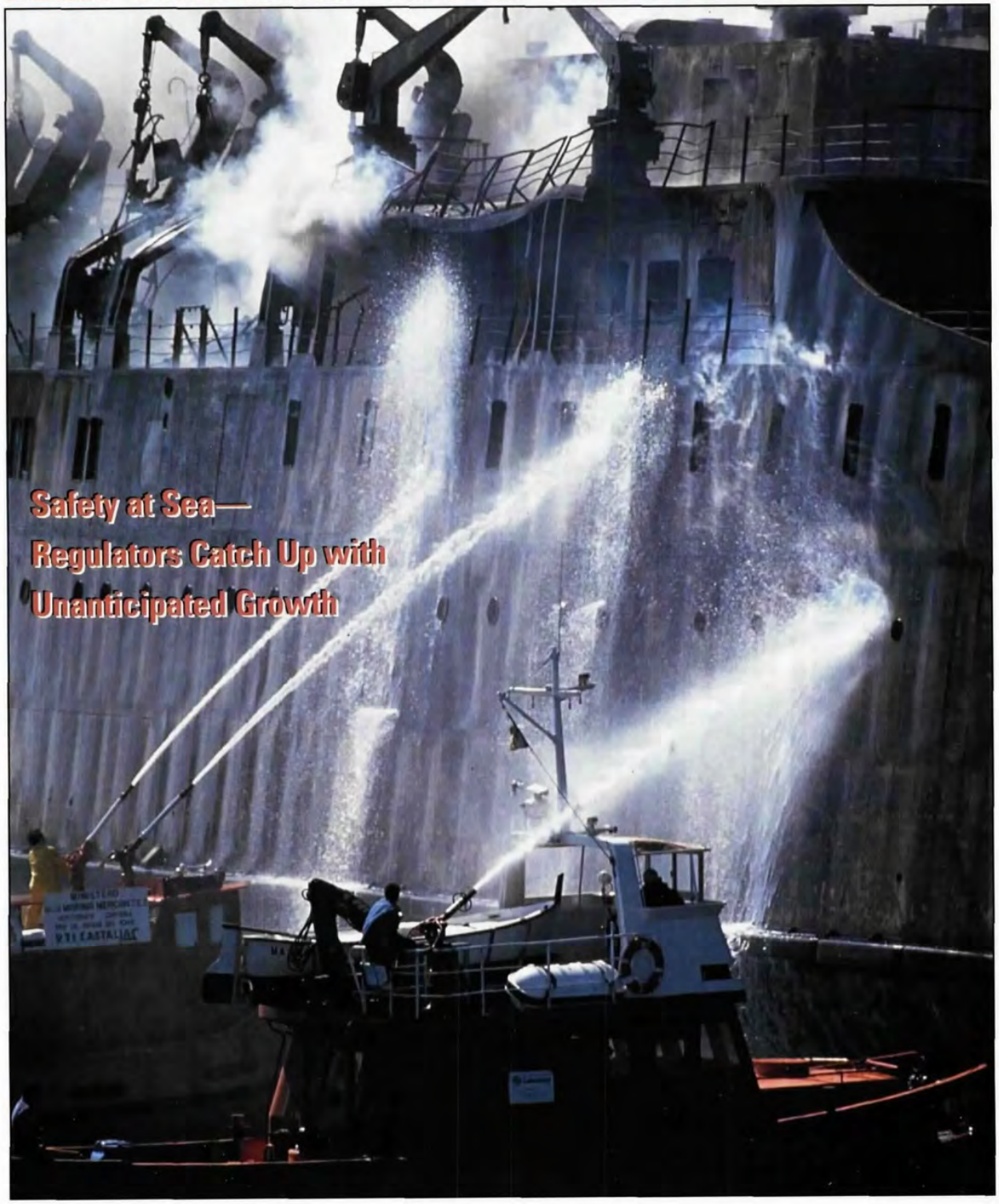
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May/June 1998

