item 5 and will allow the building official to receive help and input from the fire official who has, if not special knowledge, a penetrating interest regarding residential fire protection systems.

3) Page 61 Section 313 Automatic Fire Sprinkler Systems

Comment: This section should be removed completely as written and re-written using the language found in the 2009 International Residential Code Section R313 Automatic Fire Sprinkler Systems.
Reason: According to the Ohio Fire Marshal’s Office, from the period of 1987 through 2008, the State of Ohio had 478,571 residential structure fires resulting in 2,912 civilian deaths, 19,793 civilian injuries, and a dollar loss in the billions.

As the Fire Official for the City of Medina Fire Department and the Fire Chief of the Medina Township Fire Department I took an oath of office which included providing for the safety and well being of the citizens of my community. By requiring residential fire sprinkler systems this will allow me and others the opportunity to uphold their oaths of office which includes providing for the safety and well being of the citizens of our communities.

During this review process your committee, I am sure, will be hearing or have heard from the Home Builders Association telling you following:
1) Smoke detectors provide enough safety for the residents.
2) Residential sprinkler systems should be the choice of the home owner.
3) The cost of residential sprinkler systems will make new housing unaffordable.

Let’s start with smoke detectors, if they provide enough safety for the resident then why have we killed 2,912 of our fellow Ohioans since 1987? During my 21 years in the fire service I have responded to 6 residential fires resulting in 7 deaths while my department responded to 2 additional fires during times I was unavailable resulting in 2 more deaths. I can write with confidence that even though some of these fires occurred in residents with smoke detectors, either the smoke detector did not function or the individual was either impaired or due to age was not able to self evacuate. All of these fires occurred within areas of the homes that if residential sprinklers had been in place I am sure the outcome would have been different.

Now let’s look at making residential sprinkler the choice of the home owner. With this type of thinking why don’t we have the home owner make the choice for other items within the code such as hand rails, truss construction, bathroom facilities, etcetera. One of the reasons for the Ohio Residential Code is the health, safety and welfare of the public.

Finally let’s look at the cost of residential sprinkler systems. During my research of this issue I have found and been told that residential sprinklers can cost anywhere from $3,000 to $5,000. Using a the Mortgage Calculator from www.mortgagecalculator.org when you add these numbers to a 30 year mortgage it does not matter if you calculate an additional $3,000 or $5,000 you only add an additional cost of $23.33 per month onto the mortgage payment.
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4) Page 63 Section 315 Carbon Monoxide Alarms

Comments: In section 315.1 Carbon monoxide alarms, the language “When construction or alteration plans include detection for carbon monoxide,” should be removed.

Reason: Carbon monoxide alarms are another tool in the tool box of safety for the health, safety and welfare of the public. Carbon monoxide is an odorless, color gas which can be just as deadly as smoke from a fire without the added benefit of flames which are visible to either the resident of a passerby.

When you go back to 101.3 Intent of the Ohio Residential Code you will see that by making these above changes we are addressing the impact the state residential building code will have upon the health, safety, and welfare of the public as well as the technical feasibility of the code is all three items, smoke detectors, residential sprinkler systems and carbon monoxide detectors are advancements within the industry to help in safety. The financial impact that these changes will have on the public’s ability to purchase affordable housing is minimal compared to the safety they provide.

In conclusion, we should not forget the core beliefs and goals of all our organizations, be it the National Association of Home Builders, the Ohio Board of Building Standards, or the Ohio Fire Service which is to provide safe, decent and affordable housing as well as a positive influence on the health, welfare and safety of the public and our communities.

Thank you,

Mark Crumley,
2nd Asst. Chief/Fire Marshal
City of Medina Fire Department
300 W. Reagan Pkwy
Medina, Ohio 44256
Ohio Board of Building Standards  
Residential Construction Advisory Committee  
8806 Tussing Road  
Reynoldsburg, OH 43068  

Re: Protection of Engineered Lightweight Floor Assemblies  

Dear Committee,  

As the representative of the International Association of Fire Fighters to the International Code Council, and the original author of the language being considered for adoption by the State of Ohio, I am writing to urge your support of our efforts to require the protection of Engineered Lightweight Floor Assemblies.  

We initially introduce a code change proposal in 2006 based on recommendations by the National Institute of Occupational Safety and Health (NIOSH) following the Line-of-Duty Death of Fire Fighter Amie Wolf of Green Bay, Wisconsin. In the report of the investigation into the death of Fire Fighter Wolf, NIOSH Report 2006-28 recommended "building code officials and local authorities having jurisdiction should: consider modifying the current building codes to require that lightweight trusses be protected with a fire barrier on both the top and bottom". Based on the recommendation the IAFF submitted a code change proposal requiring a fire barrier system on floor assemblies. The initial code change proposal was disapproved but the submittal caused an opening in dialogue between a number of non-traditional partners.  

The language submitted for your consideration is a product of collaboration between the International Association of Fire Fighters, International Association of Fire Chiefs, American Forest & Paper Association and the National Association of Home Builders. It is the product of a compromise of the parties involved. The fire service recognizes that the first, and most efficient, line of defense for occupants in the event of a fire is Residential Sprinklers. To this date the State of Ohio has not adopted the requirement of residential sprinklers and may not this cycle.  

Because of the uncertainty of the residential sprinkler requirements I strongly urge the committee to support fire fighter safety, and the egress protection of the occupants, by adopting the proposed language requiring engineered lightweight floor assemblies be protected.  

Please contact me with any questions or concerns.  

Sincerely,  

Sean DeCrane, Battalion Chief  
Cleveland (OH) Division of Fire  
IAFF Representative to the ICC  
216-224-6150
APPENDIX – LETTERS TO THE RESIDENTIAL CODE ADVISORY COMMITTEE

Proposed Language:
Ohio Residential Building Code

By: Sean DeCrane, Battalion Chief
Cleveland Division of Fire

July 21, 2010

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch gypsum wallboard membrane, 5/8 inch wood structural panel membrane, or equivalent on the underside of the floor framing member.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.

2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.

3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.