

Volume 9, No. 1

Spring/Summer 2013

The Magazine of Effective Compartmentation



# Life Safety DIGEST

**In This Education Occupancy Issue:**  
Tornado Resistant Schools Mean Much More Than Wind  
A Virtual Tour at Canada's National Research Council Laboratory  
Audible Notification for Educated Consumers



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**On the Cover:**

Fire resistance rated compartmentation protects people in this busy corridor. The detection and alarms, communication systems, sprinklers, and occupant education complete the Total Fire Protection System concept. System Sensor Photo.

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# Editor's Message

Educational occupancies protect people of all ages who come to learn, share, exercise or reside in the many structures from elementary schools through universities.

In this issue, you will find articles on Fire Rated Gypsum, Mass Communication and Notification Systems, Firestop Contractor Certification, Fire Rated Glazing and more.

The question might be asked, 'why are there articles on communication and alarms' in an Effective Compartmentation Magazine? FCIA also believes in Total Fire Protection. Detection, alarms and communications are important pieces to Total Fire Protection. Communications may ask building occupants to find safe places in buildings. Maybe that's a fire, smoke shelter...or a compartmented area. Alarms cause people to move to compartmented areas. Compartmentation must work in conjunction with other fire protection features.

Communications and alarms are important items on educational campuses. We appreciate the articles by alarm and communications firms here in *Life Safety Digest*.

FCIA believes that the proper design, installation, inspection and maintenance (DIIM) of Total Fire Protection, including Effective Compartmentation components, are vital to fire and life safety in educational and other occupancies.

Enjoy this issue of *Life Safety Digest* and know that architects, building officials, contractors, fire marshals and those who supply products to the industry want to provide the best in safety for all. 🔥

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# Firestop Specifications - What You Don't Know May Hurt!

By Peter Schmidt

Most savvy building professionals are aware that poking a hole doesn't qualify a person to fill it -- not if it's in a fire rated barrier.

As a result, more 07-84-00 firestopping specifications are calling for "FM-4991 Approved, UL/ULC Qualified or Manufacturer Trained," leading unsuspecting building owners, managers, and general contractors to assume "Manufacturer Trained" is an acceptable substitute for an FM-4991 Approved Firestop Contractor and/or UL/ULC Qualified Firestop Contractor. But is it?

## FM and UL Firestop Exams

The FM 4991 and UL Qualified Firestop Contractor



Multiple cables firestopped.  
*Firestop Solutions, Inc. photo*

Programs provide an objective evaluation of competency in firestop systems selection and installation. The FM and UL/ULC Firestop Examinations set a benchmark level of knowledge for the person overseeing the entire operation of firestop installation.

Manufacturer Trained means a contractor may have spent anywhere from an hour to a few days in a program where the manufacturer introduces their particular products and some applications. As with anything, some programs are better than others. Even the best Manufacturer Training programs are missing



Pipe properly firestopped through a penetration.  
*Firestop Solutions, Inc. photo*

one significant factor that is a given for any FM-4991 Approved or UL/ULC Qualified Firestop Contractor. That's the objective third party auditing of the system used to manage all firestop operations.

## FM 4991, UL Qualified Contractor Company Audits

FM 4991 Approved and UL/ULC Qualified Firestop Contractors are subject to two independent audits



Firestop Spray installed to the listed system detail becomes a 'Firestop System'.  
*Firestop Solutions, Inc. photo*

every year. Audits are based on the globally recognized ISO 9001 guidelines and standards. The programs were developed collaboratively between FCIA and FM Approvals, FCIA and Underwriters Laboratories.

The first audit (Office and Facility Procedures Audit) verifies the management system of the contractor to ensure competency in the procedures used. The second audit (Field Procedures Audit) confirms that installers are working in compliance with the approved management system / quality assurance manual.

The management system quality assurance manual addresses the following key points:

### -Employee Training & Education

- How are employees, including the field and office workforce, trained?
- How is that training verified?

### -Systems Selection

- Is there a formal process for selecting firestop systems?
- If not, how does the company know the appropriate firestop system has been selected for the particular application?

### -Communication

- How is the field staff informed which firestop systems selected are to be used and where?
- What kind of freedom does the field staff have

to select and install an alternate system which may not have been in the submittal?

#### -Material Controls

- How are defective materials handled?
- How does the company ensure that they will not be intermingled with good materials?

#### -Systems Installation “Protocol”

- How does the company confirm firestop products are being installed to a tested and listed system, engineering judgment, or equivalent fire resistance rated assembly instructions?
- How does the company verify that the installation is within system parameters?

#### -Labeling

- Where labels are used to state the UL Listing or FM Approval number? How are they designated and who has access to the labels?

#### -Variance Procedures

- How does the company keep track of variances and their resolutions?

#### -Documentation

- How does the company document the systems used, enabling future maintenance?
- Is a complete closeout file prepared for the hiring authority, the Authority Having Jurisdiction, the building owner, and manager as specified in the construction documents?
- Are these records made available for a minimum of seven years?

Independent Audits by a well respected third party such as FM Approvals and/or Underwriters Laboratories or Underwriters Laboratories of Canada sets the FM 4991 Approved and/or UL/ULC Qualified Firestop Contractor apart from those who do not specialize in firestopping. This includes “Manufacturer Trained.”

Accept no substitutes. Require an FM 4991 Approved and/or UL/ULC Qualified Firestop Contractor on all your projects. Your fire rated barriers will be properly restored without the disruption and delays caused by a faulty installation.

Learn more about the details of FM 4991 at <http://www.fcia.org/fm4991approval.php> or the UL/ULC Qualified Firestop Contractors program at <http://www.fcia.org/ulapproval.php>. 🔥

*Peter Schmidt is with Firestop Solutions, Inc., Bohemia, NY. He can be reached at [pschmidt@firestopsolutions.com](mailto:pschmidt@firestopsolutions.com)*



Pipe firestopped through a fire resistance rated brick masonry wall.  
*Firestop Solutions, Inc. photo*

### How to Choose a Firestop Contractor

Selecting a Firestop Contractor can make the difference between a safe and effective firestopping application that makes effective compartmentation work and disaster. From the Firestop Contractors International Association, here are some factors to consider when choosing a Firestopping Contractor:

1. Is Firestopping one of the contractors' primary businesses? Specialists understand the 'zero tolerance' industry installation protocol.
2. Does the firm have experience installing the particular materials on the project? Have they been educated by the manufacturer?
3. Is the company a FM 4991, Standard for Approval of Firestop Contractor, or UL/ULC Qualified Firestop Contractor? Did they just pass the FM or UL/ULC Firestop Exam? Does the company have a FCIA Firestop Manual of Practice?
4. Does the Contractor belong to the Firestop Contractors International Association? Are they on committees or the board? Involvement in the industry means commitment.
5. Insurance protection is important. Does the Contractor have Workers Compensation, Finished Products and General Liability Insurance as required by local ordinances?
6. Did the contractor provide a reference project listing of similar projects?
7. Did the contractor provide a written detailed proposal?
8. Have you verified the contractors address, Tax I.D. number, phone and fax numbers?
9. What kind of Management System Quality and Safety Programs does the firm have in place to protect you and their employees? Do they have any certifications? Is their safety record better than the national average consistently?
10. Who will supervise the work? Does the supervisor and crew specialize in Firestop/Containment Work?

At FCIA, we suggest focusing not just on price, but also on quality and the quantified qualifications of the company and employees. The objective of Firestopping is to restore the integrity of the fire resistance-rated Effective Compartmentation that keeps people safe in buildings. Insist on Specialist Contractors.



# The Inspector

By Philip Chandler

*Reprinted with permission from The Center for Campus Fire Safety (<http://www.campusfiresafety.org/>) from the May 2013 eNewsletter.*

It seems like just yesterday that I had the unique joy of teaching my daughters to drive—manual transmission, no less. It took weeks for the swelling on my forehead to recede; learning to shift was no different than breaking in a wild bronco. Included in the instruction was the use of the parking brake. In my day—I'm really dating myself—it was also called an emergency brake. In the event of catastrophic pedal brake failure, we were taught how to bring the car to a halt using the hand brake. Being the perennial worrier, I taught my daughters this fail-safe operation.

It should come as no surprise, that when informed during a routine oil change that the aforementioned brake cable was badly rusted, I replaced it without the slightest hesitation. I am a big proponent of having a plan B.

In my estimation, the compartmentation of our buildings with fire-resistant rated construction is akin to equipping an automobile with an emergency brake. These days, when most new buildings and many older ones are equipped with sophisticated fire detection and suppression systems, one might reasonably question the need for this old-fashioned building technology.



Firestop Products installed in a sleeve to a FM, UL or other listing laboratory detail becomes a SYSTEM. Note identification label for system. *FCIA Photo.*

Firestops, shaft enclosures, partitions, barriers and the like, add significant cost to new buildings. Subsequent maintenance of these passive systems adds further expense. There are those that argue that this money could be put to better use. I beg to differ! The compartmentation of our buildings

provides indispensable back-up protection for our buildings and their occupants. When the unthinkable happens—when fire strikes—it's reassuring to know that the danger will be stopped dead in its tracks.