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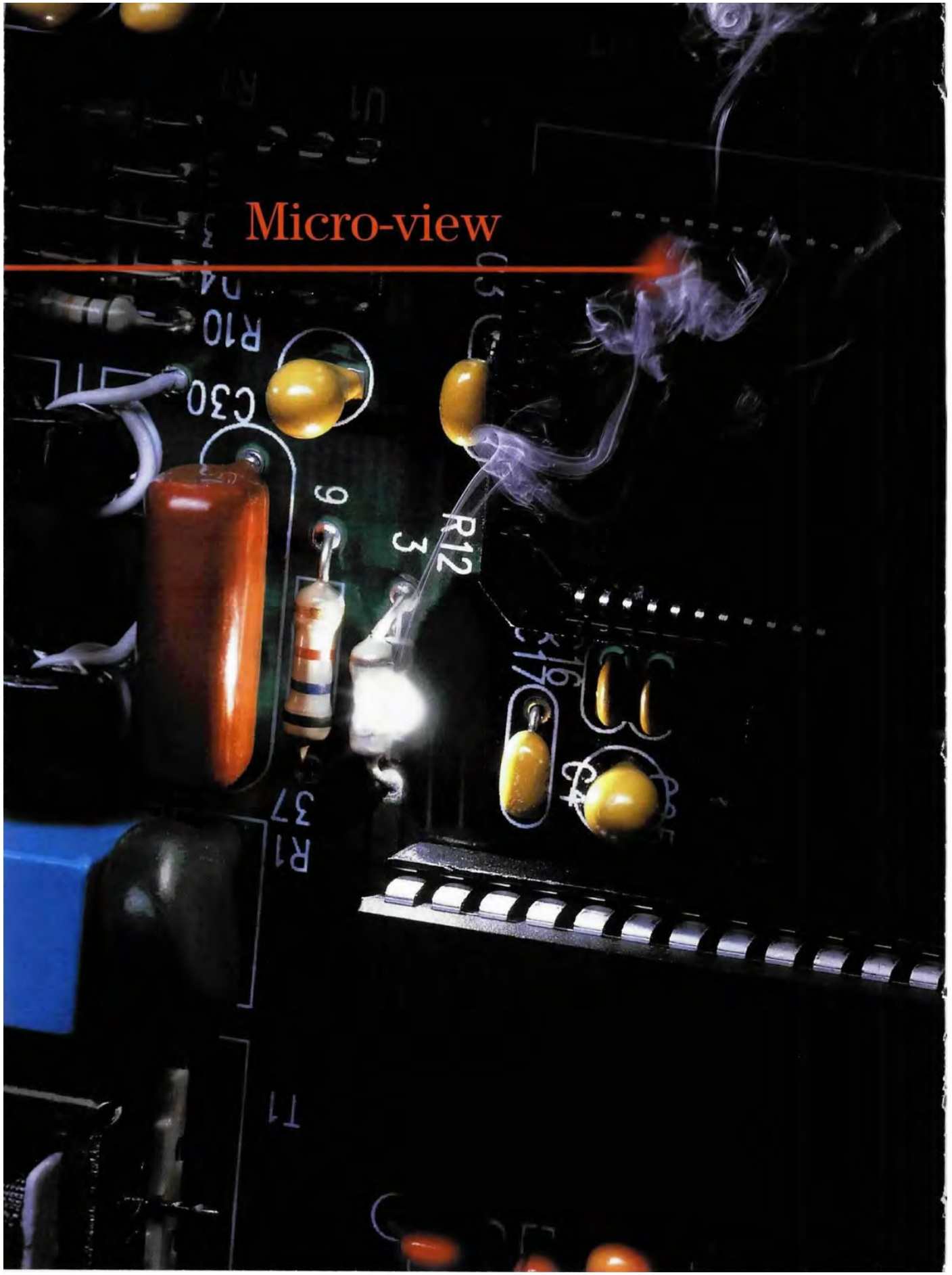


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NFPA, ICC End Agreement



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The theme of this year's Annual Meeting is "Building a Bridge to a Fire Safe World." "Building a bridge" is a metaphor commonly used to express the desire to bring people, ideas, or organizations together. Unfortunately, building a metaphorical bridge can be as difficult as building a physical bridge, if not more so. Sometimes, in spite of everyone's best efforts and intentions, a bridge simply can't be built.

