Presented to House Regulatory Reform Committee by Home Builders Association

CODE CHANGE SUBMITTAL

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Code/Code Sections/Tables/Figures Proposed for Revision; Note: If the proposal is for a new section, indicate (new).

Delete IRC Section 313 in its entirety as shown below:

~~**R313 AUTOMATIC FIRE SPRINKLER SYSTEMS**~~
~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.~~

~~**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904.~~

~~**R313.2 One- and two-family dwellings automatic fire sprinkler systems.** Effective January 1, 2011, an automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential fire sprinkler system.~~

~~**R313.2.1 Design and Installation.** Automatic residential fire sprinkler systems shall be installed in accordance with Section P2904 or NFPA 13D.~~

Reason:
Habitat for Humanity of Michigan does not oppose the voluntary installation of fire sprinklers. We do oppose a state mandate that forces installation of a fire sprinkler system into every new home or townhouse.

Fire deaths statistics in Michigan do not justify the imposition of mandatory sprinklers in all new one- and two-family homes and townhouses.

Michigan's fire statistics should not be examined in a vacuum. There are important variables needed to place them in the proper context.

A January 2008 study [1] by Fire Analysis and Research Division of the National Fire Protection Association contained the following finding:

"The chances of surviving a reported home fire when working smoke alarms are present are 99.45%."

The same study reported a survival rate for homes fires without working smoke alarms of 98.87%.

With survival rates that high, even when there are no working smoke alarms, are sprinklers really justified?

The same report also found:

"Because there is evidence that working smoke alarms often act so early that they convert what would have been a reported fire into a very small, unreported fire, the potential savings from universal working smoke alarms could be even larger."

The above findings don't mean people do not die in home fires; they do. Those deaths should not be minimized. However, to make a sound decision on the need for mandatory sprinklers, emotions need to be set aside and the issue examined dispassionately.

Between 2000 and 2006 inclusive, an average of 109 Michigan residences per year were the site of a fatal fire. [2] During the same period, there were an average of 131 residential fire deaths in Michigan per year. [2]

Ninety-three percent of all the above fatal residential fires occurred in homes without working smoke alarms. [2]

Michigan has 4,527,655 residences. Michigan's current population is estimated at 10,033,442 residents. [3]

Each year only 2.41 homes out of every 100,000 or 0.0024% (a bit more than one two-thousandths of a percent) of all Michigan residences are the site of a fatal fire.

While any fire death is a tragedy, the annual residential fire death rate in Michigan is 1.31 people per 100,000. This rate equals the average number of Michigan citizens who die from asthma each year. [4]

The chances of dying in a residential fire in Michigan are 1 in 76,362 while the chances of dying in an auto accident are nearly ten times higher at 1 in 7,500.

Working smoke alarms are a practical, cost-effective, proven way to reduce home fire fatalities.

The National Fire Protection Association says "*Smoke alarms are the residential fire success story of the past quarter century. ... Working smoke detectors can prevent 75 percent of residential fire deaths and 84 percent of fire injuries. ... If every home had working smoke alarms, home fire deaths would decrease by an estimated 36%.*" [5]

Studies show the risk of fire death is greatest in cases of "delayed discovery", typically when the home's occupants are asleep or when there's a smoldering fire, like one started by an unattended cigarette. Smoke alarms work because they alert occupants in time to react.

Mandated sprinklers have not been shown to be a cost-effective method of preventing fatalities.

How safe is safe enough?

While questions regarding construction code requirements intended to increase the safety of homes cannot and should not be decided solely on the issue of cost, it is reasonable to ask if an acceptable level of safety can be achieved through other, less expensive means. Where this is achievable, regulatory authorities should always opt for the less expensive method. The cost of an incremental increase in the margin of safety can be quite high.

Let's set aside the 99.45% and 98.87% home fire survival rates.

A Johns Hopkins University study, funded by the United States Fire Administration, found that 75 percent of residential fire deaths and 84 percent of residential fire injuries could have been prevented by smoke alarms. [6]

According to the Home Fire Sprinkler Coalition, installing both smoke alarms and a fire sprinkler system reduces the risk of death in a home by fire by 82%, relative to having neither. [7]

If working smoke alarms can reduce residential fire deaths by 75% and if having *both* smoke alarms and a fire sprinkler system can reduce residential fire death by 82% over having *neither* then mandatory, fire sprinklers would only reduce deaths in homes with working smoke alarms by 7%.