I could not put my girls in an automobile without a working emergency brake. Nor could I ever feel comfortable with someone else's daughters asleep in a college residence hall lacking the passive protection offered by fire-resistant rated construction features. Look, we all know how difficult it is keeping our

fire alarm systems glitch-free. We are also routinely challenged in keeping our sprinkler systems leak and obstruction free. As essential as these systems are, and as extensive as our inspection, testing and maintenance programs are, we know deep down that there is always a chance that they will not perform as intended. Reliable compartmentation is our plan B.

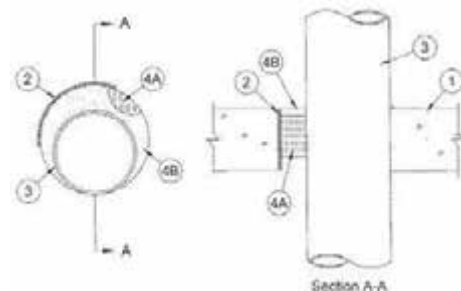
There are many impediments to securing the benefits of fire-resistant rated construction. The first impediment is the simple lack of proper installation of the systems and components in our new buildings (see e-Newzone, March, 2013 at <http://www.campusfiresafety.org/e-newzone>). The second impediment, and in many ways a more daunting challenge by virtue of its scope, is maintaining the continuity of fire-resistant rated construction in existing buildings. One of the most persistent threats to this continuity is the through penetration of fire-rated walls and floors. The passage of pipes, conduits, cables and ducts through rated assemblies is unavoidable. But doing so without due regard to maintaining the fire resistance of the penetrated assemblies effectively impairs their ability to stop the spread of smoke and fire.

There is rarely a day in the life of a fire safety inspector where new holes are not found in rated walls and floors. The telecom guy, the plumber, the electrician, the security camera guy, you name them; they all wreak havoc on our fire-rated assemblies. Keeping up with their destruction is a full time job.

Often times, an attempt is made, half-hearted at that, to protect the through-penetration. But in more cases than not, the method used or the materials installed are improper. Just because it's red is no assurance of protection. Nor should we be deceived by any number of UL listings, ASTM certifications and



Trained installers get firestopping done right. *Hamilton-Benchmark photo*



Firestop systems designs provide the "recipe" for installation. Without the system design, there may not be protection against fire.

the like on the products used. Without carefully vetting all product information, one is likely to grab can of foam stuff that has been tested by one laboratory or



another for any number of applications, but one of them appropriate for the job at hand. One size does not fit all. In most instances, we need to demand a firestop system that is tested in accordance with UL 1479 or ASTM E 814. Accept no substitutes. Additionally, and this is critical, the system must be installed exactly as tested and in the manner specified by the manufacturer. A little dab won't always do ya'!

Part of the difficulty in maintaining fire-resistant construction in new and existing buildings is due to the delegation of responsibility for protection of penetrations. On larger projects, it has become widespread practice to rely on each sub-contractor, vendor or trades person to supply the appropriate firestopping. This arrangement rarely works. There are of course mechanics that are knowledgeable in the intricacies of good through-penetration protection—many of these have ample experience working in highly regulated environments. But many times a particular mechanic or firm lacks any clue as to what is required. Maybe this job is the first one of this scale—a big break for Joe's Plumbing and Heating. (Yes, we all have to start somewhere.). What we need is single source accountability. In those projects where outside resources are used, the general contractor has to own the responsibility for adequate compartmentation. If the GC is not up to the task, than a specialized firestop contractor—and there are many with national certification—makes sense. At the very least, a third-party inspection agency should be considered.

Sadly, our building code officials often miss the most egregious firestopping deficiencies. And quite frankly, if many of the permitting authorities were doing their job, they would have demanded a detailed schedule of all firestopping systems before approving the project.

Likewise, on small everyday projects done inhouse, we need better accountability. The trade supervisor, project manager, whoever, needs to assume responsibility for repairing breaches of fire-resistant construction. This cannot be done as an afterthought. Every project involving through penetration, regardless of how small, needs an assessment at the outset of what materials and methods are needed to complete the job. We don't drive a nail in the wall without an asbestos review. Isn't the hazard of fire worth a little extra care? 🔥

*Philip Chandler is a long time firefighter and a fulltime government fire marshal working extensively in the college environment – from large public university centers to small private colleges. His primary responsibilities include code enforcement and education. Phil welcomes your comments, thoughts and opinions (whether in agreement or opposition) to his viewpoints. He may be reached at: [theinspector@campusfiresafety.org](mailto:theinspector@campusfiresafety.org)*

*Note: The viewpoints expressed in The Inspector are those of the author alone. They are offered to initiate thought and debate; however, they do not necessarily represent the views or opinions of The Center for Campus Fire Safety or Life Safety Digest, its officers, directors or its editorial staff.*



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# Tornado Resistant Schools Mean Much More Than Wind

By Stephen S. Szoke

Enhanced resiliency for buildings through a different method to design and construct is important for any structure in a disaster prone area. Resilience is also a mostly overlooked component for sustainable or green building design. The need for enhanced resiliency must be a priority for schools especially where there is an opportunity for schools — or portions of schools — to serve as community shelters.



Figure 1: Shelter Design Wind Speeds for Tornadoes  
Source: FEMA.gov, visited 2013.

The Federal Emergency Management Agency (FEMA) publishes guidelines<sup>1</sup> on how to design storm shelters. In addition, standards for the minimum design and construction requirements for storm shelters<sup>2</sup> are referenced in the model building codes.<sup>3,4</sup> The model codes set minimum criteria for storm shelters where they are present. Unfortunately, codes do not specify where storm shelters are needed. Like other essential and critical facilities, all schools in hurricane and tornado prone areas should be equipped with storm shelters.

Every school located in an area where the shelter design wind speed for tornadoes exceeds 160 mph, as shown in Figure 1, or between the coast and the landward extent of hurricane prone region identified by the American Society of Civil Engineers (ASCE), as shown in Figure 2, should be equipped with a storm shelter. The storm shelter should be large enough to house no less than the maximum occupancy of the school.

1 *Design and Construction Guidance for Community Safe Rooms*, FEMA P-361, Federal Emergency Management Agency, Washington, DC, 2008

2 *Standard for the Design and Construction of Storm Shelters*, commonly referred to as ICC 500, International Code Council, Country Club Hills, IL and the National Storm Shelter Association (NSSA), Lubbock, TX, 2008.

3 *International Building Code*, International Code Council, Country Club Hills, IL, 2012.

4 *International Residential Code*, International Code Council, Country Club Hills, IL, 2012.

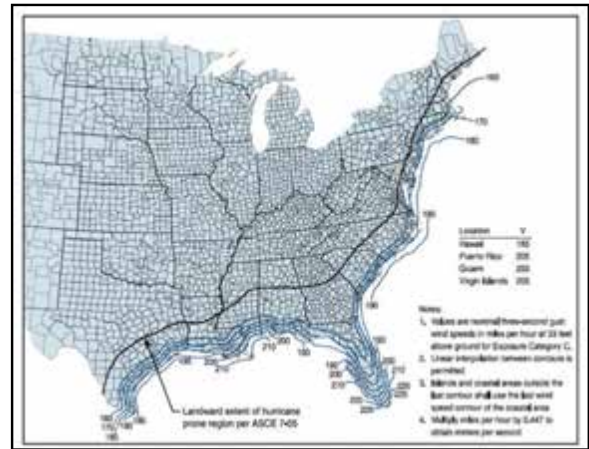


Figure 2: Shelter Design Wind Speeds for Hurricanes  
Source: FEMA.gov, visited 2013.

Where the wind speeds are less than 200 mph, the gymnasium may be economically designed and constructed as an adequate storm shelter. In areas where the design wind speed is less than 200 mph, it is often possible to design entire schools — or at least significant portions — as storm shelters. The school shown in Figure 3 is reported by FEMA to provide nearly absolute protection for more than 2,000 people in Gulfport, Mississippi.



Figure 3: Hurricane/tornado shelter at West Harrison High School, Gulfport, MS.  
Source: Photo by Tim Burkitt / FEMA photo. FEMA.gov, visited 2013.

Tall walls of gymnasiums are typically provided with lateral support at the top with long spans of steel joists acting as a diaphragm. Thus, it may not be economical to design and construct gymnasiums to serve as storm shelters in areas where the design wind speed is 200 mph or more. When the roof is compromised, walls lack the necessary lateral support and tend to collapse as shown in Figure 4. Alternatively, locker rooms, restrooms, cafeterias, or similar spaces within the school may be better suited as storm shelters where the design wind speeds are 200 mph or more.

While all schools in hurricane and tornado prone areas should be provided with storm shelters that are at least adequate to accommodate the design occupancy

load, building the entire school to resist a direct impact of a tornado or hurricane with winds exceeding 200 mph may not be economically feasible. However, schools should be designed to resist multiple aspects of potential foreseeable disasters.

Properly incorporating enhanced resilience into the design and construction of schools will also serve as an exemplary educational model for students and the community. Where damage to schools can be minimized, the ability for communities to recover from major windstorm disasters will also be improved.



