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NIST report acknowledges NFPA's timely response to The Station fire

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WSCE

Preview of the 2005 World Safety Conference & Exposition.



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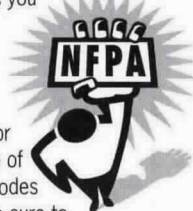
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Fighting for equality for people with disabilities

Franklin Delano Roosevelt told America in the darkest days of the Depression, "The only thing we have to fear is fear itself." In truth, we've learned that Roosevelt was preoccupied by one fear that he never shared with the public.

Roosevelt contracted polio in the 1920s and it made it impossible for him to walk without heavy braces and required him to use a wheelchair. As a boy, he had seen a relative burn to death in a fire. Once he lost the use of his legs, he was terrified that he would be unable to escape a fire and so at his home in Hyde Park, and later in the White House, he would practice pulling himself across the floor to save his own life if ever a fire broke out.

In those days, little thought was given to the needs of people with disabilities and few attempts were made to ensure that they had equal opportunity. In the decades since, society has changed its attitude toward people with disabilities. At least we say that we have changed our attitude.

In 1990, Congress passed the Americans with Disabilities Act (ADA) that did much to expand the rights of people with disabilities. Progress has been made in spite of some reluctance by code organizations, enforcement officials, and the construction and development community. The promise of the ADA for the millions covered by its protections has yet to be fully realized.

NFPA can't solve this entire problem, but our members and those who participate in our code development system can do more to make sure that our codes provide equal access to buildings and equally safe evacuation for all occupants including people with disabilities.

Since 1994, NFPA has included accessible means of egress provisions in NFPA 101®, *Life Safety Code*®, that are in agreement with the ADA Accessibility Guidelines, but these provisions, while a great step forward, don't go far enough. One option under the guidelines relies on sprinklers to "protect in place" those unable to evacuate because of a disability. In essence, the presence of automatic sprinklers waives the requisite special stair and elevator provisions for areas of refuge for those with disabilities. Sprinklers are a tremendous means of saving lives and property, but we aren't doing

enough if we say to people with disabilities, "Stay in place and the sprinkler will save you."

That's why we're doing more. We're working with the American Society of Mechanical Engineers, which develops the *Safety Code for Elevators and Escalators*, on criteria that will make elevators safe for use by building occupants after a fire alarm is initiated and allow for safe operation of elevators by emergency responders well into the fire emergency. These kinds of actions by code developers, which require more creativity and more involvement by those in the disability community, are the only way that we can really say honestly that we believe in equal rights for people with disabilities.

And we have to encourage the enforcement community to do a better job in understanding the requirements of the law and making sure that its principles are applied. We still find too many buildings that are designed and built in ways that limit access and use by people with disabilities and too many public officials who are willing to look the other way.

NFPA is committed to being a force for change. We've established the Disability Access Review and Advisory Committee, which reports to me as president. The committee identifies existing needs and emerging issues within the disability community and makes recommendations on how NFPA can provide leadership on disability issues. The committee also ensures that our codes and standards development process includes proposals and comments that reflect the latest thinking on disability issues, access provisions, and other matters of concern to the disability community.

It will take all of us who are committed to NFPA's mission to take the ideas that come from the committee and turn them into real improvements for people with disabilities. Only then can we say that we really believe in equality for people with disabilities and that our mission at NFPA is to make the world safer for everyone. ♣

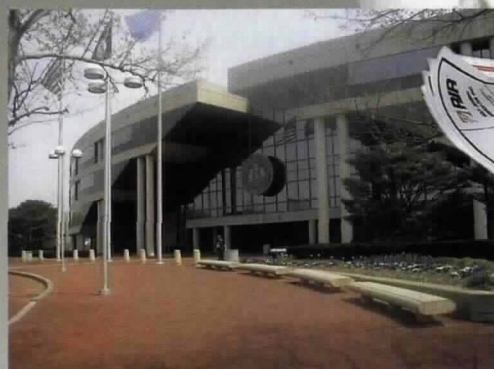
James M. Shannon, President and CEO
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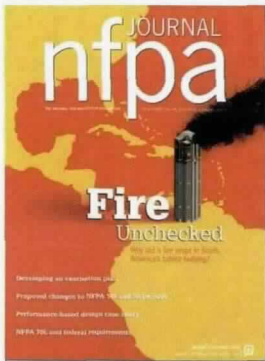


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Avoiding tragedy

While reading the latest edition of the *NFPA Journal* [March/April 2005] I noticed several articles that dealt with the unfortunate outcome of fires in houses with no smoke detectors and other articles stating that detector-equipped structures save lives. The message was quite clear, smoke detectors save lives.

What was less clear was what steps to take to stop the needless, avoidable fire deaths. All of us in the fire service have seen people dying for the same reason repeatedly. How many times have you heard the talk, "if only they would have had smoke detectors?"

The City of Pontiac, Michigan, in 2004, took steps to end this avoidable tragedy. An ordinance was passed that was said to be the most strict in the nation (although I have no knowledge of this), requiring smoke and carbon monoxide detectors in rental housing units.

The ordinance requires that each rental unit within the city shall place lithium, tamper-proof, and carbon monoxide detectors (in accordance with current construction code) within 90 days of passage of the ordinance. The ordinance was passed in February of 2004. Further, the ordinance requires hard-wired, battery-backed-up, interconnected smoke detectors to be mandatory, again as with placement per current code, on the following schedule: one-third of an owner's rental properties in 2007, another one-third in 2008, and the final third in 2009.

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For more information, contact Chief Wilburt "Skip" McAdams at Pontiac Fire Department, 123 East Pike Street, Pontiac, MI 48342.

DAN DURHAM

Fire Marshal
City of Pontiac, Michigan

NFPA RESPONDS:

We would also like to add that smoke alarms are the residential fire safety success story of the past quarter century. Smoke alarm technology has been around since the 1960s. But the single-station, battery-powered smoke alarm we know today became available to consumers in the 1970s, and since then, the home fire death rate has been reduced by half. Most states have laws requiring them in residential dwellings.

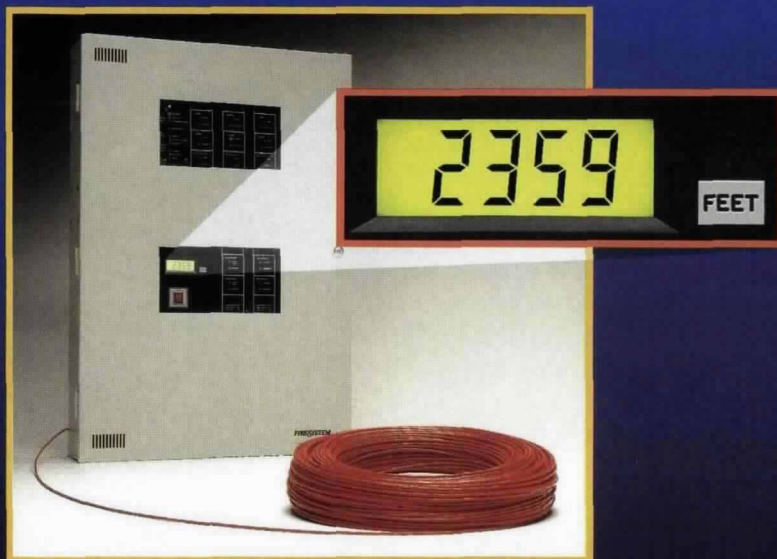
Important: Working smoke alarms are essential in every household. It is necessary to practice home fire drills to be certain everyone is familiar with the smoke alarm signal, and to determine if there are any obstacles to a quick and safe evacuation (including the inability for some to awaken to the smoke alarm signal).

Additional factors to consider

I read with great interest the article on the "Great Escape" by Kevin G. McGuire that was published in the *NFPA Journal* of the March/April 2005 Issue.

In addition to the key points that were highlighted in the developing of an evacuation plan, I wish to add a few more points:

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1. While the non-disabled people have the ability to walk down the long flight of stairs, however, a contingency plan would also be needed for them to get out or for them to be rescued if they are

trapped above the fire floor(s) in a blazing high-rise that is beyond the reach of the super aerial ladder.

2. A disability evacuation plan will not be complete if there is no provision of appropriate

escape devices for their self-reliance escape or appropriate equipment that enable people to safely assist them to evacuate. At some point in the process of search and rescue, depending on the life threat level of the emergency situation, rescue workers may have to get the disabled people out. With the provision of appropriate escape devices or equipment will give a better chance for the disabled to get out alive and would also be easier for the helpers to assist them in the evacuation.

3. What are the recommended "alternative means for people with mobility impairments to be safely evacuated" ... without using the elevator? Would the relevant authorities or bodies provide some guidance as to what are the equipment and escape devices that are considered to be relatively safe for use as "alternative means" of escape?

JOHN NG

Escape Consult Mobiltex

Seeking more support

As a Certified Fire Safety Instructor who trains staff who work with people with disabilities, I am encouraged by your recently published article entitled "The Great Escape: Developing an evacuation plan for people with disabilities" [March/April 2005]. It was a well-presented article with many good tips concerning the needs of people with disabilities, particularly about the development of a disability evacuation plan. I am also encouraged by NFPA's commitment, as expressed by NFPA's president, James M. Shannon, to fully address the safety needs of people with disabilities through careful planning and training.

Where I am discouraged is when I scour every NFPA training

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Mail Call

catalogue as soon as it arrives at my desk to see if there are any suitable videos to use to train staff who work with people with developmental and other cognitive disabilities. I am always disap-

pointed as there are none. I have contacted NFPA several times to ask that such a training video be developed, but to my knowledge, none has. Maybe with this new interest and commitment, your

education department could look at developing appropriate training materials, which reflect the varied needs of people with disabilities. By some estimates, about seven percent of the U.S. population, or about 20 million people, have some form of disability. It's about time something be done about their safety.

DAVID PLOWRIGHT, MHS

Executive Director
Potomac Center, Inc.
Romney, West Virginia

NFPA RESPONDS:

In January, NFPA began distributing an Evacuation Training package with print and video/DVD components, produced by Kevin G. McGuire, who wrote the *NFPA Journal* article.

The Disability Evacuation Plan Set is a complete toolkit that helps safety directors develop and implement evacuation plans that comply with Americans with Disabilities Act standards.

The package includes:

- Two *Developing Your Plan* videos (VHS and DVD)—Presentation of a five-step approach including designating evacuation routes, staff training, and coordinating with local emergency responders. (17 min.)
- Two *Executing Your Plan* videos (VHS and DVD)—Demonstrations of how to evacuate people with 4 different types of impairments: visual, cognitive or emotional, hearing, and mobility. (18 min.)
- One *Companion Guidebook* — Templates, checklists, forms, and other tools for plan development and implementation and employee training.

For more information, visit www.nfpa.org/catalog/.

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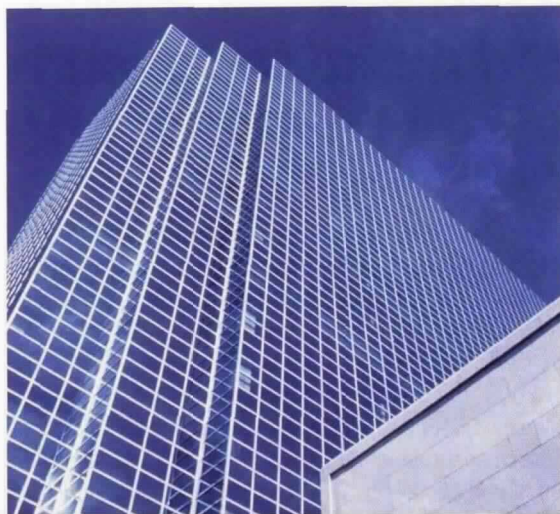
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- Unique configuration eliminates need to drain system before installing relief valve
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- All sizes include mandated NFPA 13 Inspectors Test connection (3/8" to 14K ESFR) and flow switch, gauge and gauge valve
- Threaded connection to 2" and grooved connection in 1-1/2 and 2"

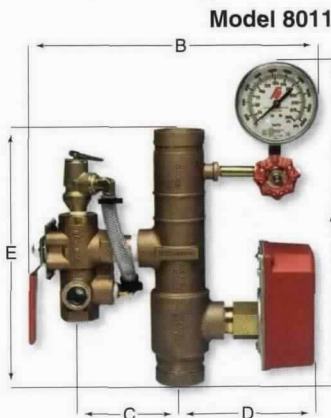
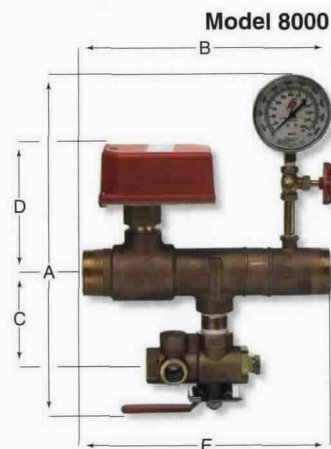
Model 8000	1-1/4"	1-1/2"	2"
A	14-1/2"	15-1/2"	15-1/2"
B	14"	14-1/4"	14-3/4"
C	4-3/4"	4-3/4"	5"
D	6-1/2"	6-3/4"	7"
E	11"	12"	12"

Model 8011	1-1/4"	1-1/2"	2"
A	11"	12"	12"
B	12-1/4"	2-1/2"	13"
C	4"	4-1/8"	4-3/8"
D	6-1/2"	6-5/8"	6-7/8"
E	11"	12"	12"

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NURSING HOMES

Medicare rules on home smoke alarms, hand sanitizers

NURSING HOMES THAT don't have sprinkler systems or hard-wired smoke alarms must install battery-operated smoke alarms in patient rooms and public areas by May 2006. In response to fatal nursing home fires in Connecticut and Tennessee in 2003, the Centers for Medicare and Medicaid Services (CMS) announced this interim final rule in the *Federal Register* on March 25, 2005. The one-year installation phase-in begins on May 24, 2005. The rule affects more than 4,000 nursing homes. CMS, which has required compliance with the safety standards set forth

in the 2000 edition of NFPA 101[®], *Life Safety Code*[®], since 2003, worked closely with NFPA to develop the new standards.

In addition, nursing homes, hospitals, ambulatory surgical centers, and other health-care facilities will be allowed to install dispensers of alcohol-based hand sanitizers in corridors that meet certain conditions. CMS originally prohibited sanitizers in corridors because of concerns that the alcohol could act as an accelerant in the event of a fire and block access to exits. However, studies showed that if



certain conditions are met, the fire hazard is greatly reduced and the reduction in hospital-acquired infections significant. Tentative interim amendments to the 2000 and 2003 editions of NFPA 101 approved last year allowed the dispensers in corridors.

REPORTS

NFPA report shows most calls to U.S. fire departments in 2003 were for medical help, false alarms

According to a recent NFPA report, U.S. fire departments responded to approximately 22.4 million calls in 2003. Of those calls, 13.6 million were for medical assistance, and false alarms triggered 2.2 million. Only 1.6 million calls—or 7 percent—were for actual fires. The report notes that, while medical calls were up 6 percent from 2002 and false alarms were up by 3 percent, calls for fires were down 6 percent. Total calls were up 5 percent.

Since 1983, medical calls and false alarm responses have doubled in number. Medical aid calls now account for 61 percent of fire department calls, and false alarms account for 10 percent, 36 percent of which are the result of system malfunctions. Another 35 percent are unintentional, and 14 percent are malicious. From 1999 to 2003, system malfunctions decreased 12 percent, from 901,500 to 795,500, while unintentional calls increased 28 percent, from 605,000 to 773,000.



AWARDS

2005 Rolf H. Jensen Award winner

The NFPA Board of Directors has chosen the Rochester, New York, Fire Department to receive the 2005 Rolf H. Jensen Memorial Public Education Award. The award provides a \$5,000 grant annually to a fire department to support a community-wide fire- and life-safety education campaign or program.

The Rochester Fire Department will use the award for its "Shelters and Safety" program by introducing *Risk Watch*[®], NFPA's injury prevention curriculum, to the hundreds of women and children who reside at Rochester's 14 shelters. Each attendee will be required to participate in the exercises and activities for each of the eight risk areas *Risk Watch* covers and must demonstrate proficiency in the prevention of each risk.

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Arson rate reaches historic low in 2003, NFPA reports



ACCORDING TO A recent NFPA report, the number of arson fires in 2003 dropped to 37,500, marking the lowest number recorded in the 27 years studied. This figure does not include suspicious fires or fires with undetermined causes, but even when those are included, the 2003 figures are still the lowest NFPA has ever recorded.

For the ninth straight year, juvenile fire-setters accounted for 50.8 percent of

those arrested for the crime. Though the percentage of children fire-setters under 10 is the lowest—3.2 percent in 2003—since at least 1980, that percentage is still much higher than for any other crime the FBI tracks.

Factors for the downward trend include sophisticated investigative techniques giving a truer picture of fire causes, widespread counseling for juvenile fire-setters, arson task forces and other

anti-arson programs, and a decline in the arson-prone age and gender in the general population.

Civilian deaths and property damage from intentional structure fires in 2003 also dropped to historic lows of 305 and \$692 million, respectively.

UPDATE

Building Code update

On March 16, the California Building Standards Commission voted 8-2 to reverse its 2003 decision to adopt NFPA 5000®, *Building Construction and Safety Code*®, and NFPA 1, *Uniform Fire Code*®. NFPA's Gary Keith answers some questions about the decision.

What is NFPA's next step for NFPA 5000?

Currently, the 2006 edition of NFPA 5000 is in the final stages of development. The Standards Council will publish it in October 2005, pending approval by the NFPA membership. The next edition of NFPA 5000, the only building code developed through a process accredited by the American National Standards Institute (ANSI), will continue to provide jurisdictions with the highest level of safety available.

What is NFPA doing to work with jurisdictions that are considering new construction codes?

NFPA has a long history of working with jurisdictions in which its codes are already adopted and those that are considering adoption of updated NFPA codes. The level of support that we provide to jurisdictions is unmatched among code developers. We plan to continue that level of support for each element of

the Comprehensive Consensus Codes® (C3) set. Codes within that set are already adopted and used in every state and around the world.

What is NFPA's long-term vision for its full set of construction codes?

The codes making up the C3 set already affect virtually every building, process, service, design, and installation in society today. And, as jurisdictions continue to seek out codes that provide the highest levels of safety, the C3 set and its elements will play an important role.

Will California's decision to use another code affect NFPA 5000?

No. Again, the next edition of NFPA 5000 will be published later this year. The recent decision by the California Building Standards Commission to reverse the Commission's 2003 selection of NFPA 5000 was not surprising. Five new members had been appointed by Governor Schwarzenegger since the commission conducted its very detailed and thorough review process in 2003. That review process had shown that the NFPA codes provided the highest level of safety for Californians. Several NFPA codes continue to be used in California, and we will continue to support the state in its use of those documents.

LEGISLATION

NFPA supports fire sprinkler legislation in Congress

THE HOUSE WAYS and Means Committee and the Senate Finance Committee are reviewing the Fire Sprinkler Incentive Act of 2005 (H.R. 1131), introduced in the House by Rep. Curt Weldon (R-PA) and Rep. Jim Langevin (D-RI) and in the Senate as S.12 by Senators Rick Santorum (R-PA) and John D. Rockefeller (D-WV). The legislation would classify fire sprinkler systems as five-year property for purposes of tax depreciation, as opposed to the current 27.5- or 39-year period for installations in residential rental and non-residential real property.

At a March press conference in Washington, D.C., John Biechman, NFPA vice-president for Government Affairs, said NFPA has no record of a fire in a building protected by an automatic fire sprinkler system killing more than two people unless it involved an explosion or flash fire. Sprinklers reduce property damage by 43 to 70 percent in educational, residential, commercial, industrial, and manufacturing buildings.

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We are pleased to announce that the following individuals have earned NFPA certifications that reflect an important achievement in advancing their professional abilities. The Certified Fire Protection Specialist Board was formed in 1971 to recognize qualified individuals who are dedicated to curtailing both physical and financial loss due to fire. NFPA has administered the CFPS program and examination, which is based on the NFPA Fire Protection Handbook, since 1998. For more information about NFPA certification programs, please visit www.nfpa.org/certification.

Certified Fire Protection Specialist

Kevin Barnes, Raven Rock Mountain Complex Fire & Emergency, Fort Detrick, Maryland
 Eric Bieber, County of Lancaster Pennsylvania Conestoga View, Lancaster, Pennsylvania
 Paul Brenninger, Malloy Irmie & Vasconi Insurance Services, St. Helena, California
 Jim Brown, Carroll County Department of Permits & Inspections, Westminster, Maryland
 Charles Carden, III, Atofina Petrochemicals, Houston, Texas
 Daniel Carlstrom, United States Military Academy, West Point Fire Department, West Point, New York
 Kristin Carrington, AON, Chicago, Illinois
 Richard Clemens, Jr., Maryland Aviation Administration, BWI Airport, Maryland
 Philip Cooke, Zurich of North America, San Francisco, California
 Leo Cox, KVCL Safety, Inc., Chicago, Illinois
 Mark Davis, GBW Associates, LLC, Westminster, Maryland
 Robert Dimock, Insurance Service Office, Chicago, Illinois
 Kevin Dittbenner, Insurance Services Office, New London, Minnesota
 Scott Dodd, Arizona Public Service, Phoenix, Arizona
 Gregory Dods, Winfield Community Volunteer Fire, Sykesville, Maryland
 James Ducey, Allmerica Financial/Hanover Insurance Co., Worcester, Massachusetts
 Robert Fash, Las Vegas Fire & Rescue, Las Vegas, Nevada
 Rick Fichter, Las Vegas Hilton, Las Vegas, Nevada
 Robert Fischer, Atofina Petrochemicals, Houston, Texas
 Steve Fudall, General Fire & Casualty Insurance, Boise, Idaho
 Gaston Garrett, Jr., Celanese Chemicals, Bishop, Texas
 Mark Gattis, Celanese Chemicals, Bishop, Texas
 Heather Heath, IBC Engineering, Rochester, New York
 Timothy Heinze, GE Global Asset Protection Services, Avon, Connecticut
 Jeanne Heinzen, Insurance Services Office, Jersey City, New Jersey
 John Hoffman, Jr., Complete Fire Protection, Inc., Queen Creek, Arizona
 Stewart Hostetter, Marsh USA, Houston, Texas
 Brian Jansen, Honeywell FM & T, Kansas City, Missouri
 Henry Koebler, III, Suntech Systems, Inc. Marietta, Georgia
 Philip Kowalske, Suntech Systems, Inc. Marietta, Georgia
 Jonathan Kulpit, Primera Engineers, Chicago, Illinois
 Philip Lacey, Performance Food Group, Oakwood, Georgia
 John Lawless, Insurance Service Office, Hermantown, Minnesota
 Ronald Martin, Fort Belvoir Fire and Emergency, Fort Belvoir, Virginia
 Richard Merck, Montgomery County Fire and Rescue, Rockville, Maryland
 Robert Moore, Texas Engineering Extension Service, Texas A&M, College State, Texas
 Larry Moore, Insurance Services Office, Austin, Texas
 Thomas Noble, City of Henderson Building and Fire Department, Henderson, Nevada
 Paul Novak, Cleveland State University, Cleveland, Ohio
 Guy Racino, MacDermid, Inc., Waterbury, Connecticut
 Michael Ramirez, Insurance Service Office, Chicago, Illinois
 Richard Ramirez, Jr., Afton Chemical Corp., Sauget, Illinois
 Alan Rodeck, Matrix Risk Consultants, Inc., Miami, Ohio
 Steven Ross, Las Vegas Valley Water District, Las Vegas, Nevada
 John Rutherford, American Engineering Corp., Ginowan City, Okinawa, Japan
 Steven Sawyer, NFPA, Quincy, Massachusetts
 Robert Schultz, University of Texas at Austin, Austin, Texas
 Matthew Schumacher, Insurance Services Office, Jersey City, New Jersey
 Michael Scott, United Fire Group, Linwood, Kansas
 Wesley Simpson, Exxon Mobil Fire Department, Billings, Montana
 Randell Thompson, Texas Instruments, Dallas, Texas
 Michael Torkelson, Insurance Service Offices, Chicago, Illinois
 Steven Toth, Prince Georges County Fire, Landover Hills, Maryland
 H. A. "Pete" Tucker, Deltona Fire Department, Deltona, Florida
 Donald Turno, Westinghouse Savannah River, Aiken, South Carolina
 John Van Haaren, University of Houston, Houston, Texas
 Herold Viard, New York City Fire Department, Brooklyn, New York
 Grant Ward, GE Global Asset Protection Services, Frisco, Texas
 Scott Wehrin, PMA Insurance Group, DeWitt, New York
 Brian Winter, Worcester County Fire Marshal's Office, Snow Hill, Maryland
 Wesley, Woelfle, Insurance Services Office, Jersey City, New Jersey

Certified Fire Inspector I and II (CFI) and Certified Fire Plan Examiner (CFPE)

NFPA developed Certified Fire Inspector I and II (CFI) and Certified Fire Plan Examiner (CFPE) programs for fire service, commercial and industrial plant, and other facility personnel to allow them to verify that facilities are properly constructed and have the proper equipment, and that the equipment is maintained and operated in compliance with related fire codes and standards. The following candidates successfully demonstrated theoretical and practical competency in NFPA codes and standards through a professionally developed examination and completion of actual field inspections.

Certified Fire Inspector I

James Adams, Chattanooga Fire Department, Chattanooga, Tennessee
 David Anthony, Dow Corning Corporation, Midland, Michigan
 Geoffrey Backus, Dupont Company, Newark, Delaware
 Dorothy Baker, Hermitage, Tennessee
 Fabio Batistini, West Vancouver Fire Department, West Vancouver, British Columbia
 Ron Best, City of Lapeer Fire & Rescue, Lapeer, Michigan

J. Linley Biblow, Calgary Fire Department, Calgary, Alberta
 John Boehm, Jr., Dow Corning Corporation, Midland, Michigan
 Andrew Brady, Wilmington, Delaware
 Larry Brooks, Mt. Juliet, Tennessee
 Albert Brumbelow, Newman, Georgia
 Franklin Burke, Jr., Ravenel, South Carolina
 Alan Burton, Sr., Snellville, Georgia
 Craig Calvacca, City of Brentwood Fire Department, Brentwood, Tennessee
 Dennis Cangelosi, Pawleys Island, South Carolina
 Melissa Collins, University of Texas, Arlington, Texas
 Anel Collins, Wilmington, Delaware
 Richard DeCaire, Dow Corning Corporation, Midland, Michigan
 Barry Draper, Dickson, Tennessee
 Larry Fogle, Cordova, South Carolina
 Jeffery Franklin, Hartland Area Fire Department, Hartland, Michigan
 David Gilbert, Billings Fire Department, Billings, Montana
 Yos Gladstone, Whistler Fire Department, Vancouver, British Columbia
 Robert Glenn, Town of West Yellowstone Fire Department, West Yellowstone, Montana
 Joey Goyt, Hartland Area Fire Department, Hartland, Michigan
 John Hanmer, Benzonina Township Fire Department, Benzonina, Michigan
 James Heynen, Calgary, Alberta
 Wayne Hopkins, Claymont, Delaware
 Matthew Hoppel, Billings Fire Department, Billings, Montana
 Michael Horgan, Jr., Wilmington, Delaware
 William Hutchison, Nashville, Tennessee
 Patrick Hutchison, Ridgetop, Tennessee
 Dan Jakes, Fox Lake, Illinois
 Sandra Jansen, Richmond Fire Rescue, New Westminster, British Columbia
 Terry Kluge, City of Lapeer Fire & Rescue, Lapeer, Michigan
 William Larsen, Grand Blanc Fire, Grand Blanc, Michigan
 Kelly Liebich, Surrey Fire Department, Surrey, British Columbia
 Dale Lundy, Salt Spring Island Fire Rescue, Salt Spring Island, British Columbia
 William Martin, Bluffton Township Fire Department, Bluffton, South Carolina
 Larry McCray, Brownstown Fire Department, Brownstown, Michigan
 James McGuire, III, Middletown Township, Langhorne, Pennsylvania
 Daniel McKinney, West Columbia, South Carolina
 Fred McNett, Dow Corning Corporation, Midland, Michigan
 David Michalak, Trenton Fire Department, Trenton, Michigan
 James Moore, Chattanooga Fire Department, Chattanooga, Tennessee
 James Moore, Langford Volunteer Fire Department, Victoria, British Columbia
 Michael Morgan, Jackson Fire Department, Jackson, Tennessee
 Doug Nickerson, Okotoks, Alberta
 Eual Noah, Jr., Morristown Fire Department, Morristown, Tennessee
 Terry O'Toole, Billings Fire Department, Billings, Montana
 Frank Odermann, Billings Fire Department, Billings, Montana
 Eddie Osborne, Presbyterian College, Clinton, South Carolina
 Robert Patterson, Langford Volunteer Fire Department, Victoria, British Columbia
 Jeffrey Roberts, Mount Pleasant, South Carolina
 Carlos Rodriguez, Banning, California
 Bianca Sancic, Mount Pleasant, South Carolina
 Steven Shacklett, Bullhead City, Arizona
 Alan Sims, City of Belton Fire Department, Belton, South Carolina
 Richard Smith, Benzonina Township, Benzonina, Michigan
 Michael Spini, Billings Fire Department, Billings, Montana
 Jeffrey Stevens, Dow Corning Corporation, Midland, Michigan
 Kenneth Strand, Columbia Framers Supply, Langley, British Columbia
 Pequita Stukes, Sumter, South Carolina
 Kip Thomas, Lake Lotawana, Missouri
 Jan Thomas, Jr., Beaufort, South Carolina
 Michael Thompson, Los Alamos Fire Department, Los Alamos, New Mexico
 Michael Vann, Wartburg, Tennessee
 Jeffrey Webster, Dow Corning Corporation, Midland, Michigan
 Leonard Weiss, Government of Nunavut Canada, Iqaluit, Nunavut [? Sp?]
 Brenden Wilson, Vernon, Connecticut
 Daniel Witlse, Kochville Township Fire Department, Saginaw, Michigan

Certified Fire Inspector II

Donald Brewer, Pendleton, South Carolina
 Gregory Crawford, Las Vegas Fire & Rescue, Las Vegas, Nevada
 Jamil Czubenko, City of Howell Fire Department, Howell, Michigan
 Jeffrey Martin, Chilliwack, British Columbia
 Robert Stevenson, Sr., Greenwood City Fire Department, Greenwood, South Carolina
 Kenneth Thomas, City of Atlanta Fire Department, Atlanta, Georgia

Certified Fire Plan Examiner

Donald Brewer, Pendleton, South Carolina
 Benjamin Bunting, Summerville Fire Rescue, Summerville, South Carolina
 Franklin Burke, Jr., Ravenel, South Carolina
 Eric Caloia, Troy Fire Department, Troy, Michigan
 John Clark, Pinckney, Michigan
 Jacqueline de la Osa, Fire Code Officials Office, Naples, Florida
 Daryl Haines, Wilmington, Delaware
 Brian Harris, Aston, Pennsylvania
 Tammy Madison, Royal Palm Beach, Florida
 James McGuire, III, Middletown Township, Langhorne, Pennsylvania
 Andrew McPartland, Aston, Pennsylvania
 Scott Melville, Saanich Fire Department, Victoria, British Columbia
 Richard Mills, Delta Fire Department, Delta, British Columbia
 Jeff Oldenburg, Dearborn Fire Department, Dearborn, Michigan
 Adam Popiel, Thornton, Pennsylvania
 Jeff Quilter, Alpharetta Fire Department, Alpharetta, Georgia
 Edward Riley, Collier County Fire Code, Ft. Myers, Florida
 Robert Simmons, Miami, Florida
 David Stevenson, Jr., Drexel Hill, Pennsylvania
 Kenneth Thomas, City of Atlanta Fire Department, Atlanta, Georgia

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2004 NFPA Treasurer's Report

NFPA TREASURER'S REPORT is issued to NFPA members as required by the Articles of the Association, Section 6.11, Paragraph 2, as adopted through Amendment to the Articles in November 2000.

Revenues in the first year of NFPA's traditional three-year business cycle were higher than expected due to higher publication sales and royalty income. Expense savings were also achieved, resulting in a better than anticipated Operating Surplus (before investment gains and a pension adjustment) of \$14 million.

NFPA's investments outperformed the overall market. The portfolio increased approximately \$19 million for the year (\$9 million from investment gains and a \$10 million transfer from short term cash). The Association's total Net Assets increased to \$118 million, exceeding \$100 million for the first time in NFPA's history.

Capital expenditures for the year were \$9,663,000 that included the purchase of a building at the Batterymarch Park premises for investment purposes. Other major expenditures were a new HVAC system, a replacement of the content management system for the web-site and enhancements to the order fulfillment system.

An analysis of revenue and excerpts from the audited financial statements of the Association for the years ending December 31, 2003 and 2004 follow:

THOMAS W. JAEGER, P.E., is Treasurer of NFPA and a member of the NFPA Board of Directors.

Statements of Financial Position

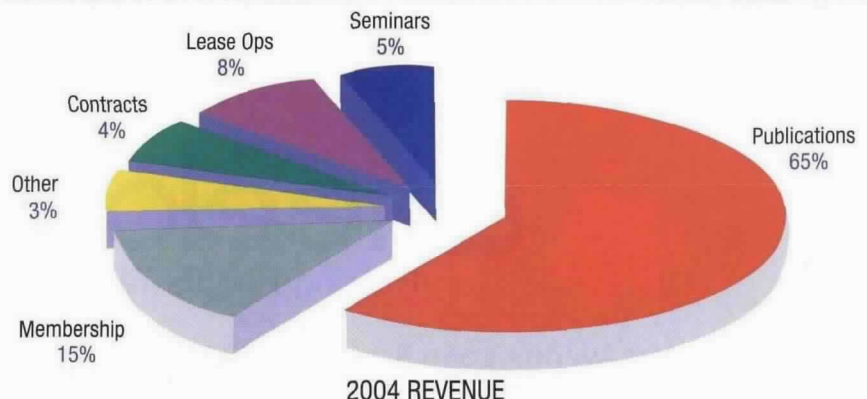
	\$'000's	
	2004	2003
Assets		
Cash and cash equivalents	16,272	13,097
Inventory, accounts receivable, and other assets	21,059	21,357
Investments	85,468	66,072
Property and equipment	<u>43,896</u>	<u>37,652</u>
Total assets	166,695	138,178
Liabilities and net assets		
Accounts payable and other liabilities	15,068	12,675
Deferred revenues	16,182	12,707
Long-term loan	<u>16,969</u>	<u>18,094</u>
Total liabilities	48,219	43,476
Total net assets	<u>118,476</u>	<u>94,702</u>
Total liabilities and net assets	166,695	138,178

Statements of Activities

Revenue		
Publications	57,921	42,341
Membership	13,248	12,332
Other	<u>17,026</u>	<u>19,512</u>
Total revenue	88,195	74,185
Expenses		
Investment gains and Pension Adjustment	(71,818)	(69,793)
Change in net assets	7,397	<u>16,856</u>
Net assets as of beginning of year	23,774	21,248
Net assets as of end of year	<u>94,702</u>	<u>73,454</u>
Net assets as of end of year	118,476	94,702

Statements of Cash Flows

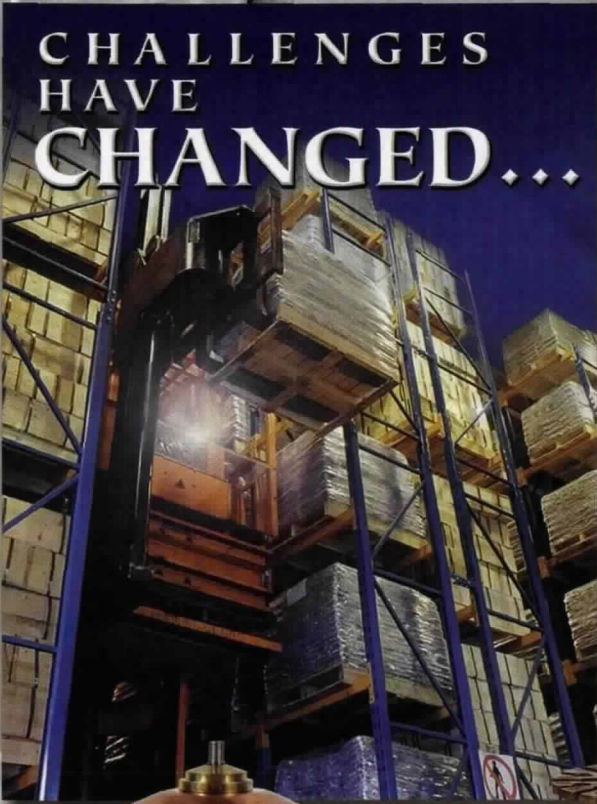
Cash flows from operating activities	25,082	6,109
Cash flows from investing activities	(20,782)	(1,389)
Cash flows from financing activities	<u>(1,125)</u>	<u>(1,125)</u>
Net change in cash and cash equivalents	3,175	3,595
Cash and cash equivalents as of beginning of year	<u>13,097</u>	<u>9,502</u>
Cash and cash equivalents as of end of year	16,272	13,097



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Fire Watch

by Kenneth J. Tremblay

SPECIAL Smoke in elevated train injures 73

WASHINGTON—Nearly half of the 150 occupants of an elevated monorail train were injured when an arcing from an electric motor started a fire in the motor compartment between two cars.

The incident occurred on a 1-mile (2-meter) track supported by concrete columns that run between a shopping area and a civic center. Each of the four cars in the train was powered by two independent electric motors, supplied with power by an electrically charged third rail in the center of the tracks. The cars themselves were built of metal framing covered by an aluminum skin and had interior fixtures of plastic, plywood, and vinyl-covered foam rubber.

The train was about to enter a tunnel the fire started between the articulating portions of two cars at the end of the train. Investigators determined that a mechanical failure in one of the motors powering the third car damaged the motor, causing the electrical arc that ignited nearby combustibles. The fire then spread to the last car in line while smoke spread to the other cars. Sixty-five passengers were treated at the scene for smoke inhalation, and eight more passengers were taken to the hospital. Damage to the monorail train, built in 1962, is estimated at \$1 million.



A firefighter works the scene after a monorail caught fire outside a Seattle, Washington, museum in May 2004. Ladders were used to evacuate dozens of passengers.

RESIDENTIAL Man dies of injuries in house fire

California—An early-morning fire spreading through concealed spaces heavily damaged the upper floors and the attic of a two-story, single-family home and resulted in the death of an 81-year-old man.

The split-level, wood-frame house, which was 40 feet (12 meters) long and 50 feet (15 meters) wide, had a stucco exterior and a clay tile roof over plywood.