Such was the case with NFPA's desire to fashion a single model fire code with the International Code Council (ICC). On a number of occasions, I've spoken of the need to replace the four fire codes currently used in the United States with one. The four codes are NFPA 1, *The Fire Prevention Code*, and the codes of the three regional model building code organizations, ICBO, SBCCI, and BOCA, which are the ICC's only members. A year and a half ago, we signed an agreement in which we proposed developing one model fire code for the country.

We knew at the outset that there were formidable obstacles to overcome. The most obvious was the fact that NFPA trusts in an open consensus process for developing codes and standards, while ICC members use a process that essentially restricts voting to enforcers, typically building code officials. Finding a way to reconcile these two different processes without compromising the integrity of either was the first challenge.

A major stumbling block was the ICC's desire to restrict the jointly developed *International Fire Code* to existing construction and fire protection system maintenance and to use the proposed *International Building (Structural) Code* for fire protection requirements related to new construction.

We believe that any code dealing with fire safety issues must reflect the knowledge and interests of fire officials. They need a voice in these codes and a right to vote. And fire officials are vitally concerned about the fire protection features of both new and existing buildings, as well as their maintenance.

Despite much discussion, the obstacles just couldn't be overcome. Sometimes, the ground simply isn't firm enough to lay the foundations for a bridge. NFPA will continue to develop and support the adoption of NFPA 1 as the one model fire code developed in a true consensus process and written to cover new and existing buildings—*everywhere* fire officials seek to protect people from fires. NFPA will also help users tailor NFPA documents to documents from other sources, such as the ICC, to develop a complete package of codes for the built environment. And NFPA is still interested in partners in code development, provided they, like NFPA, believe in the broad consensus process as a bedrock value. In addition, we plan to work with the ICC as we did with the three model building code organizations before the ICC was formed. In the end, NFPA will make sure Americans have the fire codes they need and want.



George D. Miller, President
National Fire Protection Association

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■ Kindergarten 101

I thought Jenna Von Dietsch's "Learning from Schools" in "Burning Issues" in the September/October 1997 issue was timely. I was disappointed that she listed fire drills almost as an afterthought as to why schools are so safe. The enforcement of fire drills—that is, safety management—is what really separates schools from other occupancies. We are not going to greatly improve fire safety until we address how to properly motivate occupancy owners to develop, practice, and implement emergency procedures.

Hal Cohen, P.E., C.S.P.
Fire Protection and Safety Engineer

■ Explaining the break-up of NFPA's agreement with ICC

I think NFPA owes the industry just a little more "information" and "explanation" concerning this "breakdown" between them and the ICC about this recent "divorce" on the *International Fire Code* process. As an architect deeply interested in the development of a consensus code, I fail to see the argument put forth by NFPA (in their recent press release) that this "commitment" on the part of NFPA leads them to break away from a process that (on the surface) seems to meet with the approval of the ICBO, BOCA, and SBCCI.

To quote NFPA President Miller, "NFPA's century-old code- and standard-making system is based on the firm belief that everyone with knowledge and interests in the subject of a code or standard deserves to have a voice in the development of that document."

If this is true (which I believe it is), then how does Miller square that comment with the NFPA decision to divorce itself from the "voice" that the remaining members of ICC seem to subscribe to? Do not ICBO, BOCA, and SBCCI deserve to have a voice in this process? Is not this decision by NFPA denying them that voice?

[Miller goes on to say that] "After more than two years of hard work, NFPA has concluded that the process we were attempting with the ICC would not allow sufficient participation by interested parties, including the fire service, and so would not result in the kind of fire code the public deserves."

