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From testimony presented to the Chicago Building Committee

A Call for Fire Sprinklers in Chicago's Existing Residential High-Rises

According to the National Fire Protection Association, U.S. fire departments responded to an average of 15,700 fires in high-rise buildings between 2005 and 2009. This is an average of more than 1,300 fires per month, a little over 300 fires per week, 43 fires per day or almost two every hour.

These fires caused an annual average of 53 civilian fire deaths and approximately 550 civilian fire injuries. The fires also caused an average of approximately 235 million dollars in direct property damage annually.

Organizations Supporting Fire Sprinklers

There are some large organizations that realize the value of automatic fire sprinkler systems in high-rise residential buildings, including the National Fire Protection Association (NFPA), International Code Council (ICC) and FM Global.

The NFPA is a nonprofit international trade association that creates and maintains codes and standards for usage and adoption by local government entities. Its membership totals more than 70,000 individuals around the world.

NFPA's mission 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. As the world's leading advocate of fire prevention and an authoritative source on public safety, NFPA develops, publishes, and disseminates more than 300 codes and standards intended to minimize the possibility and effects of fire and other risks. Only some of NFPA's codes and standards are referenced by the Chicago Building & Fire Codes. NFPA's Fire Code (NFPA 1), which provides requirements to establish a reasonable level of fire safety and property protection in new and existing buildings, is not referenced by the Chicago codes. The current edition of NFPA 1 requires an automatic sprinkler system for both new and existing high-rise buildings, without any exceptions.

The ICC, is a nonprofit membership association dedicated to building safety, fire prevention and energy efficiency. It develops the model codes that are used for both residential and commercial buildings. Most U.S. cities, counties and states that adopt model codes choose the International Codes, which are a complete

set of comprehensive and coordinated building safety, fire prevention and energy efficiency codes. The latest editions of the ICC International Building & Fire Codes both require automatic sprinkler systems for new high-rise buildings.

FM Global is a Rhode Island-based mutual insurance company with offices worldwide. It specializes in loss prevention services primarily to large corporations throughout the world. The company employs a nontraditional business model whereby risk and premiums are determined by engineering analysis as opposed to historically based actuarial calculations. This business approach is centered on the belief that property losses can be prevented or mitigated. FM Global engineering personnel regularly visit insured locations to evaluate hazards and recommend improvements to their property or work practices to reduce physical and financial risks if a loss were to occur.

FM Global understands the importance of automatic fire sprinkler systems. Its approval standards development decisions are based upon advanced research. The company publishes numerous documents called Data Sheets which contain requirements and recommendations for the properties they cover. One of the provisions in the Data Sheet for high-rise buildings is to have an automatic fire sprinkler system installed throughout such buildings.

High-Rise Fire Sprinkler Requirements

There are numerous major metropolitan cities in the U.S. that have adopted automatic fire sprinkler retrofit ordinances for high-rise buildings. These include:

- Atlanta
- Denver
- Las Vegas
- Honolulu
- Houston
- Los Angeles
- Philadelphia
- Phoenix
- San Diego
- San Francisco
- St. Louis

Also, there have been a few states that have enacted high-rise fire sprinkler retrofit ordinances, including:

- Florida
- Louisiana
- Massachusetts
- New York
- Virginia

In addition, two large suburbs of Chicago, Oak Brook and Schaumburg, Illinois, have adopted high-rise sprinkler retrofit ordinances.

Problems with Chicago Residential High-Rise Ordinance

Despite all these facts, the City of Chicago has not yet passed an automatic fire sprinkler retrofit ordinance for residential high-rise buildings. In 2004, the City passed an ordinance allowing owners of high-rise residential buildings to have a Life Safety Evaluation (LSE) performed, in lieu of installing an automatic sprinkler system. An LSE, measures three major areas of safety, including Fire Safety, Means of Egress and General Safety. In my opinion, the LSE scoring model has a number of shortfalls. I have performed Life Safety Evaluations on seven high-rise residential buildings and none of them had the minimum passing scores for Fire Safety, Means of Egress and General Safety.