It was unsprinklered. A smoke detection system had been installed, but neither the couple who lived there nor the firefighters reported hearing any alarms.

The victim's wife awoke to a clicking sound in the master bedroom and saw

flames coming from her bedroom closet.

Running out of the room, she called to her sleeping husband, dialed 911 at 2:39 a.m., and left the house. Once outside, she realized her husband had not followed her out and tried to reenter the home, but she was held back by a police officer.

Firefighters responded to the alarm to find the house involved in flames. The fire spread through most of the structure, and a large part of the roof collapsed.

Though investigators couldn't determine the ignition source, they did discover that the area of origin was a first-floor storage room loaded with combustibles.

Once the fire ignited, it spread to the room's walls and ceiling into the closet of the master bedroom above.

The husband died of injuries he

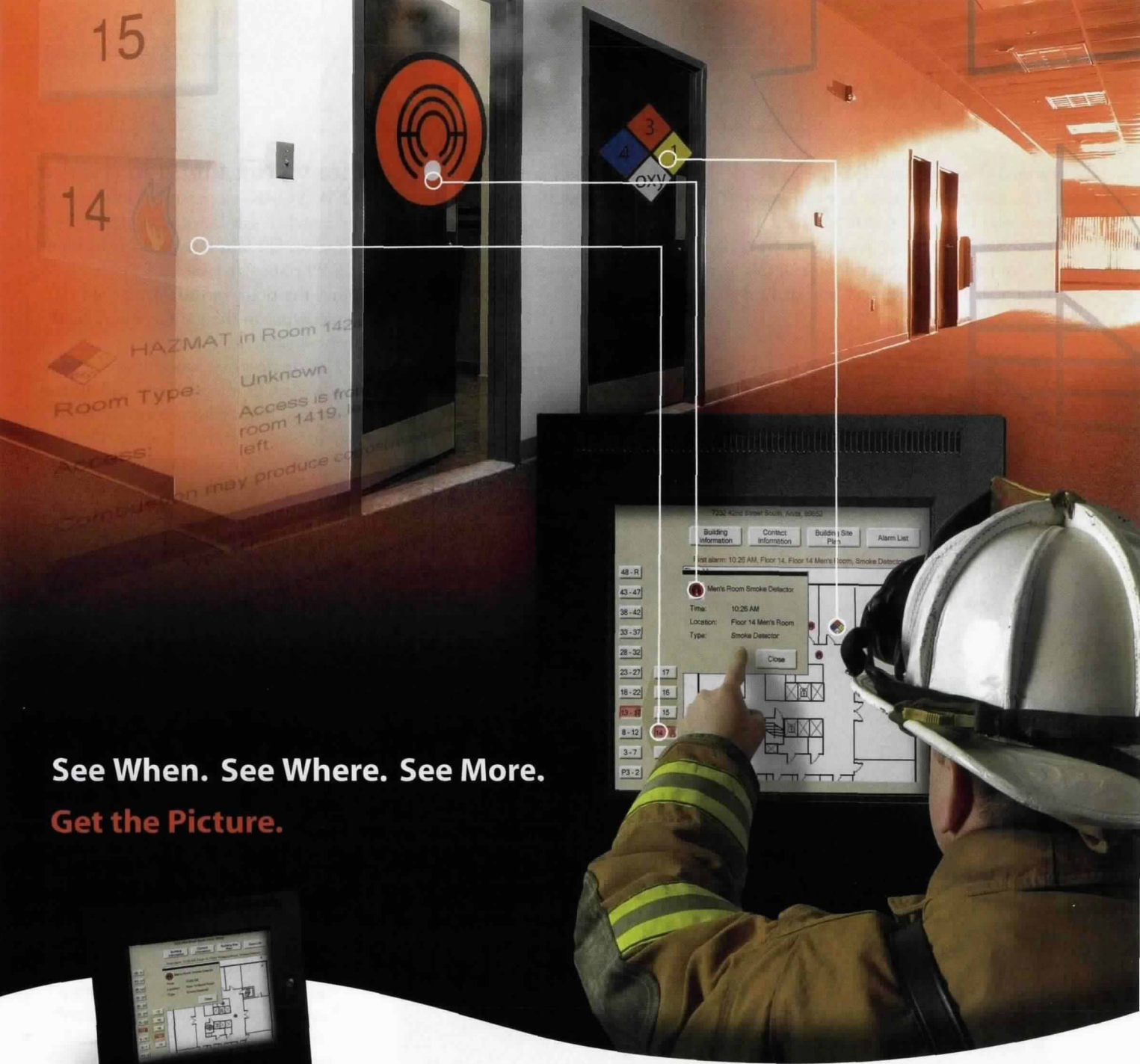
suffered in the fire, and two firefighters were taken to the hospital with non-life-threatening injuries.

The house, valued at \$600,000, sustained losses estimated at \$500,000. Its contents, valued at \$300,000, sustained a \$250,000 loss.

Cigarettes, oxygen involved in fatal fire

INDIANA—A 66-year-old woman died of smoke inhalation and burns in her single-family home when her cigarette ignited her clothing and the chair in which she was sitting. The woman was using medical oxygen at the time of the fire.

The one-story, wood-frame house covered an area of 1,000 square feet (93 square meters). It had a working smoke alarm, but the location and type weren't



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Fire Watch

reported. There were no sprinklers.

The victim called out to her housemate, who found her on fire and tried unsuccessfully to extinguish the flames. He then ran to a neighbor's house to call 911 at 5:18 a.m. Firefighters, who arrived

within three minutes, quickly extinguished the fire, but the woman had succumbed to her injuries.

The house, valued at \$30,000, and its contents, valued at \$10,000, were destroyed.

Fire victim found in garage

NEW YORK—A passerby discovered the attached garage of a single-family home on fire and reported the incident at 6:29 p.m. Arriving firefighters found the body of the 66-year-old homeowner in the garage where he'd been working on a car.

The single-story, wood-frame garage was 25 feet (8 meters) long and 20 feet (6 meters) wide with a concrete floor and an asphalt-shingled roof. There was no fire protection equipment.

Investigators believe the fire started when a spark from the engine ignited gasoline vapors, and smoke and flames filled the garage.

The house, valued at \$450,000, and its contents, valued at \$100,000, sustained losses of \$30,000 and \$20,000, respectively.

Child playing with lighter starts fire

FLORIDA—A four-year-old girl who used a cigarette lighter to start a fire in a clothes closet was afraid her mother would punish her, so she simply closed the door and went to play. Her mother, who was talking to a neighbor on the telephone, smelled smoke and discovered the fire. Before calling 911, however, she and the neighbor tried to extinguish the fire themselves, thus delaying the alarm.

The single-family, one-story home had concrete block walls covered with stucco and a wooden roof covered by composite shingles. There were no sprinklers, but a smoke alarm in the room where the fire started operated.

During her phone conversation, the girl's mother smelled what she thought was burning plastic. The neighbor came over to help her investigate and found the fire burning in the bedroom closet. The two women tried to put it out using buckets of water and a garden hose, and helped the children evacuate.

Firefighters arrived within five minutes of the 911 call at 12:02 p.m. to find smoke coming from the house. They quickly found the area of origin



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Fire Watch

and advanced a hose line into the room, just as the windows failed.

Investigators spoke to the girl, who admitted that she had set fire to a jacket in the closet.

The flames consumed the contents

of the closet, and the fire spread into the bedroom when the mother opened the door.

No one was injured. However, property damage was estimated at \$100,000.

The child was referred to the county juvenile firesetter program.

Three children die in cooking fire

TEXAS—Firefighters responding to a fire at a single-family home discovered flames shooting from windows and the front door. When told that several people might be trapped in the house, they advanced two lines through the front door. Inside, they found the bodies of three children, all of whom had succumbed to smoke inhalation.

The one-story, wood-frame house was 30 feet (9 meters) long and 40 feet (12 meters) wide. There were no smoke alarms or sprinklers.

Investigators determined that food left cooking unattended on a gas stove ignited and that the resulting fire spread to combustibles in the kitchen and others areas of the house. One resident discovered the fire and called 911 about six minutes later at 3:47 a.m. Firefighters brought the fire under control within an hour.

Fire crews found the bodies of a one-year-old boy and a one-year-old girl in the remains of a crib and the body of a two-year-old on a bed.

Property loss estimates weren't reported. One firefighter was injured.

Spontaneous heating ignites fire, destroying home

COLORADO—Fire engulfed an unoccupied, 6,000-square-foot (557-square-meter) house shortly before construction was completed, destroying the house and damaging portions of the garage.

The two-story, single-family house had a wood frame and a stucco finish on the exterior. The developer and members of the contracting crew had been in the home staining and finishing woodwork in the central foyer, and the last workers left around until 7 the evening before the fire.

Firefighters received a 911 call reporting the fire at 4:48 a.m. and

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Directional Sound clearly communicates the location of exits using *broadband noise*. The varying tones and intensities coming from Directional Sound devices offer easy-to-understand cues for finding the way out. As soon as people hear these devices, they *intuitively* follow them to get out quickly.

How was Directional Sound discovered?

Directional Sound was conceived at Leeds University in England and first researched by Professor Deborah Withington.

How do I know Directional Sound works?

Directional Sound is based on the science of human hearing. It is a broadband signal – what some people call “white noise” – consisting of all or most of the frequencies audible to the human ear. Numerous studies have demonstrated that when devices emitting Directional Sound are added to traditional fire systems, evacuation times are dramatically reduced. From these studies, researchers have reached four key conclusions:

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Is Directional Sound available? Where can I get it?

Directional Sound was researched and developed by Leeds University and SoundAlert Technology. System Sensor has incorporated Directional Sound into ExitPoint™ – the sound new direction in fire safety.

What is ExitPoint™?

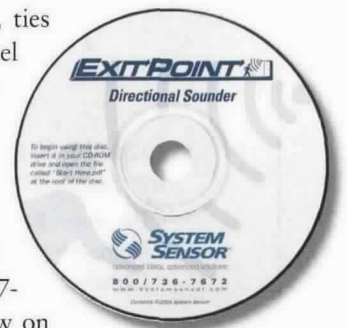
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Fire Watch

arrived approximately 14 minutes later to find heavy fire showing. Engine and ladder crews connected hoses to hydrants and began to set up for defensive operations using ladder pipes and monitors.

After the work crew finished applying two coats of stain and varnish to the woodwork, they put most of the debris they'd produced that day in a dumpster outside. However, they left their staining rags, masking tape, and

paper in a large, wheeled trash barrel in the foyer. Based on the statements of the work crew and evidence at the scene, investigators determined that the rags spontaneously ignited, and the fire spread throughout the house.

Property damage was estimated at \$1.1 million. There were no injuries.

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STORAGE

Underground storage tank explodes

SOUTH CAROLINA—Lightning struck the vent pipe of a 10,000-gallon (37,853-liter) underground tank once used to store gasoline, igniting the residual gas vapors and triggering an explosion so powerful that it lifted a 15-by-30-foot (4.5-by-9-meter) section of concrete over the tank 10 feet (3 meters) in the air. An 18-by-18-inch (46-by-46-centimeter) steel plate covering a submersible pump and a leak detection monitor were also blown about 125 feet (38 meters) into the air, landing 70 feet (21 meters) from the concrete pad covering the tank.

The privately owned fueling station's pumps and electricity had been disconnected, and the contents of the single-wall fiberglass tank had been pumped out to within an inch (3 centimeters) of the bottom.

At about 7 p.m., witnesses reported that a squall line passed through the area, followed by a brilliant flash and a large explosion. Shortly after the explosion, they saw black smoke coming from the tank's fill port. One witness called the fire department at 7:04 p.m.

Responding firefighters taped off the area and confirmed that the dispenser's power had been disconnected and tagged correctly. Investigators interviewed the witnesses and confirmed that a single lightning strike caused the blast.

The fueling station's owners had complied with temporary closure requirements. However, a report produced by a private investigation company notes, "The fact that the UST

What's in your rack

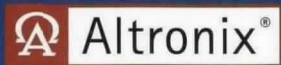


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Fire Watch

[underground storage tank] was empty increased the likelihood that the tank environment would have been in the combustible range. Had the tank held fuel, it is very likely the tank atmosphere would have been above the upper

explosive limit indicating the atmosphere was too rich for combustion." Experts believe that purging tanks with nitrogen or carbon dioxide would cause them to remain inert and eliminate the risk of a similar explosion.

Property damage was estimated at \$13,000.

MERCANTILE Sprinkler controls fire in mall

WASHINGTON—A single sprinkler controlled a fire in a department store in a large shopping mall, limiting fire damage to the area of origin. However, smoke damaged neighboring occupancies and a common corridor at the rear of the store.

The steel-frame mall, which was 1,185 feet (361 meters) long and 600 feet (183 meters) wide, had concrete tilt-up walls, a concrete floor, and a steel-and-wood roof. It contained 103 retail tenant spaces. A wet-pipe sprinkler system monitored by a central station alarm company provided full coverage and included a partial smoke detection system. The smoke detection equipment in the air handling ducts was in "power-save" mode and did not operate. The store in which the fire started was closing for the night.

Investigators determined that the fire began when an employee piled broken-down cardboard boxes on top of an electric stove in an employee break room and inadvertently turned on a burner. Fire department notification was delayed when the employee had difficulty locating a telephone after trying unsuccessfully to put the fire out with a portable extinguisher. Firefighters received the 911 call at 9:50 p.m., about the same time they received the water-flow alarm from the central station monitoring company.

First responders extinguished the fire, which a sprinkler had confined to the area of origin. The building, valued at \$60 million, and its contents, valued at \$100 million, sustained a combined loss of \$2,600. There were no injuries.

According to fire department officials, this was the second time a sprinkler extinguished a fire at the mall in six years. ❖

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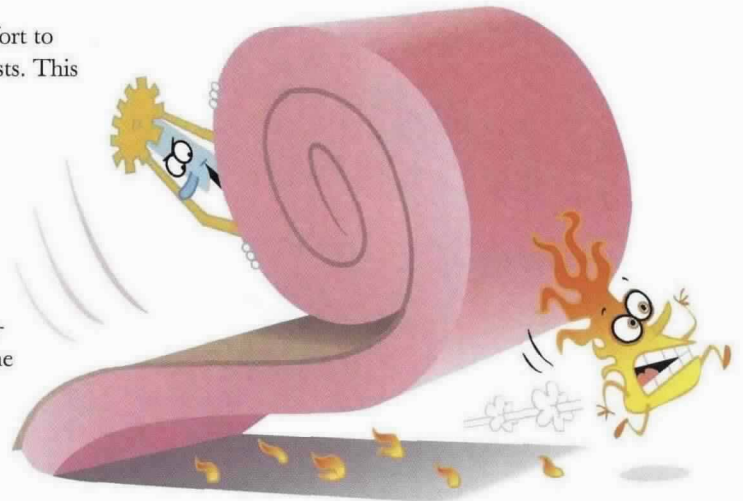
THE NEED TO protect water-filled sprinkler piping against freezing is well understood. When water freezes, it expands, and this expansion can damage the piping or sprinklers.

The most common form of failure is cracks in cast iron fittings, such that flow takes place when temperatures rise and the ice thaws. Pendent sprinklers are especially vulnerable, since freezing that starts at the top of a drop and moves downward can create such high pressures that valve caps distort and glass bulbs rupture, again resulting in unwanted flow when the ice thaws.

Ironically, the need to protect sprinkler systems against freezing may actually be most critical during the summer months, when new sprinkler systems are usually

in a misguided effort to reduce heating costs. This can also happen with the blown-in insulation used in attics of new sprinklered residential units. Unless batt insulation is laid over the sprinkler piping first, the blown-in insulation can settle below the sprinkler piping, insulating it from the heat of the dwelling below.

For this reason, the illustrations of proper



that adequate heat [minimum 4.4°C (40°F)] is available.”

Rising energy costs have led building owners and operators to economize on heat, particularly when it comes to unoccupied or partially occupied buildings, and such economics can become excessive. It is important that a building be warm enough at all times to avoid damaging the fire sprinkler system. If this is not possible, owners should consider converting the system to a dry-pipe, preaction, or antifreeze system that is designed to survive cold weather. Of course, these systems must also be checked in advance of cold weather. Antifreeze solutions should be tested, and low points on dry systems should be identified and drained.

Freezing is one of the most common problems with sprinkler systems, but perhaps the most easily avoided. It simply requires a focus on coming cold weather, even when it's hot outside. ❄️

RUSSELL FLEMING is the executive vice-president of the National Fire Sprinkler Association and a member of the NFPA Technical Correlating Committee on Automatic Sprinklers.

Precautions must be taken to ensure that wet system piping is protected against freezing and building insulation is usually the key.

installed. However, it can be difficult to focus on properly insulating or otherwise protecting piping against future cold snaps in warm weather.

More than 90 percent of all sprinkler systems, including most residential systems, are wet-pipe systems, since they are the most economical to install and the easiest to maintain. Precautions must be taken to ensure that wet system piping is protected against freezing, and building insulation is usually the key. Unfortunately, insulation is not always properly placed to protect sprinkler piping.

One common mistake is placing the insulation between the heated area and the piping, thus isolating the sprinkler piping from the heat of the space below. In existing buildings, this has been known to occur when additional batt insulation is placed directly above a suspended ceiling

insulation techniques in the annex of NFPA 13D, *Sprinkler Systems for One- and Two-Family Dwellings and Manufactured Homes*, and NFPA 13R, *Sprinkler Systems for Residential Occupancies up to and Including Four Stories in Height*, all use fiberglass batts arched over the sprinkler piping. The space below the batt insulation is considered part of the heated building area, not part of the unheated attic.

NFPA 25, *Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, recognizes the need to anticipate cold weather, calling for a special annual inspection “prior to the onset of freezing weather...to verify that windows, skylights, doors, ventilators, other openings and closures, blind spaces, unused attics, stair towers, roof houses, and low spaces under buildings do not expose water-filled sprinkler piping to freezing and to verify

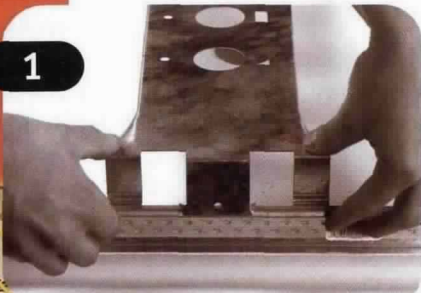
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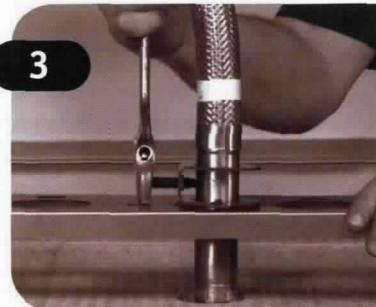
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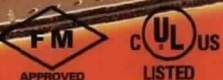


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Accountability systems

BECAUSE ACCOUNTING FOR responding personnel at an emergency is critical, the incident commander (IC) must know the location and assignment of every unit and every responder at the scene. Tracking all on-scene personnel is a good management practice and, more importantly, it allows the IC to establish an immediate head count if a building collapses, an explosion occurs, or some other sudden, catastrophic change takes place.

Chapter 8, "Emergency Operations," of NFPA 1500, *Fire Department Occupational Safety and Health Program*, requires an incident man-

locations and functions of all crews under their supervision, just as the operations section and branch leaders must know the location of tactical level management resources under their command.

These accountability procedures are



A personnel accountability system is essential when trying to determine the location of firefighters at an incident scene or operation.

agement system (IMS) and a personnel accountability system at all incidents. An incident management system provides structure and coordination to the management of emergency incidents to help ensure the safety and health of fire department members. A personnel accountability system tracks assignments and personnel on an emergency scene and should record the individuals assigned to a company, crew, or entry team; the assignment for each team; and the teams' current activities.

At a single-company operation, the company officer is both IC and accountability officer. When an incident becomes more complex, the IC delegates his or her accountability officer duties to another staff member.

The IMS is the primary accountability system. At incidents where sectoring is necessary, company officers manage and account for their crews and are usually in direct contact with members of their crews when working in hazardous areas. Group, division, and sector officers must know the

the basis for a personnel accountability report (PAR) and for deploying a rapid intervention crew (RIC) when firefighters need immediate assistance. It is easier to find trapped or disabled firefighters if the number needing assistance and their locations are known, and a properly organized operation provides a means of locating every responder at the scene at all times.

The personnel accountability system should follow the IMS organizational structure in providing an additional means of accounting for all units and individuals. Just as high-risk industrial processes commonly provide multiple redundant safety measures, redundant measures can be used to account for emergency responders.


An essential task for the IC and any incident safety officer assigned is making sure these systems are in place and used. The department accountability procedure ought to address how the system will be used with and without an accountability officer and explain when an accountability officer must be appointed. When an emergency arises that

requires a PAR, both the accountability officer and the IC should be able to determine the status of all units working at the scene. If one system fails, the other provides back-up accountability. If both systems function properly, accountability is verified.

Most IMS have more than enough capacity to organize an operation when used correctly. Each accountability system has advantages and disadvantages. However, every system we have seen can provide the necessary information about the location of personnel operating at the scene. And most have more than enough capacity to organize an operation when used correctly. Lack of accountability is generally due to misapplication of, or failure to implement, the accountability system.

Standard operating procedures and training are necessary if accountability systems are to provide the intended levels of safety. Perhaps the best training is the routine PAR called at regular intervals and when major tactical objectives are achieved. Most important is that both systems be used at every incident. To order a copy of NFPA 1500, go to www.nfpa.org. 🔥

This column is adapted from the book *Structural Fire Fighting*, available at www.nfpa.org or (800) 344-3555.



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Bills offer an economic incentive

THE CODES HAVE been increasing their requirements for automatic sprinklers in new buildings over the years, particularly as we have come to understand the life-safety benefits sprinklers provide.

When I first began in this profession, it wasn't unusual to find the parking garage attached to the hotel sprinklered but the hotel was not protected with sprinklers. We were primarily looking at sprinklers as "property protection" then but the philosophy has changed for the better as we have seen the fire safety record of sprinklers.

The codes have traditionally been reluctant to place retroactive requirements for sprinklers in buildings. Of course there have been some retroactive requirements for sprinklers such as in hospitals and high-rise buildings. However, the code

existing buildings at an accelerated rate. Presently, the tax code provides for 39-year depreciation for sprinklers in commercial buildings and 27 years for residential buildings. This lengthy depreciation schedule is hardly an economic incentive for the installation of sprinklers in existing buildings.

The new bills before Congress will accelerate that depreciation to only five years. This would apply only to the retro-

There has not been a big economic incentive for the installation of sprinklers in existing buildings. That could change if two bills submitted to this 109th Congress get passed.

committees look carefully at any retroactive requirements and their impact on existing buildings, including cost benefit. Unless there's an obvious code requirement, it is often difficult convincing the owner to install sprinklers in their existing building.

We have all heard about the reduction in insurance premiums when automatic sprinklers are installed in many types of buildings. This has served as an incentive for the installation of sprinklers in some buildings. But there has not been a big economic incentive for the installation of sprinklers in existing buildings. Well, that could change if two bills submitted to this 109th Congress get passed.

These two bills will permit the depreciation for the cost of sprinkler installations in

fitting of sprinklers in existing buildings. Imagine how easy it will be to convince owners to install sprinklers with this tax incentive. They can possibly lower their insurance premiums, get 20 percent per year depreciation, and significantly improve their fire safety.

Bill background

These bills were originally introduced in the 108th Congress but did not get acted on before the end of that session. At that time, there were 140 co-sponsors of the House bill with 14 of those co-sponsors on the Ways and Means committee.

The bills have been resubmitted in the 109th Congress. The House Bill (HR-1131) is sponsored by Rep. Curt Weldon,




R-Pa., and has 41 co-sponsors. The Senate Bill (S-512) is sponsored by Sen. Rick Santorum, R-Pa., and has three co-sponsors. Senator Santorum is a member of the important Senate Finance Committee. Sen. Jay Rockefeller, D-W. Va., is also a sponsor and a member of the finance committee.

Contact your Congressmen and Senators to support this important fire safety legislation. If you are not sure who they are, there are some web sites that can help. Members of the Senate can be found at www.senate.gov and members of the House can be found at www.house.gov. Just input your state and zip code and your representative with their address will appear.

This is an opportunity for every person interested in fire safety to support a change in the tax code that will definitely have a positive impact on fire safety of existing buildings. 🖱

CHIP CARSON is owner and president of Carson Associates, Inc., Warrenton, Virginia. He is also a member of the NFPA Board of Directors.



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New technology requires more training

MOST, IF NOT ALL, of the fire alarm systems on the market today operate using programmable software. As this software technology develops, the fire protection industry has expressed concern about a possible decline in both equipment and installation reliability.

Today's software technology provides fire alarm systems with greater flexibility and operational controls, but the price one must pay for this flexibility and control is an increase in the technical skill needed by those who install and maintain the sys-

Many installers remember the "old days," when the only thing you needed to install a fire alarm system was the ability to read the instructions and the technical skill to learn how to install systems on the job. The new software-driven fire alarm control systems do not allow such a cavalier approach to training.

Nationally recognized organizations responsible for testing and listing the new systems have re-oriented themselves to ensure that software-driven fire alarm control equipment will meet the minimum

ANSI/UL 864 also requires the manufacturer to examine software operation with a test-and-verification program that includes documentation by means of a test plan and test results. These test results must, at a minimum, include the verification of the proper operation of all fire-alarm-control-unit functions.

In addition, the manufacturer must show that its software test program confirms the proper operation of all circuits of each applicable type, style, and class the system contains; confirms proper operation of all programming options; verifies that the control unit processes incorrect entries appropriately; confirms proper operation of intelligent devices that the panel controls; and verifies that the panel correctly controls each device as designed. The manufacturer must submit this testing information for all new products and when it adds functions to the software of an existing product.

As UL tries to improve software reliability through increased and uniform testing, however, manufacturers are deciding how they will respond to the new requirements. Based on conversations with some manufacturers, it appears they will no longer manufacture many of their existing, conventional fire-alarm-system products or some of the current addressable technology products. This will further exacerbate the training problems, and manufacturers will have to redouble their efforts to create a base of qualified technicians that can keep installed fire alarm systems operating effectively.

Like the paperless society promised by the advent of computers, it appears that today's more sophisticated fire alarm systems may not necessarily fulfill the industry's hope for more reliable systems. ❖

WAYNE D. MOORE, P.E., FSFPE, is chair of the National Fire Alarm Code Technical Correlating Committee.

Is new technology thwarting the efforts to improve equipment and installation reliability?

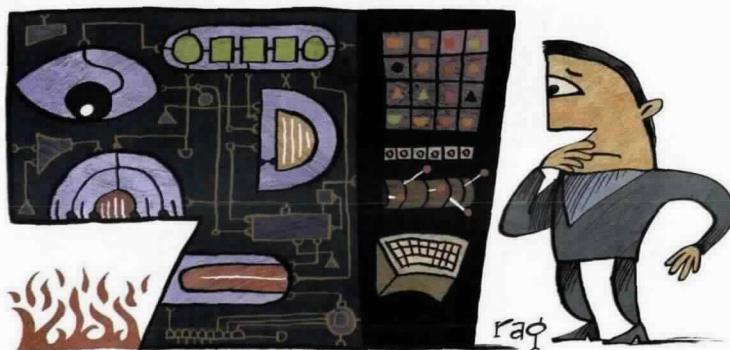
tems. Technicians must not only understand the system hardware and competently troubleshoot hardware-related problems, but they must be proficient in software programming.


Finding and keeping such technicians presents a challenge to manufacturers and installers of the more sophisticated systems and drives the cost of installed fire alarm systems up, regardless of the purported savings in hardware costs. Although manufacturers continue to develop training programs to ensure that their factory technicians and their distributors' technicians have the information they need to apply, install, program, and troubleshoot their products, too few technicians

actually receive appropriate training because installation company owners treat training, no matter how important, as an overhead cost that has no apparent return on the money invested.

performance and reliability requirements of the equipment standards. For example, Underwriters Laboratories' ANSI/UL 864, UL Standard for Safety for Control Units and Accessories for Fire Alarm Systems, now requires that manufacturers meet "software integrity" requirements. These requirements become effective October 1.

UL requires that the software design allows the product to operate as intended and that it not contain known critical defects that could result in an interruption of product operation, operation not intended by the design of the product, or operation which would prove inconsistent with the requirements of ANSI/UL 864.





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Preventing cooking fires

A FEW MONTHS ago, when my sister, Sylvia, had just given birth to my niece, I wanted to surprise her and her family with a special, home-cooked meal when they came home from the hospital.

My brother-in-law, Aron, gave me detailed instructions on how to operate their gas oven, which required lighting the pilot light each time it was turned on.

He and Sylvia were still getting used to it because they had only moved into their home two weeks earlier. Aron said that I should turn the oven thermostat to 350°F (177°C), light a kitchen match, and place it

Two out of three reported home cooking fires start with the range or stove and usually start when food, grease, rags, bags, cabinets, curtains, or other common household items ignite.

According to NFPA's report "Home Cooking Fire Patterns and Trends," there were 117,100 home fires involving cooking equipment in 2001. Of these, 48,900 were confined to a cooking vessel, such as the oven, microwave, toaster, toaster oven, or, most frequently, a pan on a stove. These cooking fires resulted in 370 civilian deaths, 4,290 civilian injuries, and



Cooking is the leading cause of fires and civilian fire injuries in U.S. homes.

over the opening of the pilot light. I followed his steps, saw the flame glowing, and put Cornish hens in the oven.

After about 20 minutes, I realized that the pats of butter I had spread on top of the hens hadn't even begun to melt. My hens weren't cooking, and the pilot light was out. Anxious to get the meal done by the time my sister and niece arrived, I hurriedly lit another match, opened the oven door, and before I could get the match close to the pilot light, I heard a "whoosh" and was blinded for a moment by a flash of light. I hadn't realized that the oven had been filling with gas for the past 20 minutes.

The next thing I knew, the smoke alarm was blaring, and Cleo, the family dog, was barking and frantically running in circles. I smelled the unmistakable stench of burned hair. The ends of my hair were singed, and my eyebrows were crispy. Aside from a little embarrassment, though, there was no serious damage. It could have been more serious.

Cooking is the leading cause of fires and civilian fire injuries in U.S. homes.

\$453 million in property damage.

About 12.3 million cooking fires account for half of all unreported fires each year, as well. These fires are responsible for an estimated 642,000 injuries or illnesses.

It is encouraging to note that home cooking fires have declined in recent years, but the drop has not been as dramatic as it has been for home fires with other causes. Why do these fires persist?

One reason is inattention. The majority of fires involving gas or electric ranges and stoves occur because food is left unattended during cooking. And most fires begin within the first 15 minutes of cooking, an indication that there is no safe time to leave cooking food unattended.

A study of unattended-cooking fires in New Zealand, done by the New Zealand Fire Service, showed that distraction and forgetfulness were primary causes. About half of the time, the study found the cook was no farther away than another room, where he or she had typically forgotten something or was distracted by children,

phone calls, visitors, the television, or something else. The rest of the time, the cook was outside the house or, more often, off the property.

Once cooking fires start, the damage may not be confined to a couple of saucepans on the stove. Fire can spread beyond the stove and even into other areas of the home.

Here are some safety tips to keep in mind when cooking:

- Never leave food cooking on the stovetop unattended and closely watch food cooking in the oven.
- Wear short sleeves or tight-fitting clothing. Loose clothing near a burner or flame can easily ignite.
- If your clothing catches fire, stop, drop, and roll to put out the fire.
- Keep children away from the cooking area by enforcing a 36-inch (91-centimeter) "kid-free zone" around the stove.
- Use oven mitts when handling pans or other cooking devices.
- Do not cook if you are drowsy.
- If a pan of food catches fire on the stove, slide a lid over it to smother the flames and turn off the burner.
- If there is an oven fire, turn off the

CONTINUED ON PAGE 143

Finally, products to fight sprinkler system corrosion from



a company that knows sprinkler systems.

Over 10 years ago, Potter Electric Signal Co. recognized the problems corrosion can cause in a sprinkler system. Since then, Potter has been the exclusive provider of a Vane Type Flow Switch (**VSR-F**) that includes corrosion proof wetted materials, eliminating potentially catastrophic problems.

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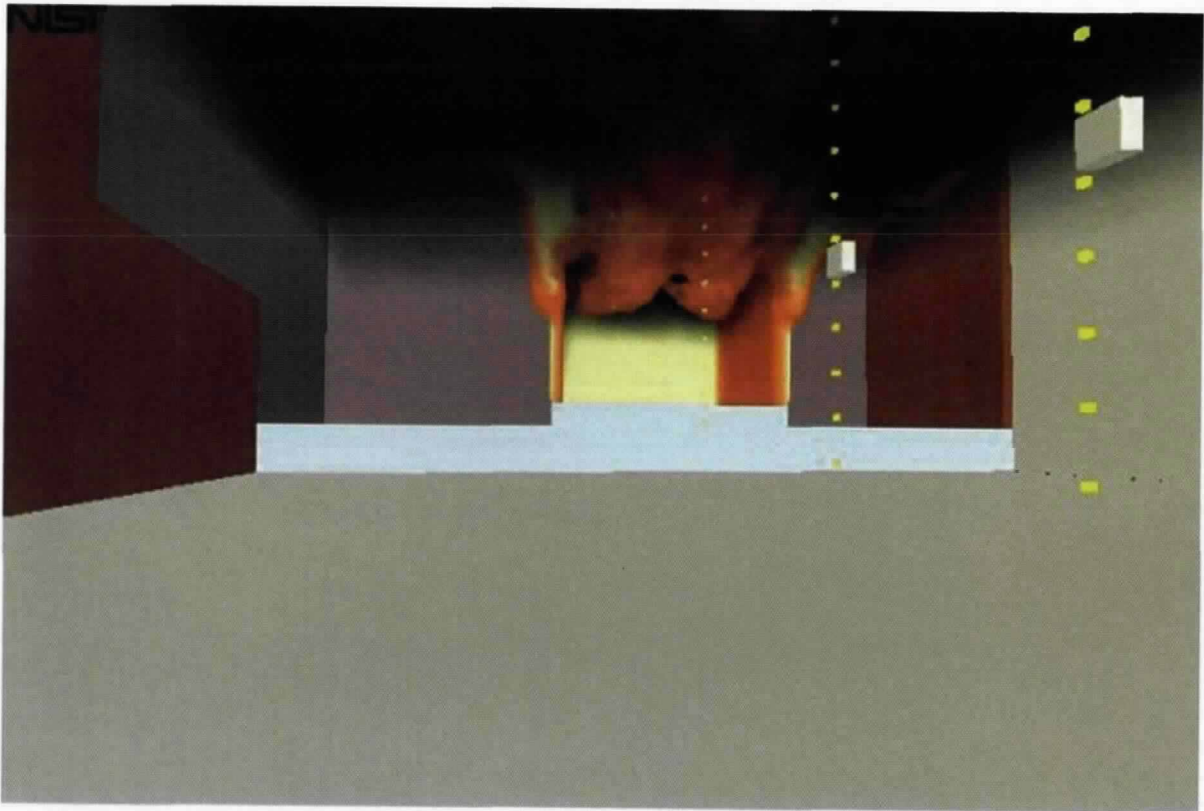
- The **PAAR** (Potter Automatic Air Release) helps eliminate trapped air in a sprinkler system. Eliminating trapped air reduces the air/water interface where corrosion often thrives. The PAAR also includes a secondary automatic water shutoff valve that can be fully supervised.
- The **PCMS** (Potter Corrosion Monitoring Station) replicates the condition in the cross main or branch line of a wet pipe system, allowing the system to be regularly inspected for signs of corrosion. Water sampling, visual inspection, coupon analysis, and sprinkler analysis are easily achieved without disabling and draining the sprinkler system.
- The **PCDS** (Potter Chemical Delivery System) utilizes a patented process that allows a corrosion-inhibiting agent to be added to the water supply as it enters the sprinkler system. This system is fully supervised, and comes complete with a local alarm and digital communicator.



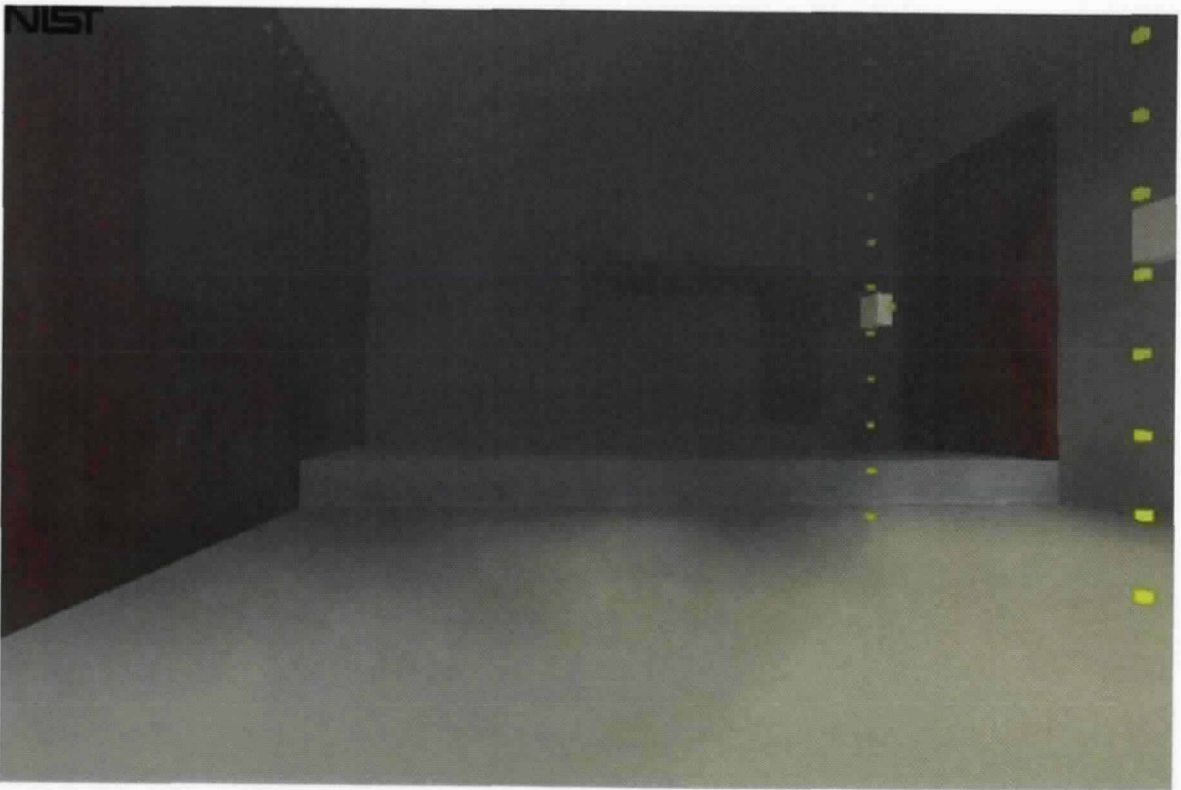
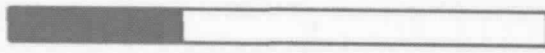
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The

By **John Nicholson**

Proactive Approach

NIST report acknowledges NFPA's timely response to The Station nightclub fire and the proposed major code changes before members at June's *World Safety Conference and Exposition*[®].