So, why not try a "process" that protects that voice while, at the same time, protecting the efforts and commitment to truly (for once) have one national code. The laws of physics do not change when one passes from Alabama to Georgia, nor when one crosses the city limits of Quincy.

Therefore, any difference of opinion between any two organizations or entities concerning codes signals nothing, if not a failure of imagination and creativity—as well as vision.

While we're on the subject, maybe Miller should explain in more detail what he means by "the kind of fire code the public deserves." From my seat, it appears that it is NFPA that has lost sight of the bigger picture here, and it is not the protection of one's turf that holds higher priority. Sadly, that is what appears to have happened.

John H. Cato, Jr.
Architect, Professional Member—SBCCI
Georgia

Association response: Your letter indicates a fundamental misunderstanding of the issues involved in the ending of the NFPA/ICC agreement to develop a single fire code. I don't know whether you and we disagree because of a communication problem or because we have philosophical disagreements similar to those that ended the agreement, but let me try to address the former.

You say that you can't understand how NFPA's commitment to true consensus codes led it to break away from a process supported by the three ICC partners. From our point of view, the agreement broke down precisely because the ICC seeks consensus only among the building officials and other enforcers directly represented by the ICC member organizations, while NFPA seeks consensus among *all* knowledgeable and interested parties. Despite hard work over two years, we never could cross that philosophical divide.

You ask how we could "deny" a voice to the ICC constituents. They have always had a voice and a vote in NFPA's process. That didn't begin with the NFPA/ICC agreement, nor did it end when that agreement ended. In NFPA's process, however, the building officials didn't have the *only* voice or the *only* vote. The latter, at least, is not true of the ICC process. Again, this was the philosophical divide that we could not bridge.

As to the laws of physics not changing when one crosses state borders, NFPA certainly agrees. With NFPA 1, *Fire Prevention Code*, we've had the only national fire code and still do. When we say that we still believe in a unified approach to national codes, that has less to do with nationalizing regional codes—an exercise that the ICC partnership needs to pursue with the codes of its member organizations but which

From the editor:

We're trying something new, and we hope you'll like it.

