



BUILDING WITH FIRE SAFETY IN MIND



Since its inception in 1999, Fire Safe North America (FSNA) and its predecessor, the Alliance for Fire and Smoke Containment and Control (AFSCC) have been active in promoting the concept of balanced fire protection design.

It is the position of FSNA that balanced fire protection design, also referred to as safety layering, redundancy, or reliability enhancement integrates multiple features and systems into the design to reinforce one another in case of the failure of any one. Safety layers include active protection such as a suppression system AND built-in fire and smoke features AND detection features to facilitate early notification and safe egress.

FSNA does not promote non-sprinklered buildings. FSNA does promote built-in passive fire and smoke protection as essential to safety layering, which also includes the widespread installation of fire sprinklers. The combination of active and passive fire protection provides a better fire safety environment than either one alone.

SAFETY LAYERING

The concept of safety layering is not new, and is recognized as sound engineering practice. Referring to that concept in what has historically been referred to as redundancy, the NFPA Fire Protection Handbook, Section 1, Chapter 1 of the eighteenth edition (1997) states, "Success is measured by the extent of usage of effectively designed, integrated fire protection systems. No one system should be considered disposable and no one system should be considered a panacea." The NFPA Fire Protection Handbook continues, and many experts agree that "passive fire protection provides the final opportunity to stop the fire and smoke, but also plays an essential role in providing automatic systems with a manageable fire to act on."

Although safety layering is essential to life safety, it can also be a contributing factor to disaster mitigation. Since 1980, natural disasters have cost the United States more than \$750 billion. In 2013, FEMA has declared more than 1,700 emergency declarations and major disaster declarations since 2000. According to the National Oceanic and Atmospheric Administration, there have been 25 major disasters over the past 2 years (since 2011) that have surpassed \$1 billion in economic losses. Both naturally occurring disasters and man-made disasters often start a chain reaction of other disasters, in particular, fires. Hurricanes cause fires, power outages and water pressure reduction; droughts lead to raging wildfires; and earthquakes cause gas leaks, which result in fires.

FSNA supports the concept of building resiliency which is a building designed to ensure life safety and, when challenged by a natural or manmade disaster that results in a fire event, can return to normal use and operation in a reasonable timeframe.

Building resiliency includes:

- increased adaptability for reuse
- increased longevity
- increased robustness
- improved life safety
- increased durability
- increased resistance to disaster

HOW RESILIENT IS A BUILDING IF IT ISN'T FIRE SAFE?

Recent trends in construction have tipped the balance toward more reliance on active systems and a relaxation or elimination of many building code-required passive fire and smoke features, sometimes referred to as trade-offs. In fact, some proponents of active systems, such as automatic sprinkler systems, is to make sprinklered buildings less expensive to build than non-sprinklered buildings by stripping out all or most passive fire protection features in the fire protection design.

In the most recent editions of the building codes, the installation of sprinklers can trigger the elimination or reduction of the following features:

- Reduced structural fire protection requirements
- Non-rated tenant separations
- Non-rated corridors
- Increased height AND areas with double tradeoffs for both, rather than one or the other
- Non-fire rated separations between occupancies
- Engineered smoke control is not required in high rise buildings
- Unprotected vertical openings are permitted through multiple floors
- Enlarged smoke compartments
- Longer travel distances for egress paths
- Reduced requirements for noncombustible or limited combustibile materials on wall and floor finishes

The concept safety layering in the context of fire protection involves measures, features and practices relating to both construction and contents that, taken as a whole, serve to try to prevent fires from occurring, and simultaneously to minimize the impacts to life and property should a fire occur. Safety layers in fire protection designs are used to minimize the risk by ensuring that adequate safeguards are in place to mitigate the hazardous consequences of potential fire incidents. The purpose of safety layering ensures that if efforts at fire prevention fail and a fire does occur by either accident or intention, both active and passive fire protection measures are in place to not only suppress the fire, but also to slow or contain fire growth and allow more time for egress and less danger to firefighters. The concern is not so much that a



properly maintained automatic sprinkler system will fail, but that a natural disaster, human error or lack of maintenance could disable the system to the point where additional layers of protection may be the only measures preventing or delaying a building or an entire block being destroyed by fire. When those layers do not exist, the building will not be able to withstand as big of a fire and will fail sooner, putting occupants and especially firefighters at great risk. There is no single silver bullet answer to the problem of fire and its consequences.

The shortcomings of human nature, inadequate design and maintenance, and even the well-intentioned proponents of green and sustainable buildings can unintentionally sabotage even the optimum balance of protection features. During the most recent code changes cycles, proponents of increased energy efficiency are submitting proposals that promote green, sustainable and energy efficient buildings. Such proposals are changing construction methods and building techniques, but do not consider the effects of such changes on fire and life safety. The National Association of State Fire Marshals (NASFM) has authored a paper identifying dozens of newly approved green and energy-saving code requirements that impede well-established firefighting strategies, which leaves buildings more vulnerable to damage and the occupants at risk.

When Energy Efficient, Sustainable Buildings Are Designed And Constructed With An Appropriate Combination Of Active And Passive Fire Protection With Consideration For Emergency Responders, The Buildings Are Fire Safe And More Resilient. They Are Better Able To Ensure Continuity Of Operations, Increase Durability, Increase Adaptability For Reuse, Increase Resistance To Disasters, And Improve Life Safety For Occupants And Firefighters.