WITHIN WEEKS OF THE CROWD RUSH at the E2 nightclub in Chicago and the tragic fire at The Station nightclub in West Warwick, Rhode Island, NFPA stepped up efforts to enhance life safety in assembly occupancies by introducing tentative interim amendments (TIAs) to NFPA 101[®], *Life Safety Code*[®], and NFPA 5000[®], *Building Construction and Safety Code*[®]. TIAs are changes made to an NFPA code or standard between editions and require justification of their emergency nature. TIAs are usually a result of a previously unknown hazard, new technology, a significant loss of life during a fire or other event or building loss. Following in-depth development and review of the TIAs by the NFPA Technical Committee on Assembly Occupancies, NFPA's Standards Council approved the TIAs in July 2003, just five months after these events.

Fast-forward to June 2005, when NFPA members will have the opportunity to vote on the previously issued TIAs as they near the end of being processed as fully considered code revisions to both NFPA 101 and NFPA 5000. These changes include sprinklering existing nightclub-type facilities and venues with festival seating for more than 100 occupants, and sprinklering new nightclub-type facilities and venues with festival seating (see sidebars for complete list).

Adoption of a revised edition of an NFPA code is up to each jurisdiction. >>

Left top: Computer model of actual NIST fire test on mockup of The Station nightclub stage area without sprinklers after 60 seconds. Bottom: Computer model of actual NIST fire test on mockup of The Station nightclub stage area with sprinklers operating after 60 seconds.

The membership vote, which will be held during the Technical Committee Report (TCR) Session at the *World Safety Conference and Exposition*[®] in Las Vegas, follows the release of the National Institute of Standards and Technology's (NIST) preliminary report on the fire. In its report, NIST called on standards-development organizations, such as NFPA, and the state and local agencies that adopt codes to make specific changes to improve fire safety in nightclubs.

The NIST report acknowledged NFPA for its quick response to the tragedy.

The NIST report also notes that compliance with NFPA codes and standards would have mitigated or prevented the fire at the Station nightclub.

"The magnitude of The Station nightclub fire in West Warwick invoked a swift response by code-developing organizations like NFPA, as well as by the State of Rhode Island, before the release of the latest NIST report. Many critical recommendations from NIST were enacted before the release, on a temporary emergency basis, and are now on their way to becoming permanent changes," the report states.

The NIST report also noted that compliance with NFPA codes and standards would have mitigated or prevented the fire.

In addition, NFPA did respond to the NIST report with a series of comments relating to the Rhode Island fire. This was the first NIST report issued under the National Construction Safety Team (NCST) Act. In the cover letter to NIST, Gary Keith, vice president of Building Codes stated, "The NCST reports are likely to be held up as the model for future building loss technical investigations."

NFPA Journal[®] columnist Russ Fleming, P.E., a member of NFPA's board of directors and executive vice president of the National Fire Sprinkler Association, notes that the test program undertaken by NIST to investigate The Station nightclub fire demonstrated the ability of a fire sprinkler system to make up for a range of other fire protection deficiencies.

"It is obvious from the test data," he says, "that sprinklers would have made an amazing difference in this fire, and it is significant that NIST's primary recommendation is that

codes require sprinklers in all new and existing nightclubs regardless of size. Fires in nightclubs leading to large numbers of lives lost are occurring all too frequently around the world, and a solution is readily available in the form of fire sprinkler protection."

During one of the fire tests of NIST's mockup of The Station nightclub's stage and dance floor, a sprinkler system installed in accordance with NFPA 13, *Installation of Sprinkler Systems*, controlled a fire that ignited in non-fire-retarded polyurethane foam panels, similar to those that burned during the actual fire. Sprinklers were not installed in The Station, nor would they have been required for such structures in the 2003 editions of the model building codes for existing buildings.

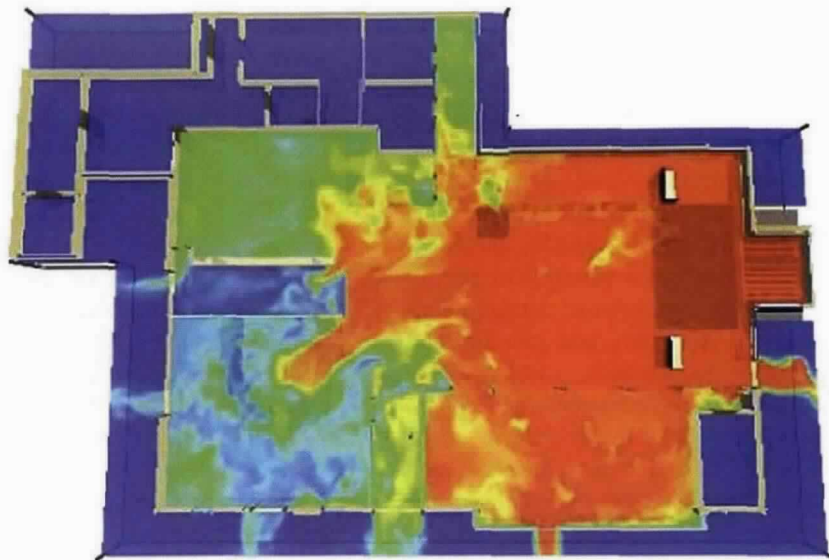
Through its regional offices, NFPA was instrumental in helping Rhode Island develop its own report and significantly improve its fire safety code. Among the most significant changes was the adoption of NFPA 1, *Uniform Fire Code*[™], and updating to a later edition of NFPA 101. Rhode Island now requires all new and existing places of assembly with a capacity greater than 300 to be completely protected by an approved automatic sprinkler system as of July 1, 2005. For new and existing buildings similar to The Station nightclub with capacities of 300 or less but greater than 150, the deadline for installing sprinklers is July 1, 2006. Additional provisions in The Comprehensive Fire Safety Act of 2003 require two 20-pound fire extinguishers in stage areas and a strengthening of the inspection authority of the fire marshal.

As part of NFPA's on-going outreach, the fire marshals and fire inspectors in the state received complimentary codes, as well as training on the new codes including the changes surrounding assembly occupancies.

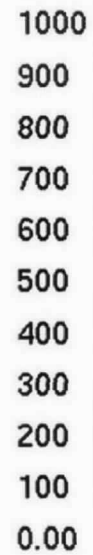
Recommendations

The inferno at The Station nightclub, which killed 100 people and injured hundreds more, started when sparks from the rock band Great White's pyrotechnics ignited highly combustible foam insulation placed around the stage as sound-proofing. The NIST report identifies three factors that directly contributed to the rapid spread of the fire, the resulting building failure, and the large loss of life: a hazardous mix of building contents, inadequate fire suppression capabilities, and the exits' inability to handle all the occupants in the short time available for evacuation for such a fast-growing fire.

NIST

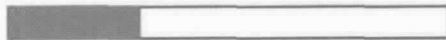


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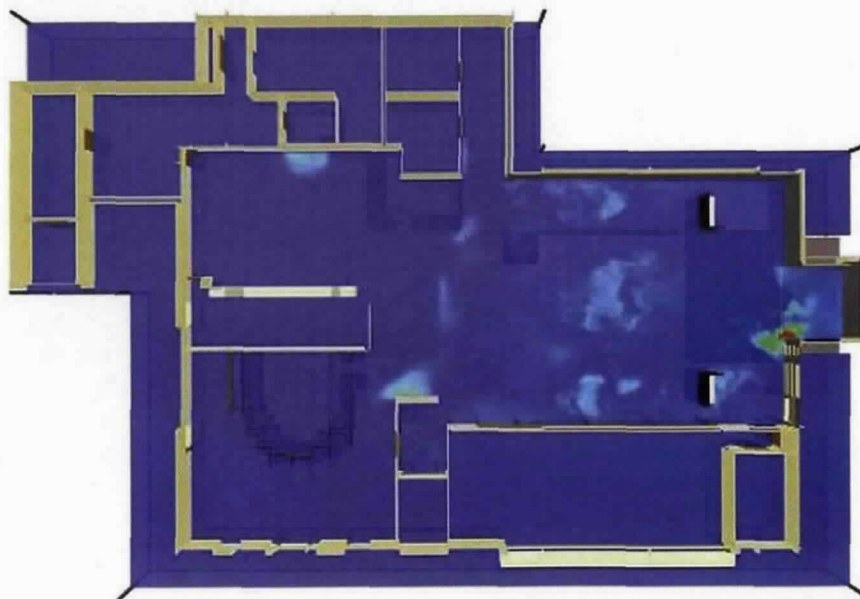


Computer model of fire at The Station nightclub showing the temperature variation after 90 seconds at 1.5 meters (5 feet) above the floor.

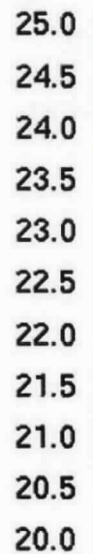
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NIST



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Computer model of fire at The Station nightclub showing the potential impact of sprinklers on the temperature variation after 90 seconds at 1.5 meters (5 feet) above the floor.

Time: 90.0



The report's recommendations for changes in nightclubs include requiring broader use of sprinklers, tightening restrictions on the use of highly combustible materials for use as interior finish and decorative products, and improving means of egress features such as available capacity. Other recommendations address emergency preparedness and response practices, and call for more research to reveal the way people behave in emergencies such as fires.

As part of its investigation into why the one-story, wooden club burned so quickly, the NIST team worked to establish a partial floor plan of the club by mapping the interior configurations of the stage, bar areas, doors, and windows, and identifying other characteristics, such as ceiling height. Investigators also examined the response by emergency personnel, the movement of the occupants as they rushed to exits, the generation of thermal radiation that exposed many of the victims and the rapid spread of smoke.

State investigators have said the building was engulfed in just a few minutes and that

most people who got out escaped in the first minute and a half. Most of the patrons rushed to the front exit, quickly creating a pile-up in which people fell on top of each other, preventing others from getting out.

An analysis that used building evacuation models to recreate the circumstances believed to have existed in the club on the night of the fire revealed that it would have taken 2 minutes and 30 seconds for everyone to get out if the club's three exits had been available and the capacity were at the legal limit of 404. With 90 percent of the occupants rushing to the front exit, it would have taken more than 4 minutes, according to NIST.

NIST's investigation and recommendations add more pressure on the U.S. concert and nightclub industry to adopt fire and crowd safety standards.

"Failure to adopt the recommendations of the nation's leading event-safety-related agencies by venue operators, producers, promoters, security firms, and artists will result in more tragedies and

WHAT'S ALREADY TAKEN PLACE

THE FOLLOWING INFORMATION is taken from Chapter 8, Summary Findings and Recommendations, Section 8.4 of NIST's *Draft Report of the Technical Investigation of The Station Nightclub Fire*. This section highlights what actions code developers and the State of Rhode Island have taken since the fire.

National Fire Protection Association

Shortly after The Station fire in 2003, NFPA's Technical Committee on Assembly Occupancies and Standards Council held hearings to consider technical interim amendments (TIAs) that would address certain life-safety issues the tragedy raised. The TIAs dealt with sprinklers, occupancy levels, crowd management, and means of egress. The following TIAs were approved in July 2003:

- Sprinkler existing nightclub-type facilities and festival-seating venues with occupant loads greater than 100.
- Sprinkler all new nightclub-type facilities and festival-seating venues.
- Require trained crowd managers

for existing and new assembly occupancies.

- Restrict festival seating in new and existing facilities with occupant load greater than 250, unless a life-safety evaluation has been conducted.
- Require of owners to inspect means of egress and keep records of the inspections.

International Code Council

A number of proposals for code changes related to The Station fire were also submitted to the International Code Council (ICC) at its September 2003 public hearing. One proposal, which required foam plastics covered with a textile or vinyl facing to pass a flame spread test, was approved. Several other proposals were rejected, primarily due to a lack of technical justification that would substantiate the change.

Several of these rejected proposals were aimed at increasing the capacity of the main entrance and the area requirement per occupant:

- Eliminate 300-occupant minimum

before requiring 50-percent capacity for the main entrance and increasing the capacity requirement to 67 percent.

- Increase the capacity of the main entrance to 75 or 67 percent.
- Increase the area required per occupant from 5 square feet (0.47 square meters) to 7 square feet (0.65 square meters).
- Eliminate sprinkler trade-offs with the egress-width requirement.

The ICC held code development hearings in February and meets again in September to act on any proposed changes related to nightclubs.

State of Rhode Island

Rhode Island required an across-the-board use of up-to-date fire safety codes, thus eliminating the "grandfather clause" exemption for older buildings, and required the coordinated administration of fire safety building codes. The state also:

- Prohibited the use of pyrotechnics in places of assembly, such as nightclubs, strictly regulating their use to

the continued escalation of concert-safety personal-injury litigation and criminal prosecution," says Paul Wertheimer, head of Crowd Management Strategies and a member of the NFPA Technical Committee on Assembly Occupancies.

"The NIST report should be required reading for anyone in the world involved with, or interest in, event crowd safety planning and management," he says.

NIST has said that preliminary tests also showed a sprinkler system would have made a significant difference in how the fire spread throughout the club.

After the Rhode Island fire, the NFPA Technical Committee on Assembly Occupancies aggressively pursued the issue of whether additional measures would adequately reduce the threat presented by expanded plastic-surface materials of the type that burned during The Station nightclub, according to NFPA technical committee member Roland Huggins, P.E., vice president of engineering for the American Fire Sprinkler Association.

"It was immediately recognized that automatic fire sprinklers were the only silver bullet," says Huggins. "But could they stop such fast-spreading fires?"

"The technical committee also reviewed egress times based on fire modeling," he says. "These helped a lot on the big picture, such as tenability and egress, but were not applicable to the suppression questions. That's where the NIST report is so valuable. After a detailed and deeper study, it confirmed that the technical committee was right and not just taking action for the sake of action. Automatic fire sprinklers are capable of handling the risk presented by exposed expanded plastics."

The period for public comment on the NIST report ended on April 12. NIST now reviews the comments to determine if additional changes may be in order then the report becomes final. ❖

JOHN NICHOLSON is managing editor of *NFPA Journal*.

large venues that can accommodate them safely.

- Mandated sprinklers in nightclubs with an occupant capacity of 150 or greater and in all Class A and B places of assembly. The only exceptions are places of worship and state and municipal buildings used for government purposes. The state also placed other requirements on nightclubs as high-risk places of assembly.

- Provided fire marshals with greater enforcement powers that allow them to inspect nightclubs and other places of assembly during their hours of operation, require immediate abatement of conditions that pose an imminent threat to public safety or property, and, when necessary, order a premises vacated.

- Established comprehensive planning requirements to identify weaknesses in Rhode Island's approach to fire safety in the future and to recommend actions needed to improve fire safety.

Commonwealth of Massachusetts

In the wake of the Rhode Island Station nightclub fire, Governor Mitt Romney formed a 32-member Task Force on Fire & Building Safety to review the Commonwealth's fire safety laws and regulations. Their findings served as the foundation of the legislation Romney signed into law.

Highlights of the new law:

- Mandates sprinklers in nightclubs with an occupancy of 100 persons or more within three years;
- Creates a two-strike rule for clubs with occupancies of less than 100 that exceed capacity. If a club is cited for an occupancy violation twice in a year, automatic sprinklers must be installed within 90 days or the business will be shut down;
- Eases the financial burden on businesses complying with the new law by putting in place an accelerated tax depreciation deduction for the purchase of automatic sprinkler systems required to be installed as a retrofit in existing nightclubs, discotheques, dance halls and bars from the current 39 years to five years;

- Creates criminal penalties for dangerous conditions in public assembly buildings, including blocking ingress or egress; shutting off or failing to maintain fire protection systems; storing flammables or explosives; and using fireworks or pyrotechnics without a permit and exceeding occupancy limits. The first infraction will result in a fine of not more than \$5,000 and/or imprisonment of up to 2½ years. Subsequent infractions will result in a fine of up to \$25,000 and/or imprisonment of up to five years;

- Establishes criminal penalties for individuals who violate provisions of the state building or fire codes when a violation results in significant injury or death. Violations may result in a fine of up to \$25,000 and/or imprisonment of up to five years; and

- Restores the Student Awareness of Fire Education (SAFE) program, which helps educate children about fire safety awareness, and provides grants to municipalities to assist in the purchase of firefighter safety equipment.

By **Daniel J. O'Connor, P.E., FSFPE**

directional

DIRECTIONAL SOUND is a new technology that holds promise in improving the use of exits and helping people find their way to an exit, a refuge area, or some other means of egress during emergency evacuation of a building, particularly under such adverse conditions as smoke or darkness. It works by introducing short bursts of broadband sound in a frequency range that's distinct from simultaneously operating fire alarm sounders, such as bells, horns, or voice communication systems. These pulses of sound, which make use of our ability to localize sound sources, are produced by electronic signaling devices installed as part of a building's fire alarm system to provide additional sound cues that don't conflict with the traditional fire alarm system notification appliances. >>

Since sound can penetrate in many directions, even around corners, using directional sound to indicate exits is inherently more flexible and efficient than using line-of-sight methods.

sound

Illustration By **Brad Yeo**

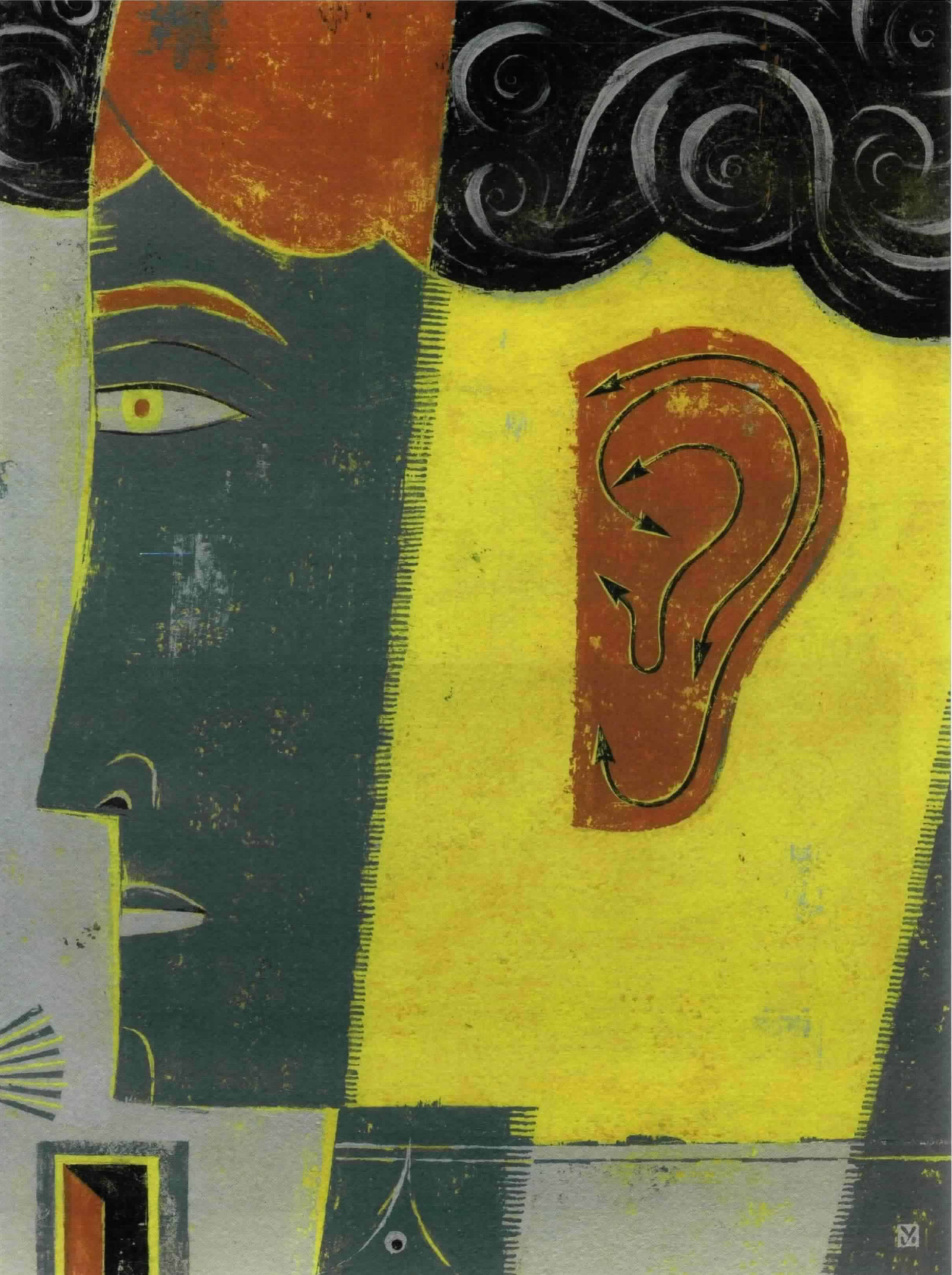


Figure 1

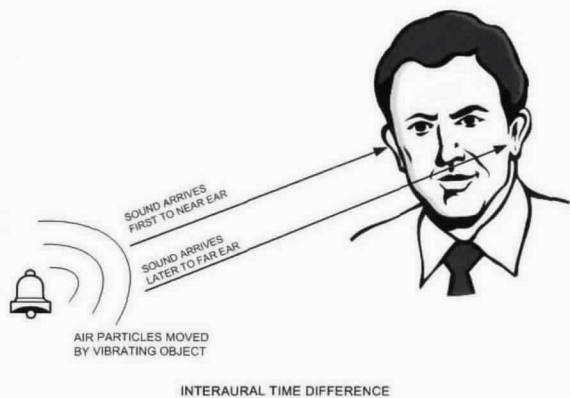
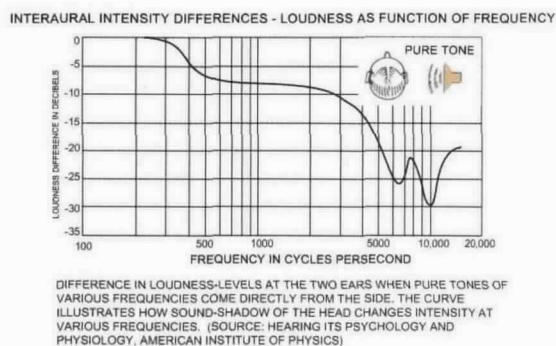


Figure 2



HOW WE HEAR

TO BETTER APPRECIATE how directional sound works requires a basic understanding of how human hearing works and how sound processing allows a listener to locate with surprising accuracy the source of a sound.

The human ear is essentially a mechanical system that is extremely sensitive to very small changes in sound waves passing through air. Sound waves are changes in air pressure resulting from the vibration of some other object, such as a musical instrument, operating machinery, or person's vocal cords.

Our ears have three primary parts: the outer ear, the middle ear, and the inner ear. The outer ear is pointed forward with curves and shapes that catch sound and direct it along the ear canal to the tympanic membrane, or eardrum. The eardrum is a thin, rigid piece of skin separating the outer ear from the middle ear. When sound reaches the eardrum, it vibrates, moving rapidly back and forth for higher frequency sound waves while moving back and forth larger distances for louder sounds.

The middle ear is an air-filled cavity that houses three tiny bones, the ossicles, whose primary function is to amplify by a factor of approximately 20 the pressure received from the eardrum. The first bone, the malleus, is connected to the center of the eardrum and transfers vibrations from the eardrum to the other two bones. The last bone, the stapes, connects to the cochlea, a fluid-filled channel in the inner ear. As the eardrum vibrates, so do the ossicles, which allow the stapes to act as piston creating fluid waves in the cochlea that represent the sound waves sensed by the eardrum.

The cochlea, a snail-shaped structure of three fluid-filled tubes separated by membranes, converts or translates these physical vibrations into nerve impulses that the brain recognizes as sound. Fluid waves moving along the cochlea's basilar membrane stimulate the thousands of tiny hair cells in the organ of Corti, which lies on the surface of the basilar membrane and extends across the cochlea.

The technology and initial applications of directional sound were developed at the University of Leeds in the United Kingdom in partnership with SoundAlert Technology Plc under the supervision of Deborah Withington, professor of auditory neuroscience. Directional sound's introduction into North America is being led by System Sensor, a major manufacturer of fire detection and notification products.

The concept of using directional sound differs from that used for bell, horn or voice speaker installations. Generally these notification devices require placement at numerous locations in order to achieve the sound levels that can be heard and understood by occupants throughout all building areas. In a basic installation of directional sounders, the concern is not for establishing a minimum audible signal in all occupied building spaces. Rather, the focus is to provide sound cues to assist occupants in more easily locating the direction to a nearby exit or area of refuge when occupants are moving through the means of egress during an evacuation (Figure 4). Since sound can penetrate in many directions, even around corners, using directional sound to indicate exits is inherently more flexible and efficient than using line-of-sight methods.

When a fluid wave excites a particular resonant frequency, the membrane releases a burst of energy that moves the hair cells at that point. This, in turn, sends an electrical impulse through the cochlear nerve to the brain. Thus, the cochlea sends the raw data that the brain must process, analyze and interpret. This neural processing is incredibly fast and accounts for our ability to detect the source of a sound.

Pinpointing the location of sound

Several basic factors account for our ability to pinpoint a given sound with surprising accuracy, particularly if it is broadband sound.^{1,2,3,4,5}

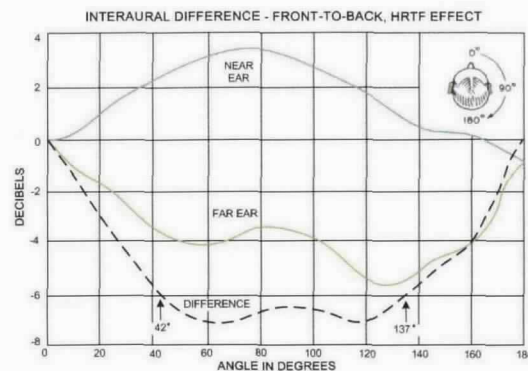
The anatomy of the outer ear and the fact that there is an ear on each side of the head allow us to capture subtle differences in sound that provide the cues for locating a sound source. These cues are interaural time differences (ITD), interaural intensity differences (IID), and head-related transfer function (HRTF)

In fact, the exit signs above doors and along egress routes required by building and life safety codes do not always seem to help people find their way out during an emergency. This behavior has been explained in terms of an established psychological concept known as “learned irrelevance,” which occurs when someone is continually exposed to a stimulus but rarely needs to respond.¹

To demonstrate this concept of learned irrelevance, 500 people chosen randomly as they left a large, busy store with 14 emergency exits were asked by experimenters from the University of Ulster at Jordanstown, Northern Ireland² (UUJNI) if they noticed any emergency exits in the store and, if they did, how many. After answering the questions, they were asked to identify the exits on a floor plan of the store. Significantly, 75.2 percent did not notice or identify any of the emergency exits.

Several human behavior studies have also demonstrated that occupants evacuating a building during an emergency will leave by a route they know. These studies, which were conducted with fire survivors and through observation of evacuation drills, consistently showed that other emergency exits are largely

Figure 3



THE CURVES SHOW THE VARYING LOUDNESS-LEVELS AS A SPEECH SOURCE IS ROTATED AROUND THE HEAD. ALTHOUGH THE DIFFERENCE AT 42 AND 137 DEGREES IS IDENTICAL, THE SOUND QUALITY DIFFERS BECAUSE THE HEAD AND OUTER EAR DISTORTS THE SOUND DIFFERENTLY WHEN COMING FROM THE FRONT OR BACK. (SOURCE: HEARING ITS PSYCHOLOGY AND PHYSIOLOGY, AMERICAN INSTITUTE OF PHYSICS)

ignored or underused.^{2,3,4} Although it could be argued that this phenomenon is more likely to take place in buildings where most occupants are unfamiliar with the premises, such as a

The concept of ITD can be explained in terms of sound waves traveling to your ears. The crest of each sound wave will reach the nearer ear before it reaches the ear on the far side of the head (see Figure 1). Thus, a subject listening for the sound will tend to place the sound source toward the side of the first wave crest to arrive at the ear.

In IID, a difference in intensity occurs at both ears of a stationary listener presented with pure tones of sound to one side, as one ear is shadowed by the head (see Figure 2). As a result, the two ears perceive a significant difference in loudness. At very low frequencies, the shadow of the head has no impact, and there is no perceptible difference in sound. At frequencies above 5000 Hz, however, the difference in perception of loudness between the two ears is as great as 30 dB. With complex sounds such as speech, music, and broadband sound, there is not only the difference in loudness and intensity but also a change

in the sound spectrum, as high frequency components are lost to the ear on the far side of the head.

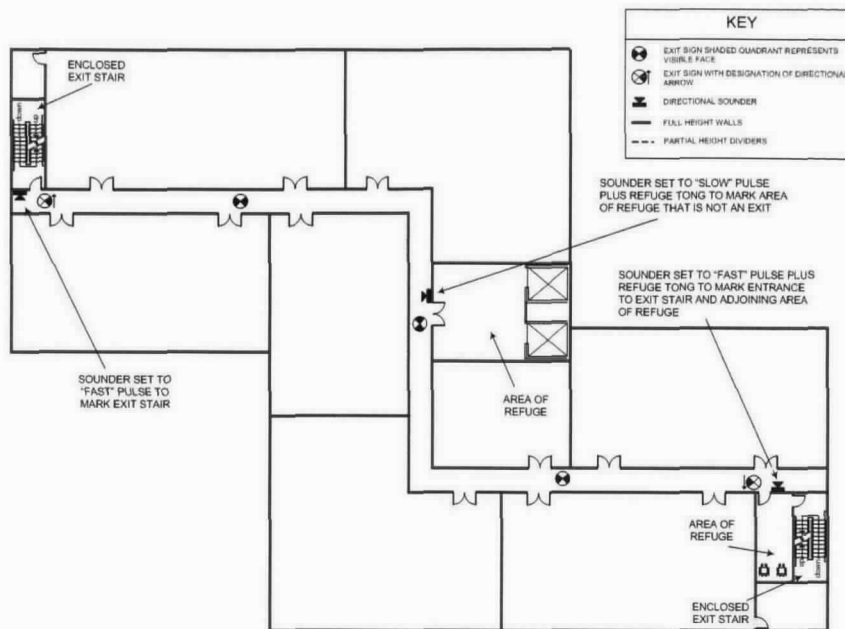
Withington¹ and other sources^{4,5} note that intensity and timing differences can result in errors in localization for the listener when narrow band or single frequencies sounds are used. However, confusion of this sort almost never occurs with broadband sources and sound durations that are long enough to allow listeners to move their heads.⁵

The external ear is key to the head-related transfer function (HRTF). The shape of the ear attenuates some frequencies and amplifies others, filtering the sound field as depicted in Figure 3. The HRTF changes depending on sound source location, providing an additional localization cue that is particularly important in determining whether the source is in front of or behind us. HRTF operates over a range of frequencies, but seems to be most effective in the 5,000 Hz to 10,000 Hz range. Combined with the listener's head motion,

HRTF provides an independent localization method that complements and reinforces ITD and IID capabilities.

While these three cues provide complementary and redundant means for locating sound, a fourth psychoacoustic phenomenon ensures that too many sound waves resulting from highly reverberant spaces do not cause confusion. This is attributable to the “precedence effect.” The ear can discern and fixate on the first sound it receives and disregard later signals, or reflected sound. The signal arriving first suppresses the ear's ability to hear other signals, including reverberation, that arrive up to about 40 milliseconds after the initial signal. A pulsing broadband directional signal makes good use of the precedence effect and can compensate for less-than-optimum listening conditions. Even in highly reverberant spaces, in which every surface was sound reflective, test subjects have had no problem determining the location of directional sounders.

Figure 4



museum or a mall, people who work or live in a building may be just as likely to exhibit this behavior, particularly if they don't use alternative means of egress in their daily routines.

As a result of their work, the team from UJUNI suggested that "any new form of signage must not be susceptible to learned irrelevance, and the only way to ensure this does not happen is to have a secondary signage come into play only when an evacuation is necessary." Directional sound, which offers an "attention-capturing ability" that extends beyond the line of sight by engaging the sense of hearing to help localize exits, is intended to operate only in conjunction with the fire alarm system during an evacuation, thus satisfying the UJUNI scientists' suggestion that secondary cues come into play only when an evacuation is necessary.

Compatibility with traditional systems

Figure 5 compares the spectrum of a typical fire alarm signal at a high setting with that of the directional sounder at a lower power setting. Note that, while the typical alarm signal clearly dominates at 3,000 hertz (Hz) and, to a lesser extent, at upper harmonics, the broadband sig-

nal of the directional sounder is 20 to 30 decibels (dB) louder than the fire alarm over most of the range. Nonetheless, both alarms are audible. Directional signals do not actually have to be higher in overall sound pressure level than traditional alarm signals because traditional alarms only mask a narrow range of frequencies near its dominant pure tones.

The situation is different with voice evacuation systems. Directional sounders can reduce the intelligibility of voice evacuation system speakers when they are in close proximity to voice speakers. Until further work is done, it is generally best if the two systems do not operate simultaneously in the same environment. If simultaneous operation of voice evacuation speakers and directional sounders is to be implemented, however, System Sensor's *ExitPoint Directional Sound Application Guide* will help reduce the effects of the directional sounders on the intelligibility of voice speakers.

Influence on human behavior

Research experiments have shown that the psychoacoustic response to directional sounders lessens the time people need to search for and use egress routes and exits. While these experi-

ments were conducted primarily on passenger ships and ferries, the results are broadly applicable to evacuation and relocation scenarios in buildings.^{7, 8, 9, 10, 11}

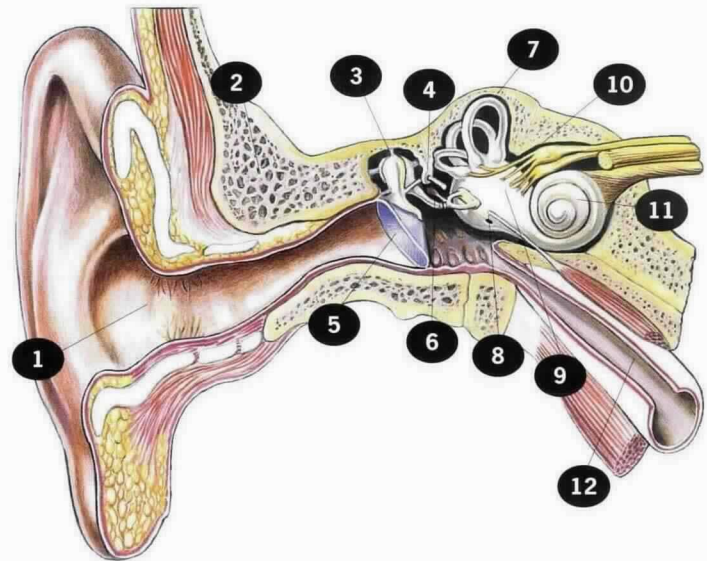
The various trials involved numerous scenarios, such as evacuations with and without directional sound, evacuations with low-visibility conditions created by theatrical smoke, and evacuations in a variety of room and corridor arrangements. In several cases, directional sound was compared to low-location photoluminescent lighting, as well.

In smoke-filled scenarios where exit signs could barely be seen or could not be seen at all, directional sound provided cues that significantly reduced the time subjects needed to find the nearest exit without retracing their steps. The egress behavior of subjects in normal visibility did not show the same extent of improvement in egress times, but subjects indicated that the sound cue acted as a confirming aid in finding the exit.

A more dramatic result was evident in evacuation trials in which subjects were briefed on the meaning of the directional sound. In these trials, the subjects consistently performed better at finding the closest exit and exhibited faster exit times.

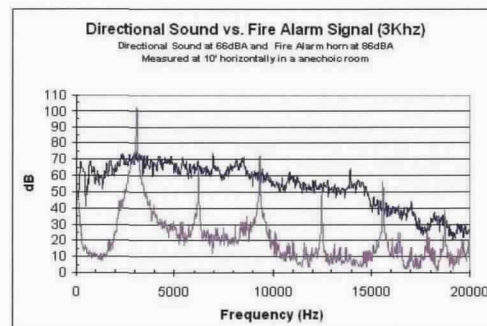
However, directional sound may not be of great use in all occupancy types. For example, hospitals may not benefit significantly from directional sound because hospital evacuation training relies on the staff to implement protect-in-place or relocation procedures before evacuating patients. In addition, required fire drills typically keep hospital staff well acquainted with the locations of exits and refuge areas.

The benefit of directional sound in smoke filled or limited visibility conditions is apparent as a result of the work that has been done in simulated smoke filled conditions. In the case of sprinklered buildings, full-scale fire tests have demonstrated that sprinklers will significantly limit the smoke toxicity and visibility hazard.¹² Consequently, for sprinklered buildings an emphasis on smoke filled or smoke obscured egress routes is far less a concern than for buildings without automatic sprinklers. However, given that adding directional sound to a building's fire alarm system is estimated to be only a 4 to 8 percent additional cost, it is worth considering for a variety of occupancies. Directional sound should also be considered for use in evacuations during emergencies other than fire, such as tornadoes, earthquakes, and hazmat spills.



- | | |
|------------------|------------------------|
| 1. Ear Canal | 7. Semicircular canals |
| 2. Temporal bone | 8. Round window |
| 3. Malleus | 9. Vestibule |
| 4. Incus | 10. Vestibular nerve |
| 5. Eardrum | 11. Cochlea |
| 6. Stapes | 12. Eustachian tube |

Figure 5



Education and training important factors

Just as we have all learned that red means “stop” and green means “go,” people in buildings with directional sounders will have to learn what the signals mean and how to react to them. Although some research appears to show that people will intuitively react to directional sound, we should not assume they will. Building managers, safety directors, and others responsible for emergency evacuation procedures should be aware that training and education increase the effectiveness of directional sound installations. 🔥

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ACHIEVING CODES AND STANDARDS RECOGNITION

ALTHOUGH DIRECTIONAL SOUND technology is a recognized and accepted technology in other countries, System Sensor considered it important to obtain independent North American expertise to review the technology and help develop an application guide. To lead this effort, System Sensor chose Schirmer Engineering Corporation because it had the appropriate combination of technical fire-alarm-system design expertise and practical experience in designing and developing life safety concepts for a wide variety of buildings and occupancies.