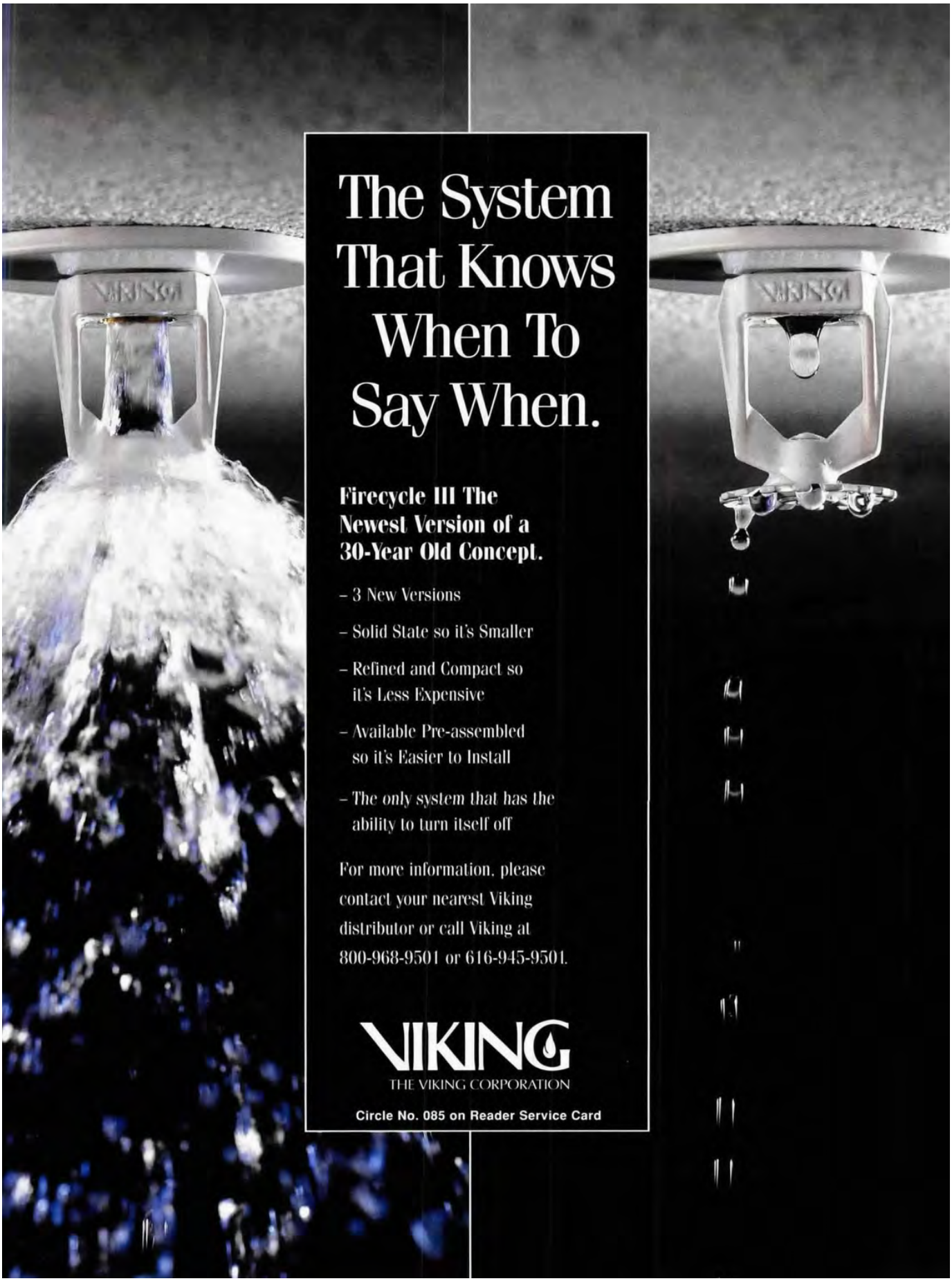
As many of you already know, *Journal* recently conducted several focus groups to help us determine how well we're fulfilling your needs as readers and as NFPA members. We heard what you said, and we've made some changes.

Among other things, you'll notice that we've added short, informative sidebars where appropriate that contain lessons learned and other useful information. And we've introduced a new type of feature we call an "application" story, which describes real-life fire protection solutions to real-life fire protection problems. Turn to page 120 for the first of these articles, describing the recent fire protection system upgrade at the newly refurbished The Crown Coliseum in Cincinnati.

Those of you who were generous enough to participate in our research have given us a lot to think about. I hope all of you will continue to share your ideas with us.

Kathleen M. Robinson

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NFPA achieved long ago—but more to do with making sure that fire and nonfire codes are compatible.

NFPA intends to pursue that goal, but as we do, we'll make sure that, for example, fire officials have a voice and a vote on any provisions that involve fire safety, whether they have to do with new or existing buildings. In fact, that was another aspect of the philosophical divide that ended the ICC/NFPA agreement: The ICC partners were unwilling to allow the fire code to be more than a maintenance code for existing buildings.

If all this sounds like nothing more than "turf" protection to you, then I guess we'll just have to disagree. To us, it couldn't be clearer that what's at stake is nothing less than the fundamental basis by which Americans decide issues of fire safety that affect us all. The "fire code the public deserves" is a fire code that reflects the values and the insights of *all* knowledgeable and affected parties. It's what the public needs, it's what the public demands, and NFPA will make sure it's what the public has.

Gary Tokle
Assistant Vice President, Public Fire Protection NFPA

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■ What's with that cover photo?