Figure 4: Plaza Tower Elementary School, Moore, OK, May 22, 2013.  
Source: FEMA.gov, visited 2013, Jocelyn Augustino/FEMA

There are a variety of risk assessment models, sophisticated design and analysis tools, and methods to evaluate the consequences of disasters. Often the use of these tools exceeds the resources available within a community. A national association representing the insurance and re-insurance industry in the United States, IBHS<sup>5</sup>, has developed prescriptive recommendations to be considered in the design and construction of buildings to better resist damage from natural disasters.

Recognizing that structure fires are not in the purview of IBHS, the Portland Cement Association working with IBHS developed a set of non-material-specific criteria in mandatory language that may be used for school design called the *High Performance Building Requirements for Sustainability*.<sup>6</sup> The criteria for enhanced resilience using this tool include increased wind load resistance, impact resistance, and fire protection for the entire structure as well as requirements for storm shelters within buildings. These criteria will result in enhanced resilience and reduced damage. Minimum hail and wind-borne debris impact resistances are established and wind loads for components designed to wind design loads for storm shelters are increased by 20%. Passive fire protection is increased to the levels required assuming sprinklers are not present, limiting the heights and areas of schools even if they are equipped with automatic fire suppression systems (sprinklers).

Current code allows schools to be built of combustible construction and containing sprinklers to be twice as tall and have a footprint that is 400 times the size that would have been permitted had sprinklers not been present. The area of space not required to

have passive fire protection or compartmentation increases from a size less than ½ a football field to more than 3 football fields. Limiting the building's compartment size to that required had sprinklers not been present, but still requiring sprinklers not only provides safety from fires after disasters when water supplies and emergency response services are disrupted or overextended. It also assures an increased level of property protection from sprinkler damage and/or the disaster. Only extremely large and aggressive fires, which for schools tend to be related to arson, tend to breach fire-resistance-rated compartmentation in buildings. It's common sense that where fires are contained to smaller areas, the damage from fire, smoke, and water will be reduced.

The passive fire protection, compartmentation and structural fire resistance, and impact-resistant construction, also tends to improve the room-to-room and outdoor-to-indoor sound transmission resistance improving student and teacher comfort and productivity.

These more robust structures will better survive high wind events that are less than the hurricane or tornado event used for storm shelter design. Therefore, the time that is required for these structures to be placed back in service will also be reduced along with reduction in repair, demolition, disposal, and reconstruction costs.

The debris resulting from the recent tornado in Moore, Oklahoma is estimated to equal a pile one mile in height. More resilient construction results in less debris and disposal which is clearly more sustainable. This is an important message that should be communicated to our communities and what better way than through more disaster-resistant schools. The debris from schools built to minimum building code requirements would still include sustainable or green components and features.

Green buildings, especially those built in disaster prone areas, must start with a more resilient core and shell than that required by minimum building codes.

Most features commonly accepted as being green, such as low-flow plumbing fixtures and energy-efficient appliances and equipment, are typically replaced several times over the service life of a school. The original core and shell tend to remain in place until the school is demolished at the end of its service life. Furthermore, most green features, such as more efficient equipment, appliances, and plumbing fixtures, tend to be expensive. When incorporated into a building where the core and shell are designed and constructed to the minimum requirements of the building code for life safety, these more efficient and expensive components are just as likely to end up in landfills as less expensive ones when disaster occurs.

For any sustainable building and for any building in a disaster prone area the first priority must now be enhanced resilience for the building's core and shell. Communities, businesses and individuals should not have to bear the costs, direct and indirect, for property losses and the costs associated with long periods of time for recovery from "non-resilient" buildings.

<sup>5</sup> Institute for Business and Home Safety, Tampa, FL.

<sup>6</sup> High Performance Building Requirements for Sustainability, Portland Cement Association, Skokie, IL 2011, [www.cement.org/codes/pdf/HPBR%20&%20Commentary%20v2.0.pdf](http://www.cement.org/codes/pdf/HPBR%20&%20Commentary%20v2.0.pdf)



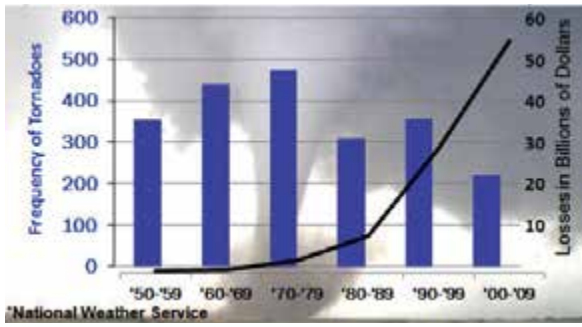


Figure 5: Frequency of EF3 to EF5 tornadoes compared to property losses.

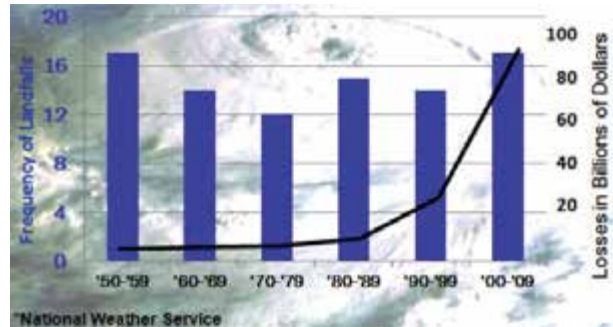


Figure 6: Frequency of hurricanes making landfall compared to property losses.

As shown in Figure 5, the frequency of EF3 to EF5 tornadoes remained relatively constant over the last four decades. However, property losses due to tornadoes in 2010 dollars increased by over 700%. Similarly, while the number of hurricanes making landfall on the United States also remained relatively constant, Figure 6 shows that property losses increased by nearly 600%. Some might argue that the property losses from these events are due to shifts in population. However, U.S. Census Bureau data indicates that population rise in the Midwest and Southeast were only about 25% and 100% respectively. Further, much of the population moving to coastal areas and more densely populated areas, due to the high prices of property in those areas, have relocated into more robust mid- and high-rise construction than less robust low-rise buildings.

Clearly, we need to build better and more disaster-resistant buildings to achieve sustainability at the

building, community, and national levels. What better place to do this than in our schools. Let's teach our children how to start learning about the importance of a strong building core and shell before adding amenities. Let's also educate them about the choices that can be made in building design that can make a difference in fire safety. This can all be done by building schools that provide excellent protection for our children! 🔥

*Stephen S. Szoke, P.E. FACI, LEED/AP is Director of Codes and Standards for the Portland Cement Association. He serves on many committees, programs, and activities related to sustainability and enhanced resilience, including past chairperson of the Sustainable Building Industries Council and currently serving on the American Society of Civil Engineers Structural Engineering Institute Board of Governors and the National Institute of Building Sciences Building Seismic Safety Council Board of Directors and Multi-Hazard Mitigation Council. Steve can be reached at [sszoke@cement.org](mailto:sszoke@cement.org).*

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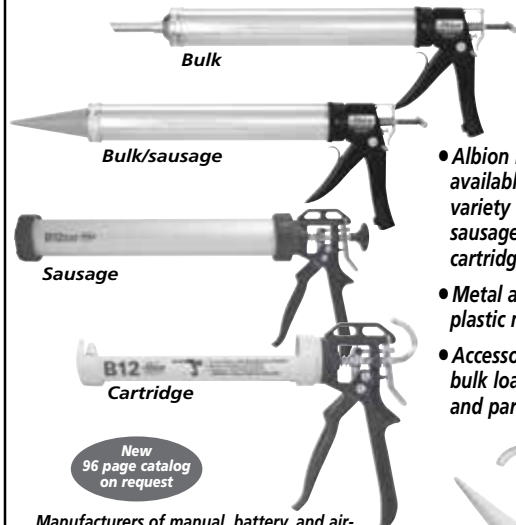


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# Automatic Vents Provide Daylighting and Save Lives

By Roger F. Joyce

Automatic heat and smoke vents are openings in a roof that are intended to provide a pre-established exit path to vent heat and smoke caused by an interior building fire. They have long been used as an effective fire protection measure. They also protect property and aid firefighters in bringing a fire under control by removing smoke, heat and gases from a burning building. Automatic vents are ideally suited for large expanses of unobstructed space such as factories, warehouses, auditoriums, schools, gymnasiums, concert halls and retail facilities.

During a fire, the smoke and hot gases rise until they reach the ceiling and then spread outward and down towards the floor level which can make manual firefighting difficult. Automatic heat and smoke vents can relieve smoke accumulation in buildings by containing the spread along the ceiling and permitting smoke to escape. The smoke rises through the vent because it is much hotter than the outside air.

In addition to providing an exit path for hot gases, venting also improves firefighting efficiency and promotes safe egress from a building. Responders are able to quickly determine the approximate location of a

fire by observing the smoke plume from an open vent and the air quality and visibility inside the building is significantly improved to allow firefighters to get in to do their job and occupants to safely escape. The vast majority of fire fatalities are due to smoke inhalation.

The principle of automatic venting is based on the distribution of a sufficient number of vents over the entire roof area to ensure reasonably early venting of a fire regardless of its location. The size and spacing of the vents must be determined for each building depending upon the size of the building, its particular use or combination of uses and the degree of hazard involved. There are many factors to be considered in determining the combustibility of various materials, so it is not possible to develop an exact formula for the number, size, and location of vents. However, tests and experience have enabled fire protection authorities to develop general guidelines for venting requirements and local professionals should be consulted for product selection for a particular structure.