Currently, ULI, Factory Mutual, and the California State Fire Marshal has listed or approved System Sensor's directional sound product.

When a new fire-safety technology arrives in the marketplace, it can be expected that the NFPA standards-development process will play an important role. In collaboration with the National Electrical Equipment Manufacturers Association (NEMA) and the American Fire Alarm Association (AFAA), System Sensor submitted technical data and proposals to the NFPA 72®, *National Fire Alarm Code*®, technical committee for evaluation. This committee is responsible for developing installation and application rules for fire detection and notification systems. Without review and consideration of the diverse volunteer experts of the NFPA 72 committee, it would be more difficult to gain widespread recognition and accep-

tance of a new technology such as directional sound technology.

In January 2005, three different technical committees evaluated several of the proposals NEMA and AFAA submitted, concentrating on notification appliances, maintenance, and protected premises systems. The committees' deliberations are available for review in the Report on Proposals, which provides the formal record of their actions.

At this time, the directional sound proposals have been accepted with various technical revisions or additions. Any public comments NFPA receives may result in further refinements during the next phase of committee deliberations, the results of which will then be published in the Report on Comments.

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By Carl H. Rivkin, P.E.

Hydrogen

and the new energy infrastructure

IN THE LAST FEW YEARS, a significant amount of media attention has been given to the developing use of hydrogen as a fuel that could replace the hydrocarbon fuels currently used to power vehicles and produce electric energy. Since President Bush's explicit discussion of hydrogen as a vehicular fuel in his 2003 State of the Union address, one of the most concrete developments occurred this March. The U.S. Department of Energy announced then a multimillion-dollar partnership with a group of automakers and energy companies to develop and build hydrogen fuel cell vehicles, possibly mass marketing them within 15 years.

Hydrogen has been around for a long time. When atoms were first formed, 300,000 years after the Big Bang, according to John S. Ridgen's *Hydrogen: The Essential Element*, 92 percent of the universe was composed of hydrogen. Today, 15 billion years later, approximately 90 percent of the universe is still made up of hydrogen, which demonstrates how prevalent it is and, on the grand scale of things, how little changes.

On the smaller scale of events, however, things are changing, and interest in hydrogen is growing. >>

Illustration By **David Brinley**



H_2

H_2

H_2

e^-

H^+

H_2O

O_2

BB

Hydrocarbons are chemical compounds that consist of hydrogen and carbon, and hydrocarbon fuels are hydrocarbons with burning characteristics that produce energy in a useful form. Gasoline, heating oil, and airplane fuel are all mixtures of hydrocarbons. When hydrocarbons are completely consumed in a combustion reaction, they produce carbon dioxide and water. Most combustion reactions are not complete and produce a variety of chemical byproducts, most of which are air pollutants, including carbon monoxide. These air pollutants and the carbon dioxide produced in complete combustion have an adverse effect on public health and the environment, contributing to global warming.

Hydrogen can be used as fuel in internal combustion engines, but its most promising applications appear to be as a fuel that feeds fuel cells to produce electricity.

Data from the American Lung Association for the State of California demonstrate the dramatic impact air pollution has on public health. A recent association report states that in 2002, there were approximately 6,500 premature deaths attributed to air pollution. To put this number in perspective, the total number of fire deaths in the United States for 2002 was approximately 3,500. Nationally, the number of premature deaths is far greater than 6,500, but it is difficult to estimate. A National Center for Environmental Health study estimates that approximately 120,000 people died in 2000 from chronic obstructive pulmonary failure and approximately 9 million people were diagnosed with chronic bronchitis. Air pollution contributes to both of these diseases.

According to the U.S. Environmental Protection Agency 2005 study of emissions and pollutants, the primary source of air pollution nationally is hydrocarbon combustion, and the largest source of hydrocarbon combustion emissions is motor vehicles. In California, the number of vehicle miles traveled per year is rising, the length of the average commute is rising, the average vehicle speed is dropping, and the number of vehicles registered is increasing. These patterns are probably similar in other large urban areas. Despite the increased pollution control on vehicles and

cleaner gasoline and diesel fuels, these trends indicate that the public health effects of air pollution will increase.

In addition, the supply of available hydrocarbons may be limited. According to the U.S. Department of Energy, the U.S. already imports most of the hydrocarbons we consume, which places the country at some risk of not having enough fuel.

All of these factors have made the search for a replacement fuel especially pertinent over the last 20 to 30 years. And hydrogen has shifted to the center of this search for a variety of reasons.

Physical properties of hydrogen

First, hydrogen burns without producing any hydrocarbon pollutants because it contains no carbon. Second, hydrogen combined with oxygen and run through a fuel cell produces nothing but electricity and water. And third, hydrogen can be produced by running electricity through water. Hydrogen and electricity are almost interchangeable. And fourth, large amounts of hydrogen can be stored but large amounts of electricity can't be stored.

Hydrogen is the element with the least mass and, in its gaseous form, is the lowest density gas. Because of its low density, it disperses rapidly upwards if released.

Hydrogen does present safety problems. It cannot be odorized, and it burns with a flame that may be difficult to see. It requires very little energy to ignite a hydrogen cloud that is in the flammable range. And because it has such a low gas density, hydrogen must be compressed to extremely high pressures to store in usable amounts. Perhaps the biggest problem with hydrogen as replacement for hydrocarbons fuels, however, is producing it. But before we discuss production, it is important to understand how hydrogen would be used.

Hydrogen fuel cells and their applications

Hydrogen can be used as fuel in internal combustion engines, but its most promising applications appear to be as a fuel that feeds fuel cells to produce electricity.

A fuel cell is an electrochemical "device" that continuously converts chemical energy into electrical energy and some heat for as long as fuel and oxidant are supplied. This means that as long as hydrogen or another fuel and an oxidant, typically oxygen, are supplied to the fuel cell, the fuel cell will produce electricity.

Although fuel cells present significant chal-

enges to widespread implementation, they offer significant advantages over internal combustion engines. The fuel cell—or, more accurately, a set of fuel cells called a stack—would power an electric motor. Vehicles would be cleaner, quieter, and, because several mechanical and hydraulic systems that are required on a vehicle with an internal combustion engine but not on an electric vehicle can be eliminated, more reliable.

Fuel cells are typically much more efficient at converting input energy into useful work than internal combustion engines, too. Automobile internal combustion engines convert a large amount of the input energy into waste heat that is dumped into the environment. Automobile internal combustion engines function in the 20-to-30-percent conversion range, while fuel cells can function in the 70-to-75 conversion range.

However, fuel cell technology that could power vehicles and meet consumer demands is relatively new, which means that costs are high and the technology for long-term reliability of fuel cell systems is being developed.

Types of fuel cells

The fuel cell was developed by William Grove in 1839. Since that time, several different types of fuel cells have been developed, including the molten oxide fuel cell, the solid oxide fuel cell, the molten carbonate fuel cell, the alkaline fuel cell, the direct methanol fuel cell, the phosphoric acid fuel cell, and the solid polymer fuel cell. Each used different fuels and oxidants under different operating conditions that provided advantages in efficiency and ease of operation for specific applications. The design that appears to have the best chance of success in vehicles is the proton exchange membrane fuel cell (PEMFC).

Like other fuel cells, the PEMFC operates when hydrogen and oxygen react in the presence of a catalyst to produce electricity. The cell consists of two catalyst-coated electrodes between which is located a plastic membrane. The catalysts are typically platinum-based materials dispersed over a carbon support structure that provides a large surface where the required reactions take place. The catalyst at the anode, or positively charged electrode, induces the production of protons or H⁺ ions when hydrogen is fed into the anode side of the cell and oxygen is fed into the cathodic side of the cell. Ionizing the hydrogen atom

also creates electrons, or electricity. The H⁺ flow toward the cathode, or negatively charged electrode, and the electrons flow back toward the anode. When the protons flow toward the cathode, they react with oxygen to form water. The PEMFC is not the most efficient fuel cell, but it is reliable and allows flexibility, characteristics that result in lower costs.

An individual cell does not produce much electricity, but cells can be stacked to produce the energy required for the specific application. Stacking fuel cells gives them the flexibility to be used in many applications, from powering a cell phone to providing the electricity required to operate a large building.

Hydrogen production

Most hydrogen is produced by steam reformation of methane, a process that consists of breaking the hydrogen (H₂) molecule off of the methane (CH₄) molecule. There are several problems with this process. First, is that the hydrogen is produced from a hydrocarbon feed material that is in short supply. Second, the process produces carbon dioxide, an air pollutant that has to be captured.

Hydrogen can also be produced in a variety of other processes that do not use hydrocarbons, including wind farms, biomass systems, nuclear power plants, and solar cells, which produce hydrogen through a process called electrolysis. In electrolysis, electricity is run through water, which separates into hydrogen and oxygen. This is a reversal of the energy production process in which hydrogen and oxygen are converted into electricity and water.

There are also other techniques for splitting hydrogen off of other materials. Coal gasification, the conversion of coal to a hydrogen rich gas, may be a way to produce large amounts of hydrogen while renewable and other technologies are developed. If hydrogen is used on a widespread basis, it is likely that several of these production techniques will be employed, based on what is most cost-effective at the location where the hydrogen is to be consumed.

Hydrogen safety issues

Hydrogen burns in a concentration range from 4 to 74 percent, and it takes very little energy to ignite. However, it is primarily the lower end of the flammable concentration range that is a safety concern. Because of hydrogen's extremely low density, it disperses rapidly

upward and is thus unlikely to accumulate in concentrations in the flammable range, much less the upper end of the flammable range, unless a release is contained.

Although hydrogen can act as an asphyxiant simply by displacing oxygen, it is not toxic. And because it is difficult to contain, it is not likely to present an asphyxiation hazard in most applications. However, hydrogen cannot be odorized for most applications because the odorant poisons fuel cell catalysts. For applications where the lack of odorant presents a safety concern, hydrogen detectors can be used.

Hydrogen can embrittle piping and storage materials, eventually leading to cracks in the metal. One mechanism for hydrogen embrittlement involves the movement of protons from hydrogen atoms to the locations in the metal under the most stress, thus reducing the metal's strength and deforming it at these locations. Hydrogen embrittlement is usually dealt with by carefully selecting materials and operating conditions.

Hydrogen may also be used at high pressures. The potential energy in a high pressure storage system presents a hazard independent of any hazardous characteristics of the material being stored. Metal hydride storage systems, that operate at relatively low pressures, are being developed to allow for more hydrogen to

be stored at lower pressures.

Another other safety issue associated with hydrogen is its small molecular size, which makes it difficult to keep hydrogen in systems using traditional gaskets and seals, especially when it is stored at very high pressures. Leaks and lost fuel are issues, as well. Burning hydrogen in conventional internal combustion engines is possible, but it burns at very high temperatures and requires exhaust gas (steam) recirculation. Because of embrittlement issues, it can damage stressed engine parts.

Hydrogen regulations and codes

Hydrogen is regulated as a hazardous material by the U.S. Department of Transportation and is subject to many requirements found in 49 Code of Federal Regulations (CFR) Parts 100-185, hazardous materials regulations. Hydrogen is also regulated under OSHA's hazardous materials regulations, 29 CFR Part 103. The OSHA material is extracted from the 1973 editions of NFPA 50A, *Gaseous Hydrogen Systems at Consumer Sites*, and NFPA 50B, *Liquefied Hydrogen Systems at Consumer Sites*.

Several NFPA codes and standards cover the use of hydrogen and hydrogen technologies, including the 2005 edition of NFPA 55, *Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Contain-*

HYDROGEN SAFETY SYMPOSIUM

Hydrogen Safety Symposium is part of the *World Safety Conference & Exposition*® in Las Vegas

THE HYDROGEN HIGHWAY is coming! This symposium will explore the safety issues associated with the fueling and storage infrastructure required for hydrogen vehicles.

Presentations include an overview of hydrogen vehicle technology, the regulatory framework for hydrogen, issues associated with fuel cells and their storage, and Chevron Texaco's experience in the design, permitting, and construction of hydrogen energy stations.

Monday, June 6
8 am—9 am

Hydrogen Technology and Safety
Carl Rivkin, NFPA

Why the growing interest in hydrogen technologies? This is an overview of the

physical properties of hydrogen and its hazards, hydrogen production and distribution, hydrogen applications, the general regulatory framework for hydrogen, and NFPA's hydrogen codes and standards.

9 am—10 am

Chevron Texaco's Experience in Building a Hydrogen Fueling Infrastructure
Earl Berry, Chevron Texaco Technology Ventures LLC

A consumer-friendly hydrogen infrastructure must be developed for the future hydrogen economy.

This presentation discusses some of the experiences Chevron Texaco has gained in the design, permitting, and construction of hydrogen energy stations.

10:30 am—12 pm

Fuel Cell Vehicle Issues

Anthony Eggert, University of California, Davis; Dr. Monterey Gardiner, California Fuel Cell Partnership

Through extensive research and development, automakers have engineered hydrogen vehicle systems that meet or exceed the safety requirements of today's conventional gasoline-powered vehicles. These technologies will be reviewed in the context of a hydrogen-based transportation system.

Tuesday, June 7
8 am – 9 am

Hydrogen Flame Behavior

William Houf and Bob Schefer, Sandia National Laboratories

ers, Cylinders, and Tanks, which covers hydrogen storage, handling, and use. NFPA 55 includes, as individual chapters, the 1999 editions of NFPA 50A, *Gaseous Hydrogen Systems at Consumer Sites*, and NFPA 50B, *Liquefied Hydrogen Systems at Consumer Sites*, both of which have been withdrawn.

The 2003 edition of NFPA 853, *Stationary Fuel Cell Power Plants*, expands coverage to fuel cells smaller than 50 kW, while the 2005 edition of NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, will be expanded to cover hydrogen, specifically hydrogen refueling. NFPA 52 will include a new chapter on hydrogen equipment and gaseous and liquefied hydrogen dispensing.

The 2003 edition of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, covers the repair of any such vehicle, including those using hydrogen. This document also covers multi-fuel dispensing operations, and the 2006 edition will reference NFPA 52 for hydrogen dispensing.

Electrical safety requirements for fuel cells can be found in Article 692 of the 2002 edition of NFPA 70, *National Electrical Code*[®], and the electrical classification of areas where hydrogen can be used or stored are found in the 2004 edition of NFPA 497, *Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Haz-*

ardous (Classified) Locations for Electrical Installations in Chemical Process Areas. Construction requirements for buildings storing hydrogen are found in the 2003 edition of NFPA 5000[®], *Building Construction and Safety Code*[®], while the 2003 edition of NFPA 1, *Uniform Fire Code*[™], contains hydrogen fire-safety operations requirements for several applications by incorporating material from NFPA 55, NFPA 52, NFPA 30A, and other documents.

We are seeing the very early pieces of what might one day become an energy infrastructure in which hydrogen plays a major role. Hydrogen-powered vehicles are already on the roads in several states, and several states have plans to develop a hydrogen infrastructure. The following years promise to be ones of major activity in the development of hydrogen technologies.

In an effort to increase the ease of use of NFPA's hydrogen safety requirements and ensure comprehensive coverage of hydrogen technologies, the NFPA Standards Council is considering a proposal to form a Hydrogen Technologies Technical Committee and placing all hydrogen safety requirements in a single document. This project will likely begin later this year. If anyone is interested in participating in this project, please contact Carl Rivkin (crivkin@nfpa.org).✉

CARL H. RIVKIN, P.E., is a senior chemical engineer with NFPA.

Sandia National Laboratories is carrying out a combined experimental and modeling program to characterize and predict the behavior of large-scale releases of hydrogen from high-pressure storage devices. In the experimental study, large-scale hydrogen flames were measured to characterize the dimensional, temporal, and radiative properties of ignited hydrogen jets.

9 am—10 am

Modeling of Hydrogen Flammable Clouds and Thermal Effects During Venting of Hydrogen Storage

Andrei Tchouvelev, Stuart Energy Systems Corporation

This presentation will discuss the results of CFD modeling of hydrogen

releases and dispersion outdoors when hydrogen storage is vented in real environment and the geometry of a hydrogen refueling or energy station. The model also assessed the potential thermal effects resulting from ignition of flammable hydrogen clouds, and the results were used to determine appropriate clearance distances for venting hydrogen storage.

10:30 am—11:30 am

Lessons Learned: Hydrogen Vehicle Refueling Station

Jonathan Weinert, University of California, Davis

This session will discuss the hydrogen fueling station located at Los Angeles International Airport, including its history, a technical and economic overview, the pro-

ject's timeline, obstacles the developers encountered, and a list of lessons learned.

11:30 am—12:30 pm

Transport of Hydrogen and First Responder Safety

William Chernicoff, Department of Transportation

Hydrogen has been successfully transported under existing U.S. regulations for decades. In order to meet the new demands of the hydrogen economy, several new technologies will have to be accommodated, and the safety community will have to be properly trained. DOT's Hydrogen Executive Leadership Panel and research plan are addressing both of these issues.

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By **Dennis W. Smith**

Must Fire Investigators Prepare a Written Investigation Report?

IN A WORD, NO. Not every fire investigation requires a written report. In fact, the decision to write one depends not on the requirements of NFPA 1033, *Fire Investigator Professional Qualifications*, as people frequently assume, but on the jurisdiction, the responsibility of the investigator, the purpose of the investigation, the client's desires, and the policy and practices of the employer. There's no requirement in NFPA 1033 to prepare a written report during an actual investigation or to perform any of the tasks listed in the standard.

Rather, NFPA 1033 lays out the job performance requirements (JPRs) that an individual must be able to do, not necessarily what he or she is required to do, identifying the duties, tasks, knowledge, skills, and performance evaluation criteria for the position of fire investigator in both the private and public sectors. While NFPA 1033 is not a training document in of itself, the "Requisite Knowledge and Skills" statements are used to develop the terminal training objectives for lesson plans and curricula. The scope, the purpose, and an explanation of JPRs are found in Chapter 1, "Administration," which clearly indicates that JPRs define what the investigator "must be able to perform in order to successfully carry out that duty."

Primary Use of Professional Qualification Standards

A detailed explanation of JPRs can be found in Annex B of NFPA 1033, which explains the development and application of the JPRs applicable to all the professional qualification standards for fire service positions, including firefighter, fire officer, and fire investigator. JPRs are primarily used to guide the development of training and certification programs, not actual investigations.

JPRs also lend themselves to any area of the profession for which a level of performance or expertise must be determined. For example, supervisors and employees can use JPRs during a performance evaluation, since the JPRs for a specific job define the tasks essential to perform the job, as well as the criteria by which to measure the completed tasks. Clearly, JPRs can be used to evaluate an investigator's performance in the field, but there is an important distinction to be made between applying JPRs for certification or training purposes and applying them to actual fire investigations.

Training and certification versus actual investigations

To be certified in accordance with NFPA 1033, a candidate is expected to perform all the tasks and successfully meet the performance requirements for a particular position. However, not all the duties and tasks described in the standard are necessarily performed during an actual investigation, nor would they be expected to be.

Section 4.1 of NFPA 1033 identifies the JPRs for the position of fire investigator, and the distinction between the application of JPRs for certification and training purposes and for actual investigations is explained in the section's annex. This annex provides that "JPRs define the tasks investigators must be able to perform to be qualified," which refers here to the use of NFPA 1033 for certification purposes. The annex also states unequivocally that it is not the technical committee's intent that any JPR be mandatory for actual investigations.

Though not a standard per se, NFPA 921, *Guide for Fire and Explosion Investigations*, is generally recognized as a standard of care for conducting fire and explosion investigations.

Finally, the annex explains that, in an actual investigation, the investigator applies the JPRs based on the needs of the investigation and the responsibility of the investigator. Collecting evidence, assessing injuries and fatalities, interviewing witnesses, and writing reports are among the tasks that are optional at an actual fire scene.

NFPA 921, *Guide for Fire and Explosion Investigations*, supports this. According to Section 1.3.3 of NFPA 921, it is up to the investigators, depending on their responsibility and on the purpose and scope of their investigation, to apply the appropriate recommended procedures to a particular incident. Though

not a standard per se, NFPA 921, *Guide for Fire and Explosion Investigations*, is generally recognized as a standard of care for conducting fire and explosion investigations.

If investigators are using the "team approach," for example, each investigator at the scene would only be responsible for the particular role he or she is assigned, such as photographer, evidence custodian, canine handler, or interviewer. It would not be logical or practical for each investigator to prepare a written report about the overall investigation. If an investigator has no code, statute, ordinance, law, policy, procedure, or authority directing that a written report be prepared, NFPA 921 says that one need not be prepared.

Section 1.3.4 also acknowledges that "time and resource limitations or existing policies may limit the degree to which the recommendations in this document will be applied in a given investigation." In some circumstances, this might include preparing a written report.

Once the decision has made to write a report, however, it must meet the performance requirements of the JPR, like all other tasks. The performance measures for written reports are found in Section 4.7 of NFPA 1033, which explains what an investigator must do to successfully complete his or her task. These duties include concisely presenting the findings of the investigation to individuals not involved in the actual investigation, expressing the investigator's opinion, and meeting the needs of the intended audience.

Frequently, jurisdictional or client reporting procedures only require oral reporting of observations, analyses, and conclusions. NFPA 921 addresses both written and oral reports, but it does not prescribe the specific format a written report should take.

However, NFPA 921 does address in Chapter 11 what a report required in accordance with the *Federal Rules of Civil Procedure* must contain. Among these requirements are a list of materials the investigator reviewed and the investigative activities he or she conducted; a list of opinions the expert expects to express at trial and the bases for those opinions; a list of the investigator's publications over the past 10 years; a list of expert testimony the investigator has given either at trial or in deposition in the last four years; and the compensation the investigator receives for his or her work.

These rules apply to both private and public sector investigators.

What other documents require

Another document that addresses written reports is *Fire Investigator*, published by the International Fire Service Training Association (IFSTA). *Fire Investigator* indicates that a written report is required only for certification purposes. It also distinguishes between the requirements for certification purposes and actual investigations, stating "to certify to NFPA 1033, fire investigators must be able to prepare a written report that documents the investigation they performed. However, in the actual performance of their duties in the field, whether or not the investigators are required to file a formal written report will be a matter of agency or company policy."

Fire Investigator also notes that reports "are generally required of investigators employed by public agencies, such as fire departments."

Reporting for the public sector is usually dictated by codes, state statutes, local ordinances, or department policy. Even where reports are required, however, the reporting methods are not standardized. Some codes only require that the basic incident information be recorded in codified, database-type reports such as the National Fire Incident Recording System (NFIRS),¹ while others require only that fires in certain "uses" be recorded.²

The *International Fire Code (IFC)* requires that a "record of fires occurring within the jurisdiction" be kept, but does not spell out any requirements for written reports by a fire investigator. Section 3 of the *IFC* notes that "reports may or may not be required of investigators employed in the private sector. This necessity is generally controlled by company policy, the entity on whose behalf the fire is being investigated or the judicial system."

ASTM E620, *Standard Practice for Reporting Opinions of Technical Experts*, also covers the "scope of information to be contained in formal written reports which express the opinions of the technical expert with respect to the study of items that are, or may reasonably be expected to be, the subject of litigation." Sections include requirements for descriptive information, pertinent facts, and opinions and conclusions.

A careful review of NFPA 1033 and other authoritative resources such as NFPA 921, IFSTA's *Fire Investigator*, and ASTM E620

clearly shows that a fire investigator is not required to prepare a written report for actual investigations. All agree, however, that once a decision is made to prepare a written report, that report must meet NFPA 1033's minimum requirements.

DENNIS W. SMITH is a senior fire expert with Kodiak Enterprises, Inc. of Fort Wayne, Indiana. He has been a member of the NFPA Technical Committee for Fire Investigations and is currently a member of the NFPA Technical Committee for Fire Investigator Professional Qualifications, responsible for NFPA 1033, *Professional Qualifications for Fire Investigator*.

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Endnotes

1. *Ohio Fire Code*, §1301:7-1-03, §(F)FM-102.4 Fire Records.

2. *New Jersey Fire Safety Code*, NJAC 5:18A-3.4 (c), Requires records in Life Hazard Uses.

NFPA 921 Fire and Explosion Investigations

Dennis Smith and Dan Churchward of Kodiak Enterprises, Inc. will present a two-day seminar on NFPA 921, *Fire and Explosion Investigations*, on June 4 and 5 at the NFPA World Safety Conference and Exposition® in Las Vegas. This seminar explains the procedures and guidelines for conducting safe, thorough, and effective investigations that enable you to determine fire origin and cause using NFPA 921, *Guide to Fire and Explosion Investigations*. The seminar will focus on administration, basic methodology, basic fire science, fire patterns, electricity and fire, appliances, legal considerations, spoliation, major fire management, origin and cause determination, and incendiary fires. For more information, visit www.nfpa.org.



By **Jennifer C. Berkshire**

The fire service faces the challenge of breaking language barriers and educating new immigrants, particularly children, on fire-safety behaviors.

fire prevention in any language

THE INCREASE IN IMMIGRATION is a hot-button political issue these days. According to the Census Bureau, 33.1 million immigrants currently live in the United States, accounting for 11.5 percent of the total population, and the trend shows no signs of stopping or even slowing down. While some Americans may be conflicted on whether or not to embrace the growing number of their new neighbors, the fire service has little choice: successful fire prevention efforts depend upon their ability to educate new immigrants, particularly children, on life-saving, fire-safety behaviors.>>

Illustration by **Dan Page**

NFPA has played a lead role in reaching out to immigrants, particularly the fast-growing Latino community.

"We need to look at the U.S. and at the demographic changes happening here," says Sharon Gamache, executive director of NFPA's Center for High-Risk Outreach. "We have a responsibility to make sure that we're inclusive of all people and that everyone can learn."

In recent years, NFPA has formed a partnership with the National Association of Hispanic Firefighters (NAHF) and has helped to develop a Spanish-language safety curriculum for use in elementary schools across the country.

"We've gone to 27 cities, from New York to San Francisco, to try to get the word out that fire prevention is of number one importance," says Ed Davis, president of the NAHF.

But for fire safety advocates in the field, getting that word out increasingly involves translating essential safety messages not just into Spanish, but into dozens of other languages, as well.

But for fire safety advocates in the field, getting that word out increasingly involves translating essential safety messages not just into Spanish, but into dozens of other languages, as well. It's a job that's as difficult as it is rewarding. Here's a look at some NFPA members who are on the front lines of an effort to teach fire prevention in a dazzlingly diverse country.

Fire prevention in any language

To understand the extent to which immigration is transforming the country, one need look no further than Sioux Falls, South Dakota. In a city of just 135,000 people, more than 65 languages are now spoken in the public schools. Sioux Falls' newest residents come from all over the world, says Dave Renli, a fire inspector and injury prevention specialist with the Sioux Falls Fire Department.

"We've got five major language groups:

Spanish, Russian, Bosnian, Oromo, and Nuer," he says, explaining that the last two are North African languages.

Immigrants are drawn to the area, says Renli, by a combination of active social service groups—the city is home to a large outpost of the settlement organization Lutheran Social Services—and the prospect of employment.

"Industry-wise, we're home to an incredible health system and to one of the largest meat-packing plants in the country. Basically, anyone who wants a job here can have one," says Renli.

Regardless of why immigrants choose Sioux Falls as their new home—whether they're fleeing civil wars or seeking economic opportunity—it's up to Renli and his colleagues to ensure that they can communicate with local personnel in the event of an emergency. Renli notes that he began to realize the seriousness of the problem constituted by language barriers more than a decade ago.

"We sent a survey out to our fire stations and asked them about the percentage of calls they were getting in which language barriers were a problem," he says. "At one station, half of the calls involved language problems."

So, Renli took matters into his own hands. He wrote up a list of six phrases that were mission-critical for emergency medical services personnel—such as "We're from the fire department" and "Where does it hurt?"—and sent them to 35 international embassies with a request for translation. Twenty-five of the embassies responded, and before long, the fire trucks in Sioux Falls were equipped with EMS cards in multiple languages.

Translating fire-safety messages into words that multiple cultures can understand involves more than finding the right terms for "smoke alarm." Witness the city's ambitious fire-safety training project: Sioux Empire Safety Village (www.safetyvillage.org).

When a Romanian family was burned out of its mobile home after a cooking fire, the fire department was able to secure the funding to create a powerful, physical tribute to the dangers of home fires. Beginning last summer, visitors to the Safety Village were able to take an audio tour of the facility, translated into the five major languages of Sioux Falls' immigrant communities.

"We'd like to do more languages," says Renli, "but it's an incredible amount of work. Even though the scripts were written to be

clear and concise, there aren't always similar words or concepts. When we translate them back into English, we're not necessarily happy with how it comes out."

While he may never have imagined that his work as a fire inspector would come with a side-specialty in languages, Renli enjoys the challenge of communicating with a multi-ethnic, multi-lingual community. And he has little patience with those who don't recognize the importance of overcoming language barriers.

"I hear people say that 'They need to learn English,' but if we do our research, we find that it takes four or five generations to assimilate," says Renli. "It's not reasonable for fire folk or anyone else to expect them to learn the language so quickly."

Breaking it down

Lieutenant Antiliano Estrella, a firefighter in Providence, Rhode Island, and a trainer for NFPA's Center for High-Risk Outreach, understands what it's like to live and work in a complex urban environment. Some 150 languages are spoken in the Providence public school system, and the city has a dense population of minorities, both African-American and immigrants from countries such as Portugal, Russia, Laos, and Guatemala.

"We have a lot of issues compared to smaller towns, and they all overlap," says Estrella. "This is a community with so many needs that fire prevention doesn't always seem important to them. They have to pay bills, pay rent, put food on the table. What we have to do is tie our fire prevention efforts to their needs."

It may sound like a complex assignment, but Estrella has managed to figure it out in two words: build trust. Fire prevention and education efforts cannot go anywhere in a city like Providence, he notes, before the people leading those efforts have done the hard work of building relationships with the people they seek to help.

"You can't just go to a church and say, 'We're going to hold a fire prevention training' and expect people to come," Estrella says. "No one will show up. I'm going to attend that church for six weeks before I even attempt to introduce new programs."

And once that relationship has been forged, says Estrella, the most important thing that safety educators can do is teach people from the relevant communities to train others. For

the past five years, the Providence Fire Department, working with a coalition of child advocates, has trained more than 800 mostly Spanish-speaking home daycare providers across Rhode Island.

"This is how we address the younger kids in the city," he says. "We train the home daycare providers and then they train the kids."

But before fire educators can do any of that, they have to understand the nature of the communities in which they're working.

"You have to break it down, and figure out: what's causing the highest number of fires?" says Estrella. While some fire departments have acquired the latest high-tech equipment to do that data analysis, Estrella and his colleagues did it the old-fashioned way: on paper. It took a long time, he notes, and the results were as surprising as they were productive.

"Cigarettes are a really big problem in some communities, while dumpster fires are an issue in others," he says. "In the Spanish communities, the issue is burns caused by cooking with oil. For the elderly population in high-rises, the problem is cooking and smoking."

Having that kind of knowledge has made him a much better fire educator, says Estrella,

NFPA and Navaho Nation

AS PART OF ITS continuing campaign to protect high-risk groups from fire, the NFPA is providing the Navajo Nation with 7,500 smoke alarms that will be installed in homes in eight Navajo Nation chapters in New Mexico and Arizona. According to a recent NFPA press release, the program is funded by the federal Fire Prevention and Safety Grant, part of the most recent Assistance to Firefighters Grant Program of the U.S. Fire Administration. The award will pay for top model, 10-year lithium battery smoke alarms, their installation, some equipment to install them, and elder fall and fire prevention training.

The project, a combined effort with the Navajo Nation Fire Department, includes implementation of NFPA's *Remembering When: A Fire and Fall Prevention Program for Older Adults*™ that focuses on fire safety behaviors and fall prevention. Each Navajo Nation chapter will teach this program to elders in their community. The grant also provides for the adaptation of the Remembering When program for First Nation elders throughout the U.S.

Training dates for Navajo Nation firefighters and other leaders were March 2-4 at the Holiday Inn in Gallup, New Mexico. Training included smoke alarm installation, use of a follow-up survey form, and basics to develop home escape planning.

According to a recent NFPA news release, "We are pleased that NFPA is working with us to reduce the incidents of fire damage and injuries in homes on the Navajo Nation," said Larry Chee, chief of Navajo Nation Fire and Rescue Services. "We know that along with the smoke alarms, the training program will have a great impact on saving lives."

NFPA and its Center for High-Risk Outreach have worked with the Navajo Nation on several other projects over the past decade, as well as helping to establish the Navajo Nation Interagency Fire Safety Coalition.

For more information, visit www.nfpa.org.

because he's able to tailor his message to specific groups of Providence residents.

"Once we broke it down, we had a much better picture of what the issues are that matter to people," he says.

Building alliances with immigrant and minority communities in Providence has also produced real dividends for the fire department, says Estrella.

"We were facing the closure of two fire houses because of budget cuts and the community backed us up," he says. "They turned out for candlelight vigils. That wouldn't have happened if hadn't take the time to build these relationships."

It's not enough to show a film and say: 'Practice your fire escape plan.' You have to figure out what's causing the fires and the deaths, and address those behaviors.

Mis Primeros Pasos

Ask Lieutenant Rene Alaniz of the McAllen, Texas, Fire Department how many children have died in fires there over the last 15 years and you'll get a quick answer: none. Alaniz is even quicker to point out the reason behind his city's strong safety record.

"We've got the program," says Alaniz, who serves as the fire department's public safety/public information officer.

The "program" is *Mis Primeros Pasos en Prevención Contra Incendios*, or *Mis Primeros Pasos*, for short, a Spanish-language version of NFPA's *Learn Not to Burn*® curriculum that teaches key fire safety behaviors to school-aged children. The impetus behind *Mis Primeros Pasos*, which means "my first steps (in prevention against fire)," came from Latino firefighters in East Los Angeles, California, says Alaniz.

"They wanted to implement *Learn Not to Burn* but there was a language barrier," he says.

Working in partnership with NAHF, Alaniz has become a veritable road warrior, traveling from city to city in the United States and Mexico, introducing teachers and

bilingual educators to *Mis Primeros Pasos*.

"At first, they're put off by the idea of a new lesson plan, but once we start the program and let them know that everything has already been done for them, they're really receptive," Alaniz says.

Back home in McAllen, which is just 6 miles (10 kilometers) from the Mexican border, the program is used in all of the elementary and private schools and even day-care centers.

"This is a high-risk population," says Alaniz. "We're so close to the border, there is a lot of poverty, many young people. We needed something in Spanish to address the problem."

While he feels a sense of personal pride about the success of *Mis Primeros Pasos* (he assisted with translation and even came up with the program's name), Alaniz anticipates that Spanish is merely the first of many languages into which fire prevention materials will have to be translated. He notes that soon after being introduced in Canada, *Learn Not to Burn* was translated into Canadian French for use in that country's sizeable Québécois community.

"People need to look ahead. If the immigrant population continues to grow and we have different cultures and languages, our materials need to reflect that," says Alaniz. "You need to be asking: 'What is my city going to look like 5 or 10 years from now?' The key is to do a community profile now, not wait until it's in hand."

A city-wide commitment

Joe Miranda, a commander with the Public Education Unit of the Chicago Fire Department, still recalls the sense of helpless frustration he felt as a firefighter working in that city's huge Hispanic community more than two decades ago.

"There were so many communication problems," he notes. "People didn't have a clue about fire safety. They had no idea that they needed two ways out, or that they needed smoke alarms. I chose public education to try to reach immigrants coming in from Guatemala, Honduras, Nicaragua, and Puerto Rico."

Today, Miranda is part of a major urban fire prevention success story. Structured programming, including *Mis Primeros Pasos* and *Learn Not to Burn*, has been implemented throughout the Chicago school system, sanctioned by the powerful office of the Chicago school board

president. Chicago is also the first city in the nation to offer a Senior Citizen's Academy where older adults from across the city are trained in fire-safety techniques. And whether the audience is very young or very old, notes Miranda, the goal is to provide them with sustained, targeted education.

"It's not enough to show a film and say: 'Practice your fire escape plan.' You have to figure out what's causing the fires and the deaths, and address those behaviors," he says.

The results have been dramatic, notes Miranda.

"Our fire deaths have gone down because of educational output. In recent years, our fire deaths were up as high as a 100; last year, we had 13 deaths. We've had documentation on the news from kids who've been educated through NFPA programming, then saved their family's lives. They knew who to call and how to get the family out of the house," says Miranda.

Part of the challenge for fire departments that work with diverse immigrant communi-

ties, Miranda argues, is addressing the philosophy of firefighting that still operates in many of the countries from which immigrants are arriving.

"Most firefighters in the home countries still have the mindset that they just put out the fires. They don't do the percentages to see what's causing the fire," he says. "They don't see that they can attack these fires with education."

Miranda acknowledges that dealing with a lack of knowledge about basic fire-safety information while trying to overcome language barriers may seem overwhelming to some fire departments. However, he has a simple solution: "Come visit us in Chicago. Speak to our public education people, and you'll get an idea of how to develop your programming. Then you can modify it to fit your community."

And if a trip to Chicago isn't in your immediate future, you can pay a virtual visit to Miranda and his crew at www.cityofchicago.org/Fire/Prevention/Prevention.html. ♦

HIGHEST RISK

IN AN AMBITIOUS campaign to protect high-risk groups from fire, NFPA is providing free of charge more than 21,000 smoke alarms with batteries that last for 10 years for home installation by fire safety officials in key high risk regions of the U.S.: Alabama, Mississippi, and the Navajo Nation.

According to an NFPA news release, the \$949,912 home fire safety program was awarded \$664,939 in federal Fire Prevention and Safety Grant funds as part of the 2003 Assistance to Firefighters Grant Program of the U.S. Fire Administration.

"Although home fire fatalities have been cut in half over the past quarter century, many in our population remain at grave risk from fire, and they need our help to overcome that risk," says NFPA President James M. Shannon. "Our goal with this program is to reduce the number of fire injuries and deaths in high-fire-risk communities in areas that our researchers have identified as top outreach priorities."

According to NFPA's national 2004 report, U.S. Fire Death Patterns by State,

Mississippi and Alabama had the highest average fire death rates in 1997-2001. Preschool age children and older adults have a home fire death rate that is roughly twice the national average. For adults ages 75 and over, the risk is three times greater; for those age 85 and over, the risk grows to four-and-a-half times the national average. NFPA is providing targeted fire safety training as part of this program to help preschoolers and older adults stay safer from home fires.