Applying the results of those studies to Michigan's fire death statistics shows having working smoke alarms in fires where they were not present would have saved 91 lives while having sprinklers in addition to those smoke alarms would have saved an additional 8.5 lives.

Smoke alarms are cheaper and easier to install and maintain than sprinklers. (Unlike sprinklers, they can also be tested to see if they are working.)

While sprinkler advocates claim installed costs of $0.50 to $2.25 per square foot for fire sprinklers, actual quotes in Michigan from sprinkler installers show costs from $4,000 to $8,000 for homes on municipal water and upwards of $15,000 for homes on wells.

When overhead and other factors such as backflow preventers, separate metering and the maintenance of the system are taken into account, the costs to home buyers escalate even higher. Rural areas are particularly hard hit because of the need for new high volume wells, storage tanks, larger pumps and, in some cases, standby generators. One and a half million Michigan families use private wells as their water source.

These cost burdens, along with the additional maintenance and service costs as well as annual inspection fees, will disproportionately affect low-income families.

By way of contrast, two hundred to four hundred dollars will allow the full installation of interconnected, hardwired battery backup smoke alarms in a 2,000-square-foot home.

The most cost-effective means of continuing the reduction of the number of residential fire deaths is, as was reported in the Journal of the American Medical Association, *"(1) smoke alarm installation, (2) monthly testing of smoke alarms, (3) reduction of residential fire hazards, (4) the design and practice of fire escape plans, (5) fire-safety education, and (6) the implementation of smoke alarm ordinances. The adoption of these strategies should lead to continued decline in residential fire deaths."* [8]

All new one- and two-family homes and townhouses built in Michigan are currently required to have interconnected hard-wired smoke alarms with battery backup.

Further, Michigan's law requires all each dwelling unit or sleeping unit including existing homes to have *"a single-station smoke alarm ...installed in the following locations: 1. In each sleeping room or each area directly outside the sleeping room. 2. On each floor level including the basement level.*

Finally, when significant renovation or remodeling is done on an existing home, interconnected smoke alarms with battery back up are installed in those areas as required by the Michigan Residential Code.

Smoke alarm technology is always changing and improving. Innovations in wireless technology and alternative signal noises that are easier for children and for seniors to hear will further improve the already overwhelming success of smoke alarm systems.

Maintaining a mandated sprinkler system is more than making sure heads are not obstructed and should not be done by homeowners.

Fire sprinklers are complicated systems and they require a significant amount of sophisticated maintenance. They are not, as sprinkler manufacturers state in their literature, "easy to maintain," nor can the required tests and maintenance procedures be "easily performed by homeowners."

In their publication, "Tips on Fire Sprinklers" the US Fire Administration, US Department of Housing and Urban Development, and National Institute of Standards and Technology's Building and Fire Research Laboratory say *"(Residential) Fire sprinkler systems require periodic maintenance and inspection. This is not a do-it-yourself job and should be left to a qualified contractor."* [9]

The National Fire Protection Association says a minimum monthly maintenance program should include the following: (1) Visual inspection of all sprinklers to ensure against obstruction of spray; (2) Inspection of all valves to ensure that they are open; (3) Testing of all waterflow devices; (4) Testing of the alarm system, where installed; (5) Operation of pumps, where employed; (See NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection.); (6) Checking of the pressure of air used with dry systems; (7) Checking of water level in tanks; (8) Special attention to ensure that sprinklers are not painted either at the time of installation or during subsequent redecoration. When sprinkler piping or areas next to sprinklers are being painted, the sprinklers should be protected by covering them with a bag, which should be removed immediately after painting is finished.

In colder climates, where anti-freeze type systems are installed, the system must be drained and refilled every winter, a task beyond the capabilities of most home owners.

The National Association of State Fire Marshals has said, "failure to properly maintain systems creates problems. ... NFPA standards allow for the deactivation of sprinkler systems for several hours during maintenance and repair. In the real world, repairs and maintenance may consume more than a typical workday, and systems often remain inactive well beyond the prescribed limit until work is completed." [10]

Quoted costs for contracts for professional fire specialists to conduct the annual system testing perform the required annual maintenance run between $500 to $900 per year. If these elaborate maintenance requirements are ignored or improperly followed, the intricate system the homeowner has been forced to pay for will not function properly.