The development of heat and smoke vents was a direct result of a 1953 fire in which a General Motors plant in Livonia, Michigan burned to the ground. Since



Bilco's Lumivent® is a domed automatic fire vent that provides natural daylight, energy efficiency and the protection of automatic fire venting, pictured in a closed position.



this incident, numerous different designs and styles have been used to satisfy safety requirements in other types of buildings and occupancies.

The advancing technology of heat and smoke vents has also prompted standards development organizations to develop a method to assess the performance of these vents. Standards to measure and evaluate the fire resistance and integrity of automatic heat and smoke vents have been adopted by the International Code Council. Test method UL 790, Standard Test Methods for Fire Tests of Roof Coverings, and UL 793 Automatically Operated Roof Vents for Smoke and Heat,

The UL 793 standard for Automatically Operated Roof Vents for Smoke and Heat designates the use of the UL 790 burning brand test procedure for product ratings and compliance. This test is designed for all roof covering materials and simulates the reaction that a product has to an ember of specific size and shape landing on its surface from a nearby burning structure. The intent of this test, along with this portion of the UL 793 standard, is to prevent the spread of fire from one building to another due to a burning ember landing on the roof surface. The ember size varies based on the rating, Class A, B or C.

The International Code Council has also recognized the requirements of UL 793 as an important fire safety standard and has incorporated its provisions into the International Building Code and International Fire Code.

Over time, it has become increasingly popular in the building industries to incorporate as much natural daylight into open spaces as possible. Warehouses, schools and manufacturing facilities are just some examples of buildings that typically house large, open areas where natural daylighting can be utilized. This option offers workers a pleasant environment. Building owners and managers often see a substantial energy savings. The glazing for an automatic daylighting smoke vent is typically constructed of acrylic or polycarbonate material using either a dome-shaped or flat panel design. Each of these designs has its own specific requirements to comply with the fire protection standards for automatic smoke vents.

Despite the aesthetic benefits of natural daylighting smoke vents, code organizations have acknowledged the need for the same level of fire protection and testing standards on these products as metal covered vents.

Regarding the burning brand test, UL 793 states that smoke vents with plastic cover panels (acrylic or polycarbonate) must be designed in a manner so that flying brands would not likely lodge on their surface. To prevent the lodging of a burning ember, the 2012 International Building Code (IBC) in section 2610.3 expands on this requirement by stating that flat plastic

skylights shall have a slope of at least four units vertical in twelve units horizontal (4:12 slope).

Dome-shaped skylights are required to have a rise above the mounting flange that is a minimum distance equal to 10% of the maximum dome width and not less than 3 inches.

In both cases, the sloped or domed cover design encourages burning embers to roll off the cover surface rather than burn through. This simulates the intent of fire protection standards. Flat panel glazing used in



Bilco's Lumivent® is a domed automatic fire vent that provides natural daylight, energy efficiency and the protection of automatic fire venting, pictured in an open position.

non-sloped covers does not meet these fire protection standards.

Incorporating natural daylighting through the use of an automatic fire vent has enhanced the aesthetics of many types of buildings including industrial, educational and the many other occupancies while satisfying the fire safety standards. 🔥

*Roger F. Joyce is the Executive Vice President of Engineering at The Bilco Company. The Bilco Company has been designing and developing specialty access products for over 85 years. An ISO 9001-certified company and a LEAN manufacturing organization, Bilco offers a full line of roof hatches, automatic fire vents, floor access doors and basement access products for residential applications. Roger can be reached at rogerj@bilco.com*

# A Virtual Tour at Canada's National Research Council Laboratory

By Life Safety Digest Staff

Science and basic research are essential to the discovery of better products and services for economy and safety. Funding basic research in North American corporate environments has become increasingly difficult as competitive pressures cause budget cuts. Unless the activity generates significant new revenue quickly, sometimes it can be put on the back burner.

The National Research Center of Canada (NRC) and other laboratories around the world provide basic research to answer the longer term, "what if" questions. The NRC's laboratories are well suited to perform basic research for industries while

servicing the public interest through value-added science that helps innovators make decisions. The facilities and staff are an impressive organization with world-class structures and equipment for cutting-edge testing. The facilities' testing capabilities span many industries from housing to energy, fire to transportation including aviation, rail and auto.

Thanks to fire research director Ahmed Kashef, FCIA's Canada members, Underwriters Laboratories and FM Approvals toured the facilities after the FCIA Educational Symposium in Ottawa in mid-March, 2013. The group visited the Ottawa laboratory facilities on March 13.

## The tour consisted of several research centers:

- Overview – NRC's Ahmed Kashef gave an overview of the facility and the research centers we would be touring.
- Housing – On the NRC campus are four homes built to test for energy consumption, alarms and detection systems, thermal and moisture resistance. "For simulation, two of the homes are exact replicas of each other, even down to the errors and dents," stated NRC's Luc St. Martin, tour guide for FCIA.
- Energy & Roofing – A large portion of a big

building concentrates on wall systems research, plus roofing and insulation.

- Fire – There are two fire testing facilities that NRC operates. The FCIA group toured the floor furnace, column furnace and other equipment including a Steiner-tunnel test apparatus for measuring flame spread and smoke developed from products being burned.

On Friday March 15, NRC's team brought FCIA's executive director Bill McHugh to visit its Almonte Fire Test Laboratory, an amazing facility. As an association, we've visited Underwriters Laboratories, FM Approvals, Intertek and Southwest Research's fire

test research centers. These are all amazing places as well. However, the NRC has something that many others do not — a 10-story fire test facility.

NRC's fire test facility has several areas where multi-story structures can be built and then burned to understand how the building construction types react to fire. The objective is to protect fire and life safety while allowing innovators to develop and test new products facilitating entry to market while complying with building and fire codes.

The facility contains one of only two 10-story high-rise atrium test facilities in the world. Adjacent to the 10-story atrium is a 10-story structure with windows that can be used for additional testing.

In the 10-story building adjacent to the atrium, simulated constructions for many building occupancies can be put to fire testing. These simulations can bring actual building contents that would exist in structures. They can then be set on fire and measurements taken for tenability, smoke release, egress, alarm response time, smoke movement and more. According to NRC's Ahmed Kashef, "Carleton University owns the facility and NRC operates the test laboratory."

In another structure, a "tunnel" simulation building exists where auto, train and other testing can



FCIA tours the NRC's Ottawa Laboratories



be performed to show smoke movement in these confined spaces.

The fire test facility is large enough to accommodate several test areas. NRC's guides showed the shell of a structure used to enclose a 2,000-square-foot home and basement. The facility was being used to test engineered wood floor/ceiling assemblies behavior and also smoke movement. Bedroom doors were left open or closed and alarm signal response times, interior room temperatures and much more measured to provide firefighters with data to build fire attack strategies.




NRC describes testing at NRC's labs

In another area, new types of wood floor assemblies were being fire tested in full scale multi-story situations. There is also a four-story-high exterior cladding test structure that measures fire spread on the exterior skin of the building due to interior fire source igniting the cladding.

Roofing systems were being tested to validate (or not) firefighter ventilation creation through cutting holes in roofs. Canadian Forces Military tents were being tested full scale to understand interior fire spread and exterior as well from tent to tent in "tent cities."

NRC's staff and facilities are amazing. The staff operates one of the world's leading fire test facilities. There is no other facility like the 10-story atrium and structure in North America, nor Europe.

FCIA was honored to be invited to tour the facility. We look forward to further collaboration with the NRC for research that results in better fire and life safety in buildings...and touring the Almonte facility. 

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# Optimizing Emergency Communications on the College Campus

By John Von Thaden

## ***New research validates the effectiveness of personal notification including social media as a critical layer of communications for crisis alerting and messaging***

The tragedies that occurred at Virginia Polytechnic Institute in 2007 and Northern Illinois University in 2008 placed a spotlight on the safety and security of students, faculty and staff at the nation's colleges and universities. Consequently, school officials have focused increasingly on the development of effective, reliable and comprehensive strategies for campus-wide emergency warning and notification.

In addition to high-profile campus shootings, a number of major weather-related emergencies including the Katrina and Sandy hurricanes and the tornado that devastated Joplin, Missouri in 2011 have also had a significant impact on how college and university administrators intend to address future emergencies.

Thinking back, it actually was not that long ago that if a college or university did have any capability for emergency warning it was limited to a few outdoor sirens scattered across the campus. However, this changed abruptly on September 11, 2001 with the terrorist attack on the World Trade Center in New York. In the years that followed 9/11, new technology was quickly incorporated into emergency communications for applications ranging from industrial complexes, shopping centers, office buildings and healthcare facilities, to the nation's college and university campuses.

As a result we have seen a proliferation in the number of emergency warning and messaging formats now in place at educational institutions. This includes the deployment of everything from cell phones, texting, two-way radios, public address and intercom systems, to outside LED signage and strobe lights, to the entire spectrum of IP-based technologies including email, instant messaging, smartphones and social media networking sites such as Facebook. Citing the words of Rex R. Yentes, president of Webber University, in Babson Park, Florida on the deployment of his school's comprehensive emergency warning and notification system, "It's one of the things you hope you never need, but you're glad you have it just in case."