In addition to coordination of free home smoke alarm installations through participating fire departments, older adults in Alabama, Mississippi and the Navajo Nation will receive training sessions utilizing the safety methodology of NFPA's *Remembering When: A Fire and Falls Prevention Program for Older Adults*™ through senior centers as well as home visits. Under this grant, NFPA will also adapt the Remembering When program for First Nations (Native Americans) elders.

The grant also provides for more than

2,000 classrooms to receive the acclaimed *Risk Watch*™: Unintentional Injuries safety curriculum for implementation in preschool through grade 8 classrooms. Risk Watch is a comprehensive program that teaches children how to identify and avoid the leading causes of injury, including fire.

According to NFPA, there were 3,925 fire deaths in the U.S. in 2003; 80 percent of which occurred where people typically feel safest - their homes. NFPA has linked a lack of adequate home smoke alarm protection to increased fire deaths. In fact, even though 96 percent of homes have at least one smoke alarm, seventy percent of all home fire fatalities occur in homes with no smoke alarms or no working smoke alarms.

Participating communities were provided with safety ladders and installation equipment as part of the grant to help facilitate the smoke alarm installation component of the program.

NFPA will be analyzing the success of the campaign through interaction with participants and surveys.

SECTION NEWS

Stay informed of critical issues in your industry! In these pages, you'll find news and information affecting your industry and your career.

Architects, Engineers, and Building Officials

WEB SITE: <http://www.nfpa.org/aebo>

CHAIR: John Kampmeyer, Triad Protection Engineering Corp.

HOT ISSUES

Executive Board Member Takes Part in Federal Security Exercise

AEBO Executive Board Vice-President Sal Dicristina took part in a national security exercise from April 4 to 8 as part of his job as construction code official for Rutgers University in New Jersey.

The exercise, known as TOPOFF 3 (top officials), was the third in a series of Congressionally mandated, full-scale exercises designed to strengthen the nation's ability to prevent, prepare for, respond to, and recover from terrorist attacks. The first was conducted in May 2000, and the second occurred in May 2003 in Seattle and Chicago.

TOPOFF 3 used a series of exercises of increasing complexity to simulate a weapons-of-mass-destruction (WMD) campaign by terrorists, with simulated attacks in Connecticut and New Jersey. During the same week, the United Kingdom and Canada also conducted simulated incidents designed to coordinate and assess international response capabilities.

The scenario for New Jersey was a biological attack in Union and Middlesex Counties, located between Newark and Trenton, which is the most heavily populated and traveled corridor on the East Coast. Rutgers' Athletic Center and Hale Center were used as a point of distribution for pharmaceutical distribution.

In New Jersey, all acute-care hospitals, some non-acute-care hospitals, and thousands of volunteer "victims" participated, along with hundreds of emergency responders. Jay Kohl, executive director for Public Safety, headed the Rutgers effort.

Section to Sponsor Education Sessions, Events at WSCE®

AEBO will sponsor 15 education sessions and 2 section events at the 2005 World Safety Conference and Exposition® (WSCE®) in Las Vegas in June.

The educational sessions include:

Monday

9:30 A.M.—10:30 A.M.

Unique Interiors on the Las Vegas Strip

Building Department Innovation and Regional Consistency

11 A.M.—12 P.M.

Plan Review Backlog: Frogs in Crisis

Tuesday

8 A.M.—9:30 A.M.

Seismic Design of Sprinkler Systems

Adding Class to Hazardous Materials Classification

8 A.M.—11 A.M.

Managing Aging Fire and Life Safety Systems

10 A.M.—11 A.M.

Estimating Smoke Detector Response

11:30 A.M.—12:30 P.M.

Math for Code Officials

3:30 P.M.—5 P.M.

Large Building Fires and Subsequent Code Changes

Wednesday

10:30 A.M.—11:30 A.M.

Who Is My AHJ and Will He Stand Up?

Mitigating Earthquake Damage and Planning for Survival

2 P.M.—3 P.M.

Understanding Building Code Sprinkler Tradeoffs

2 P.M.—3:30 P.M.

How Fire and Building Officials Work Together to Achieve a Code-Compliant Project

4 P.M.—5 P.M.

Understanding and Testing Smoke Management Systems

4 P.M.—5:30 P.M.

Principles of Fire Code Enforcement Administration

Among the section events are the AEBO Executive Board dinner meeting, to be held on Saturday, June 4, from 6 to 9 p.m. in Palm C at the South Convention Center. NFPA Board Chair George Ockley will attend the AEBO Executive Board meeting, where section Board members will discuss their thoughts on staffing, training, and support products for NFPA 5000®, *Building Construction and Safety Code*®, among other subjects related to the section's interests.

The other section event is the AEBO general business meeting, open to all section members. This will be held on Sunday, June 5, from 5:30 to 6:30 p.m. in Mariners B at the North Convention Center. Members will elect an architect, an engineer, and a building official to the Executive Board at this meeting. The nominating committee will present a slate of candidates, but nominations may also be made from the floor. It's your section, so please make every effort to attend this meeting.

In addition, AEBO Board members and staff will be at the AEBO booth in the exhibition hall. Stop by and find out what new directions the Board is pursuing, pick up general information, or just introduce yourself.

The exhibition hall will be open on Monday from 3:30 to 7:30 p.m., on Tuesday from 12:30 to 3:30 p.m., and on Wednesday from 10:30 a.m. to 2 p.m.

Call for Volunteers

The Executive Board consists of three architects, three engineers, and three building officials, with a member of each profession elected every year to a three-year term. The current Board has worked very hard over the past few years to plan and run the programs at annual and fall meeting, staff the AEBO booth in the exhibition hall, and put together periodic newsletters and informational pieces.

The resulting growth in section membership has been spectacular, but the workload has begun to overwhelm the Board. AEBO Chair John Kampmeyer is asking for help.

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"We've been putting together some very good programs that have drawn a lot of interest and new members over the last few years, but we've really just started," he says. "It's our hope that more of the new members will come forward to get involved in planning, presenting, and taking active leadership roles in the section, as well. But if you can't commit that much time, we'd love to get your ideas for program topics or even a paragraph or two about something that would help you do your job better or faster."

The Executive Board desperately needs members to run for positions on the Board and to volunteer to help with various section programs and activities set up by the Board.

The time commitment isn't very large. There is a 3- to 4-hour Executive Board meeting and a 1½-hour general section business meeting annually at the WSCE, as well as a monthly 1-hour conference call. Additional volunteers are needed to participate 1 to 3 hours monthly, either on a conference call or on such items as newsletter articles and suggesting or contacting potential speakers.

With more than 4,200 members, the section's potential is unlimited, but we need your help. If you can volunteer a few hours a year, the rewards will be well worth it.

Please contact Allan B. Fraser, AEBO executive secretary, at afraser@nfpa.org or (617) 984-7411.

**HOW TO REACH US: Allan Fraser,
Executive Secretary, (617) 984-7411,
afraser@nfpa.org**

Aviation

WEB SITE: <http://www.nfpa.org/aviation>
CHAIR: Dennis Kennedy, P.E., Tyco Safety Products

HOT ISSUES

Committee Activities

The Helicopter Facilities Committee is revising NFPA 418, *Heliports*. Members met by teleconference to act on public proposals and to develop their own proposals. Since the committee received only

two public comments, members will again handle their business by phone. NFPA 418 is in the Fall 2005 revision cycle.

The ARFF Committee, which will meet during the week of October 24, is working on a revision of NFPA 414, *ARFF Vehicles*. The *Report on Proposals* will become available on June 24 and comments are due on September 2.

Three ARFF committee task groups are working on several issues, including ARFF vehicles built on commercial chassis; new vehicles to provide access to large aircraft, such as the Airbus A380 and the Boeing 747; and safe distances between aircraft and vehicles with booms that discharge extinguishing agents. These groups will report their findings at the October meeting.

The Aircraft Fuel Servicing Committee, which met in Reno, Nevada, last February, is revising NFPA 407, *Aircraft Fuel Servicing*, on the same schedule as NFPA 414. Since there didn't seem to be any particularly controversial issues, the committee is not planning to hold a meeting this Fall.

The 2004 editions of NFPA 405, *Recurring Proficiency of Airport Fire Fighters*; NFPA 408, *Aircraft Hand Portable Fire Extinguishers*; NFPA 409, *Aircraft Hangars*; NFPA 410, *Aircraft Maintenance*; and NFPA 422, *Construction and Protection of Aircraft Engine Test Facilities*, are now available on the NFPA web site.

**HOW TO REACH US: Mark Conroy,
Executive Secretary, (617) 984-7410,
mconroy@nfpa.org**

Building Fire Safety Systems

WEB SITE: <http://www.nfpa.org/bfss>
CHAIR: Neal Krantz, LCV Technologies, Inc.

HOT ISSUES

Vetrotech Saint-Gobain to Move to New Facility

According to a recent press release, Vetrotech Saint-Gobain, a manufacturer and distributor of fire- and safety-rated glass, will move its North American head-

quarters and manufacturing operations, currently located in Auburn, Washington, to a newly refurbished facility, also in Auburn. The company's entire product range will now be made in the United States.

**HOW TO REACH US: David Hague,
Executive Secretary, (617) 984-7452,
dhague@nfpa.org**

Education

WEB SITE: <http://www.nfpa.org/edsection>
CHAIR: Peg Carson, Carson Assoc., Inc.

Fire Corps: Citizen Support for Local Fire Departments

In today's world of increasing call volumes and complex new threats, fire departments are asking a common question: How do we handle daily administrative and support tasks while providing for the public education needs of the community with existing staffs? One answer is Fire Corps.

Launched in December 2004, Fire Corps is a program partner of Citizen Corps, President George W. Bush's grassroots effort to involve everyone in making communities across the United States safer, stronger, and better prepared for emergencies. Citizen Corps is a component of USA Freedom Corps, the President's initiative to encourage volunteer service and to promote a culture of service and citizenship.

What is Fire Corps?

Fire Corps is a partnership of the International Association of Fire Chiefs' Volunteer and Combination Officers Section (IAFC/VCOS), the International Association of Fire Fighters (IAFF), the National Volunteer Fire Council (NVFC), and the U.S. Fire Administration (USFA). Its mission is to help career, volunteer, and combination fire departments supplement existing providers by recruiting "citizen advocates."

Each group represents an important part of the fire service. As the lead federal agency, USFA provides oversight and direction, manages the funding stream, and is

actively involved in Fire Corps' National Advisory Committee. IAFC/VCOS, IAFF, and NVFC all have important roles to play, as well, be they in coordinating programs, developing technical resources, or promoting the program to their members.

Since each partner's constituents are different, the partners present the program to the fire service in ways that have the greatest impact. The benefits for an urban, all-career department will differ from those for a rural, all-volunteer department. Because Fire Corps is intended to assist all fire service organizations, cooperation among the partners in developing and distributing materials is important to its success.

Fire Corps' National Advisory Committee is made up of 15 public safety organizations, including NFPA, the Congressional Fire Services Institute, the Fire Department Safety Officers Association, the International Association of Arson Investigators, the International Association of Black Professional Fire Fighters, the IAFC, the IAFF, the International Fire Service Training Association, the International Society of Fire Service Instructors, the National Association of Hispanic Firefighters, the National Association of State Fire Marshals, the NVFC, North American Fire Training Directors, Volunteers In Police Service, and Women in the Fire Service.

The advisory committee's role is to provide strategic direction and help promote the program. Providing feedback from fire and emergency service providers as to what is and is not working and letting departments know about the program and its benefits are critical. The committee met for the first time in December 2004 and is scheduled to meet twice a year to review the progress and direction of Fire Corps.

How does it work?

Many fire and EMS departments already have community outreach programs or administrative volunteers. While the concept is not new, the campaign and the resources being made available to it are. Fire Corps will help fire departments expand programs they already have or help them create new programs by providing resources such as marketing materials, resource guides, a national database for listing departments, and peer connections to exchange ideas with other Fire Corps participants.

The centerpiece of the program is the Fire Corps web site, www.firecorps.org. From the web site, fire departments can register their programs, find other programs in their area, request resources, and sign up for peer-connection opportunities. All municipal and non-profit fire and EMS departments and affiliated groups can register.

Citizens can also use the site to search for Fire Corps opportunities at their local fire departments and to learn about the program. The process is easy. Once you log onto the site, all you need to do is click on "find a program" and search by state or your zip code and a mileage radius, and you will get a list of departments in your area. Clicking on the department will bring up the department's listing, which outlines the functions or services the department needs, the point of contact, the web address, and any documents the department may have uploaded, such as applications or brochures.

Who is a citizen advocate?

A citizen advocate is a member of the public who helps a department or organization by filling a non-operational or support role. While each program is different, the goal of Fire Corps is to involve people of all ages, backgrounds, and talents, without regard for disabilities.

In addition to the obvious benefit of the labor the citizens provide, there is the additional benefit of learning about each other. Generally, the public does not have a clear picture of what goes on in the fire and EMS services, and some things that providers take for granted may confuse the public. Conversely, emergency services do not always know the community they serve as well as they would like. Fire Corps can educate each group about the other.

The program is not intended to replace firefighters with Fire Corps citizen advocates. Rather, it means to free firefighters to accomplish the tasks they are primarily trained to do: fight fires and save lives.

What can a citizen advocate do?

The possible roles of citizen advocates are almost endless. Examples include administrative functions, life-safety education, fundraising, canteen services, public relations, and grant-writing.

A program in Florida might use citizen advocates to identify issues that arise during hurricane evacuations, including planning for people needing assistance and educating the public about hurricane survival. A program in California might use citizen advocates to identify brush that needs to be thinned before wildfire season or to educate the public about urban/wildland interface issues. And teachers anywhere might be involved in life safety education, expanding the number of people who hear the message of fire and life safety.

One advantage of the Fire Corps model is that individual fire departments define the roles citizen advocates will fill according to their needs. The roles are flexible, allowing for optimal use of the citizen advocates by the individual organizations.

Fire Corps and public education

One important role Fire Corps and citizen advocates can fill is that of public educator, which can be done in two ways.

The first is simple exposure of the community to the fire department through the program itself. Even if a department does not use citizen advocates in a public education role, their exposure to the fire and EMS services will allow them to see what goes on in the firehouse simply by being there. Understanding how a department works, learning what the hazards are, and seeing the results of incidents will educate citizen advocates, who can carry that message back to their neighbors.

The second, more direct way is by using citizen advocates to teach fire and life safety. Many fire departments would like to expand their public education efforts but do not have the personnel to do so. Using Fire Corps members as part of the education team allows departments to get an important message out to the public, and it lets advocates contribute to their communities by providing critical information that could save lives.

In addition to promoting public education, Fire Corps is teaming up with organizations such as the NFPA and the Home Safety Council to create resources for fire and EMS departments. Resources include a guide to recruiting citizen advocates and a summer day camp for kids to teach them about fire- and life-safety issues in a fun and relaxed environment.

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To learn more, visit www.firecorps.org or phone (202) 887-4809.

Section-Sponsored Sessions at WSCE®

The Education Section will sponsor several education sessions at the World Safety Conference and Exposition® (WSCE®) in Las Vegas in June.

Education 101

Education Section Board members will present the basics for planning, presenting, and evaluating a targeted public education program, emphasizing age-appropriate learning, emerging issues, and best practices.

Student-Housing Fire Safety— A National and Local Perspective

This program will address the alarming fre-

quency of fires, deaths, and injuries in student housing on and around the campuses of U.S. colleges.

Adolescents—Issues and Answers

Adolescence is a time unlike any other in life. Learn about the issues facing teens today and how best to approach them with fire- and life-safety information.

Developing Fire Safety Education Programs for People with Disabilities

This session will describe the elements of an effective fire-safety program for people who are blind or have low vision. It will include lessons learned while developing a new fire-safety program for adults with developmental disabilities.

Older Adults Safety— Tapping into the Network

Discover how partnerships can increase your ability to reach older adults. This presentation, co-sponsored by the Center for High-Risk Outreach, will feature the partnership between Unlimited Choices, a non-profit based in Portland, Oregon, that adapts and mends homes for older adults, and Portland

Fire and Rescue. It will also feature the implementation of NFPA's *Remembering When* by an Illinois state team.

Assessing the Impact of Residential Fire on Children: An Intervention Strategy Based on the Yale University Model

This session will discuss a community fire-fighting/policing program designed to give firefighters basic knowledge of child development to help them determine whether children at the scene of a fire need clinical intervention.

Before the section holds its regular business meeting, there will be a presentation on the journey to fire-safe cigarettes in Canada, where a new fire-safe cigarette law will go into effect on October 1. Learn how Canada passed this landmark law. The annual business meeting that follows will give you an opportunity to network and learn about section activities.

HOW TO REACH US: Judy Comoletti, Executive Secretary, (617) 984-7287, jcomoletti@nfpa.org

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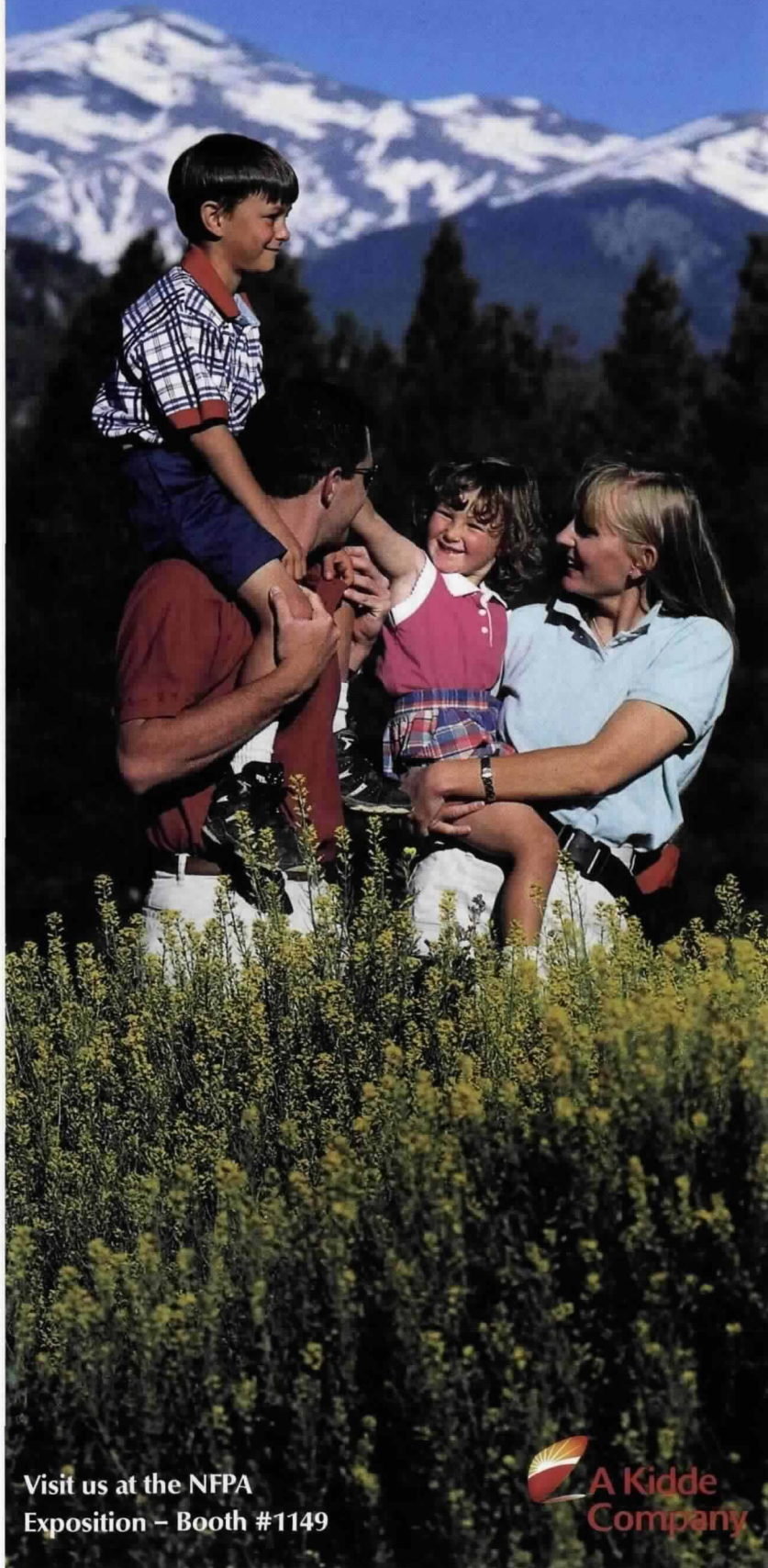
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Electrical

WEB SITE: <http://www.nfpa.org/electrical>

CHAIR: Paul Dobrowsky, Innovative Technology Services

Section-Sponsored Events at WSCE®

The section will sponsor several events at the World Safety Conference and Exposition® (WSCE®) in Las Vegas in June.

Monday, June 6

6:30 A.M.—7:45 A.M.

Electrical Section Executive Committee

8 A.M.—10:30 A.M.

Electrical Section Codes and Standards Forum

Tuesday, June 7

3:30 P.M.—5:30 P.M.

International Association of Electrical Inspectors Soares Grounding and Bonding

6 P.M.—7:30 P.M.

Electrical Section, *necdigest* Reception

Wednesday, June 8

10:30 A.M.—11:30 A.M.

Case Study: The Neiman Marcus Incident

HOW TO REACH US: Jeff Sargent,
Executive Secretary, (617) 984-7442,
jsargent@nfpa.org

Fire Science and Technology Educators

WEB SITE: <http://www.nfpa.org/firescience>

CHAIR: Patrick Kennedy, John A. Kennedy & Associates

Distance-Learning Programs

by **ROBERT M. GAGNON, P.E.**

The Fire Science and Technology Educators Section has been newly revitalized, with membership growing and participation very strong. We welcome our new members and encourage you to visit us at our booth at the World Safety Conference and Exposition® (WSCE®) and to let us know if you want to participate in the section leadership. You can keep up-to-date on section news by visiting www.NFPA.org/firescience.

A relatively recent and very encouraging trend in fire science education is the growth of distance-learning programs conducted by schools and universities and by organizations representing the sprinkler and fire protection

industry. Among these are the American Fire Sprinkler Association and the National Fire Sprinkler Association, which have conducted distance-learning programs for some time, and the Society of Fire Protection Engineers, which is developing a number of programs aimed at practicing professionals, particularly fire marshals and code officials. The University of Maryland Department of Fire Protection Engineering has also launched a distance-learning program for those interested in a Master's degree in fire protection engineering, and Worcester Polytechnic Institute has a very successful Master's program in fire protection engineering. Many other distance-learning programs are in full swing or are being developed.

Distance-learning programs make fire science and fire protection engineering education accessible to students and professionals throughout the world, and the expansion of these programs will help vitalize our profession, allowing us to keep up with the demand for fire science professionals.

Robert M. Gagnon, P.E., is the principal of Gagnon Engineering in Woodbine, Maryland.

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Section-Sponsored Events at WSCE®

The Fire Science and Technology Educators Section will sponsor several events at the World Safety Conference and Exposition® (WSCE®) in Las Vegas in June.

Tuesday, June 7

1:30 P.M.—2:30 P.M.

Fire Science and Technology Educators Section Business Meeting

Wednesday, June 8

4 P.M.—5 P.M.

Case Study: Hazardous Materials in the British Virgin Islands—Keeping Up with Development

HOW TO REACH US: Frank Florence, Executive Secretary, (617) 984-7480, fflorence@nfpa.org

Fire Service

WEB SITE: <http://www.nfpa.org/fireservice>

CHAIR: Terry Allen, Chief, Cambridge, Ontario, Canada

Similarities Across the Pond

by DAVID KENNEDY

Although the fire services of the United Kingdom and the United States are funded very differently, it would seem that they experience similar problems.

Recently, the U.K. government, through their local authorities (LAs), announced the fire services' funding levels. The LAs are responsible for passing the money onto the chief officer and his or her management team to fund their day-to-day costs and development programs. Alterations at a local level are set in precepts from the fire service managers, and the local politicians are given stewardship on behalf of local taxpayers.

Needless to say, there are some significant shortfalls between the funds required and those made available. Some LAs are more generous in supporting the fire service than others, so spending on public safety can vary depending on the community. Given that there are more than 50 fire and rescue services in the U.K., the spread of levels of service is very large.

I am always amazed how some financial officials, be they national or local, suspect chief officers of overestimating their needs.

Perhaps this was the case in the past, but I am unaware of any current chief who would see the sense of trying to prosecute such a policy in the present financial climate. It is apparent to professional firefighters that resources are stretched and that optimum levels will soon be passed, given the public's growing expectations. And attempting to second-guess a professional fire officer is a very dangerous thing for an official, who is not an expert in the field, to do.

What, then, is the answer?

As a chief officer, I have long told local and national government officials that the only organisation equipped to respond to incidents at any time of day throughout the year is the fire service, which can deploy large numbers of personnel in most major incidents in under 30 minutes. No other organisation can provide such a commitment and respond to routine demands from the public for assistance at the same time.

Unfortunately, opinion seems to be that a crew of four on any first-responding fire apparatus in the U.K. is safe and adequate on all occasions, despite the fact that in-depth research by experienced fire officers has raised serious concerns about underestimating the risk involved. In my own experience, a first-response staffing level of five—above the national guidelines of four—can contain a fire under normal circumstances 89 percent of the time.

However, the changing demand in firefighters' skills challenges even this level of crewing. The duties of first-arriving crews and their back-up are crucial to a successful conclusion. Reducing the number of personnel carrying out these duties threatens the safety of the public and the lives of firefighters.

Governments are badly served by advice that supports a lower number of personnel responding in first-arriving apparatus.

We must demonstrate to generally supportive local authority politicians that times and demands have changed and that they can properly protect their communities and firefighters only by ensuring that emergency services are crewed at a safe level. To take any other course will lead to an event that will cost public or firefighter lives, and it will have occurred during their stewardship.

It is up to fire service managers to uphold their professional status and that of their personnel against the resistance of local of

national government officials, even if they suffer uncomfortable challenges. Some issues are worth protesting. Those not competent or tenacious enough to advance public protection in the face of political or fiscal challenges should step away from the front line. The public and firefighters deserve such loyalty from a chief officer.

The control of any rescue service must be in the hands of those who understand the danger of committing emergency workers to untenable situations to protect lives.

HOW TO REACH US: Gary Tokle, Executive Secretary, (617) 984-7490, gtokle@nfpa.org

Health Care

WEB SITE: <http://www.nfpa.org/healthcare>

CHAIR: Susan McLaughlin, SBM Consulting

Chair's Corner

This year, two organizations of importance to the health-care industry meet in a significant way. The two organizations are NFPA and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).

JCAHO has supported health-care compliance with NFPA 101®, *Life Safety Code*®, for many years. Hospitals, long-term care facilities, and others have long had to demonstrate code compliance to achieve JCAHO accreditation, evaluating their facilities and planning improvements to bring deficiencies into compliance.

Historically, compliance documents and facilities have been inspected by JCAHO surveyors who are physicians, health-care administrators, or nurses are trained in the *Life Safety Code* and taught how to spot deficiencies. Although they have done a good job, everyone involved recognizes that, in many cases, code compliance is not their area of expertise.

This year marks the beginning of a new JCAHO program in which hospitals of 200 or more beds will be surveyed for compliance with the *Life Safety Code* by a *Life Safety Code* Specialist, a new JCAHO position. JCAHO has hired and trained about 50 specialists to work on a part-time basis. They were hired from the ranks of health-care facility management for their expertise in health care and their knowledge of the *Life Safety Code*.

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Each specialist will be in the hospital for one day of the survey, which usually lasts three days. Initially, they will interview staff to discuss the building layout and any interim life safety measures that must be implemented to compensate for deficiencies. They will also review building maintenance plans and tour the facilities to check for code compliance in in-patient buildings. Finally, they will review the maintenance of features of the emergency generator, and the fire protection and medical gas and vacuum systems.

The result is that larger hospitals will now be surveyed for compliance by a *Life Safety Code* expert who can provide peer consultation. As we gain experience with this process, we will have new insights that we hope will lead to hospitals that are even safer from fire. The Health Care Section applauds this new process.

As you read this, final preparations are being made for the World Safety Conference and Exposition® in Las Vegas. This meeting is especially significant as it is the first single annual NFPA meeting. It will also give you an opportunity to vote on the revision of the *Life Safety Code*.

Hope to see you there.

Events at the 2005 WSCE®

The following are highlights of section activities planned for the World Safety Conference and Exposition® (WSCE®) in Las Vegas in June:

Monday, June 6

11 A.M.—12 P.M.

Changes to *Life Safety Code*—Health Care

2 P.M.—3 P.M.

Nominating, Membership, LRP, *Bylaws*, and Info Task Group Meetings

Tuesday, June 7

7:30 A.M.—8 A.M.

Health Care Codes and Standards Review Task Group

8 A.M.—11 A.M.

Health Care Codes and Standards Review

11 A.M.—12 P.M.

Education Task Group

11:30 A.M.—12:30 P.M.

Upgrading Existing Hospitals Creatively Through New Construction Technologies and Code-Complying Assemblies

3:30 P.M.—5 P.M.

Health Care Section Town Meeting

Wednesday, June 8

10 A.M.—12 P.M.

Section Executive/Business Meeting

2 P.M.—3:30 P.M.

Wildfires and Health-Care Facilities

4 P.M.—5 P.M.

Emergency Preparedness—Family Assistance Center

HOW TO REACH US: Rich Bielen, Executive Secretary, (617) 984-779, rbielen@nfpa.org

Industrial Fire Protection

WEB SITE: <http://www.nfpa.org/industrial>

CHAIR: Mike Snyder, Dow Corning Corp.

HOT ISSUES

Chair's Corner

by **MIKE SNYDER**

Recently, I had the opportunity to prepare an educational session for a basic Municipal

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Firefighter I training program that focused on the operational characteristics of automatic sprinkler systems. I quickly came to realize how valuable the experience of an industrial or commercial sprinkler system owner or operator is to the local fire service and the excellent outreach opportunity it gave my company.

Hands-on sprinkler system training provides a unique opportunity for us, as members of the Industrial Fire Protection Section, to educate fire service professionals about the benefits of sprinkler systems and to leverage our knowledge on how best to interface with these systems during emergencies. In light of current budgetary constraints facing many municipal fire service organizations, the offer of low-cost, hands-on training at one of our sprinklered facilities provides much-needed service and familiarizes first responders with the sprinkler equipment we use.

The topics we can cover are endless:

- How a sprinkler system operates
- Sprinkler system maintenance procedures required by NFPA 25
- How to diagnose alarms generated by an

automatic sprinkler system

- The importance of allowing sprinkler systems to remain in service until a fire has been extinguished
- The criticality of keeping fire service personnel, with communications equipment, at a sprinkler riser until the system has been restored
- Augmenting system water supplies with fire engines and siamese connections
- The unique challenges of ventilation in a structure with sprinklers operating

It is not difficult to prepare a fire service sprinkler outreach program. Most sprinkler manufacturers have literature you can use as training aids, and Factory Mutual's training program, *Fighting Fires in Sprinklered Buildings*, is available free to municipal fire service organizations. The program has excellent presentation materials. Most important, however, is giving students time to tour your facility and demonstrating how the sprinkler system works.

Taking a few hours to help local fire departments understand how automatic fire sprinkler systems work can make a huge difference in how effective firefighters are

during an actual emergency at your facility. Please make a personal commitment to offer this type of training opportunity to your local fire department. Send out the invitation today!

HOW TO REACH US: Guy Colonna, Executive Secretary, (617) 984-7435, gcolonna@nfpa.org

International Fire Marshals Association

WEB SITE: <http://www.nfpa.org/ifma>
CHAIR: Fire Marshal Scott Adams, Park City, Utah, Fire District

IFMA Annual Meeting in June

IFMA's annual meeting will move to June this year as a result of NFPA's decision to suspend the Fall Education Conference. Please join us in Las Vegas from June 4 to 10, when we will hold the chapter presidents' meeting. The IFMA business meeting will be held on Tuesday from 1 to 2 p.m. and the codes and standards forum from 2 to 3 p.m. Please refer to the program for the location of these and other events.

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IFMA Nominating Committee Report

In accordance with the IFMA Bylaws, the Nominating Committee, consisting of John Bender, IFMA's immediate past president; John Robison, IFMA past president; and David Lynam, reviewed the list of candidates and submitted its report to the Executive Secretary by November 30. The following individuals were nominated:

President: Scott Adams, Park City, Utah, Fire Department

First Vice-President: Jon Nisja, Minnesota State Fire Marshals Office

Second Vice-President: Jimmy Hill, Los Angeles City Fire Department

Secretary: Charles "Ed" Altizer, Virginia State Fire Marshal

Directors (term expires in June 2007): Bonnie Howe, Goodyear, Arizona, Fire Department; Steven Peavey, Altamonte Springs, Florida

Other candidates may be nominated by petition of 10 IFMA members, provided the Executive Secretary receives the petitions not less than 5 and not more than 45 days after the Nominating Committee's nomina-

tions are published. All nominees for office must be members of IFMA. IFMA members will act on the report at the annual business meeting in Las Vegas.

Professional Development

The IFMA Fire Protection Institute Principles of Fire Protection Engineering course and the performance-based design course are being offered in conjunction with the SFPE's professional development weeks in 2005. Those interested in attending or sponsoring a program may contact Section Executive Secretary Steven F. Sawyer at (617) 984-7423 or ssawyer@nfpa.org. Check www.nfpa.org/ifma for complete details.

And Don't Forget...

IFMA is in the final planning stages for our 100th anniversary. The celebration will take place at the 2006 NFPA WSCE in Orlando, Florida, to be held from June 4 to 9, 2006. Hope to see you there.

HOW TO REACH US: Steven Sawyer, Executive Secretary, (617) 984-7423, ssawyer@nfpa.org

Latin American

WEB SITE: <http://www.nfpa.org/latinamerican>

CHAIR: José Figueroa, FM Global

HOT ISSUES

INS Publishes a Fire Protection Manual by OLGA CALEDONIA

The National Insurance Institute (INS) of Costa Rica has published a manual that contains the standards to which all public works construction projects, existing buildings, and buildings designed for temporary or permanent occupancy must comply. INS' fire department has also adopted the complete set of NFPA codes and standards, which are mandatory for constructing new buildings, remodeling existing buildings, constructing and installing fire protection systems, safety inspections, and events with more than 50 attendees.

The document, approved by INS' Board of Directors, takes into account several scenarios, including the danger during the beginning and propagation of a fire, the danger of smoke or gases and the probability of explosion, and other events that could threaten occupants' lives. The regulation was set forth in accordance with Article

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34 of Law 8228, *National Insurance Institute's Fire Department Law*, published in Newsletter No. 78 on April 24, 2002.

Engineer Héctor Cháves, general director of the fire department, says that, although he has contributed to important developments in fire protection in Costa Rica since 1990, the fire department did not rely on its own legal framework to establish the regulations in this matter.

"Nowadays, Law 8228 does not support our actions," he says. "Nevertheless, it is important to note that the work done over approximately 15 years has created awareness in the consultants, constructors, and proprietors of the buildings of the great importance of incorporating elements of fire protection necessary to prevent the types of disasters that can cause death and pain in the buildings of Costa Rica."

NFPA has maintained a cooperative relationship with the fire department since 2002, the first year a Fire Forum was held in Costa Rica.

"I remember very clearly the active participation of Engineer Esteban Ramos during conferences and the eagerness to establish relations with the speakers and expert engineers," says Cháves. "INS has been working with NFPA standards for several years."

"On behalf of NFPA, we are dedicated to offering all the support necessary for the implementation of this new law," says Olga Caledonia, director of NFPA's Latin American programs.

Among the referenced standards in Law 8228 are NFPA 101®, *Life Safety Code*®; NFPA 13, *Installation of Sprinkler Systems*; NFPA 20, *Installation of Stationary Pumps for Fire Protection*; NFPA 24, *Installation of Private Fire Service Mains and Their Appurtenances*; and NFPA 14, *Installation of Standpipe and Hose Systems*.

Currently, NFPA counts on Spanish-language professional development programs to train attendees to interpret and apply the standards and to help local authorities implement them. NFPA is dedicated to working with INS to find the best way of putting the legislation into practice and to ensure compliance.

By applying these standards, the INS seeks to equip Costa Rica with technicians who can contribute to the improvement of life-safety and fire-protection systems. The fire department is authorized to carry out

adjustments for the suitable application of the regulation in the published manual.

NFPA, Sener Sign Agreement

On January 5, 2005, NFPA and Mexico's Secretary of Energy signed a licensing agreement for the translation and use of the 1999 and 2002 editions of the *National Electrical Code*® (NEC®), which served as a foundation for the official Mexican standard NOM-001-SEDE-2004, *Electrical Installations (Utilization)*. Signatories were NFPA President James M. Shannon; C.P. Manuel Minjares Jimenez, Greater Official; and Eng. Rubén Flores García, general director of Distribution and Supply of Electrical Energy and Nuclear Resources.

Northeast Chapter Formation Meeting

A second meeting about the formation of the Mexican Northeast Chapter of NFPA was held on December 13. Attendees included Eng. Jesús Cruz Vorrath, chapter president, and, on behalf of NFPA, Eng. Jesús Valenzuela and Eng. Antonio Macías. Others present were Alejandro Arrañaga, Gibran Jaquez, Nazario Ramos, José Luis Buergo, Leonardo Pérez, Francisco Gamez, José de Jesús Villalba Gómez, Magda Flores Garza, Jesús R. Jaquez, Raúl Donjuán, and Américo Garza Cavazos.

Eng. Macías explained the advantages of forming an NFPA chapter in the northeast region of the country.

The New Reference Guide, Fire Alarms

The work of the fire alarm work group, led by Eng. Yosti Méndez and Eng. Antonio Macías, was incorporated into the reference guide of the official Mexican standard NOM-002-STPS-2004, *Safety—Prevention, Protection, and Fire Fighting Conditions in the Workplace*. This guide is based on NFPA 1, *Uniform Fire Code*™, making its incorporation the most important step in the adoption of NFPA codes and standards into official and general knowledge Mexican documents to date.

Evaluation Guide

In other adoption efforts, Eng. Antonio Macías, representing NFPA, and Arq. Alejandro Flores Maya, representing the Mexican College of Architects, proposed to the NOM-002-STPS-2004 Standardization Committee the inclusion of an evaluation

guide as part of this official Mexican standard project. The guide is based on NFPA 101®, *Life Safety Code*®, and on *NFPA Safety Manager Guide to Fire Protection*.

The Americas' Security Show 2005

For the second consecutive year, NFPA was invited to participate in The Americas' Security Show exposition, which was held February 1 to 3 in Mexico City.