The paradox of mandating costly incremental increases in safety is they will only protect those who can afford them and will often decrease safety for those who cannot.

The mission of Habitat for Humanity of Michigan is to increase the capacity to build simple decent homes in partnership with people in need in the State of Michigan. More than 200,000 volunteers have been recruited and trained to build and renovate houses for people in need in Michigan. Michigan Habitat affiliates have built more than 3,000 Habitat homes, providing more than 12,500 individuals with housing. Michigan affiliates are building homes at the rate of 250 per year.

The additional cost burden of this proposed mandate will mean an annual reduction of 20 less homes built for families in need, preventing about 85 individuals from being housed each year. Over a 10-year period, mandated sprinklers means 850 men, women and children could remain homeless or in substandard housing because of the added costs of mandatory fire sprinklers. Habitat for Humanity of Michigan will not be the only provider of safe decent housing to be negatively affected by this regulation.

More than 1.4 million Michigan families cannot afford to purchase a home, new or existing, costing more than $100,000 while another million cannot afford homes priced over $175,000. [11]

Families who cannot qualify to purchase the new homes due to the increased costs from mandatory sprinklers will have to live in housing that is less safe because that housing was built to less stringent code requirements.

A Harvard University study entitled "Residential Building Codes, Affordability, and Health Protection: A Risk-Tradeoff Approach" found "T*he mortality risk from house fires is clearly higher in older homes.*" [12] Another study in North Carolina reported on in the *New England Journal of Medicine* found the fatality rate per fire to be 100% greater in homes 20 years or older than in newer homes. [13]

Homes built before 1980 account for 68.7% of Michigan's housing stock. Homes built before 1960 account for 40.6% while 25.1% were built before 1950. Only 8.3% percent of homes in Michigan have been built since 2000.[3]

These older homes can have building materials, space heaters, faulty wiring, or other characteristics that might lead to a greater risk of a fire starting along with structural inadequacy, or lesser ease of exit which increase the chances of dying in that fire.

Even as homes built to today's Michigan Residential Code get older, they will continue to provide protection for families through their improved fire separation, fire blocking and draft stopping, emergency escape and rescue openings, electrical circuit breakers, arc-fault circuit interrupters, capacity and outlet spacing, reduced need for space heating and enhanced means of egress.

Residential fires sprinklers still face questions about their reliability.

Sprinklers advocates claim an effective rate of 96% where sprinklers operated. The key word is "*operated.*"

A January 2009 report entitled "U.S. Experience With Sprinklers And Other Automatic Fire Extinguishing Equipment", conducted by the National Fire Protection Association (NFPA), found sprinklers installed in one- and two-family homes did not operate or were not effective in 61% of the fires that occurred in these homes. [11]

According to the study, from 2003 to 2006 inclusive, in all residential one- and two-family homes in the nation equipped with sprinklers where fires occurred, sprinklers did not operate in 60% of those fires and in another 1% did not operate effectively. [11]

The fire was too small to activate the sprinklers in 57% of these incidents and the sprinklers failed to operate in 3% while in another 1% they operated but were not effective. Each of these fires required a response from the fire department to make it into the NFIRS system. Sprinklers installed in one- and two-family homes only operated and were effective in 39% of the fires that occurred in these residences. [14]

That same NFPA report listed several factors "***that make fatal injury possible even when sprinklers are present and operate***." They included:

- People in the same area as the fire when it started. This category accounts for 85% of the fatalities that occur even when sprinklers operate.
- People whose clothing catches fire from a fire too small to activate sprinklers.
- People who are unusually vulnerable for fire effects such as adults 65 or older.
- People who are bedridden or restrained.
- People who act irrationally by returning to the fire after safely escaping. [14]

A (NIST) report lists other situations when the sprinkler system will not be able to prevent the loss of life:

- Fires that begin so close to a victim that he or she could be described as being intimate with the ignition of the fire.
- Fires that begin in combustibles in a concealed space.
- Some fires with substantial smoldering periods in the same room with a victim who is immobile (e.g. bedridden or incapacitated by drugs or alcohol) and has no prospects for quick rescue.
- Some fast-flaming fire that begin in locations shielded from the sprinkler. [15]

The majority of fire deaths are caused by smoke inhalation not burns.