As has been the case at the University of Texas at Austin and Duke University in Durham, North Carolina, Webber University has recently taken steps to improve its campus safety and security system with outdoor directional array sirens/speakers (DSA). These systems support the capability of producing both tone alerts and voice announcements that ensure effective campus-wide coverage for outdoor emergency warning. Among the most sophisticated systems to come on stream are those

that combine traditional outdoor-warning methods including sirens with network-based, multi-device communications software platforms. Such a software-based system is designed to support access across the entire spectrum of personal and mass notification capabilities to include everything from cell phone voice and text alerts, to emails and "tweets".

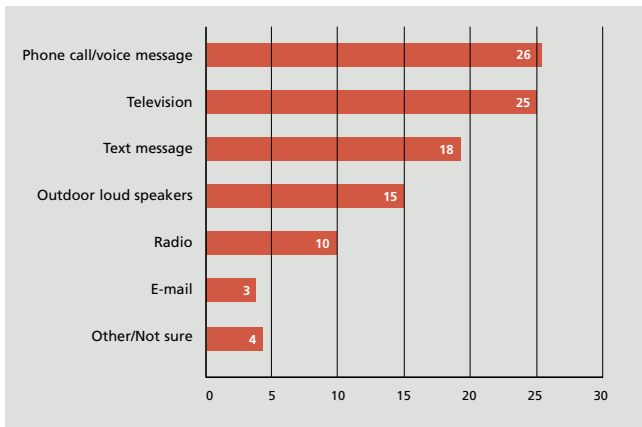
Fayetteville State University in North Carolina offers an example of a system that integrates traditional outdoor warning with various methods of personal notification. In this case the system includes an electronic digital siren network that provides tone alerts and voice announcements for outdoor warning. This network is controlled by an integrated siren encoder which has been integrated with the communications platform for simultaneous activation of alerts to Webber's students, faculty and staff via cell phones, landlines, radios, PDAs, pagers, email and other personal notification devices. This safety and security platform supports a distributed instant messaging and scenario management architecture that supplies instant scalability, redundancy and automated fail-over features to alert and notify the institution's more than 6,000 users across hundreds of servers.

When it comes to the subject of multiple communication layers, Fayetteville University's vice chancellor of police and public safety, Travis Bryant, comes right to the point: "You want to have as many layers of notification as possible." Moreover, he is confident that the university's system "ensures that our people will receive notification regardless of where they are on campus," which he emphasizes "provides peace of mind for everyone."

## **Recent Research Examines Critical Factors of Human Behavior That Influence Students' Response to Emergency Alerts**

Through their studies of campus-related shootings, University of Buffalo School of Management researchers Dr. Raj Sharman, associate professor, and Dr. H. Raghav Rao, SUNY Distinguished Service Professor, hope to uncover ways to encourage students to comply with alert messaging distributed during a campus emergency. They were joined in their research by the university's Dr. Joseph Brennan, vice-president for university communications, and collaborating research scientists Dr. Serkan Ada, assistant professor, Kahramanmaraş Sutcu Imam University, Turkey, and Wencui Han, doctoral degree candidate at the State University of New York at Buffalo.

With the goal of identifying and analyzing crucial factors that influence student responses to on-campus emergencies, the researchers targeted communication channels that were most effective in reaching students.



Federal Signal's Annual Public Safety Survey revealed that America's Generation Y prefers to receive emergency notifications via TV and texts.

Additionally, they examined student attitudes toward emergency alerts, including what they expect from alert notifications, and what factors influence their compliance with instructions.

Surveys of 600 students and a dozen focus groups demonstrated that students are more likely to immediately comply with emergency alert instructions (e.g. "shelter in place," or "evacuate the building") when they know and trust the source of the warning. In the absence of that trust, the students felt compelled to verify the information with either peers or known official sources before complying. "If students believe the information is coming from a trustworthy source (e.g., close friend, parent, professor or administrator such as the campus police chief) they are more likely to follow the directions given in the emergency alerts," stresses Sharman.

The University of Buffalo's research demonstrated that campus alert notifications are the best way for students to find out about an incident and what they

should do, and that campuses should use multiple layers of communications to reach students, i.e., text, email, social media, etc. Sharman stresses that colleges and universities should continually work to improve their reach across these channels. "Once students become accustomed to receiving official notifications through these channels, they are more likely to acknowledge emergency alerts and take action as directed."

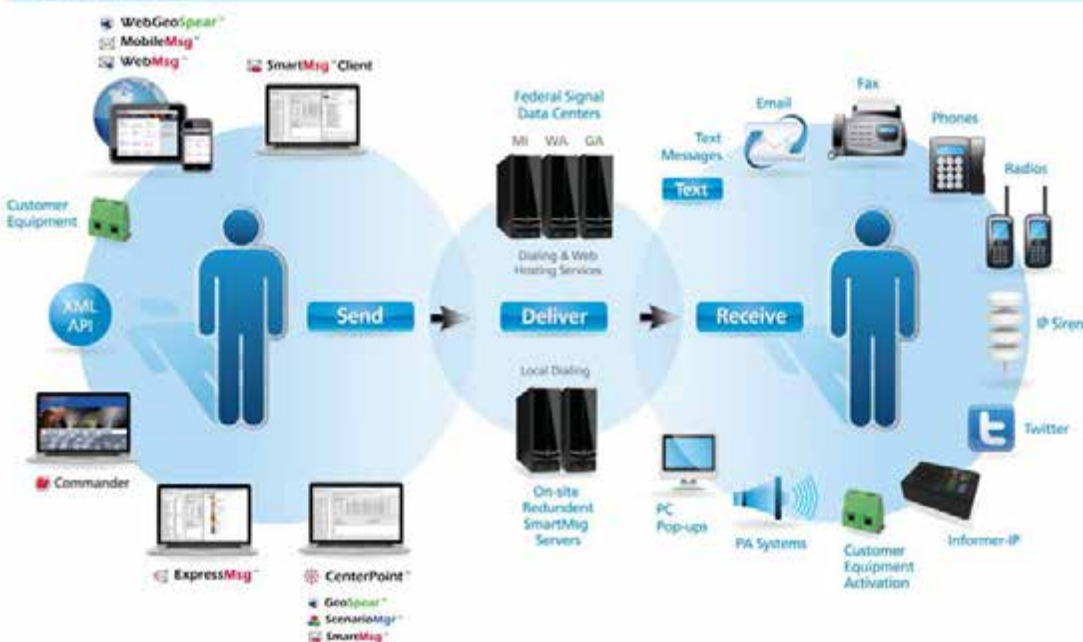
Notably, the researchers also cite the importance for campus public safety officials to have a presence on Twitter, as well as Facebook. Emphasizing this point, Professor Rao explains, "that Twitter should become a trusted source for such emergency information. The number of followers for such a Twitter account would increase enormously during a rapidly unfolding crisis situation, and allow for trusted word-of-mouth dissemination."

The growing use of social media by official sources responsible for dispersing and disseminating emergency information is a positive trend that now goes well beyond merely taking advantage of a communications medium preferred by a specific group such as students. By providing users of social media networks with credible sources for accurate information, emergency managers and other public safety officials are able to effectively counter the misinformation and rumors that are common to social media, especially during highly intense crisis situations.

For obvious reasons it should come as no surprise that the emergency management information arms of many municipalities and government agencies have already opened accounts on social media networks including Facebook and Twitter to counter this issue. 🔥

*John Von Thaden is vice president/general manager for the Alerting and Notification Systems, Safety and Security Group of Federal Signal Corporation. John can be reached at [jvonthaden@federalsignal.com](mailto:jvonthaden@federalsignal.com)*

SmartMsg System Diagram



Federal Signal's SmartMsg™ is a sophisticated system that combines traditional outdoor-warning methods, like sirens and PA systems, with network-based, multi-device communications software platforms. The diagram displays how software is delivered to the receiver in a variety of ways through multiple technologies.



# Superior Fire Resistance Just One of Many Attributes for Fiberglass Mat Gypsum Panels

By Barry Reid and Becky Serbin

A viable, long-lasting building must incorporate more features and functionality than ever before. While fire resistance is required by code, newer versions of other codes and programs call for increased levels of energy efficiency, moisture management, durability, and indoor air quality. These requirements have added to the complexity of designing, building and maintaining high-performance structures.

Today's buildings are safer, more energy efficient, more resilient and more likely to last for many years to come. But such integration brings with it additional challenges – not the least of which is determining the best materials to use when designing, specifying and constructing a building. Indeed, a challenge faced by building products manufacturers is to help designers get past single attributes of a product and look at how they integrate with other systems to enhance long-term performance.

A good example to consider is Continuous Insulation (CI). CI is used on the exterior walls to reduce the impact of thermal bridging of the wall framing and is an effective way to achieve significant energy savings. Some insulation is made of combustible materials. Others are inherently fire resistant.

But, does combustible CI meet energy efficiency requirements and the needs of fire-rated assemblies? The answer, happily, is yes — especially if used in conjunction with fiberglass mat-based exterior gypsum sheathing. Using fiberglass mat gypsum sheathing not only provides a stable substrate for the air, water-resistant, and thermal (insulation) barriers, it offers superior mold and moisture resistance for high-performance exterior wall assemblies.