Many countries participated in the exposition, exhibiting state-of-the-art products and technology. Among the security issues covered were fire detection and suppression; crisis management and risk control; access controls, alarms, and CCTV; and radio and telecommunication systems.

Seated at the podium during the opening ceremony were Eng. Antonio Macías, NFPA regional director for Mexico, Central America and the Caribbean, and Eng. Ugolino Durán, president of NFPA's Mexico Chapter.

HOW TO REACH US: Olga Caledonia, Executive Secretary, (617) 984-7231, ocaledonia@nfpa.org

Lodging Industry

WEB SITE: <http://www.nfpa.org/lodging>

CHAIR: Richard Anderson, Chimney Hill Farm Inn

The Fire Sprinkler Incentive Act

The Fire Sprinkler Incentive Act has been resubmitted to both houses of Congress. The House version is HR 1131, and the Senate version is S 512.

This landmark fire protection legislation will reduce the depreciation time in the 1986 *Internal Revenue Code* for the retrofit of fire sprinklers from the current 39 years in commercial occupancies and 27 years in residential occupancies to an accelerated depreciation schedule of 5 years at 20 percent per year.

In the interest of all of those who have spent our lives trying to protect people from hostile fire, please go to NFSA.org and link to the special Fire Sprinkler Tax Incentive page. There you will find a Cap Wiz where you can automatically send a prepared or personalized letter to your Congressional representative and members of the House Ways and Means Committee or to your Senators and members of the



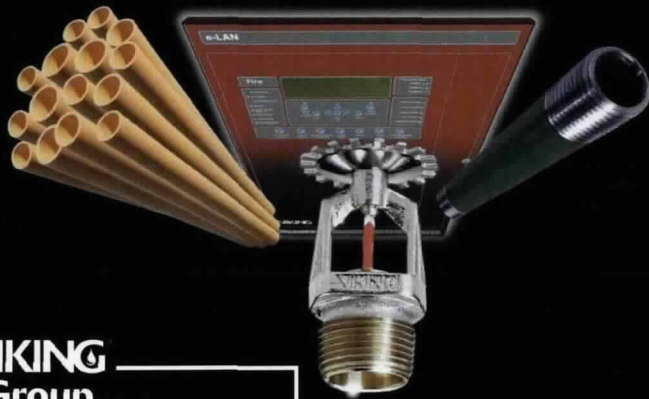
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HOW TO REACH US: Greg Harrington, Executive Secretary, (617) 984-7471, gharrington@nfpa.org

Metropolitan Fire Chiefs

WEB SITE: <http://www.nfpa.org/metro>

CHAIR: Rebecca Denlinger, Cobb County, Georgia, Fire and Emergency Services

Section-Sponsored Events at WSCE®

The section will sponsor the following event at the World Safety Conference and Exposition® (WSCE®) in Las Vegas in June.

**Tuesday, June 7
8 A.M.—9 A.M.**

Lessons Learned: Mentoring a New Generation of Fire Officers

HOW TO REACH US: Russ Sanders, Executive Secretary, (502) 894-0411, rsanders@nfpa.org

Rail Transportation Systems

WEB SITE: <http://www.nfpa.org/rail>

CHAIR: James Gourley, Fire Protection Engineer

HOW TO REACH US: Jim Lake, Executive Secretary, (617) 984-7470, jlake@nfpa.org

Research

WEB SITE: <http://www.nfpa.org/researchsection>

CHAIR: Daniel Madrzykowski, National Institute of Standards and Technology

Current Research Foundation Projects

The Fire Protection Research Foundation staff met with industry and insurance company representatives to develop a plan to study appropriate protection methods for Class III and other liquids in non-listed plastic intermediate bulk containers. A research consortium is being formed, and a test program is planned for late 2005.

At its February 11 meeting, the Research Advisory Council also agreed to form a

working group to develop a compendium of information on the fire hazards associated with the interior furnishings of passenger vehicles. The white paper will include post-fire investigation information and case studies, fire test data on vehicle components, vehicular fire statistics, statistics on materials used in vehicle components, and a comparison of automotive vehicle component fire tests and regulatory requirements with those of other vehicles. The compendium should be completed in 2006.

Another research consortium is being formed in conjunction with the National Research Council of Canada to develop best-practice guidance on fire detection technologies for roadway tunnels.

Detection Research Council Formed

On January 25, the Research Foundation convened a workshop to define a research agenda and road map for hydrogen infrastructure safety. The day-long discussion focused on the research needs for regulating the safety of hydrogen technology as it reaches commercialization.

Participants, who included members of key NFPA technical committees, the fire service, the research community, government agencies, and those commercially involved in hydrogen technology, identified more than 50 research items important in the path toward acceptance of this new technology by the regulatory community. The six top items were code synthesis, stationary fuel cell siting, vehicle refueling stations, metal hydride storage safety, the safety of enclosed parking structures, and fire service and AHJ education. The Foundation is working with the hydrogen community to implement this research.

At its February meeting, the Foundation's Board of Trustees approved the formation of a new research council in cooperation with the Fire Detection Institute. The Council will hold a planning meeting in May to identify and initiate one or more priority research projects in 2005. The Board also approved the formation of new research committee to oversee the nature and management of Foundation research projects.

In January and February, Foundation staff also presented to NFPA's Standards Council a white paper outlining the Foundation's role in the introduction of new technology to NFPA's codes- and



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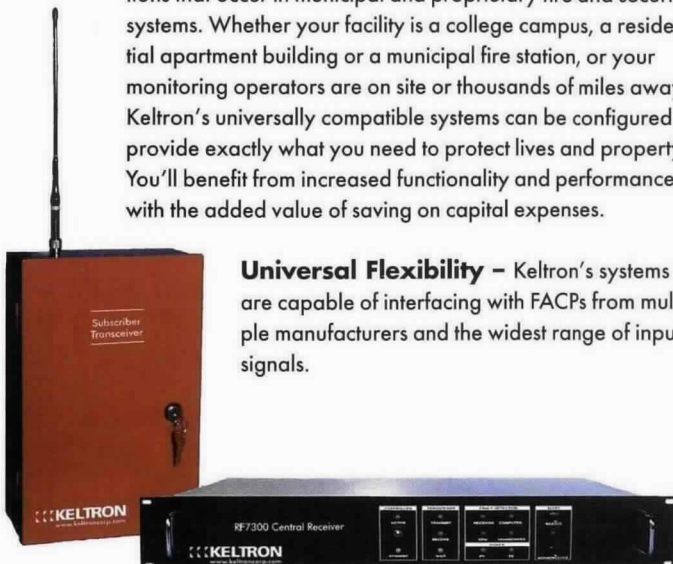
Universal Reception - In campus or multi-building complex environments, Keltron's systems can monitor signals via wire, fiber or radio.

Universal Accuracy - Our systems add point-specific remote event reporting to addressable FACPs that lack that capability.

Universal Savings - Keltron's systems' compatibility enables facilities managers to save capital expense by using existing equipment and enabling optimal purchasing.

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Visit Keltron's booth #1529 at the 2005 NFPA World Safety Conference



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standards-development system. In addition, Foundation staff met with members of the NFPA 232 committee, the NFPA 921 committee, the NFPA 150 committee, and the Protection Task Group of NFPA 30 to discuss the Foundation's role in supporting their data needs.

Also in January and February, the Foundation met with representatives of the Federal Highway Administration, the Consumer Product Safety Commission, the U.S. Fuel Cell Council, and the Society of Fire Protection Engineers to discuss collaborating on research programs under development. And staff met with the National Safety Council to discuss participating in a window safety program with fall protection and firefighter egress aspects.

Potential Projects

The Foundation is exploring two new projects. One, devoted to calibration standards for NFPA 262, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Space*, is designed to enhance NFPA 262 on plenum cable fire testing by selecting and characterizing a new set of calibration cables.

The other will focus on furnaces and siting distances for stationary fuel cells. This project will inform the spatial separation requirements for hydrogen fuel cells in storage enclosures in NFPA 55, *Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks*.

Symposia

Ninety participants engaged in an exchange of the latest detection and suppression technology at the Foundation's January symposium. They discussed research needs and will feed this information into the Foundation's research planning.

On June 6 and 7, the Foundation will co-sponsor with NFPA two other symposia during the World Safety Conference and Exposition® (WSCE®) in Las Vegas. One will focus on tunnel fire safety, reviewing the latest information about fire development and fixed fire protection systems in roadway tunnels. The other will address regulatory and fire safety issues related to refueling hydrogen vehicles and fuel cell storage for the hydrogen highway. The Foundation will also host a booth at the WSCE.

For more information, contact Eric Peterson at epeterson@nfpa.org.

Section-Sponsored Sessions at WSCE

The Research Section is sponsoring 17 sessions at the WSCE in Las Vegas in June. The sessions cover a wide range of topics, including the National Institute of Standards and Technology's report on the collapse of the World Trade Center. Other fires to be discussed are the 1980 MGM Grand Hotel fire and the 2003 Cook County Administration building fire.

Among the section-sponsored sessions are:

- Risk vs. Gain: Considerations for Working Fires in Unoccupied Structures
- Fire Protection Aspects of the Luxor Hotel and Casino: A Performance-Based Approach
- Fire Detection and Situational Awareness
- Heat Release Rates of Motor Vehicles
- The Building Calorimeter: FM Global's Novel Approach to Large-Scale Fire Testing
- Detection and Diagnostic Studies of Microbiological-Influenced Corrosion (MIC) in Fire Protection Systems
- Estimating Smoke Detector Response
- Ambulance Safety in the Fire Service
- Eiffel Tower II—Performance-Based Structural Fire Safety
- Tenability Analyses for Three Atria Smoke Management Systems
- Performance-Based Design of Structural Fire Resistance
- Fire Protection Aspects of the Mandalay Bay Resort and Casino
- New Sprinkler Fire Statistics

Details can be found on NFPA's web site.

Bigglestone and Guise Awards

Winners of the 2005 Harry C. Bigglestone Award and of the SFPE's 2004 Arthur B. Guise Medal will present their work at the WSCE on June 8.

Tingguang Ma, Stephen M. Olenick, Michael S. Klassen, Richard J. Roby, and Jose L. Torero won the Bigglestone Award for their paper *Burning Rate of Liquid Fuel on Carpet (Porous Media)*. The Bigglestone Award is presented to the authors of the best paper submitted to *Fire Technology* during the previous year.

Dr. Vytenis Babrauskas, winner of the 2004 Guise Medal, will present his paper *Ignition: A Century of Research and an*

Assessment of Our Current Status. The Guise Medal recognizes achievement in advancing the science and technology of fire protection engineering.

Research Section Business Meeting

The section's annual business meeting will take place on June 7 from 1:30 to 2:30 p.m. at the WSCE at the North Convention Center. Plan to discuss presentations we might sponsor at future meetings and efforts to build section membership.

HOW TO REACH US: Rita Fahy, Executive Secretary, (617) 984-7469, rfahy@nfpa.org

Wildland Fire Management

WEB SITE: <http://www.nfpa.org/wildland>
CHAIR: Bill Terry, USDA Forest Service

Section Events at the WSCE®

The section will sponsor the following events at the World Safety Conference Exposition® (WSCE®) in Las Vegas in June.

Monday, June 6

7:30 P.M.—9 P.M.

Wildland Section Business Meeting

9:30 A.M.—10:30 A.M.

National Fire Plan: Where It Is Today

Wednesday, June 8

How Hurricanes Affect Health-Care Facility Operations

Publication to Help Make Your Community Firewise

NFPA's *Protecting Life and Property from Wildfire* provides community leaders and the fire service with the tools they need to understand the problem of wildland fires and to work together to mitigate risks. This informative text outlines U.S. agencies and programs that have wildfire responsibilities and provides sample firewise implementation plans, case studies, and mitigation initiatives. It also includes firewise construction and landscaping checklists.

To order, call (800) 344-3555 or visit www.nfpacatalog.org.

HOW TO REACH US: Jim Smalley, Executive Secretary, (617) 984-7483, jsmalley@nfpa.org



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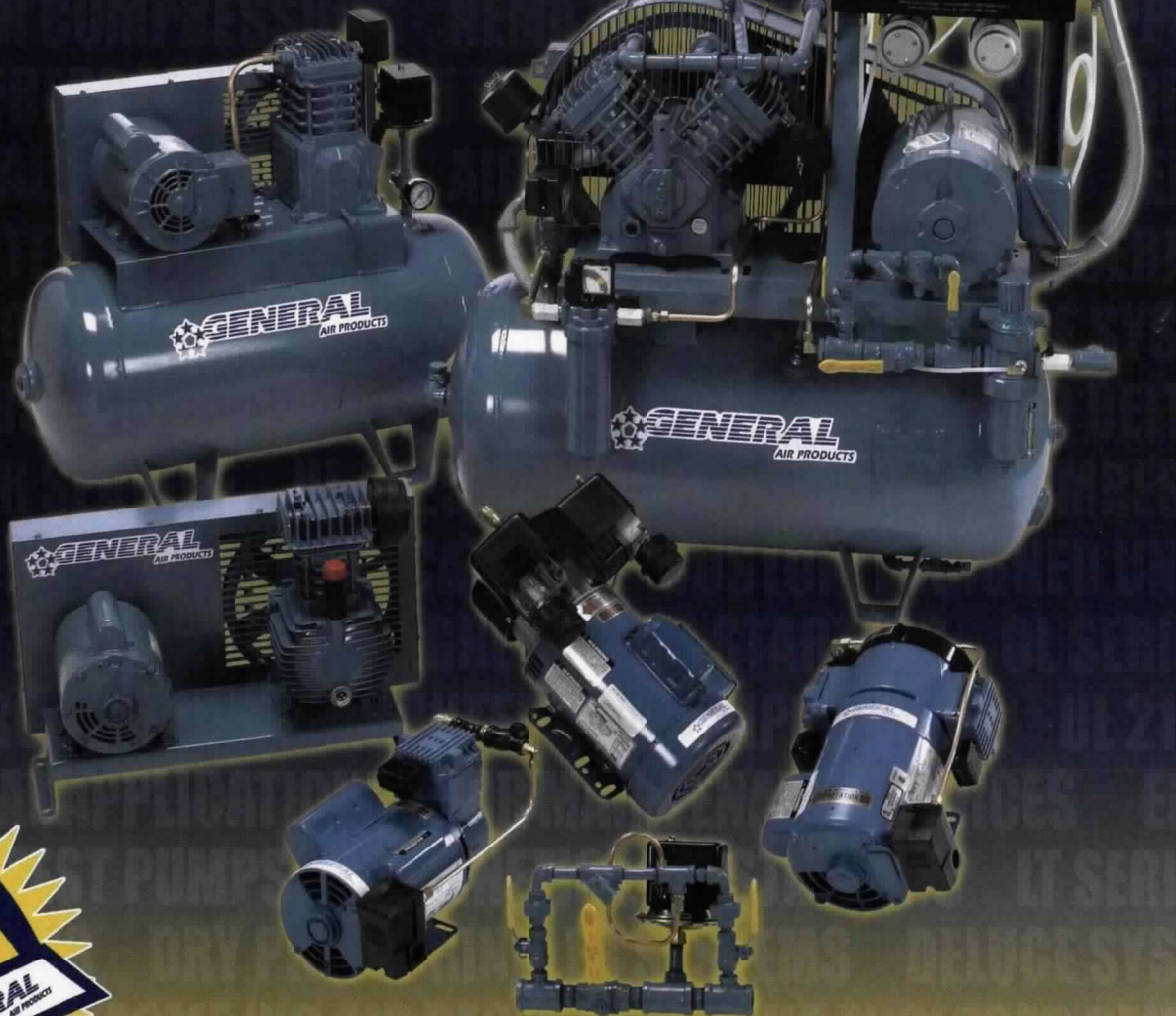
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2005 WORLD SAFETY CONFERENCE & EXPOSITION®

WSCE®

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What's New at the WSCE? p. 104

**Case Study: Fire Protection
at Mandalay Bay and Casino** p. 108

Exhibitor Showcase p. 114



WSCE

THE 2005 WORLD SAFETY CONFERENCE & EXPOSITION®

will open June 6 in Las Vegas with a keynote performance by Regis Philbin. Best known as the co-host of "Live with Regis and Kelly" and former host of the primetime game show, "Who Wants to be a Millionaire?", Philbin will jazz up his witty commentary with a rendition of popular songs.



Held at the Mandalay Bay Resort and Convention Center through June 10, the conference offers 10 tracks with more than 140 educational sessions, including Lessons Learned: Mentoring a New Generation of Fire Officers; Large Nightclub Fires; Fuel Storage Facility Fires; Assembly Overcrowding in Seasonal Resorts; and several major incident case studies. Continuing education units (CEUs) will be awarded for participation in most of the sessions.

Two concurrent tracks provide expanded offerings on building and life safety and necorum™ topics, including presentations that address the unique interiors, designs, special effects, and fire sprinkler applications on the Las Vegas Strip, and analysis of changes to the 2005 *National Electrical Code*® (NEC®) and NFPA 72®, *National Fire Alarm Code*®.

Among the technical highlights of the conference are special symposia presented by the NFPA Research Foundation addressing Hydrogen Safety and Tunnel Fixed Fire Suppression Systems. The latter symposium is also sponsored by the World Road Association.

The featured technical presentation is a discussion on June 7 by Dr. William Grosshandler on the National Institute of Standards and Technology's (NIST) findings from its investigation into the September 11, 2001 World Trade Center fires and structural collapses. Joining Dr. Grosshandler in the presentation is Shyam Sunder, also with NIST.

The Exposition is held June 6-8, featuring products and services related to fire protection, building and life safety systems, electrical systems and building design from more than 200 organizations and companies.

The Uniform Fire Code Association is holding its annual conference in conjunction with the WSCE.

PRE-CONFERENCE SEMINARS

Saturday, June 4

Electrical Inspection for the Safety Practitioner
Fire Protection and Life Safety in Food Service Establishments

NFPA 70E, *Electrical Safety in the Workplace*

Saturday, June 4, and Sunday, June 5

NFPA 5000®, *Building Construction and Safety Code*®
CFPS Primer

Disaster/Emergency Management and Business Continuity Programs (NFPA 1600)

NFPA 1, *Uniform Fire Code*™, Overview

NFPA 921, Fire and Explosion Investigations

NFPA 99, Health Care Facilities

Stallcup's High-Voltage Workshop

Sunday, June 5

Developing an Electrical Safety Program

Fire Alarm Systems Plans Review

Pricing

One-Day Seminar: Member \$220 / Non-member \$245

Two-Day Seminar: Member \$445 / Non-member \$495

AGENDA AT A GLANCE

Building & Life Safety

Monday

M01 8 AM - 9 AM

Case Study: Investigation Into the Progressive Collapse of a Rack Supported Structure in Lomira, WI

M07 8:00 AM - 9:00 AM

Fire Protection Aspects of the Luxor Hotel and Casino: A Performance-Based Approach

M23 9:30 AM - 10:30 AM

Unique Interiors on the Las Vegas Strip

M25 9:30 AM - 10:30 AM

Building Department Innovation and Regional Consistency

M32 11:00 AM - 12:00 PM

Fatal Chicago High-Rise Office Building Fire

M33 11:00 AM - 12:00 PM

Plan Review Backlog - Frogs in Crisis

Tuesday

T05 8:00 AM - 9:30 AM

Unique Stages, Designs and Special Effects

T08 8:00 AM - 9:30 AM

Adding Class to Hazardous Materials Classification

T16 8:00 AM - 11:00 AM

Managing Aging Fire and Life Safety Systems

T23 10:00 AM - 11:00 AM

Estimating Smoke Detector Response

T24 10:00 AM - 11:00 AM

Large Nightclub Fires

T26 10:00 AM - 11:00 AM

Banff Study - Top 15 Fire Code Violations

T30 11:30 AM - 12:30 PM

Upgrading Existing Hospitals Creatively Through New Construction Technologies and Code Complying Assemblies

T36 11:30 AM - 12:30 PM

Eiffel Tower II - Performance-Based Structural Fire Safety

T41 11:30 AM - 12:30 PM



Math for Code Officials
T47 3:30 PM - 5:00 PM
Large Building Fires and Subsequent Code Changes
T56 3:30 PM - 5:30 PM
The Fire Official's Overview for Aerial and Close Proximity
Fireworks

Wednesday

W01 10:30 AM - 11:30 AM
Who Is My AHJ and Will He Stand Up?
W02 10:30 AM - 11:30 AM
Mitigating Earthquake Damage and Planning for Survival
W08 10:30 AM - 11:30 AM
Performance-Based Design of Structural Fire Resistance
W13 10:30 AM - 11:30 AM
Fire Protection Aspects of the Mandalay Bay Resort and
Casino
W24 2:00 PM - 3:00 PM
Understanding Building Code Sprinkler Tradeoffs
W32 2:00 PM - 3:30 PM
Review of 9/11 Pentagon Scenario from the Fire Fighter's,
Fire Marshal's, and Fire Protection Engineer's Perspectives
W34 2:00 PM - 3:30 PM
Up Your Stack - A Look at Current Commercial Kitchen Veni-
lation Code Standards, Research, Testing and Design Tips
W35 2:00 PM - 3:30 PM
How Fire and Building Officials Work Together to Achieve a
Code Compliant Project
W43 4:00 PM - 5:00 PM
Understanding and Testing Smoke Management Systems
W48 4:00 PM - 5:30 PM
Principles of Fire Code Enforcement Administration
W49 4:00 PM - 5:30 PM
The Fire Hazard of Generator Fuel Systems
W50 4:00 PM - 5:30 PM
Assembly Overcrowding in Seasonal Resorts

Detection & Suppression

Monday

M03 8:00 AM - 9:00 AM
Integration of Mass Notification Systems in NFPA 72
TS01 8:00 AM - 9:00 AM
Tunnel Fixed Fire Suppression Systems Symposium Introduc-
tion and Overview
M04 8:00 AM - 9:00 AM
Case Study: The Need for Water Supply and Sprinkler Sys-
tem Testing
M05 8:00 AM - 9:00 AM
Water Mist System Testing and Performance Considerations
TS02 9:00 AM - 10:20 AM
International Codes, Standards and Guidelines
M17 9:30 AM - 10:30 AM
Fire Detection and Situational Awareness
M18 9:30 AM - 10:30 AM
Heat Release Rates of Motor Vehicles
TS03 10:45 AM - 12:00 PM
Suppression Systems and Panel Discussion

M27 11:00 AM - 12:00 PM

Case Study: State-of-the-Art Fire Detection and Alarm System
Tuesday

T06 8:00 AM - 9:30 AM
Seismic Design of Sprinkler Systems
TS04 8:00 AM - 9:45 AM
Applications of Transportation Tunnel Suppression Systems
T16 8:00 AM - 11:00 AM
Managing Aging Fire and Life Safety Systems
T22 10:00 AM - 11:00 AM
Case Study: Retrofitting Warehouse ESFR Sprinkler Systems
T23 10:00 AM - 11:00 AM
Estimating Smoke Detector Response
TS05 10:15 AM - 11:30 AM
Incident Experience
TS06 11:30 AM - 12:30 PM
Tunnel Fixed Fire Suppression Systems Symposium Panel Dis-
cussion
T45 3:30 PM - 4:30 PM
Environmental Update on Fire Fighting Foams
T55 3:30 PM - 5:30 PM
Unique Fire Sprinkler Applications on the Las Vegas Strip

Wednesday

W06 10:30 AM - 11:30 AM
Treatment of MIC in Existing and New Dry Pipe Sprinkler Sys-
tems
W12 10:30 AM - 11:30 AM
Waking Effectiveness of NFPA Recommended Alerting
Devices
W23 2:00 PM - 3:00 PM
New Results on Sprinkler Fire Statistics
W28 2:00 PM - 3:30 PM
Using CCTV (Digital Video) for Smoke Detection
W33 2:00 PM - 3:30 PM
Society of Fire Protection Engineers' New Book on Sprinkler
Design

Disaster Preparedness/ Business Continuity

Monday

M08 8:00 AM - 9:00 AM
Evacuating the Disabled: Training and Programmatic Issues
M35 11:00 AM - 12:00 PM
Emergency Management — Exercise Program Development
Tuesday
T11 8:00 AM - 9:30 AM
The Role of the Corporate Engineer and Business Continuity
Plan to Survive a Natural Catastrophe
T19 10:00 AM - 11:00 AM



ALS Engine/Ladder Companies Concept — Out of the Box
T20 10:00 AM - 11:00 AM
Fully Integrated Business Continuity Planning: A Three-Dimensional Approach
T32 11:30 AM - 12:30 PM
Communication Tools Notifying the Public During Disasters, Natural and Man Made
T49 3:30 PM - 5:00 PM
Forensic Analysis and Legal Management of Large-Loss Fires
Wednesday
W02 10:30 AM - 11:30 AM
Mitigating Earthquake Damage and Planning for Survival
W03 10:30 AM - 11:30 AM
Training Employees for Emergency Action and Response
W20 2:00 PM - 3:00 PM
Fire Pre-Emergency Planning for Mission-Critical Facility Operations
W29 2:00 PM - 3:30 PM
How Wildfires Affect Health Care Facility Operations
W38 4:00 PM - 5:00 PM
Emergency Preparedness — Family Assistance Center

Business Management

Sunday
SU13 12:00 PM - 4:00 PM
Committee Leadership Conference
Monday
M20 9:30 AM - 10:30 AM
Evaluating Fire/Life Safety Prevention Programs
M28 11:00 AM - 12:00 PM
How to Establish a Medical Program
Tuesday
T01 8:00 AM - 9:00 AM
Lessons Learned: Mentoring a New Generation of Fire Officers
T20 10:00 AM - 11:00 AM
Fully Integrated Business Continuity Planning: A Three-Dimensional Approach
T31 11:30 AM - 12:30 PM
The Value-Added Fire Department
T32 11:30 AM - 12:30 PM
Communication Tools Notifying the Public During Disasters, Natural and Man Made
Wednesday
W04 10:30 AM - 11:30 AM
Ontario Fire Service Performance Measurement and Benchmarking
W19 2:00 PM - 3:00 PM
Developing a Performance Measure for a Fire Protection Program
W47 4:00 PM - 5:30 PM
NFPA 921, Guide for Fire and Explosion Investigations, in the

Post-Daubert Era
W51 4:00 PM - 5:30 PM
Competency-Based Performance Model for the Fire Service and Related Positions

Codes & Standards

Monday
M02 8:00 AM - 9:00 AM
Are Children's Playground Structures in Malls and Restaurants Properly Protected from Fire?
M03 8:00 AM - 9:00 AM
Integration of Mass Notification Systems in NFPA 72®
HS01 8:00 AM - 9:00 AM
Hydrogen Technology and Safety
M04 8:00 AM - 9:00 AM
Case Study: The Need for Water Supply and Sprinkler System Testing
M05 8:00 AM - 9:00 AM
Water Mist System Testing and Performance Considerations
M12 8:00 AM - 11:00 AM
NFPA 160, Flame Effects Before an Audience
M13 8:00 AM - 11:00 AM
NFPA Standards Forum
TS02 9:00 AM - 10:20 AM
International Codes, Standards & Guidelines
M21 9:30 AM - 10:30 AM
Fire Pump Standard (NFPA 20) — 2006 Edition Proposed Changes
M30 11:00 AM - 12:00 PM
Changes to the Life Safety Code® — Health Care
Tuesday
T05 8:00 AM - 9:30 AM
Unique Stages, Designs and Special Effects
T06 8:00 AM - 9:30 AM
Seismic Design of Sprinkler Systems
T15 8:00 AM - 11:00 AM
Health Care Codes & Standards Review
T21 10:00 AM - 11:00 AM
Case Study: The 1999 Ford Power Plant Explosion — Explosion and Loss Issues
T26 10:00 AM - 11:00 AM
Banff Study — Top 15 Fire Code Violations
T30 11:30 AM - 12:30 PM
Upgrading Existing Hospitals Creatively Through New Construction Technologies & Code Complying Assemblies
T34 11:30 AM - 12:30 PM
NFPA 72® Update
T37 11:30 AM - 12:30 PM
Checking the Doors of Egress
T48 3:30 PM - 5:00 PM
Health Care Section Town Meeting
T52 3:30 PM - 5:30 PM
Fire Safety Code Trends and NFPA's Activities in China
Wednesday
W02 10:30 AM - 11:30 AM
Mitigating Earthquake Damage and Planning for Survival



W05 10:30 AM - 11:30 AM
 NFPA 13 Update
 W08 10:30 AM - 11:30 AM
 Performance-Based Design of Structural Fire Resistance
 W13 10:30 AM - 11:30 AM
 Fire Protection Aspects of the Mandalay Bay Resort & Casino
 W18 2:00 PM - 3:00 PM
 Creating a Fire and Injury Safe State Through Coalition Initiatives
 W19 2:00 PM - 3:00 PM
 Developing a Performance Measure for a Fire Protection Program
 W30 2:00 PM - 3:30 PM
 After the Fire: NFPA in the Courtroom
 W34 2:00 PM - 3:30 PM
 Up Your Stack — A Look at Current Commercial Kitchen Ventilation (CKV) Code Standards, Research, Testing and Design Tips
 W47 4:00 PM - 5:30 PM
 NFPA 921, *Guide for Fire and Explosion Investigations*, in the Post-Daubert Era
 W49 4:00 PM - 5:30 PM
 The Fire Hazard of Generator Fuel Systems

Research

Monday

M01 8:00 AM - 9:00 AM
 Case Study: Investigation Into the Progressive Collapse of a Rack Supported Structure in Lomira, WI
 M05 8:00 AM - 9:00 AM
 Water Mist System Testing and Performance Considerations
 M06 8:00 AM - 9:00 AM
 Risk vs. Gain: Considerations for Working Fires in Unoccupied Structures
 HS02 9:00 AM - 10:00 AM
 Chevron Texaco's Experience in Building a Hydrogen Fueling Infrastructure
 M18 9:30 AM - 10:30 AM
 Heat Release Rates of Motor Vehicles
 M19 9:30 AM - 10:30 AM
 The Building Calorimeter: FM Global's Novel Approach to Large-Scale Fire Testing
 HS03 10:30 AM - 12:00 PM
 Fuel Cell Vehicle Issues
 M31 11:00 AM - 12:00 PM
 The Evolution and Future of Sprinkler Technology for Warehouse Protection

Tuesday

T09 8:00 AM - 9:30 AM
 Consumer Fireworks Fire Test Performance Standards
 HS06 9:00 AM - 10:00 AM
 Modeling of Hydrogen Flammable Clouds and Thermal Effects During Venting of Hydrogen Storage
 T17 10:00 AM - 11:00 AM
 Detection and Diagnostic Studies of Microbiological Influenced Corrosion (MIC) in Fire Protection Systems
 T23 10:00 AM - 11:00 AM
 Estimating Smoke Detector Response

T33 11:30 AM - 12:30 PM
 Ambulance Safety in the Fire Service
 T35 11:30 AM - 12:30 PM
 Hazard Index Testing of Small Glass Containers of Isopropyl Alcohol in Cardboard on Pallets
 T38 11:30 AM - 12:30 PM
 Tenability analysis for Three Atria Smoke Management Systems
 T40 11:30 AM - 12:30 PM
 Ultra-High-Speed Deluge System Technology
 T45 3:30 PM - 4:30 PM
 Environmental Update on Fire Fighting Foams
 T58 3:30 PM - 5:30 PM
 The MGM Grand Hotel Fire

Wednesday

W-FP 8:00 AM - 10:00 AM
 NIST's Findings on the World Trade Center Fire and Collapse
 W06 10:30 AM - 11:30 AM
 Treatment of MIC in Existing and New Dry-Pipe Sprinkler Systems
 W12 10:30 AM - 11:30 AM
 Waking Effectiveness of NFPA Recommended Alerting Devices
 W16 10:30 AM - 12:00 PM
 Reconstructing the 2003 Cook County Administration Building Fire: Fire Development and Occupant Behavior
 W22 2:00 PM - 3:00 PM
 Health and Safety Guidelines for Emergency Workers: Post-Structural Collapse Hazards
 W23 2:00 PM - 3:00 PM
 New Results on Sprinkler Fire Statistics
 W31 2:00 PM - 3:30 PM
 Advances in Rolled Paper Fire Protection
 W32 2:00 PM - 3:30 PM
 Review of 9/11 Pentagon Scenario from the Firefighter's, Fire Marshal's, and Fire Protection Engineer's Perspectives
 W42 4:00 PM - 5:00 PM
 Chemical, Biological, Radiological, and Nuclear (CBRN) Respirator Standard Development
 W52 4:00 PM - 5:30 PM
 The Guise and Bigglestone Awards

Fire & Emergency Response

Monday

M06 8:00 AM - 9:00 AM
 Risk vs. Gain: Considerations for Working Fires in Unoccupied Structures
 M20 9:30 AM - 10:30 AM
 Evaluating Fire/Life Safety Prevention Programs
 M22 9:30 AM - 10:30 AM



National Fire Plan - Where It Is Today
 M28 11:00 AM - 12:00 PM
 How to Establish a Medical Program
 M34 11:00 AM - 12:00 PM
 Case Study: The Explosion at the West Pharmaceutical Plant in Kinston, NC

Tuesday

T01 8:00 AM - 9:00 AM
 Lessons Learned: Mentoring a New Generation of Fire Officers
 T03 8:00 AM - 9:00 AM
 Spontaneous Combustion of a Truck Trailer Load of Ammonium Nitrate Explosives
 T19 10:00 AM - 11:00 AM
 ALS Engine/Ladder Companies Concept — Out of the Box
 TS05 10:15 AM - 11:30 AM

Incident Experience

T31 11:30 AM - 12:30 PM
 The Value-Added Fire Department
 T33 11:30 AM - 12:30 PM
 Ambulance Safety in the Fire Service
 T44 3:30 PM - 4:30 PM
 The National Advisory Committee for Development of AEGLS
 T45 3:30 PM - 4:30 PM
 Environmental Update on Fire Fighting Foams
 T47 3:30 PM - 5:00 PM
 Large Building Fires and Subsequent Code Changes

Wednesday

W04 10:30 AM - 11:30 AM
 Ontario Fire Service Performance Measurement and Benchmarking
 W09 10:30 AM - 11:30 AM
 Fire Prevention — Still Not a High Priority for the American Fire Service
 W10 10:30 AM - 11:30 AM
 Case Study: The Neiman Marcus Incident
 W11 10:30 AM - 11:30 AM
 Fuel Storage Facility Fires
 W21 2:00 PM - 3:00 PM
 Aircraft Composite Materials: Dispelling Myths, Focus on Facts
 W22 2:00 PM - 3:00 PM
 Health and Safety Guidelines for Emergency Workers: Post-Structural Collapse Hazards
 W32 2:00 PM - 3:30 PM
 Review of 9/11 Pentagon Scenario from the Firefighter's, Fire Marshal's, and Fire Protection Engineer's Perspectives
 W39 4:00 PM - 5:00 PM
 Interior Fire Attack on Commercial Passenger Aircraft
 W40 4:00 PM - 5:00 PM
 Case Study: Hazardous Materials in the British Virgin Islands:

Keeping Up With Development
 W42 4:00 PM - 5:00 PM
 Chemical, Biological, Radiological, and Nuclear (CBRN) Respirator Standard Development"

necforum™

Monday

M10 8:00 AM - 10:30 AM
 Electrical Section Codes and Standards Forum
 M29 11:00 AM - 12:00 PM
 Case Study: Implementing a Practical Electrical Safety Program (NFPA 70E) — Delphi Corporation

Tuesday

T02 8:00 AM - 9:00 AM
 Maintaining Product Certification of Repaired Electrical Equipment Used in Hazardous (Classified) Locations
 T10 8:00 AM - 9:30 AM
 Emergency and Standby Power Sources and Requirements
 T28 10:00 AM - 12:30 PM
 Analysis of Changes - 2005 NEC
 T53 3:30 PM - 5:30 PM
 International Association of Electrical Inspectors (IAEIs)
 Soares Grounding and Bonding
 T54 3:30 PM - 5:30 PM
 NEC® Hotspots in Industrial Facilities

Wednesday

W10 10:30 AM - 11:30 AM
 Case Study: The Neiman Marcus Incident
 W14 10:30 AM - 11:30 AM
 Proposed Changes to NFPA 79
 W27 2:00 PM - 3:30 PM
 Grounded/Neutral Conductor in the NEC
 W41 4:00 PM - 5:00 PM
 Case Study: Electrical Fire Tragedy Compels Change — A University Experience

Premises Security

Monday

M09 8:00 AM - 9:00 AM
 Security in the Health Care Environment
 M24 9:30 AM - 10:30 AM
 A Sneak Preview of a Proposed One- and Two-Family Security Code
 M36 11:00 AM - 12:00 PM
 A Summary of NFPA's New Standard on Installation of Electronic Security Systems — NFPA 731

Tuesday

T13 8:00 AM - 9:30 AM
 Blending Access and Security in Museums
 T18 10:00 AM - 11:00 AM
 Facility Security in a Time of Terror
 T37 11:30 AM - 12:30 PM
 Checking the Doors of Egress
 T50 3:30 PM - 5:00 PM
 Conducting a Security Vulnerability Assessment

Wednesday

W03 10:30 AM - 11:30 AM

Training Employees for Emergency Action and Response

Public Education

Monday

M16 8:00 AM - 12:00 PM

Education 101

Tuesday

T07 8:00 AM - 9:30 AM

Student Housing Fire Safety — A National and Local Perspective

T25 10:00 AM - 11:00 AM

Adolescents — Issues and Answers

T39 11:30 AM - 12:30 PM

Developing Fire Safety Education Programs for People With Disabilities

T57 3:30 PM - 5:30 PM

Older Adults Safety - Tapping into the Network

Wednesday

W07 10:30 AM - 12:00 PM

Education Section Business Meeting (Featuring a Presentation on the Journey to Fire-Safe Cigarettes in Canada)

W12 10:30 AM - 11:30 AM

Waking Effectiveness of NFPA Recommended Alerting Devices

W16 10:30 AM - 12:00 PM

Reconstructing the 2003 Cook County Administration Building Fire: Fire Development and Occupant Behavior

W18 2:00 PM - 3:00 PM

Creating a Fire and Injury Safe State Through Coalition Initiatives

W53 4:00 PM - 5:30 PM

Assessing the Impact of Residential Fire on Children: An Intervention Strategy Based on the Yale University Model

Codes and Standards

NFPA members will have the opportunity to vote on several major codes during the technical committee report session, including NFPA 1, *Uniform Fire Code*™; NFPA 101®, *Life Safety Code*®; NFPA 54, *National Fuel Gas Code*; NFPA 5000®, *Building Construction and Safety Code*®; NFPA 730, *Guide for Premises Security*; and NFPA 731, *Installation of Electronic Premises Security Systems*.