The number one cause of death related to fires is smoke inhalation. An estimated 50%-80% of fire deaths are the result of smoke inhalation injuries rather than burns. Some fires can begin as smoldering fires that produce smoke and gases that will set off smoke alarms but not the appreciable heat needed to activate the sprinklers.

Over 23 million defective fire sprinkler heads are in use today.

In 2001, the federal government recalled more than 35 million defective fire sprinkler heads. According to the National Association of Fire Marshals, eight years after the recall "*nearly two-thirds remain in use, millions more have been recalled and a leading sprinkler head manufacturer reports that some claims of property loss have been made in buildings found to contain the recalled heads. In spite of a significant effort to replace defective heads in all occupancies, no one knows how many more recalled heads remain to be discovered. … In many jurisdictions, the code official lack the authority to require the replacement of recalled sprinkler heads, which remain formally listed and, therefore, technically in compliance with the code. Sprinkler manufacturers say they lack information on where the heads were installed, and installers expect reimbursement for labor to replace defective units.*" (10)

It's not about granite countertops.

Proponents of mandatory sprinklers often use the argument "They'd only spend the money on a granite countertop anyway," to justify forcing home buyers to pay for sprinklers they do not want.

Set aside the fact most affordable homes, including those built by Habitat, don't have granite countertops or other fancy features. Taking away a homebuyer's choice in how to spend their money, as the sprinkler mandate does, means they lose the ability to use that money in other ways they have decided would better increase the quality of life for themselves and their families.

Dollars involuntarily spent on a sprinkler system won't be available for improved medical care, better insurance, a safer and more fuel-efficient car, education expenses, retirement accounts, charitable giving, physical fitness activities or even upgrades such as a higher efficiency furnace in the new home.

References

1. M. Ahrens, "*Home Smoke Alarms – The Data As Context For Decision,*" (National Fire Protection Association, Fire Analysis and Research Division, Quincy, MA, 2008)
2. Michigan Department of Energy, Labor and Economic Growth, Bureau of Fire Services, State Fire Marshal
3. United States Census Bureau
4. Asthma Initiative of Michigan
5. NFPA Journal May/June 2005 & NFPA publication "Planning & Implementing a Successful Smoke Alarm Installation Program."
6. City of Rochester Hills Fire Department

7. Home Fire Sprinkler Coalition
8. *"Deaths Resulting From Residential Fires and the Prevalence of Smoke Alarms – United States, 1991-1995,"* Journal of the American Medical Association, October 28, 1998 – Vol 280, No. 16
9. "Tips on Fire Sprinklers" US Fire Administration, US Department of Housing and Urban Development, National Institute of Standards and Technology, Washington D.C.
10. J. C. Dean, the National Association of Fire Marshals, Written justification for International Code Council Code Change G100-06/07
11. National Association of Home Builders, Housing Policy Department
12. J. K. Hammitt, E. S. Belsky, J. L. Levy, J. D. Graham, *Residential Building Codes, Affordability, and Health Protection: A Risk-Tradeoff Approach* (Joint Center for Housing Studies, Harvard Center for Risk Analysis, Harvard University, Cambridge, MA, 1999)
13. C.W. Runyan, S. I. Bangdiwala, M. A. Linzer, J.J. Sacks and H. Butts. *"Risk Factors for Fatal Residential Fires,"* New England Journal of Medicine 327, 859-863
14. K. D. Rohr, J. R. Hall Jr., *"U.S. Experience With Sprinklers And Other Fire Extinguishing Equipment,"* (National Fire Protection Association, Fire Analysis and Research Division, Quincy, MA, 2009)
15. K. D. Rohr, J. R. Hall Jr., *"U.S. Experience With Sprinklers And Other Fire Extinguishing Equipment,"* (National Fire Protection Association, Fire Analysis and Research Division, Quincy, MA, 2005)

Cost Impact:
The code change proposal decreases the cost of construction by not mandating sprinklers.

XX Back up/Graphic material included

☐ **Additional Code Proposals**