While the fire-resistant properties of gypsum are well documented, so too are the moisture- and mold-resistant attributes of a particular form of gypsum panels – fiberglass mat-based gypsum panels. When replacing paper facings with fiberglass mats, improved resistance to the effect of moisture results in fewer panels needing replacement if exposed to moisture. In fact, some fiberglass mat gypsum panel products have a limited warranty against delamination and deterioration for up to 12 months of exposure to normal weather conditions commonly seen on job sites.

That means in addition to helping protect against panel damage from mold and moisture, their resilience can help ensure high indoor air quality performance. As noted above, fiberglass mat sheathing, and its interior panel counterparts, can remain exposed to normal weather conditions during construction, thus helping accelerate construction schedules since the products' installation don't have to wait for perfect weather or completion dry in conditions.

The moisture-resistant properties of fiberglass mat gypsum products in no way impacts the fire-resistant properties of these materials. Fiberglass mat gypsum and traditional gypsum products are equally effective in meeting fire safety requirements. Along with the aforementioned qualities, fiberglass mat gypsum panels are an extremely effective choice in all types of buildings including schools and universities.

The sheathing is a durable substrate and/or protector for all air- and water-resistive barriers and continuous insulation products. Additionally, taped gypsum board qualifies as a "deemed to comply" in section 402.4.1.2 of the 2012 International Energy Conservation Code, "Air Barrier Compliance Options." Penetrations of the gypsum air barrier must be "caulked, gasketed, or otherwise sealed in a manner compatible with the construction materials and location." according to the 2012 IECC. And, the interior products can benefit indoor air quality and resilience to incidental moisture.

Because gypsum is comprised of 20% chemically combined water, it is inherently heat- and fire-resistant. An excellent thermal barrier, gypsum boards offer greater cost-effective fire protection than other conventional commercial roofing, sheathing and wall boards. In the case of fiberglass mat gypsum panels, their dimensionally stable gypsum core has been reinforced with glass fibers, increasing strength and resistance to the passage of heat. Fiberglass mat gypsum boards are considered to be noncombustible, as described and tested in accordance with ASTM E136.

Many fiberglass mat gypsum panels are UL and ULC Classified and included in numerous fire-rated building assemblies with FM Approvals' fire ratings. Listings can be found at UL's Fire Resistance Directory (<http://www.ul.com/global/eng/pages/>, bottom right, On-Line Certifications Directory) and the FM Approval Guide, <http://www.approvalguide.com>.

These dual properties – superior fire resistance and mold/moisture resistance – make fiberglass mat gypsum panels an excellent choice in supporting most types of building assemblies, including schools and healthcare facilities.

For example, the Texas Children’s Hospital Maternity Center in Houston, a 790,000-square-foot, 15-floor building, used 133,000 square feet of fiberglass mat gypsum sheathing. Doing so contributed to enhanced indoor air quality requirements by potentially eliminating the chance for mold growth on the back of the gypsum sheathing panel. Also, the fire protection of the gypsum panels ensured that the builder was not compromising safety requirements in selecting this multi-purpose product.

### On the Roof Deck

While all parts of the building can benefit from the protective qualities of fiberglass mat gypsum panels, the increased importance of roofs makes these panels particularly attractive to architects and contractors. Where the decking, insulation or membrane is comprised of potentially combustible material, a non-combustible cover board can contribute to a desired, industry-accepted and code complying fire rating.

Fiberglass mat gypsum cover boards are often used over metal deck installations when specifications or code requirements mandate a fire barrier. When

used above the metal deck, cover boards serve as an underlayment that helps prevent membranes and adhesives from further fueling a fire below the roof. Such specifications are common when the membrane — or adhesive used as part of the roof system — is flammable.

Gypsum cover boards can also help reduce the likelihood of fires on or near the exterior of the structure from spreading to the interior. That is because their noncombustible core makes fiberglass mat-based roof boards an excellent thermal barrier, providing greater fire resistance than some other conventional commercial roofing boards.

This is an especially attractive feature in cities, where many buildings are in close proximity to each other, or in areas prone to drought and wind-driven wildfires, where fires can spread quickly from rooftop to rooftop.

While specifiers, architects and contractors must consider numerous factors when specifying and selecting building materials, they naturally gravitate towards those that address numerous code requirements and other pragmatic concerns. Those advantages are especially significant when used in conjunction with materials that share similar attributes.

With more materials than ever before being used to address energy efficiency, fire resistance and other requirements, building owners and managers can take



Fiberglass mat-based gypsum sheathing panels, like these Georgia-Pacific Gypsum DensGlass® panels installed on a student apartment complex in Atlanta, have excellent fire-resistant properties as part of a fire-rated exterior wall assembly. The exterior wall system, part of the building envelope, provides structural support; air and water resistant barriers; insulation and an attractive cladding for a beautiful building built to last.



comfort in the fact that fiberglass mat gypsum panels are extremely effective in wall and roof assemblies. Their superior mold and moisture resistance can add value to the building owner's investment, while ensuring that the highest levels of fire resistance characteristics are maintained. 🔥

For another complete listing of gypsum products and designs and their fire-resistant properties, please refer to the GA-600 Fire Resistance Design Manual, produced by the Gypsum Association.

Barry Reid, LEED AP BD&C, is Sustainability/ Product Manager and Becky Serbin is Interior Product Manager for Georgia-Pacific Gypsum, based in Atlanta, Georgia. Georgia-Pacific Gypsum manufacturers Dens® Brand and ToughRock® Brand gypsum panel products. Barry can be reached at bsreid@gapac.com. Becky can be reached at rsserbin@gapac.com



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# Audible Notification for Educated Consumers

By Roopa Shortt

*Fire alarm notification has undergone rapid changes over the past decade.*

With many of the recent advancements in fire alarm and emergency notification, educational facilities can now take advantage of new technologies and techniques to provide higher levels of safety to students, staff, and visitors.

These new approaches are largely driven by research into occupant response to emergency notification. This research has resulted not only in new technologies and techniques for alerting, informing and guiding occupants in an emergency, it has also led to changes and updates in industry standards and codes.

As many schools reassess security and life safety plans in light of recent emergency events, and new fire alarm requirements are more widely adopted on state and local levels, educational facilities will be one of the primary markets for these more advanced notification technologies.

## Speakers Lend a Voice

Nearly everyone can recall a time when a fire alarm horn/chime/bell has sounded and rather than evacuating, people choose to ignore the alarm. This conditioned response to traditional fire alarm notification, mixed with growing research supporting the effectiveness of voice messages, has led to a steady increase in demand for fire alarm systems with speakers for voice evacuation. A series of tragic incidents have also driven demand for these systems to enable authorized users to send live voice messages (a.k.a. mass notification/emergency communications) in real time.

Educational facilities are beginning to understand the benefits of coupling emergency communications systems (ECSs) with fire alarm systems. Beyond the potential cost savings of utilizing an existing fire alarm system, the robust survivability, 24-hour supervision and regular testing fire alarms must adhere to per code ensure a high level of reliability. Due to budget and installation time constraints, many schools implement ECS in phases, adding or upgrading speakers first, then pre-recorded voice messaging capabilities, and lastly, adding local operator consoles to allow authorized users to perform live voice paging.

Before ECS became popular, the fire alarm industry had a different design focus than acoustic systems designers (i.e. public address and music systems). When the 2010 edition of National Fire Protection Association (NFPA) 72®: *National Fire Alarm and Signaling Code* expanded its coverage of emergency communications, which included new intelligibility

requirements for fire alarm voice evacuation and ECSs, the industry's focus on proper system design and intelligibility, or clarity of message, quickly changed.

Proper layout and placement of speakers greatly affects intelligibility, particularly in large spaces with potentially high levels of ambient noise, such as school auditoriums, gymnasiums, cafeterias and other places of assembly. Commercially available software programs can be used to simplify the design of intelligible voice evacuation systems. Sound designers utilize these programs to model the acoustic properties of specific environments and speaker configurations. With proper speaker and space (i.e. room layout) information, these programs can help predict the intelligibility of a voice system before installation.



A Local Operator Console from Gamewell-FCI enables authorized users to send live voice alerts or pre-recorded messages through the fire alarm/emergency communication system

Signal-to-noise ratio is a comparison of the volume or sound level that is being produced by a speaker to the ambient or background noise in a space. Chapter 18 of NFPA 72 calls for the speaker sound output to be an average of 15 decibels (dB) higher than ambient to achieve the needed intelligibility. Any higher than 15 dB over ambient will most likely diminish the level of intelligibility, and it is therefore recommended that more speakers be added at lower tap settings as opposed to increasing existing speakers' sound output.

A fire alarm voice evacuation system can now be used to alert people for fire, inclement weather, police incidents as well as paging and intercom. The intelligibility of the new system designs allow for clear messages to be played so that occupants can move quickly to safety.



## Low-Frequency Sounders Awaken

A series of research studies funded by the NFPA Fire Protection Research Foundation concluded that a low frequency tone, around 520 Hz, is more effective at waking sleeping individuals, including those with mild-to-severe hearing loss. Due to these findings, a code change proposal was initiated in the 2010 edition of NFPA 72, requiring that new, commercial sleeping areas utilize a low frequency sounder with a 520 Hz (+/- 10%) square wave. This new requirement is located in NFPA 72 Section 18.4.5.3: Sleeping Area Requirements and has been carried over to the current 2013.