Fire Sprinkler Operation & Benefits

Fire sprinklers are most effective during the fire's initial flame-growth stage. A properly selected sprinkler will detect the heat of a fire, initiate an alarm and begin suppression within moments after flames appear. In most instances, sprinklers will control fire advancement within a minute or two of their activation. This will result in much less damage than otherwise would occur without sprinklers.

A typical sprinkler consists of a plug held by a trigger mechanism which is usually a small glass bulb partially filled with a liquid that will expand when heated. At a certain temperature (e.g., 155 degrees Fahrenheit), the liquid will expand enough to break the glass bulb and the pressurized water in the system piping will force out the plug. Water will flow from the fused sprinkler in the area of the fire until the sprinkler system control valve is closed.

One major advantage of modern residential fire sprinkler systems is the requirement for residential-type sprinklers, which activate in a shorter time period than standard response sprinklers. Residential sprinklers are different from standard sprinklers in that they have both fast-response characteristics and a special water distribution pattern. Typically, only one or two sprinklers will quickly control a fast-developing fire while it is still small, which maintains survivable conditions within the room of fire origin.

Benefits of having an automatic fire sprinkler system in a building include:

- Sprinkler systems will control or extinguish a fire any time of day or night; they work 24/7.
- Immediate identification and control of a developing fire: Without an automatic sprinkler system, a room with a fire can reach flashover conditions within only a few minutes.

- Immediate occupant notification: In conjunction with the building's fire alarm system, automatic sprinkler systems will notify occupants and emergency response personnel of the developing fire.
- Reduced heat and smoke damage: Significantly less heat and smoke will be generated when the fire is extinguished at an early stage.
- Reduced water damage: A single sprinkler will only discharge approximately 15 to 25 gallons per minute, while a hose and nozzle used by the fire department will put out up to 250 gallons per minute, approximately 10 to 15 times more water.
- Decreased insurance expenditure: Sprinkler controlled fires are less damaging than fires in non-sprinklered buildings. This results in lower insurance reimbursements. Insurance underwriters typically offer reduced premiums for properties with sprinkler protection.

Residential High-Rise Fire Sprinklers

The City of Chicago has previously passed two ordinances that have resulted in cost savings to a building owner when an automatic sprinkler system is installed in an existing high-rise building.

The first is a provision in the Chicago Building Code that allows the existing water supplies that feed a building's fire department standpipe system to be reused for the new fire sprinkler system. Basically, water supplies include the standpipe risers (the large vertical steel piping, fittings and hose valves typically located in the exit stairways), fire pumps and the underground incoming water service(s). The reuse of these items results in huge cost savings for the building owner and also alleviates the need to close a street down so that trenches can be dug to install new underground piping.

The second code provision permits the use of chlorinated polyvinyl chloride (CPVC) piping and fittings in automatic fire sprinkler systems in a high-rises. CPVC piping offers greater flexibility and is easier to install than traditional steel piping, therefore resulting in additional cost savings for the building owner.

Fire Sprinklers Provide Firefighter Life Safety

In 2004, the first-ever National Fire Fighter Life Safety Summit was hosted by the National Fallen Firefighters Foundation in cooperation with the U.S. Fire Administration. The summit resulted in 16 Firefighter Life Safety Initiatives. Initiative 15 called for stronger codes and laws in order to decrease the number and severity of structural and residential fires to keep firefighters out of harm’s way. The recent (more stringent) revisions to the model codes regarding occupancies where automatic fire sprinkler systems are required address a large part of this Initiative.

There are many reasons and benefits for installing an automatic fire sprinkler system in a building, as outlined in the City of Chicago Resolution #R2012-170

which was recently sponsored by Alderman James Balcer, Alderman Edward Burke and Alderman Daniel Solis. A very large benefit for the City includes a reduced level of risk for firefighters involved with fighting a fire in a sprinklered building versus a non-sprinklered building. In addition to the health and welfare of the firefighters, there would be a cost savings with regard to reduced workers' compensation claims if all residential high-rises were sprinklered.

Conclusion

The current Chicago Building Code only requires automatic fire sprinkler systems for new high-rise buildings, but not for existing residential high-rises. There is no doubt that automatic sprinkler systems are the most effective fire- and life-safety systems available today. I urge you the Council Members to consider developing and implementing a fire sprinkler retrofit ordinance for existing residential high-rise buildings in the City of Chicago.

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