Also included are NFPA 59A, *Production, Storage, and Handling of Liquefied Natural Gas (LNG)*;

NFPA 303, *Fire Protection Standard for Marinas and Boatyards*; NFPA 307, *Construction and Fire Protection of Marine Terminals, Piers, and Wharves*;

NFPA 1000, *Fire Service Professional Qualifications Accreditation and Certification Systems*;

NFPA 1071, *Emergency Vehicle Technician Professional Qualifications Pyrotechnics*;

NFPA 1123, *Code for Fireworks Display*;

NFPA 1124, *Manufacture, Transportation, Storage and Retail Sales of Fireworks and Pyrotechnic Articles*;

NFPA 312, *Fire Protection of Vessels During Construction, Repair, and Lay-Up*;



NFPA 92A, *Smoke-Control Systems*;

NFPA 160, *Flame Effects Before an Audience*;

NFPA 1126, *Pyrotechnics before a Proximate Audience*;

NFPA 52 *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*;

NFPA 57, *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code*;

NFPA 18, *Wetting Agents*;

NFPA 220, *Types of Building Construction*;

NFPA 221, *Fire Walls and Fire Barrier Walls*;

NFPA 703, *Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials*;

NFPA 203, *Guide on Roof Coverings and Roof Deck Constructions*

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What's New for 2005 WSCE?

By John Nicholson

SEVERAL MAJOR FACTORS, industry representatives and fire protection engineers say, influence the new technologies and products in the field of life safety, many of which will be unveiled for the first time at NFPA's *World Safety Conference & Exposition*® (WSCE) in Las Vegas in June.

Among these factors are federal, state, and local building codes that mandate effective fire detection and protection measures in newly constructed buildings, system upgrades in buildings undergoing renovation, and fire alarm systems that are integrated with other building safety systems. In addition, the American with Disabilities Act (ADA) mandates the use of strobes or visual devices to alert the hearing-impaired, as well as the usual audio devices.

Another factor is the current trend toward voice-evacuation systems and the use of directional sound technology. NFPA 72®, *National Fire Alarm Code*®, now requires that emergency voice-evacuation systems be intelligible to build-

In most instances, a new product is developed first then a code change is promulgated to govern the installation and use of the product.

ing occupants, particularly since voice is considered superior to conventional evacuation tones and bells in notifying building occupants of an emergency. Being considered for inclusion in NFPA 72 is directional sound technology, which is among the newer technologies on the market today.

Also new to the market are intelligent fire alarm panels and devices that integrate disparate subsystems and optimize hardware and wiring requirements, and enable a single system to operate several components. This improves the efficiency of the entire set-up, creating huge demand for these devices. Advances in software integration also ensure that fire alarm systems are immune to the failures of other building systems.

A third factor influencing the development of new life-safety technologies and products is industry demand. Those working in the field are asking for more products that meet code requirements, including those of NFPA, and take advantage of multiple technologies.

The WSCE is the largest exposition in the field of fire and life safety, providing the industry's leaders a unique opportunity to showcase their latest services and products before an audience of top fire protection and life-safety specialists.

An example is SimplexGrinnell's Fire- and Life-Safety Road Show Series, which provides support to the fire protection engineer. Topics in this year's series, the theme of which is "What's New, What's Next, What's Vital," include developments in fire sprinklers and special hazards protection; advances in emergency notification, including intelligibility measurement; fire protection product and service applications, migrations, and upgrades; fire protection in health-care environments and high-rise structures.

This is the third consecutive year that SimplexGrinnell, a business unit of Tyco Fire & Security, has organized this series of symposia and technology expos for engineers, architects, building owners, facility managers, contractors, local fire officials, and others interested in code updates, technology advances, and practical applications in fire and life safety.

"Knowledge is key to those responsible for helping to protect life and property," says Bruce Fraser, director of industry relations at SimplexGrinnell. "The SimplexGrinnell 2005 Fire- and Life-Safety Road Show Series provides a unique forum where professionals in the industry can learn about the latest developments in fire protection systems and services. It's a chance to share vital information and further the goal we all share for providing the best possible fire- and life-safety protection."

In 2004, the series was presented in 21 cities and attracted more than 4,000 attendees.

Also at this year's WSCE, Gamewell will introduce its voice evacuation system product line, a fully digital and networkable audio evacuation systems that can support up to six channels of digital audio, including line paging and two-way telephone communications, as well as various control functions, all operating simultaneously on a single pair of wires or fiber optic cables. This new technology allows Gamewell to provide an extensive portfolio of integrated fire safety solutions for low- to mid-rise buildings and general assembly areas, in addition to digital audio solutions for high-rise and campus applications.

Gamewell's voice evacuation systems can be custom-configured for unique buildings and floor plans, or to meet local requirements for voice evacuation systems. The systems use prerecorded messages and emergency paging during an emergency to facilitate orderly evacuation. Gamewell voice evacuation systems are offered in two forms: integrated solutions and audio expansion solutions. Integrated solutions are integrated in the panel, while audio expansion solutions are an addendum to the panel.



Gamewell is also introducing SmartScan, a new, fully digital communications protocol for improved event-reporting speed and accuracy. SmartScan provides alarm verification for every detector and a polling speed 10 to 15 times faster than existing protocols. The new protocol reduces panel end-to-end response to less than five seconds and supports 99 detectors and 99 modules per loop. Additional SmartScan benefits include detector adjustability and compensation, as well as adjustable analog heat detector range circuit isolation and priority interrupts. The protocol also enables loop distances up to 12,000 feet (3,658 meters) of twisted-pair, parallel-pair, THHN, and shielded wires.

Fire-Lite Alarms will introduce its ACC25/50 Series. This includes the ACC-25/50DA audio panel, a new audio and zone splitter panel that increases the available wattage of the system to more than 1,500 watts of digital audio power, and the ACC-25/50ZS zone splitter panel, which increases the zone splitter capability up to a total of 24 separate audio circuits.

These precise, fully featured emergency communications systems are ideal for schools, auditoriums, dorms, theatres, restaurants, places of worship, lodging facilities, assisted-living facilities, office buildings, and factories. With full supervision in both active and standby conditions, the ACC25/50 Series provides up to five customizable messages and features full manual paging to allow first responders to give occupants precise evacuation directions.

System Sensor will introduce the SP201K outdoor speaker and the SP2R1224MCK outdoor speaker strobe for use in fire protection voice-evacuation systems. The speaker and the speaker strobe are UL-listed for temperatures from -40°F to 151°F (-40°C to 66°C) and are best suited for use in parking garages, stadiums, and balconies. Both feature low total harmonic distortion and wide frequency response for excellent intelligibility.

Fire Control Instruments (FCI) will showcase the E3, an expandable emergency evacuation system, at the WSCE. The entire system works on only 10 modules, making it easy to install, and components can be purchased as needed to expand the system over time. The E3 incorporates existing components and has network-enabled ILI-MB and ILI-S fire panels that can store 8 MB of memory. A peer-to-peer network operating at 625K baud, it can be arranged as Style 4 or Style 7 using two conductor unshielded wire or fiber cables. The network riser includes paging, firefighter telephones, and input/output capabilities. The E3 can be used as a stand-alone, a network, or a broadband voice and audio solution.

Directional sound

Notifier will highlight its series of ONYX® products, which includes its ONYX ExitPoint, a new technology for guided egress through directional sound. ONYX ExitPoint is a compact speaker producing broadband noise triggered by a building's fire alarm control panel that is installed near building exits or along egress routes, acting as an audible "exit sign," even when visibility is impaired. Because ONYX ExitPoint generates noise at all frequencies across the human

hearing range, occupants can easily locate the source of the sound, which provides distinctive directional cues and does not conflict with traditional notification devices such as horns or bells. ONYX ExitPoint emits four different field-selectable sound pulse patterns to create an egress pathway out of a building and to mark perimeter exits, defining an immediate escape route. Additional pulse patterns can be added to let building occupants know that they are approaching a stairway and how they need to proceed.

'Actuated and demonstrated'

Tyco, one of the industry's largest players, will unveil a new Code Selector program that helps installers use NFPA 13, *Installation of Sprinkler Systems*, as well as a new version of its dry-pipe sprinkler system calculation program, says Tom Prymak, vice-president of marketing with Tyco Fire Products.

"In hardware, we will be showing a new 6.9 K-factor residential sprinkler for NFPA 13 occupancies (as opposed to NFPA 13D and NFPA 13R). We will also have our valve trailer at the show that features working valves and components—all of our latest valve designs and styles—that can be actuated and demonstrated," Prymak says.

Tyco's SprinkCODE uses interactive screens to offer the choices needed to quickly and accurately narrow the options for the desired system density and coverage area or for special-application sprinkler. The available options for any 1999 edition NFPA 13 code requirement can be displayed within seconds for review or printing. The 1996 edition of NFPA 13 and the 1995 and 1998 editions of NFPA 231, *General Storage*, and NFPA 231C, *Rack Storage of Materials*, are also referenced.

Fire alarm panels

Siemens Building Technologies, Inc., will introduce a low-cost releasing module for its FS-250 intelligent fire alarm panel. The FS-250 panel has two 3-amp, 24v releasing circuits that can release waterless fire protection by itself or in combination with pre-action sprinkler system to protect mission-critical facilities and irreplaceable assets. The FS-250, a single-loop fire alarm panel that supports up to 252 addressable inputs and 252 signal/relay outputs, uses the the FirePrint Application-Specific Fire Detector.

The panel is polarity-insensitive and operates on standard wire with no special twist or shield required. This means that existing systems can be upgraded to the FS-250 without installing new wire for the addressable loop. The panel can be programmed from the front keypad or through Windows®-based PC programming software, and the addressable devices can be programmed either with a device program-

mer/tester or directly from the front panel. The device programmer/tester can also be used to test the addressable loop wiring for shorts, grounds, and device operation.

Faraday's MPC-6000 and MPC-7000 fire alarm panels with MPC-Net2 capabilities are also polarity-insensitive and can operate on standard wire with no special twist or shield required, allowing systems to be retrofit without installing new wire for the addressable loop. Faraday's MPC series uses the new FireSmart application-specific detection technology designed to eliminate deceptive phenomena in specific environments. They use advanced software algorithms and a neural network to sense both smoke and heat.

From Kidde comes the ARIES™ Control Unit, which controls the complete spectrum of fire suppression system applications, ranging from flammable-liquid protection that discharges extinguishing agent immediately after fire detection to telecommunications and information-technology facilities where the fire is extinguished in a planned, sequential system response.

A few devices or appliances have come to the market place as a result of code requirements.

Among the standard features in the ARIES™ Control Unit is Fenwal's FENWALNET 6000 Control Unit, specifically designed to provide early fire detection, immediate occupant notification, and fast fire suppression by its waterless extinguishing systems. The FENWALNET 6000 uses the SmartOne® family of automatic initiating devices, monitor modules, and control modules, and adds other features such as duplicate-address detection for faster system start-up and automatic initiating device testing for greater reliability. These enhancements enable backward compatibility with the installed base of SmartOne devices.

The ARIES™ Control Unit's releasing circuits are also protected against unwarranted activation by FENWALNET 6000's new triple-redundancy ("Triple-R") safeguard system. This system requires the main microprocessor to issue two release commands of opposite polarity and by separate signaling channels, and to combine these commands with a signal from the control unit's watchdog timer, thus confirming proper microprocessor operation before a release circuit is activated. This ensures that an electrical transient or disturbance that temporarily interferes with the main microprocessor's operation will not inadvertently activate an extinguishing system.

Fire alarms

Silent Knight, part of Honeywell's Life Safety Group, will feature its IFP Series of analog/addressable products at the WSCE. The IFP Series ensures that the end-user's require-

ments are met with the most appropriate and economical fire alarm solution, regardless of application or facility size. Smaller sites that require fewer addressable devices can use the IFP-50, while medium and large applications can use the IFP-100/IFP-1000. In addition, all-in-one integrated voice panels offer all of the features of Silent Knight's control panels, as well as a voice-evacuation system.

GE Security will feature its Synergy-enabled® EST3 Life Safety platform that features integration of fire, security, and access control functions. System components have security, access-control, and fire-alarm listings, ensuring code compliance, compatibility, and seamless operation. The EST3 platform's design flexibility and system survivability make it suitable for projects featuring multiple building networks and high-rise buildings.

Additional products being exhibited include FireWorks®, a four-quadrant graphic workstation providing a single point of system management and control for fire, security, and access control; Genesis® horns, strobes, speakers, and speaker strobes; FireShield® panels; and QuickStart® panels for new and retrofit applications.

Wheelock offers a broad line of notification appliances with the Series NS/HS4 Horn Strobes and NH Horn Appliances featuring low current; a continuous and temporal Code 3 tone and dB levels of 90 or 95; and a patented universal mounting plate. The Series NH matching horn is a selectable 12/24V model that can include a notification-appliance trim plate for use in spaces between a finished wall and the flush backbox.

Wheelock will also introduce the Series E50 speaker strobes for fire alarm notification. The wall-mount speakers and speaker strobes, available with a wide range of strobe intensities, meet the need for a low-profile product with universal mounting, two-wire installation that can be mounted to a standard 4-inch-by-2-1/8-inch (10-centimeter-by-5.3-centimeter) electrical box-with no extension ring required. The appliances incorporate a speaker mounting plate and a grille cover that snaps on so no mounting screws are visible.

Wheelock also manufactures facility communication systems, including SAFEPATH4 which combines voice-messaging, paging, background music, and emergency notification.

Honeywell Power Products will showcase the HPF602ULADA and the HPF902ULADA fire alarm power products at the WSCE. These products, which connect to virtually any panel to provide the additional power needed for notification-appliance circuit expansion, offer 6 or 9 amps of notification power, direct AC power connections, an on-board battery-charging circuit, and spacious backup battery space. Each can power notification appliances required by the ADA and contains built-in ANSI cadence patterns, which can upgrade older control panels that lack cadence capability. In addition, the power supplies offer stand-alone operation, ground-fault detection indicators, and a lightweight design that reduces installation and reduces shipping costs.

Altronix's new ALTV2416ULI power supply will be on display. It is one of a new series of UL-listed isolated power supplies designed specifically for commercial CCTV equipment (UL2044). The unit delivers 24VAC distributed over 16 fuse- or



PTC-protected isolated outputs ideal for powering video surveillance cameras, heaters and other video accessories.

Sprinklers

Viking has expanded its storage line and will feature its newest products at the WSCE. These include the K-14 extended-coverage, ordinary-hazard (EOH) pendent sprinkler that produces the flows required to meet ordinary-hazard density requirements in storage facilities at pressures lower than 8.0 or 11.2 K-factor sprinklers. Also featured will be the K-17 upright sprinkler, which has a K-factor of 16.8, and the ESFR cold storage system. The K-17 upright sprinkler is a standard-response spray sprinkler for applications using the area/density protection criteria of NFPA 13, while the ESFR cold storage system uses Viking's K25 ESFR pendent sprinklers and a mix of propylene glycol antifreeze and water to protect commodities up to Class II stored in rack storage up to 40 feet (12 meters) high in buildings as high as 45 feet (14 meters).

Potter Electric Signal Company will display the Potter Automatic Air Release, or PAAR, a new corrosion-inhibiting device that eliminates the air/water interface line where corrosion often thrives. The patent-pending mechanical fail-safe water shutoff valve offers a visual indicator of valve operation and is designed such that no water sprays, drips, or leaks from the air vent. In addition, the PAAR reduces water surges and helps prevent the flow switch from short cycling when air is trapped in the system.

Smoke detection

Vision Systems will release its VESDA LaserFOCUS™, an early-warning smoke detection system designed to protect small critical areas. This new air-sampling smoke detector offers SonicFlow™ ultrasonic flow sensing, a unique circular display, pre-engineered piping options, and easy installation and maintenance. It is the most recent addition to the VESDA line of smoke detection products and is UL-listed and FM-approved.

"The trend toward smaller and more concentrated critical business operations has driven the need for more flexible and focused solutions to protect high-value assets," says Jay Waldron, senior vice-president and general manager of Vision Fire & Security.

VESDA air-sampling technology provides very early-warning smoke detection that reliably detects fires in their incipient stages, Vision Systems says.

System Sensor's singled-ended, reflected-type beam smoke detectors are easier to install than dual-ended projected beam detectors because they are aligned using an optical sight and a built-in, two-digit signal strength meter. These four-wire detectors provide 16- to 328-foot (5- to 100-meter) protection coverage in an operating temperature range from -22°F to 131°F (-30°C to 55°C) to give early warning in environments where temperatures reach extremes.

The detectors can be equipped with an integral sensitivity test feature that consists of a test filter attached to a servo motor inside the detector optics.

Using the remote test station RTS451, the motor is acti-

vated and moves the filter in the pathway of the light beam, thereby testing detector sensitivity and enabling the user to meet the maintenance and test requirements of NFPA 72.

Suppression systems

ANSUL® will feature the SAPPHIRE™ Fire Suppression System as a halon replacement at the WSCE. SAPPHIRE is stored as a liquid but expelled as a gas, making it appropriate for special-hazard applications in the electronics, telecommunications, and banking industries, as well as in marine facilities, hospitals, cultural institutions, and military installations.

The system incorporates NOVEC™ 1230 fire protection fluid by 3M® to protect valuables and critical assets without harming occupants or contents.

The SAPPHIRE system complements the ANSUL INERGEN® clean agent system and rounds out Tyco's portfolio of clean-agent suppression systems. ANSUL will also feature the UL-listed Kidde engineered fire suppression system designed for use with the NOVEC 1230 fire protection fluid.

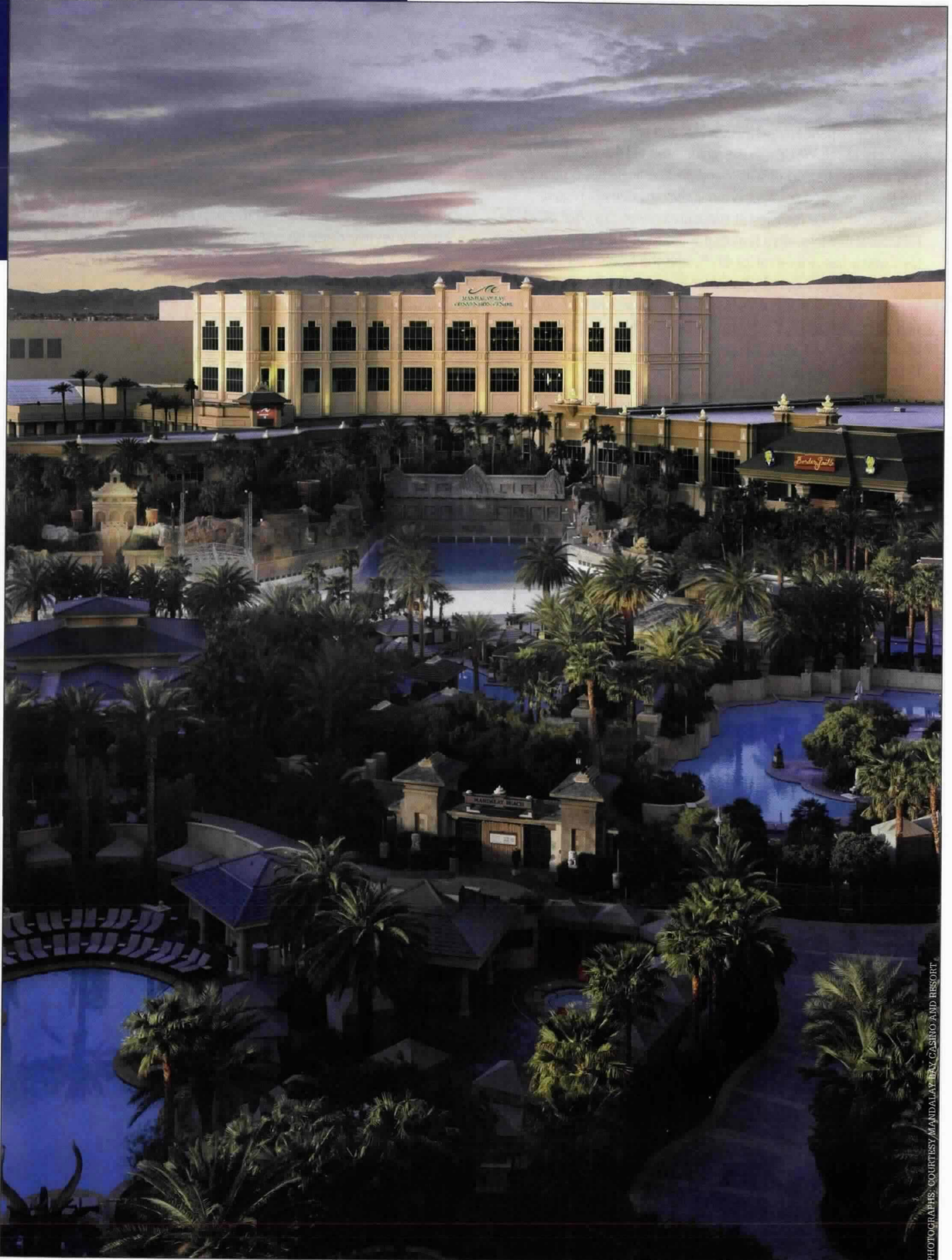
According to Kidde, NOVEC 1230 fluid, listed for hazard temperatures between 0°F and 132°F (-18°C and 56°C) has several environmental benefits. Its ozone depletion factor is zero, and it has the lowest global warming potential of any chemical-based clean agent. It also provides a high safety margin with a 4.2 percent use concentration, a no-observed-adverse-effect level of 10 percent, and a lowest-observed-adverse-effect level greater than 10 percent. The NOVEC 1230 fluid flow calculation software allows for design flexibility.

Protection

Safety Technology International, Inc. (STI) will introduce a new extra-large, super-tough, see-through polycarbonate enclosure for remote annunciators, fire alarm control panels, and other electronic products. STI enclosure STI-7550 guards against vandalism, dirt, dust, and grime, and can be secured with a thumb lock for easy access. The STI-7550 also requires that the operator to have a key to access the equipment stored within. The enclosure mounts on the wall, allowing units to be protected in their designated location.

For more information on any of these products and services, please join us at the WSCE in Las Vegas from June 6 through 8. 🍷

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PHOTOGRAPHS COURTESY MANDALAY BAY CASINO AND RESORT



Fire protection challenges for A CITY WITHIN A CITY

The Mandalay Bay Hotel and Casino

By **James R. Quiter, P.E.**

FIRE PROTECTION ASPECTS OF THE MANDALAY BAY RESORT AND CASINO is one of the education sessions being offered at the WSCE. On Wednesday, June 8 from 10:30 am to 11:30 am, Doug Evans, Clark County, Nevada, Building Department and James R. Quiter, Arup Fire, will present a discussion of this city under one roof. For more information, go to www.nfpa.org.

THE MANDALAY BAY HOTEL AND CASINO is one of the largest hotels in the world. With more than 4,900 hotel rooms in a single complex, it dwarfs the major hotels in most U.S. cities. However, thinking of the property as a hotel misses the bigger part of the fire protection story. The complex includes a large casino, one of the biggest convention centers in the world, a theater, an arena, a shopping mall, and an aquarium.

In early 1996, Klai Juba Architects began designing the original 43-story building, which had about 3,800 guest rooms and suites. Below the hotel tower is a low-rise podium of about 1.4 million square feet (130,060 square meters) that contains a 125,000-square-foot (9,90-square-meter) casino, a 1,800-seat show theater, a separate performance theater for the House of Blues, and a shopping and restaurant arcade. It also includes a registration desk and service areas for Mandalay Bay and The Four Seasons Hotel, both of which are in the same building but have separate entrances, as well as several restaurants, meeting rooms in The Four Seasons, and back-of-house areas.

Built at the same time were a five-story open garage with about 400,000 square feet (18,580 square meters) of parking per level, a convention center of about 300,000 square feet (27,870 square meters), an arena that can hold 12,000 people, and a connector to the Luxor Hotel and Casino, which was originally intended to be used as a retail mall. The complex opened in 1999 and was an immediate success.

Following the opening, an aquarium was added, also in 2000. Next came a new three-level convention center covering 1.8 million square feet (167,221 square meters) and, more recently, a 1,120-room suite hotel called The Hotel at Mandalay and a 125,000-square-foot (11,613-square-meter) retail mall in the Luxor connector (see Figure 1).

When considered with the Luxor and Excalibur Resort and Casino, which are also owned by Mandalay

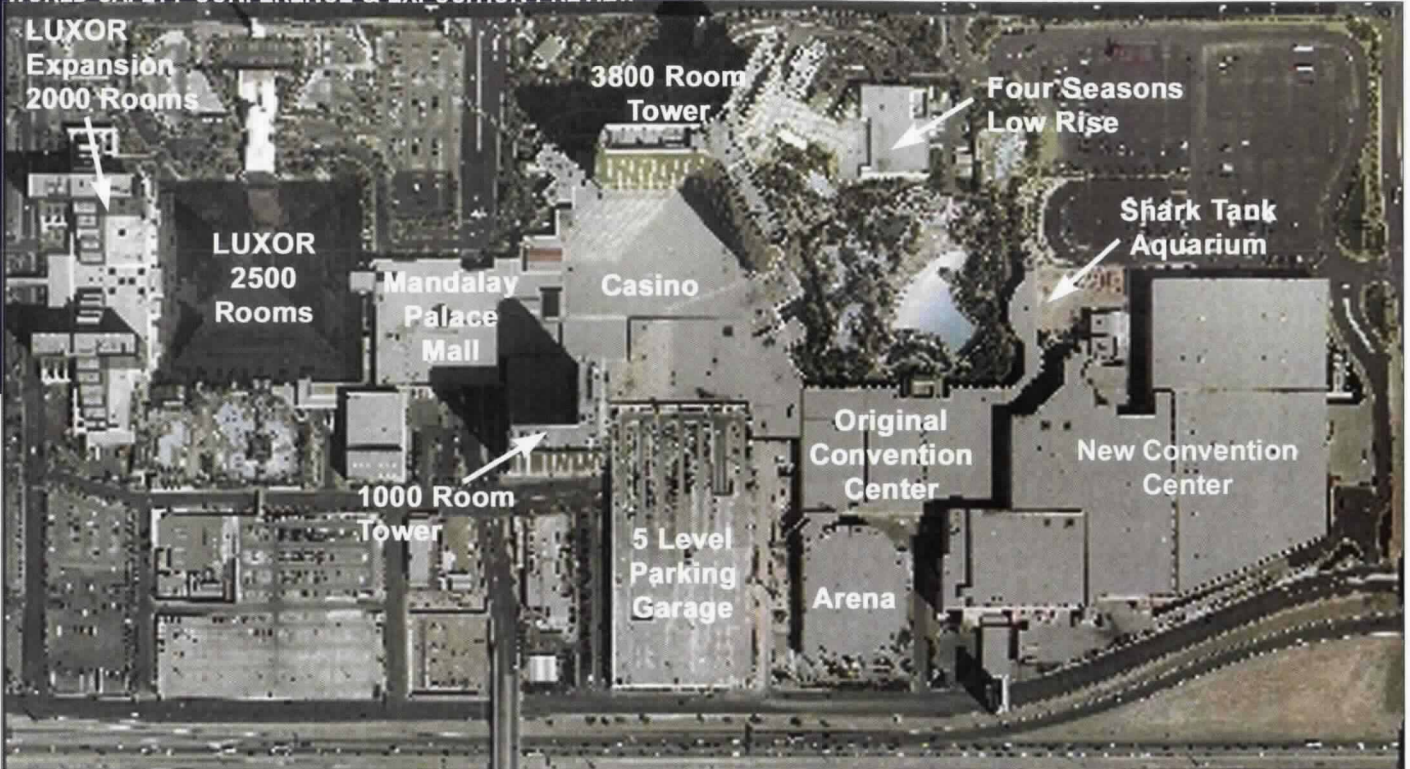


Figure 1. Aerial photograph of the layout of The Mandalay Bay Hotel and Casino

and physically connected by walkways or malls, there are more than 13,000 guest rooms and nearly 300,000 square feet (27,870 square meters) of casino area.

Fire protection issues

A complex such as the Mandalay Bay presents several key fire protection issues. First and foremost are moving and evacuating large numbers of people and providing discharge and holding areas for them. Other major issues involve compartmentation; separation of buildings and occupancies; designing and installing proper sprinkler protection, particularly in high-ceiling areas; smoke control; and the development of a logical, cohesive approach to fire alarm and notification.

Along with these major fire protection decisions, there were several more mundane but still important fire protection and code issues to resolve. These included fire-stopping beneath the raised floor of the stage of the "Mamma Mia!" musical; evacuation and security for cage areas where the money is handled; construction and protection for the Wall of Fire, the front entrance of a restaurant; and interior finishes and furnishings needed to make the project a vibrant, inviting location.

Another key feature of this and many other Las Vegas projects was the speed and pace of design and construction. From first design until The Hotel opened eight years later, more than 12 million square feet (743,203 square meters) of space was built. The original project was designed and constructed in less than three years, and the

convention center expansion was completed in less than two years. Nowhere else in the country, or perhaps the world, are major projects designed and built so quickly.

In order to design and build at this pace, the owner, designer, contractor, and the authority having jurisdiction (AHJ) must cooperate closely and work as a team. Mandalay Development kept its team intact from start to finish, creating a sense of accomplishment and teamwork that is often missing in major projects. That, and the cooperation of the Clark County Building and Fire Departments in responding rapidly to issues, reviewing plans, inspecting systems and buildings, and acceptance testing final installations, is what allowed this complex to be built so quickly with such a high quality of construction.

The overall complex

The original complex contains much of the infrastructure for the future additions to the property. Because the same design team was involved throughout the process, decisions made in the first phase were reinforced, rather than compromised, by subsequent phases.

The complex has an integrated, coordinated fire protection program, the key to which is the automatic sprinkler protection installed throughout. The sprinkler, standpipe, and water supply systems are designed in accordance with NFPA Standards. The sprinkler system is supplied by fire pumps in a central plant, which is a separate, stand-alone structure. The sprinkler and standpipe systems for the entire site are interconnected, with a



number of fire department connections. There are also redundant annunciators at some of the remote fire department response points.

Another important feature in a project this large is compartmentation. The entire complex is of fire-resistive construction, so building-stability and floor-to-floor separations were provided. Horizontal compartmentation, by means of 4-hour fire walls and 2-hour fire barriers, was also provided to limit the potential of very large losses (see Figure 2).

The complex is served by a single fire alarm and notification system, with automatic voice communication throughout, designed in accordance with NFPA 72. Audible zones are coordinated with sprinkler, alarm, smoke control, and compartmentation zones. On the hotel floors, alarms sound on the floor of origin, the floor above, and the floor below. On lower floors, the designer, the fire alarm contractor, and the Clark County Fire Department worked together to balance the number of people relocated and the hazard to which they may be exposed. This limits initial evacuation to those who need it first, then relies on the fire department to make subsequent evacuation decisions. This approach is typical for Las Vegas properties and is essential to controlling crowd movement.

A single fire command center (FCC) in the central plant portion of the original complex serves the entire project. The FCC is permanently staffed.

The site also has several emergency generators near the buildings they serve to support all key fire protection components.

Most of the facility, including the hotel buildings, the mall, the low-rise podium, and the convention center expansion, is designed and constructed as a high-rise building. The original convention center and the arena are separated from other buildings by 4-hour firewalls and were not treated as a high-rise. However, the primary difference is only that no smoke control was provided in the convention center.

In Nevada, buildings are considered to be high-rises when they are more than 55 feet (17 meters) high. Although the new convention center is only three stories high, the third floor is more than 55 feet above grade, so the building was constructed as a high-rise.

Specific building issues

Because of their many uses, each building at the site had some unique features that had to be considered. This article cannot address all of these features, so it concentrates instead on some of the key issues in the major building components.

The primary fire protection issue for the casino was evacuating large numbers of people. Occupant load calculations for the first floor of the building projected about 14,000 people on this floor. While the first floor is at grade level at the front end of the building, it is above grade on the other three sides. To exacerbate the problem, the five-

story parking garage abuts the building on the west; the theatre and mall cover much of the north face and the House of Blues blocks another large portion; the convention center is to the southwest; and the Four Seasons lobby is to the southeast.

Although the fire alarm system does not automatically sound to the entire floor, the egress calculations assumed that all areas open to the casino or separated by less than 2-hour construction would simultaneously evacuate. To solve the exiting issues for this floor, a combination of exits direct to grade, horizontal exits to other parts of the building or to other buildings, and stairs was used.

The horizontal exits lead to the west into the garage through large sliding doors with man doors and panic hardware into the convention center, into the theater lobby on the northwest, and into the Four Seasons lobby on the southeast. Stairs discharge beneath the mall building into basement exit passageways and down to the pool area. Paths and walkways in the pool area were sized to accommodate the occupant loads of people exiting into the area.

The exit discharges beneath the mall were of particular concern. Clear areas for discharge were designated until access to Hacienda Boulevard was reached. Since the mall also covers Hacienda, analyses of smoke movement and exposures were performed to ensure that occupants would not be exposed and able to exit safely.

The arena

The arena is designed to hold up to 12,000 people in convention or concert mode and about 8,500 people in sporting-event mode. It may also be used as an extension of exhibit space on the floor of the bowl and in concourses. Therefore, the fire protection design had to be flexible while providing adequate protection for each type of event.

The smoke-protected assembly seating provisions of NFPA 101[®], *Life Safety Code*[®], were used to maximize seating. These provisions require a smoke-control system designed to keep the level of smoke above the highest occupants in the facility. This, in turn, demands that a fire size be developed.

Because the floor of the arena could be used for exhibit space, the fire size is quite large. The arena is about 80 feet (24 meters) high, so a combination of the DETACT fire model (a model developed by NIST to determine thermal detector response) and the results of U.S. Navy tests in aircraft hangars was used to estimate fire size upon sprinkler actuation. Once sprinklers actuate, the models

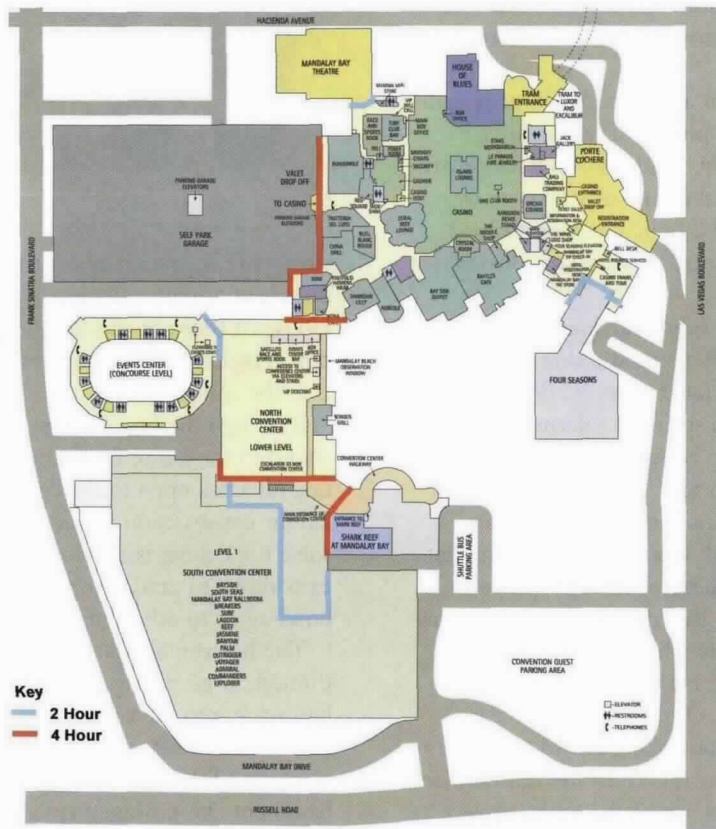


Figure 2. Mandalay Compartmentation.

assume the fire size, which is assumed to be 20 megawatts (MW), will remain constant.

In reality, it is very unlikely that the seats in the arena would be full when the floor is being used for exhibits. For the sake of conservatism, however, the designers assumed that the bowl seating area was completely occupied by people while the floor contained exhibits.

Above the top row of seating is a press area that will have a very small occupant load. Using the exhaust method as a means of calculating smoke-layer height and keeping it above the press area resulted in needing very-high-capacity exhaust fans, as well as the need to get supply to the floor. Rather than maintaining the smoke layer above the press level, it was allowed to descend gradually to 10 feet (3 meters) above the top public level. For the press level, a timed exiting study was performed to determine how long it would take to evacuate. This was compared to the time it would take the smoke layer to drop to that level. Using a safety factor of two, the model showed that the occupants of the press level had more than enough time to evacuate before the smoke layer reached them. Using this approach, the designers reduced the exhaust capacity and the related supply at the base by about 200,000 cubic feet per minute (5,663 cubic meters per minute).

The convention center expansion

The new convention center presented the greatest challenges for the fire protection engineering team. It is one of the largest convention centers in the world and, as such, attracts huge crowds in the range of 75,000 people. Halls A through D on the first floor alone can be combined to give 600,000 square feet (55,70 square meters) of exhibit space with an occupant load of 40,000 people.

The size of the building and the halls created two significant challenges. First, the code permitted a maximum travel distance of 250 feet (76 meters). In some exhibit configurations, travel distance to the exit doors from the halls could be as great as 450 feet (137 meters). And second, there is a need for truck access to two levels because there are large exhibit halls on two levels. This means that exiting and truck traffic need the same space.

To address the travel distance issue, a smoke study and egress analysis was performed. Although the halls are massive, the exiting was rather simple, so timed egress was manually calculated rather than computerized. This resulted in a required safe egress time (RSET).

To calculate the available safe egress time (ASET), the fire protection engineering team used computer modeling to determine when the smoke layer descended to unsafe

WSCE

levels. As with any similar model, a fire size had to be developed before smoke layer height could be calculated. With a ceiling height of 35 feet (11 meters), a DETACT model could be run to determine the fire size at time of sprinkler actuation. However, some shows in convention centers have large shielded areas, such as display booths or yachts, manufactured homes or trucks. The Clark County Fire Department requires sprinkler protection in large covered exhibits, so the covered display booths will not form the most challenging fire. To facilitate this protection, drop risers were provided at several columns. Thus, the remaining challenge is enclosed vehicles.

Although fully loaded trucks may be on the floor during setup and takedown, they are unlikely to be present when a show is in session. Therefore, the design team evaluated anticipated fires in yachts and mobile manufactured homes. Since yachts are typically more compartmented than manufactured homes, which may be open from end to end, the designers developed the peak heat release rate before ceiling burn-through by estimating the peak rate for a series of "rooms" in a mobile manufactured home, and combined them to assume simultaneous burning. This resulted in an estimated fire size of about 16 MW. A fast-growing fire was assumed.