The compliance date for installation of low frequency sounders is January 1, 2014, and the requirement applies to new, commercial sleeping spaces, including school dormitories, hotels and assisted living facilities.

The research study, waking effectiveness of alarms (auditory, visual and tactile) for adults who are hard of hearing, was included in the Optimizing Fire Alarm Notification for High Risk Groups research project published in June 2007. The researchers tested numerous auditory signals and alternative alarms to determine which were most successful at waking and alerting individuals with partial hearing loss.

The lower pitched tone was found to be much more effective than the higher pitched tone, typically 3100 Hz, commonly used in residential smoke alarms.

Audible emergency evacuation signals set at a 520 Hz square wave tone awakened 92% of the hard-of-hearing test participants when used at or below the code-minimum sound level of 75 decibels for 30 seconds. The success rate was 100% at 95 decibels. One study found that only 57% of individuals that are hard-of-hearing awoke to a 3100 Hz signal at less than 75 decibels.

## Directional Sounders Lead the Way

Oftentimes, the occupants within a school facility may not be familiar with the building and its associated emergency egress routes. The traditional maps and signage required by codes provide occupants a visible means for locating or finding a path to safety. Occupants, however, may not have had an opportunity to study and understand such a diagram or cannot visualize an actual escape route as depicted on such a diagram.



A speaker strobe being installed

Many times, the illuminated front of exit signs competes with nearby bright lights or other visually distracting elements. Persons with visual disabilities will have more difficulty with emergency information that relies on visual cues. Of course, at the time of a fire, smoke will many times obscure exit signs and the location of exit doors. All of these factors, combined with an individual's tendency to attempt to leave a



A combined fire alarm and emergency communication system from Silent Knight

building by the same route he or she entered, can lengthen evacuation times in an emergency.

Directional sounders offer an audible means of identifying exits and egress routes, helping to overcome the limitations of current exit signage and alarm signals. Utilizing a broadband acoustic characteristic that is distinctive from the audible sounds of bells, horns, or voice speakers, directional sounders do not conflict with traditional audible alarm signals; however, they are not a substitute for these traditional notification devices. Directional sound devices are intended to operate with traditional fire alarm notification devices and to be wired as part of the fire alarm system notification circuits.

The psychoacoustic response to directional sounders has been shown in numerous exercises and research studies to lessen the time required for evacuation (in some cases by as much as 75%) and to effectively assist occupants searching for egress routes and exits. Schools already putting directional sounders to use include Oregon State University, Alabama's Pleasant Grove and Hueytown High Schools, and Children's Haven Childcare Center in Denver, Colorado.



ExitPoint Directional Sounder from System Sensor positioned by a school building's main entryway and exit

A question often asked about directional sounders is how building occupants will know how to react when they hear the sound. Although the sound is intuitive to many people, an enhancement made to directional sound technology is the addition of voice messaging. In between four

second bursts of directional sound, an alert message in the form of a recorded voice message can be used. The purpose of the voice message is to instruct the occupants of what action to take as they approach the directional sounder. The messages will instruct occupants that they are approaching stairs going up, stairs going down, an area of refuge, or the exit.



A busy school hallway with typical light-up exit signage

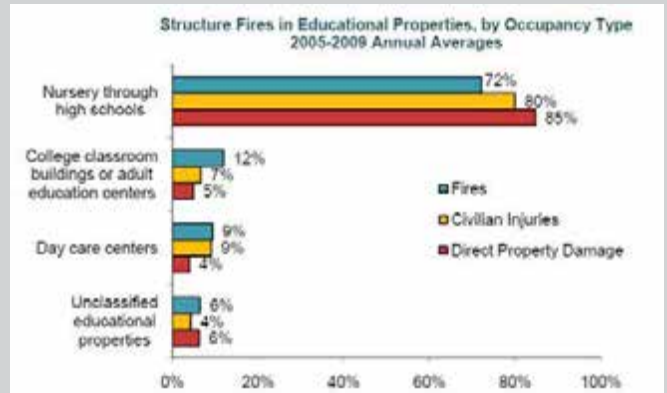


Many hotel guest rooms will soon be required to have a 520 Hz low frequency sounder as part of the fire alarm system

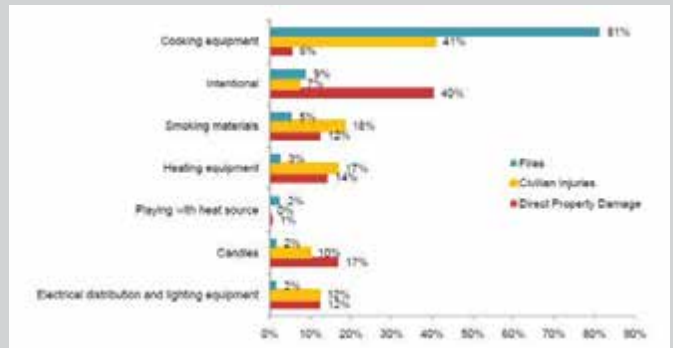
# NFPA Statistics

The Fire Analysis and Research Division of the National Fire Protection Association (NFPA) reports an estimated average of **6,260** structure fires took place, annually, in educational properties in 2005-2009, causing **\$112** million in direct property damage. The majority of fires in educational properties were in nursery through high schools.

This same division of NFPA looked into fire



incidents taking place during 2005-2009 in college and university dormitory, fraternity, sorority and barrack structures. This report estimates an annual average of **3,840 structure fires, resulting in \$20.9 million** in direct property damage, annually, with the majority of incidents, 81%, caused by cooking equipment. 🔥



*Roopa manages System Sensor's Audible Visible line of devices, which includes speakers, strobes, and horns. She holds a bachelor of science and engineering degree, and a masters degree in business administration, both from the University of Michigan. Roopa can be reached at [roopa.shortt@systemsensor.com](mailto:roopa.shortt@systemsensor.com)*





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# Industry News & Code Corner

**FM People, Promotions** – FCIA’s Accreditation Committee has met with many people at FM Approvals over the years. Rich Ferron has been involved with Jeff Gould in the FM 4991, Standard for the Approval of Firestop Contractors. He was promoted to director, fire protection. Congrats Rich. FCIA also had FCIA’s Asia and South America manager Bob Azimi at FCIA’s



Educational Seminars in the UAE. Bob appointed Kleber Oliveria to support growth in South America. Kleber is based in Brazil. We look forward to working with Kleber, Rich and Jeff as we have for years.

**UL People, Friends** – UL’s regulatory services leader Al Ramirez presented at the FireSafe Brazil Conference in Sao Paulo in June. Al and his team have spoken at FCIA Conferences over the years and been a big help at various code hearings including ICC, IAPMO and NFPA over the years. Thanks UL!



**ASHE Annual Conference** - ASHE awards several members during the 50th Annual Conference in Atlanta, July 21-24. ASHE’s Crystal Eagle award is presented to Douglas S. Erickson, FASHE, CHFM, HFDP, CHC, president of TME, Inc. For more than 30 years, Erickson has been a driving force in bringing about comprehensive improvements to the health care physical environment. The President’s Award is presented to Arthur D. Kjos, AIA, NCARB, FASHE, principal at Clark/Kjos Architects in Portland, Ore. The team from the University of Texas MD Anderson Cancer Center in Houston is presented the 2013 Excellence



in Health Care Facilities Management award. ASHE also recognizes emerging regional leaders and recipients of the SASHE and FASHE designations. For more information, visit ASHE.org. FCIA has a booth at this important industry event. Visit us at booth #437.

**NFPA CFPS Board** - The CFPS Board of Directors held their annual meeting in Chicago, Illinois on June 9, 2013. The board honored two outgoing directors, Thomas K. Varney and Edward J. Jones while welcoming two new directors, Bret Martin and Anthony R. Cole. The board reelected Bruce H. Clarke as chairman, David R. Hague as vice-chairman and elected David W. Ward as secretary/treasurer. In other business, the board voted on several changes to the bylaws, reviewed annual financial information and certification data, and discussed the future of the CFPS program.

**CONSTRUCT/CSI Annual Convention** - Online registration is now open for the 2013 CONSTRUCT

show, taking place September 24-27, at the Music City Center in Nashville, Tennessee.

Online registration is available at <http://www.constructshow.com/Attendee/RegForm>, where information is accessible 24 hours a day, seven days a week. Registering in advance will save attendees not only money, but also time by not having to wait in long on-site registration lines.

“Early bird registration enables CONSTRUCT attendees to plan for and meet their business objectives for the show,” said Tom Cindric, VP of CONSTRUCT. “By spending only a few minutes to register, attendees will receive show updates, breaking news and ensure a place in their desired conference session.”

FCIA exhibit is at booth 348 this year at CONSTRUCT.



**NFPA Conference & Expo** – FCIA’s marketing chair Don Murphy and FCIA staff Evie Caprel organized FCIA’s efforts for a great showing at this Expo. FCIA’s presentation by Bill McHugh, executive director and Bill Koffel, Koffel Associates, FCIA’s code consultant on Monday had a packed room. Check out the presentation on FCIA.org’s home page, right side.

At the FCIA exhibit booth, we met with high-level contacts including ICC’s CEO, CFO/COO, UL India’s president, The Joint Commission Engineering Department, FCIA members from USA, Canada, the Middle East and potential members and friends from around the world. FCIA’s code consultant and member Bill Koffel, Koffel Associates, chairs the NFPA Correlation Committee on Safety to Life and is very active at this important meeting.



**FCIA @ Construction Specifications Canada Convention (CSC)** – FCIA board member Ken Slama, Bill McHugh and past director Randy Perry presented to a full room at CSC about the DIIM of Firestopping in Canada. FCIA received kudos from the CSC members for the French 07-84-00 Firestopping Spec on FCIA.org. Thanks to Randy Perry and Ken Slama for flying



over to help with this program. We enjoyed visiting with our many FCIA member friends from Calgary, Alberta, Canada as well.



**NFPA Fire Protection Features Committee Meeting** – FCIA attended this code development meeting with Bill Koffel. We were successful at the committee level adding FM 4991, Standard for the Approval of Firestop Contractors and the UL Qualified Firestop Contractor Program, plus International Accreditation Services (IAS) AC 291 Programs to the NFPA 101, 5000 Chapter 8 Annexes during the meeting. The proposal still has a letter ballot circulation vote to go through so it is not complete yet.

FCIA and the International Firestop Council worked together with the Illinois State Fire Marshals' Office on a proposal regarding "water washing" of assemblies to get a fire rating. It's our belief that fire-resistance-rated assemblies must be first fire resistant without a water washing for fire performance when needed in buildings. This was also successful. Clarifications were also discussed on the height that buildings can "interconnect" with a vertical opening. Watch for more on this in the fall.

**UL's Annual Meeting and Fire Council** – UL always holds a world-class event with leaders from the standards development arena, fire resistance industry, fire protection engineers, and high-level UL staff. We had the opportunity to meet with friends of FCIA such as Jim Milke, University of Maryland, Sean DeCrane, International Association of Fire Fighters, UL's PDE Luke Woods, UL's senior vice presidents, presidents of business units and many other UL and industry contacts.

**IAS Accreditation Committee Meeting** – International Accreditation Services (IAS) has developed and manages many management system-based accreditation programs. One unique quality of IAS is the ability to have meaningful technical requirements in addition to management system audits. As the IAS board liaison to the Accreditation Committee, FCIA Executive Director Bill McHugh had the opportunity to welcome and thank many who make the IAS open accreditation program development process work.



**FCIA Travels** – After a short break, FCIA's Marketing Committee travels to Atlanta for the American Society of Healthcare Organizations (ASHE) Annual Conference & Technical Exhibition. FCIA's booth (#417) is always busy as we visit with healthcare industry leaders from ASHE. We're at the Construction Specifications Institute and CONSTRUCT Show Sept. 24-27 visiting with specifier friends. Then, it's off to ICC's Annual Conference, Expo and Group B Public Comment Hearings in Atlantic City Sept. 29-Oct. 9. ASTM E06 Meetings happen in Jacksonville, FL Oct. 20-23. Before we know it, FCIA's Firestop Industry Conference along with Trade Show Nov. 5-8 will be here...along with the holidays.

**Education for FM & UL Firestop Exams** – FCIA travels to UL's Melville, New York location for the FCIA Education Prep Class for the UL Firestop Exam August 22. The next FM or UL/ULC Firestop Exam is in Albuquerque, NM at FCIA's Firestop Industry

Conference. Info is available on [www.fcia.org](http://www.fcia.org) or contacting [evie@fcia.org](mailto:evie@fcia.org).

**FCIA's Board & Committees Meet** – The FCIA Board of Directors meets several times yearly. The group met in January and again before the FCIA Education and Committee Action Conference (FCIA ECA). Many board members are also active on committees as chairs or members. Past presidents are also still involved while many new members have jumped in and started working together as well. FCIA's Committee Action day at the ECA was well attended with members hearing committee reports and then inputting ideas on how FCIA can continue to make an impact in the firestopping and compartmentation industry through the DIIM – design, installation, inspection and maintenance — of firestopping.

**ICC Committee Action Report & Public Comments** – The International Code Council has its "Public Comment" submission deadline coming up quickly. The 2013 Report of the Committee Action Hearing contains all the revisions of the Group B Committee Action Hearings, held April 21-30 in Dallas. The report includes recommendations of the Code Development Committees with reason statements as well for each code proposal. Download documents at [www.iccsafe.org](http://www.iccsafe.org), code development tab. Public Comment deadline is July 15.

FCIA's Code Committee is working on public comments for the ICC Public Comment hearing coming up in October. We've been in discussions with many industry stakeholders to prepare a meaningful public comment proposal. Proposals will be heard by the ICC Voting "Governmental Members" at their Public Comment Hearings in Atlantic City this October. Watch for more on this important topic in the next Enews and Issue of *Life Safety Digest*.

**FCIA's Membership is Growing** - Membership growth in any association is a function of retaining existing members and recruiting new members. Both are on an upward trend to meet or exceed last year's 317 members worldwide. FCIA gained its first new member in Columbia last month. We've had interest from Brazil and Mexico. FCIA has had more interest from India and the Far East where members already exist as well.



**ASTM E06 Proposal gains traction** – FCIA's Standards Committee leaders met with industry leaders at the ASTM E06 Meetings in Indianapolis in April. We were successful at adding an appendix with information about specialty firestop contractor accreditation programs and also special inspection agency accreditation as well. While we were not able to mention the FM 4991, Standard for the Approval of Firestop Contractors or UL/ULC Qualified Firestop Contractor Programs, we were successful getting the concepts in an important place for inspection agencies, building owners and managers, general contractors and specifiers to see.

### **NBIMS-US™ Version 3 Ballot Submission**

**Period Opens** - Building professionals who have been waiting to submit ballots to the nation's building information modeling (BIM) standard don't have to wait much longer. The ballot submission period for the *National BIM Standard – United States™* Version 3 (NBIMS-US™ V3) opened June 3 and remains open until Aug. 19. <http://www.nibs.org/news/123142/Get-Ready-to-Improve-the-National-BIM-Standard--United-States.htm>

Because a BIM covers all aspects of the building process, everyone in the construction industry will be impacted as the use of BIMs becomes standard operating procedure. Therefore, the buildingSMART alliance™ is asking every sector in the building industry to participate in the development process of NBIMS-US™ V3. Ballots can amend or revise current NBIMS-US™ content or they can address the latest technologies, processes and practices not yet included in the standard.

### **Thermafiber's New Ownership – FCIA**

member Thermafiber, Inc. has been purchased by Owens Corning. The Toledo company believes that the purchase adds significant tools to participate in the commercial insulation market. Thermafiber's strengths have been in non-combustible insulation for curtainwall perimeter fire containment systems,



industrial and high temperature insulation using mineral wool as the technology.

### **Hanley Wood buys USGBC's Greenbuild Show**

– The United States Green Building Council has sold its "Greenbuild" show to Hanley Wood. Hanley Wood adds Greenbuild to its impressive lineup of shows including the International Roofing Expo (purchased from National Roofing Contractors Association) and "The CSI Show," purchased from the Construction Specifications Institute. 🔥

## **Life Safety Digest**

### **Spring 2013 Industry Calendar**

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#### **July 21 to 24**

American Society of Healthcare Engineers Annual Conference, Atlanta (booth #473)  
[www.ashe.org](http://www.ashe.org)

#### **Aug. 7 to 9**

National Association of State Fire Marshals Convention, Indianapolis  
[www.firemarshals.org](http://www.firemarshals.org)

#### **Aug. 16 to 20**

Thermal Insulation Association of Canada Annual Conference, Thunder Bay  
[www.tiac.ca](http://www.tiac.ca)

#### **Sept. 22 to 24**

Canadian Healthcare Engineering Society National Conference  
Niagara Falls, Ontario  
[www.ches.org](http://www.ches.org)

#### **Sept. 25 to 27**

CONSTRUCT2013 and CSI Convention, Nashville (FCIA @ Booth #348)  
[www.csinet.org](http://www.csinet.org)

#### **Sept. 29 to Oct. 2**

ICC Annual Conference & Expo, Atlantic City  
[www.iccsafe.org](http://www.iccsafe.org)

#### **Oct. 3 to 5**

Insulation Contractors Association of America Convention, Tucson  
[www.insulate.org](http://www.insulate.org)

#### **Oct. 2 to 9**

ICC Group B Final Action Hearings, Atlantic City  
[www.iccsafe.org](http://www.iccsafe.org)

#### **Oct. 20 to 23**

ASTM E06 Meetings, Jacksonville, FL  
[www.astm.org](http://www.astm.org)

#### **Oct. 27 to Nov. 1**

Society of Fire Protection Engineers Annual Meeting, Austin, Texas  
[www.sfpe.org](http://www.sfpe.org)

#### **Nov. 5 to 8**

FCIA Firestop Industry Conference and Trade Show, Albuquerque  
[www.FCIA.org](http://www.FCIA.org)

#### **Dec 4 to 6**

Construct Canada, Toronto  
[www.constructcanada.com](http://www.constructcanada.com)

#### **Dec. 9 to 12**

ASTM E05 Meetings, Jacksonville, FL  
[www.astm.org](http://www.astm.org)



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