The fire model CFAST was used. CFAST is an acronym for Consolidated Fire and Smoke Transport, and is a zone fire model developed at NIST. This model and other zone fire models are not normally well suited for direct application to large-volume spaces such as convention centers and warehouses. One limiting assumption the model makes is that all products of combustion rise instantaneously to the ceiling of the specified room and form a uniformly thick layer across the ceiling. If one were to observe an actual fire in the middle of a convention center, however, one would probably notice a significant variation in layer height depending on how far one was standing from the fire. For example, no upper layer will have formed initially at a distance of 200 feet (61 meters) from the fire. As the fire progresses, one would notice that, far from the fire, smoke had cooled and the layer had dropped. The smoke would also be less dense in these far-field areas. Near the fire, where the plume and ceiling jet are very hot, the layer would most likely be higher, hotter, and more hazardous. Current zone models don't readily account for this variable phenomenon.

To refine the fire modeling and more appropriately depict the fire physics in large spaces, we used the concept of "pseudo-rooms," subdividing the large halls into 18 different compartments. We chose the number of compartments based on the size of the room and degree of accuracy desired.

One may think of these compartments as individual boxes that are all open to each other by very large "door" openings. Between each compartment, the soffits of the "doors" are 33 feet (10 meters) high, as opposed to

the ceiling height of 35 feet (11 meters), and the width of the "doors" is 95 percent of the length of the "compartment." Generally, these openings reduce the compartment-to-compartment flow by 2 to 5 percent. This approach provides a means of accounting for the friction, thermal and otherwise, experienced by the "flowing" products of combustion. As in a real fire, it would take appreciable amounts of combustion gases longer to collect far from the fire. In addition, combustion products farther from the fire would be cooler. Using pseudo-compartments in zone fire models better reflects this phenomenon by predicting a lower smoke layer further from the fire. The number of pseudo-compartments and size of the compartments is related to the size of the space and engineering judgment. The results are a more realistic representation of a fire in an exhibition hall.

Safe egress

Using this approach, the required safe egress time in the halls ranged from 8 minutes for the smaller halls to 15 minutes for the larger halls. The available safe egress time ranged from 10 minutes for the small halls to 20 minutes for the larger ones. In all cases, the available time exceeded the required time. Safety factors were also incorporated into the design. The ASET times were based only on the size of the hall and the smoke reservoir. In actuality, smoke control is provided in each of the halls, calculated to maintain the smoke layer at 10 feet (3 meters), so a further significant safety factor is provided. Furthermore, the times to exit were doubled before comparing the RSET and ASET. The times shown above are those which include the double evacuation time factor.

The Mandalay Bay is one of the largest connected buildings in the world, with a calculated occupant load of more than 100,000 people. Developing a fire program for such a project requires a comprehensive, thoughtful approach, and the close cooperation of the entire ownership, design, and construction team. Fortunately, this type of teamwork existed during the eight years it took to construct this complex. ♦

JAMES R. QUITER, PE, is a principal of Arup, an international engineering firm, and head of ArupFire in the Americas. He served as Arup's project manager and principal in charge for the convention center, mall, and hotel expansion projects, and as RJA's principal in charge during the earlier phases. Quiter is also chair of the NFPA Safety to Life Correlating Committee and of the newly formed NFPA High-Rise Building Safety Advisory Committee.

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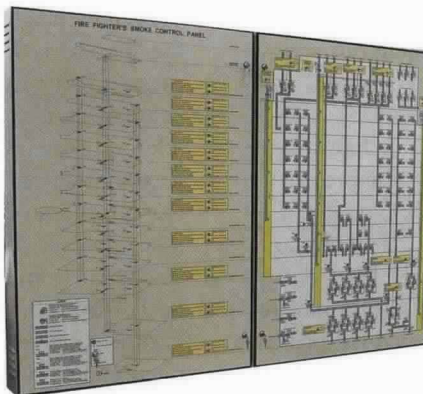
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www.homefiresprinkler.org

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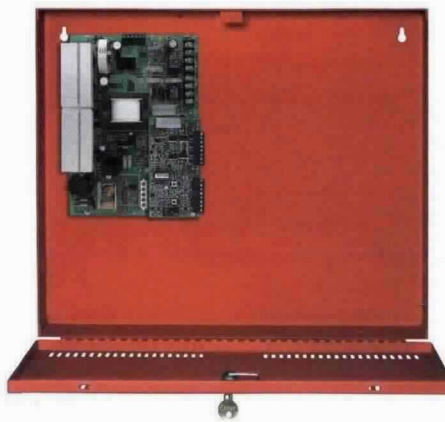
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www.drakausa.com

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www.dupont.com/fire

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Booth 2243

www.durasystems.com

A North American-based manufacturer with over 50 years of proven performance specializing in passive fire protection systems for commercial, industrial, and institutions.

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Edwards Manufacturing

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www.edwardsmfg.com

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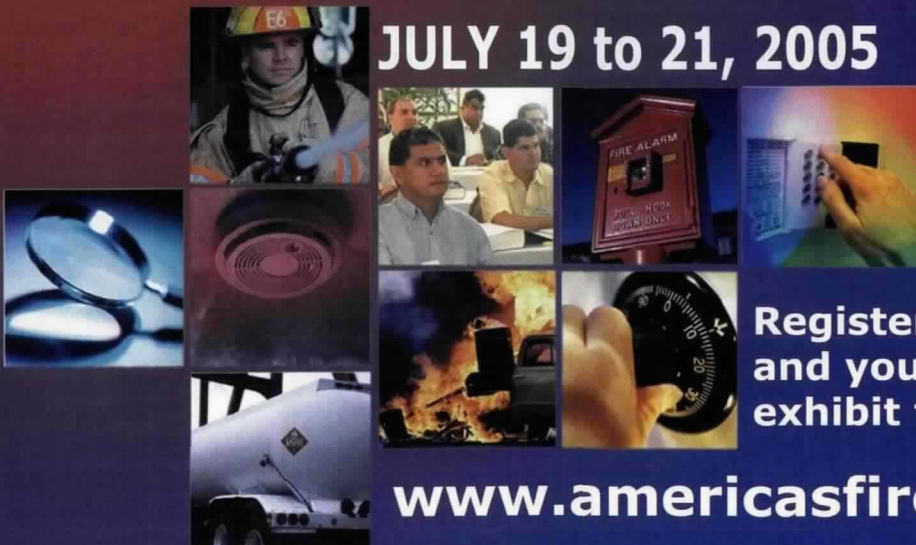
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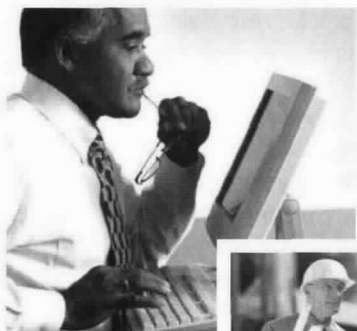
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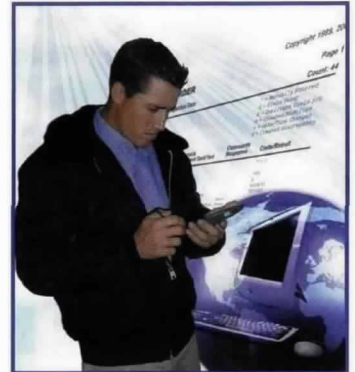
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Booth 2142

www.medc.com

MEDC designs, manufactures and markets a range of field devices for fire and gas and communications systems with worldwide certifications incl. ATEX/UL/FM/GOST/CSA/CQST and many more. The range includes call points, horns, speakers, strobes, status lamps, lighting and control & distribution equipment for use in harsh environments/potentially explosive atmospheres.

Circle Reader Card No. 235

Metraflex Co.

Booth 1959

www.fireloop.info

Fireloop Seismic Expansion Joint protects fire sprinkler systems during seismic events. It is streamlined, takes up less space, takes less time to install, moves in every direction, and is a smart solution. This listed assembly comes pre-tested and requires only two connections.

Circle Reader Card No. 236

Micropak Detection Inc.

Booth 2060

www.micropack.co.uk

Advanced CCTV imaging based flame detector. Each camera operates standalone and incorporates, within a single unit, an integrated CCTV system and DSP Software Algorithms to process the video image and inter-



pret flame characteristics. The flame detector is capable of discriminating between genuine fire conditions and other nuisance radiant sources.

Circle Reader Card No. 238

Metron Inc.

Booth 1625

www.metroninc.com

Metron Inc. is a manufacturer of UL, FM-listed fire pump controllers. See the new microprocessor-based products and our variable frequency drive fire pump controller.

Circle Reader Card No. 237

MIJA Inc.



Booth 749

www.mija.com

Electronically monitored fire extinguishers eliminate the 30-day physical inspection by continually monitoring fire extinguishers for pressure, access and removal. MIJA, the largest manufacturer of spiral wound pressure gauges proudly introduces EN-Gauge. UL listed, code approved and endorsed as an alternative to the required monthly inspections, EN-Gauge is changing the way fire extinguishers are viewed.

Circle Reader Card No. 239

Modeltech International

Booth 2042

www.modeltech.com

"Hazard House" is an interactive portable simulator that will make

your next fire safety presentation more striking and most memorable. This 3D-miniature home illustrates typical fire hazards and injury prevention situations both inside and outside the house. The display features special effects using smoke, arcing sounds, and moveable accessories.

Circle Reader Card No. 241

Modular Protection Corp.

Booth 1866

www.modprocorp.com

Modular Protection Corporation introduces the self-contained modular automated clean agent fire suppression units. Each automated suppression system is factory assembled and tested, minimizing installation time/cost. Custom designed for communications/computer room applications.

Circle Reader Card No. 242

Mircom Technologies LTD



Booth 1265

www.mircom.com

Mircom's FA-300 Series fire alarm control panels are multi-zone units designed for maximum flexibility and easy installation and operation. Equipped with advanced features, the FA-300 Series provide a reliable and economical solution for new and retrofit applications.

Circle Reader Card No. 240

National Diesel Corp.

Booth 259



Diesel engine drives for centrifugal fire pumps, UL/FM approved, from 40 to 640 horsepower. Radiator packages and other ratings available upon request.

Circle Reader Card No. 243

NGC Testing Services

Booth 2143

www.ngctestingservices.com

More than 40 years of providing fast, cost effective evaluations of materials, products and systems for fire endurance and flame spread from the

full developmental stage through the certification process. Accredited lab with full scale floor-ceiling and partition fire test capabilities. Acoustical testing also available.

Circle Reader Card No. 244

Nibco, Inc.

Booth 1900

www.nibco.com

NIBCO manufactures UL, ULC, FMRC, NYC valves for the fire protection market and its valve package has expanded to include TOLCO™ pipe hangers, supports and seismic bracing products including pipe hangers, supports and seismic bracing.

Circle Reader Card No. 245

Notifier

Booth 947

www.notifier.com

NOTIFIER develops cutting-edge fire

detection products that enable a faster, more intelligent response to fire emergencies. Innovations for 2005 include audible exit technology and an intuitive graphic touch-screen designed specifically for firefighters. NOTIFIER - Leaders in Life. Safety. Technology.

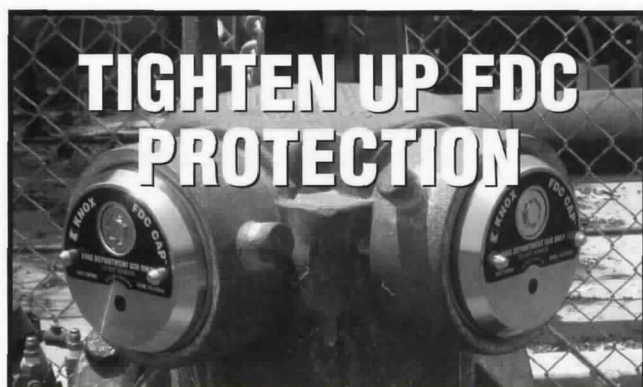
Circle Reader Card No. 247

No Climb Products/SDI

Booth 1335

www.detectortesters.com

No Climb Products/SDI is a world leader in professional test and service equipment for fire detection systems, and supplied SOLO, TRUTEST and CANNED SMOKE, all universal in their design and all market leaders in their respective fields. SDI also offers INSPECTION TRACKER, premier fire inspection tracking software, saving time and



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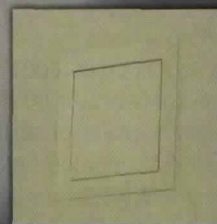
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Normal View



Fire Alarm Fixtures

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Circle Reader Card No. 246

OCV Control Valves

Booth 1622

www.controlvalves.com

OCV Control Valves are known for quality engineering, expert support, simple maintenance, and globe and angle applications.

Circle Reader Card No. 249

Omega Point Laboratories Inc.

Booth 1336

www.opl.com

Omega Point Laboratories is an independent laboratory specializing in the performance characteristics of building materials and systems. OPL is dedicated to being responsive by providing the best quality. Services include testing, listing, labeling, consulting, litigation support, and third-party inspections.

Circle Reader Card No. 250

OMNICADD, Inc.

Booth 1058

www.omnicadd.com

Fire sprinkler software.

Circle Reader Card No. 251

Patterson Pump Company

Booth 349

www.pattersonpumps.com

Patterson continues to be the world's number one supplier of stationary fire pumps. UL/FM approved models include vertical in-line, vertical turbine, horizontal split case, and packaged systems. Manufacturing in Ireland, sales offices in Thailand, Greece, and UK, give world wide service to all Patterson products.

Circle Reader Card No. 252

Peerless Pump Company

Booth 1735

www.peerlesspump.com

Since 1923, Peerless Pump provides industries with the highest quality pumps, packaged pumping systems,

parts, and service. As a recognized leader in pump design, performance, and innovation, Peerless serves customers throughout the world. Our package system business provides the most sophisticated engineered-to-order turnkey pumping systems available in the world today.

Circle Reader Card No. 253

Pem All/Pem Security and Optical

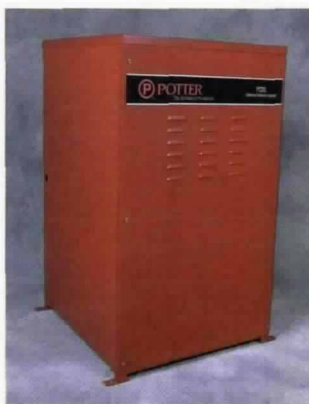
Booth 1704

www.pemall.com

Pem All/Pem Security and Optical FM-200 Engineered, FM-200 Pre-Engineered Low Pressure, Clean Agent Cylinders and Controls, Gas Station, Industrial Dry Chemical, Aero-K Aerosol, Marine Systems, Security and Defense Equipment, Sentri II Neural Recognition Systems, Programmable Visual & Sound Recognition Technology, Sensors, Chemical Tracers, Conventional and Addressable Fire Release and Alarm Panels, Detection, Audio and Visual Alarm Devices.

Circle Reader Card No. 254

Potter Electrical Signal Co.



Booth 1347

www.pottersignal.com

Potter manufactures a full line of fire sprinkler monitoring devices and fire panels. Potter's panels and peripheral devices range from two-zone conventional to 381-point analog addressable, and releasing panels. Potter also distributes the complete line of Amseco

door contacts, sirens, speakers, and fire alarm notification devices.

Circle Reader Card No. 257

Pinghu Chenren Meter Co., LTD

Booth 1825

www.chenren.com

Pressure gauges for fire extinguishers were listed by UL,ULC in 2000. Brass and aluminum forging/die-casting parts like valves, hoses, nozzles,etc.

Circle Reader Card No. 255

Post Glover Lifelink

Booth 2125

www.postgloverlifelink.com

Manufacturers of isolated power systems, operating room equipment and patient care equipment including headwalls, service consoles and columns. We also manufacture a full line of anodized aluminum surface mount raceways, power poles, and columns.

Circle Reader Card No. 256

Potter Roemer

Booth 1842

www.potterroemer.com

Potter Roemer will be exhibiting a full line of standpipe equipment, including cabinets, hose and accessories, fire extinguishers, pressure regulating valves, and fire department connections.

Circle Reader Card No. 258

Protectowire Company, Inc.



Booth 1653

www.protectowire.com

The Protectowire Company will be

introducing a new linear heat detector, Model PHSC-220-EPC designed for a wide range of commercial and industrial applications. Also featured is the new SRP 4X4 Fire Alarm/Releasing Panel that offers unique features such as Alarm Point Location and field selectable Class A or B detection circuits in a standard off the shelf and field programmable package. The SRP 4X4 is UL, FM and CSFM Listed and Approved. Circle Reader Card No. 259

Pyrogen Aerosol, Firepak Oil, and Gas Industries

Booth 1803
www.pyrogen.com
Firepak Oil and Gas Industries provides Pyrogen Aerosol Fire Suppression Systems to the Americas. Providing fire suppression

systems to all industrial sectors. Circle Reader Card No. 260

Rehau Incorporated

Booth 1720
www.rehau-na.com
REHAU manufactures a fire sprinkler system consisting of RAUPEX cross-linked polyethylene (PEXa) polymer pipe and EVERLOC fittings for use in NFPA 13D residential fire sprinkler systems. Circle Reader Card No. 262


Rectorseal Corporation

Booth 1458
www.rectorseal.com
RectorSeal, manufacturer of Firestopping Products, maintains one of the largest listings of systems in UL's Fire Resistance Directory. Our Products include sealants, putty, mortars,


sprays, putty pads, inserts, gaskets, pillows, collars, wrap strips, and composite sheets. We also have a Fire Test Laboratory recognized under UL's Witness Test Lab Program. Circle Reader Card No. 261

Remtec International


Booth 1237
www.remtec.net
Halon and Alternative Replacement Agents. RemTec International offers our customers a full range of clean fire protection agents, such as; Halons 1211, 1301 and 2402, and also new alternative (ozone friendly) agents. RemTec is especially proud to introduce RT-227™ (HFC-227ea). It is a component recognized by Underwriters Laboratories, Inc. and is equivalent to FM-200 and FE-227. Our high quality standards are monitored by our



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EXHIBITOR SHOWCASE

in-house ARI certified laboratory and audited by an outside independent laboratory. Industry specifications include: ASTM 5632, ASTM D6064, NFPA 2001, ISO-7201 and ARI-700 (refrigerants). RemTec International will also purchase used Halon.
Circle Reader Card No. 263

RJA Group, Inc.

Booth 1705

www.rjagroup.com

A global leader in fire protection engineering and security consulting, The RJA Group, Inc. operates in the marketplace through its branded subsidiaries Rolf Jensen & Associates, Inc., fire protection consultants, and SAKO & Associates, Inc., security and communications consultants. The RJA Group delivers specialty consulting for the built environment, exemplifying quality and excellence of service.

Circle Reader Card No. 265

Retrotec, Inc.

Booth 1565

www.retrotec.com

Enclosure Integrity Test Equipment for measuring the leakage rate of clean agent protected enclosures. This is then used for predicting retention times per NFPA 2001 Appendix C and for predicting the peak enclosure pres-

ures upon discharge. Testing services and training are also offered.
Circle Reader Card No. 264

Rockbestos-Surprenant

Booth 1551

www.r-scc.com

Rockbestos-Surprenant manufactures VitaLink 2-hour rated (per UL 2196) circuit integrity cable. RSCC will be exhibiting its full line of 2-hour rated cable including VitaLink CHow voltage circuit integrity cable used on fire alarm and sprinkler and voice evacuation controls; and VitaLink MC and RHW 600 volt power cable used on emergency circuits for fire pump controls, emergency ventilation and smoke fans and emergency lighting. The VitaLink fire rated cable product line provides the broadest offering of 2-hour rated cable in the industry.
Circle Reader Card No. 266

Safe Fire Detection, Inc.

Booth 1837

www.safefiredetection.com

New ProLine Linear Heat Detection and new ProSeries Early Warning Air-Sampling Smoke Detection systems. ProLine is a new affordable linear heat detection line and ProSeries is the next generation in air sampling detectors.

Circle Reader Card No. 267

Safety Storage, Inc.

Booth 2257

www.safetystorage.com

Safety Storage, Inc. has been the industry leader designing high quality, cost-effective hazmat and haz-waste storage buildings and lockers meeting the latest compliance codes for the handling, use and containment hazardous materials, hazardous wastes, and other chemicals.
Circle Reader Card No. 268

Securiplex LLC

Booth 1525

www.securiplexllc.com

Securiplex's Water Mist Systems (WMS) provides fire suppression solutions for industrial, power, marine and semiconductor applications. Total flooding protection - for combustion turbine enclosures, machinery spaces, and special hazard machinery spaces.
Circle Reader Card No. 270

Safety Technology International

Booth 765

www.sti-usa.com

STI manufactures multipurpose push buttons, protective covers and alarms to help prevent theft and vandalism to: fire pull stations, smoke detectors, strobe/horns, biometrics, keypads, exit signs, emergency lights, thermostat controls, motion detectors, clocks, AEDs and heated covers for fire pull stations or strobe units. Many products UL listed and ADA compliant.

Circle Reader Card No. 269

Sensor Electronics Corp.

Booth 768

www.sensorelectronics.com

Manufacturer of Fire Suppression and Gas Detection products. ULC Approved Aerosol Generator called Aero-K® on display. This product is 10 times more effective than gaseous agent alternatives. Other fire suppression products include: CAFS or Twin Agent Systems that can be mounted on a truck, trailer or skid. Also Performance Approved Infrared Combustible and Smart Toxic Gas Detector. Low cost and virtually maintenance free.

Circle Reader Card No. 271

Seung Jin Ind. Co. LTD

Booth 261

www.i-seungjin.co.kr

Flexible Sprinkler Home Fittings has been approved by UL and FM. The spiral design of corrugated pipe provide low fluid resistance. The corrugated pipes are constructed from STS304/3162 and the production length is 700mm-2800mm. (Length outside this range can be ordered to be custom built.)

Circle Reader Card No. 272

Sevo Systems



Booth 1864

www.sevosystems.com

SEVO® Systems, the first UL Listed manufacturer and developer of Fire Fluid Technologies®, featuring 3M™ Novac™ 1230 Fire Protection Fluid. SEVO offers variable delivery pressures. Products featured: thermatic domes, pump systems, small and large capacity total flooding hardware.

Circle Reader Card No. 273

Shurjoint Piping Products

Booth 1931

www.shurjoint.com

A world leader in the design and manufacture of grooved, hole-cut, threaded, plain-end and flow control piping components. Company facilities are certified to ISO 9001 and products are listed, approved and certified by UL, cUL, FM, VdS, LPBC etc. Active members of AFSA, CASA, IFSA, NFPA, and NFSA.

Circle Reader Card No. 274

Siemens

Booth 1021

www.sbt.siemens.com/fis

The focus of the Fire Safety Division of Siemens Building Technologies, Inc. is on the protection of life, property and business continuance from the threat of fire. Our commitment is to provide the best in design, manufacturer and distribution of quality, cost effective products and services in the life safety industry to meet our customers' expectations and surpass industry standards.

Circle Reader Card No. 275

Signalink Technologies, Inc.



Booth 1062

www.signalink.com

Fire-Link is a system designed to supplement the signaling capabilities of a building's existing fire alarm system by utilizing the existing wiring infrastructure, the 120V AC power line, Signalink offers the fire protection industry a solution to audibility problems that is easy to install without the

expense of any additional wiring. Our systems has all the features expected of a life safety product.

Circle Reader Card No. 276

Silent Knight

Booth 1059

www.silentknight.com

Silent Knight now offers a full range of fire alarm solutions through its Farenhyt analog/addressable fire systems. The series includes the IFP-50, IFP-100, IFP-1000, and the IFP-100/1000 Voice Integration Panel. The series also includes the IFP-Net Fire System Manager, a PC-based system that monitors Silent Knight's fire control panels.

Circle Reader Card No. 277

SIMPLEXGRINNELL

Booth 443

www.simplexgrinnell.com

SimplexGrinnell, a business unit of Tyco Fire & Security, is a leader in fire protection and life safety. The Simplex-Grinnell portfolio includes fire alarm, fire sprinkler, fire suppression, integrated security and healthcare communications systems and services.

Circle Reader Card No. 278

Space Age Electronics Inc.

Booth 1729

www.1sae.com

Manufacturer of fire alarms, fire alarm systems, fire alarm products, fire alarm detection systems, graphic annunciators, tabular annunciators, wire guards, notification, strobes, sounders, terminal cabinets, battery cabinets, smoke control annunciators, security and suppression, and carries a complete line of relay products.

Circle Reader Card No. 279

Spears Manufacturing

Booth 1747

www.spearsmfg.com

Spears® is a leading manufacturer of CPVC fire sprinkler, pipe fitting and sprinkler head adapters under the



FlameGuard™ brand. Spears proprietary stainless steel reinforced CPVC head adapters greatly increase system integrity.

Circle Reader Card No. 280

Spectrex Inc.

Booth 1365

www.spectrex-inc.com

Spectrex is a leader in innovative optical gas and flame detection products. The new Mini IR3 (20/20MI) is a small, lightweight, low-power, inexpensive, general-purpose flame detector, highest false alarm immunity.

Circle Reader Card No. 119

Specified Technologies Inc.



Booth 1822

www.stifirestop.com

Specified Technologies Inc (STI) is a leading manufacturer of firestop products with over 700 UL-classified systems. We concentrate all our resources on providing quality, performance, and value under our

SpecSeal® and EZ-Path™ brands.
Circle Reader Card No. 195

Spectronics Corp.

Booth 458

www.spectronics.com

Spectronics designs and manufactures fire and security monitoring and control systems for commercial, industrial (including special hazards) and institutional markets. Products range from small conventional panels to large engineered voice evacuation systems with thousands of zones.

Spectronics also sells initiating devices, notification appliances, annunciators (including graphic), power supplies and accessories.
Circle Reader Card No. 221

System Sensor



Booth 629

www.systemsensor.com

System Sensor is the world leader in fire detection and notification devices. With sales, service and manufacturing facilities throughout the Americas, Europe, and Asia, our product line consists of system smoke detectors, duct smoke detectors, waterflow detectors as well as a complete line of horns, speakers and strobes.

Circle Reader Card No. 099

Stryker

Booth 2104

www.evacuation.stryker.com
Stryker's Evacuation-CHAIR is designed for the evacuation of disabled or injured personnel from multi-level facilities in emergency situations. It features the innovative Stair-TREAD™ system, enabling one person to control movement down stairs and out to safety without lifting. The Evacuation-CHAIR exceeds standards set by the ADA for accessible egress.
Circle Reader Card No. 248

Superior Tank Co., Inc.

Booth 1523

www.superiortank.com

Manufacture and install bolted and welded steel storage tanks. Capacities from 20,000 to 10 million gallons. Fire protection, service water, and portable water industries.
Circle Reader Card No. 284

SPP Pumps Inc.



Booth 1065

www.sppumps.com

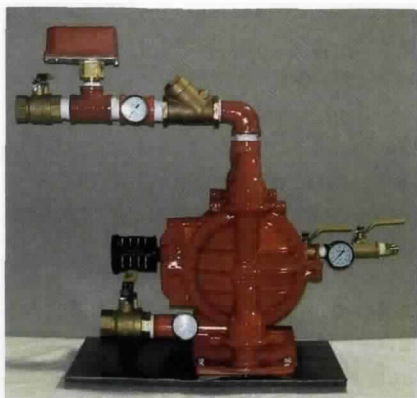
SPP Pumps Fire Products comply with the demanding requirements of the UL and FM approval standards and meets all the requirements of NFPA 20. As the first pump manufacturer in Europe to achieve FM approval, SPP has one of the widest range of approved and listed equipment in the world.

Circle Reader Card No. 098

Talco Fire Systems

Booth 1954

www.talcofire.com



Talco specializes in development, manufacture and sales of packaged pump systems for NFPA 13D, NFPA 13R, and other NFPA applications. A broad product line allows us to handle just about any application. Our extensive experience enables us to back-up our equipment and work with engineers on difficult installations. Circle Reader Card No. 097

Task Force Tips Inc.

Booth 1442
www.tfft.com

Task Force Tips is a world-wide leader in the design, manufacture, and distribution of quality high performance fire suppression equipment for the municipal, industrial, wildland, and military services. Circle Reader Card No. 096

TEEX Emergency Services Training

Booth 365
www.teex.com/esti

TEEX Emergency Services Training Institute offers state-of-the-art comprehensive training to more than 50,000 emergency response personnel from all 50 states and more than 40 countries every year. We offer courses in Firefighting, Rescue, Hazardous Materials, Aircraft Rescue and Firefighting, as well as nuclear/chemical/biological terrorism courses. Circle Reader Card No. 094

Telex Communications

Booth 1800

www.telex.com
Pro-Announce paging and life-safety voice evacuation system.
Circle Reader Card No. 093

TISCOR



Booth 366
www.TISCOR.com
FireProof XT from Brady/TISCOR uses software and hand-held computers to automate the inspection and maintenance activities associated with fire/life safety equipment. The system increases productivity, ensures data integrity and assists in proving compliance with regulatory agencies. Circle Reader Card No. 095

Technology Research Corp.

Booth 2022
www.trci.net

TRC is recognized as a worldwide leader in electrical safety products that prevent electrocution, electrical fires and protect against serious injury from electrical shock. TRC's Fire Shield® products are the world's first and only surge strips and cords that prevent cord fire, ground faults, surges, and overloads. Circle Reader Card No. 092

Tolco, a brand of Nibco, Inc.

Booth 1900
www.tolco.com

TOLCO is a manufacturer of quality products including pipe hangers, supports and seismic bracing for the residential and commercial fire protection markets. With more than 35 years experience, TOLCO is a leader

in seismic bracing technology. TOLCO also pioneered the development of hangers for CPVC pipe. Circle Reader Card No. 091

Tomco Fire Systems

Booth 2210

Tomco equipment company has been a leader in the manufacturing of CO2 equipment for more than 30 years and will introduce a state of the art low pressure CO2 fire suppression system thru its new division Tomco Fire Systems. This product is currently being tested at one of the nationally recognized testing laboratories. Circle Reader Card No. 090

Tornatech Inc.

Booth 358

www.tornatech.com
Since 1985, Tornatech manufactures fire pump controllers built to NFPA 20 and UL 218 standards. Amongst our products are electric fire pump controllers with or without automatic transfer switch, diesel engine fire pump controllers, and miscellaneous pump controllers such as jockey pump controllers, alarm panels, and booster pump controllers. Circle Reader Card No.089

TVA Fire & Life Safety Inc.

Booth 1451

www.tvafiresafety.com
TVA Fire & Life Safety, Inc. offers comprehensive loss control, fire protection, life safety, security, engineering, and risk management services to Fortune 500 companies and smaller firms. Headquartered in San Diego, California, TVA has nine regional offices (and one European location) and more than 200 employees, making it one of the largest fire protection engineering firms in the world. Circle Reader Card No. 088

Twenty-First Century Fire Suppression Systems

Booth 1142

www.21centuryfire.com
Residential range-top fire suppression system.
Circle Reader Card No. 087

Tyco Fire Suppression Group

Booth 843
www.ansulinfo.com/nfpa5
Tyco Fire & Security-Fire Suppression Group. Discover the innovations offered by Tyco's Fire Suppression Group of Portable, Foam, Forestry, Marine, and Commercial Suppression Products. We'll be featuring our ANSUL® and PYRO-CHEM® brands while introducing CLEANGUARD® non-magnetic fire extinguishers, SAPPHIRE™ clean-agent systems, and MAGNUM™ rapid intervention vehicles.
Circle Reader Card No. 086

Tyco Fire and Building Products

Booth 547
www.tyco-fire.com
Tyco Fire and Building Products is a leading manufacturer of water based fire suppression system components and auxiliary building construction products continually expanding its capabilities through innovative research and product development. It provides its customers effective fire protection and construction solutions for residential, commercial, industrial and institutional buildings.
Circle Reader Card No. 085

Tyco Thermal Controls

Booth 547
www.tycothermal.com
Pyrotenax is the leading brand of 2-hour, fire-rated electrical cables. Pyro CiC is a 2-hour, fire-rated FPL and NPLF fire alarm cable that connects the main fire alarm panel with data-gathering panels (transponders) throughout the building. Pyro CiC's tubed jacket makes it the easiest cable on the market to terminate.
Circle Reader Card No. 084

Underwriters Laboratories Inc.

Booth 1634
www.UL.com
Underwriters Laboratories Inc. is proud to partner with you in your commitment to public safety. Our team offers technical support that includes everything from online information to on-site field evaluations. UL and the integrity of the UL Mark offers you something important when making compliance decisions: peace of mind.
Circle Reader Card No. 083

Unique Fire Stop Products

Booth 1901
www.uniquefirestop.com
Mechanical sleeve systems for fire barrier penetrations. Systems are neat-complete-effective and reasonably priced. Makers of the "split sleeve" and penetrator systems. NEW products: endcaps for empty sleeves.
Circle Reader Card No. 082

UNR Fire Science Academy

Booth 1929
www.fireacademy.unr.edu
The University of Nevada, Reno, Fire Science Academy is committed to providing the highest quality training in the fields of fire protection, crisis management, rescue, hazardous materials and instructor training to its global clientele, allowing them to be leaders in the life-safety field.
Circle Reader Card No. 081

Uponor Wirsbo

Booth 1751
www.wirsbo.com
Uponor Wirsbo's AQUASAFE® is a multi-purpose fire sprinkler system intended for NFPA 130 installations. AQUASAFE utilizes AquaPEX® cross-linked polyethylene tubing to create a cost-effective fire sprinkler system, integrated with the potable water.
Circle Reader Card No. 080

USA Tank Storage Systems

Booth 2038
www.usatanksales.com
USA Tank Storage Systems sells and erects, steel welded fiberglass and plastic tanks for liquid and dry applications. We also sell and install immersion heaters, level controls, insulation. USA Tank Storage Systems can turn key your projects.
Circle Reader Card No. 079

Vibro-Meter Inc.



Booth 1547
www.vibro-meter.com
Our new Model 760 Multi-Spectrum IR optical flame detector is approved for use in both hydrocarbon and non-hydrocarbon applications where multi-spectrum IR is specified or best suited. The patented "5" band-width sensor design provides superior detection and false alarm discrimination capabilities.
Circle Reader Card No. 078

Viega North America

Booth 764
www.viega.com
Viega offers the ProPress copper joining system, which includes sprinkler head fittings in a variety of size combinations. The ProPress System utilizes a press technology eliminating the traditional sweat method for joining fittings saving considerable installation time and expense.
Circle Reader Card No. 077

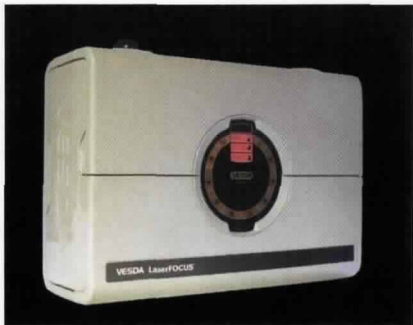
Viking Group

Booth 1611



www.vikingcorp.com
 Visit the Viking booth to see the latest innovations in fire sprinklers, including the K14 ECOH Pendent Sprinkler, K17 Upright Sprinkler, Model E Spray Nozzles and expanded Freedom™ residential sprinkler line. The new ESFR Cold Storage System for protecting freezers is also among the products you'll learn about.
 Circle Reader Card No. 076

Vision Systems



Booth 1659
www.visionusa.com/vesda
 The trend toward smaller and more concentrated critical business operations has driven the need for more flexible and focused solutions to protect high value assets. Vision Systems addresses these needs by offering outstanding

VESDA smoke detection performance for smaller, critical areas - previously limited to conventional protection methods. VESDA is used in a variety of applications ranging from clean to harsh environments.
 Circle Reader Card No. 075

Viviglo Technologies Inc.



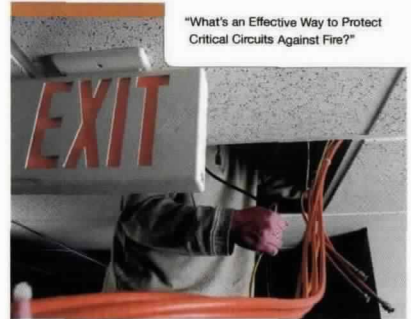
Booth 2014
www.viviglo.com
 Viviglo™ Technologies Inc., manufacturer of photoluminescent safety egress products. This is not a tape system. Viviglo combines cold injection molding, metal finishing and casting as components of our state-of-the-art manufacturing capabilities. Today, Viviglo is the technology leader in this industry.
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Westex Inc.

Booth 2023
www.westexinc.com
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Wacker Chemical Corporation

Booth 1865
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mineral-based fire cables.
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Wheelock, Inc.

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Booth 466

www.zurn.com

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Worcester Polytechnic Institute

Booth 963

www.wpi.edu/+ADLN

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Wireguard, Inc.

Booth 2124

www.wireguardinc.com

WireGuards are reusable 18-gauge steel plates that protect electrical and datacom wires from damage caused by sheetrock routers, drywall mud and paint. Available in a variety of sizes that easily fit into the electrical box providing needed protection. Circle Reader Card No. 066

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Booth 1927

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Zero International

Booth 1066

www.zerointernational.com

Zero International is a domestic manufacturer of intumescent products used in a wide range of fire and life safety applications. Along with the intumescent products, we manufacture both gasketing and extrusions for smoke and fire applications as well as a line of fire rated lites and louvers for doors. Circle Reader Card No. 063

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OUTREACH CONTINUED FROM PAGE 42

heat and keep the oven door closed to prevent flames from burning you and your clothing.

- Always use cooking equipment tested and approved by a recognized testing facility.

- Treat a burn right away using cool water. Cool the burn for 3 to 5 minutes with a clean, dry cloth. Seek medical help.

To my relief, my hair has grown back to its normal length. A technician fixed the oven, and I finished preparing the welcome-home meal at a neighbor's house. Most importantly, I learned first-hand how quickly cooking a meal can go terribly wrong if safety precautions aren't followed. 🔥

LISA BRAXTON is a public education project manager with NFPA's Public Education Division. In this position, Lisa manages projects for the Public Education division and the Center for High-Risk Outreach.

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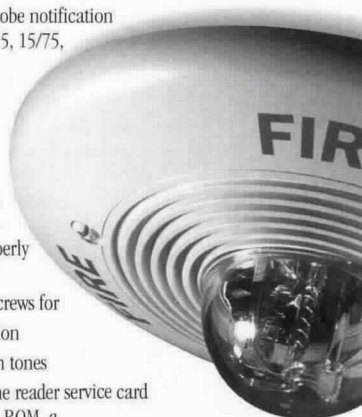
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