There's an old saying that "a picture is worth a thousand words," and the cover of the latest *NFPA Journal* (March/April 1998) certainly says a lot. Although the cover subject is the 1997 wildfire season, your cover photo shows nine firefighters fully outfitted in structural turnout protective clothing: None of the equipment appears to be the type of PPE recommended for wildfires, nor would it be compliant with NFPA 1977, *Protective Clothing and Equipment for Wildland Firefighting*.

As the standards-setting organization for the U.S. fire service, I encourage you to carefully consider the subtle message that is being sent to your readers through the pictures used in the *Journal* and insure that the appropriate (and NFPA-compliant) protective clothing and equipment is displayed.

Dick Mangan
Chair, NFPA 1977
U.S. Forest Service
Missoula, Montana

***Journal* responds:** Mea culpa! Sometimes, we screw up, and this was one of those times. Thanks for keeping us honest.

■ Another idea for improving smoke detector batteries

Since J. Scott Mitchell of the Dallas, Texas, Fire Department wrote his letter, in which he was moved by a "Firewatch" column about three children who died in a house fire, a volley of letters to the editor on the issue of smoke detector batteries has appeared in the *Journal*. Jorge Batlle, responding to Mitchell's suggestion, wrote that special smoke detector batteries wouldn't work.

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solution to the problem of "missing" smoke detector batteries—at least for hard-wired smoke detectors. Instead of a separate battery for standby, smoke detectors could be manufactured with an integral battery that receives a trickle-charge from the house current to keep it fully charged for standby use. Such systems are commonly used for emergency lighting fixtures. This eliminates the need for humans to insert batteries.

As for battery-powered smoke detectors, I agree with Batlle that standard batteries should be used. Again, improvements could be made in smoke detector design to minimize the chances that batteries will be "missing." One improvement would be to have all smoke detectors have a drawer into which the battery is inserted, instead of the current battery compartment which requires removing the detector from the ceiling and connecting the wires to the battery, then replacing the detector. The drawer is simply opened without removing the detector, a battery inserted (no wires necessary), then closed. If there is no battery, the drawer cannot be closed. The drawer sticking out is an additional visual reminder that the detector needs a battery, especially if the drawer is brightly colored. This design greatly simplifies battery installation so that, hopefully, it will eliminate the burden.

Jeffrey D. Halpert
Fire Prevention Inspector
Fire Prevention Bureau
Glendale, California

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■ Public relations and the fire service

About "Customer Service with Pride" in the January/February 1998 issue of *NFPA Journal* by Robin Paulsgrove—Yes! Public relations is a big part of the fire service. In New Jersey's state capital, the fire department not only fights fires, it gives directions, installs smoke detectors and replaces batteries, fixes bicycles, drains basements, assists stranded motorists, and I've chased bad guys and helped victims until police officers arrived. Our training office issues monthly assignments which include required readings from Chief Brunacini's book!

John K. Honer
Firefighter, Engine Company #8
Trenton, New Jersey

■ Illustration hits a nerve

I wish to comment, not on the written content of "Strengthening the Standards," but on the illustration prominently displayed on page 26 of the January/February 1998 issue of the *Journal*.

Sir, I am a safety professional and a veteran (meaning old) firefighter. I have served in the safety field for 12 years, and in various aspects of fire service since 1966. I am a member of NFPA since 1986 and am proud to be associated with NFPA, the fire service, and the field of safety. I have found the *Journal* to be an excellent proponent of all three of these thing that I hold dear.

I believe that you have done a disservice to the NFPA and the field of safety with your depiction of what is obviously NFPA



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staff or members in callous disregard of safety in order to grind out a new NFPA 13. Shame on you! Those of us in the field who strive against complacency to educate and train others to be constantly vigilant against hazards and unsafe acts have been dealt a "low blow" by those who should be representing the epitome of regard for safety.

How dare you depict members of such an organization of NFPA in a way so demeaning as to have one perched precariously atop an illegal step ladder? Is this supposed to represent the "real" attitude of NFPA towards safety? If so, what then about fire prevention and protection?

I expect better from you.

Glen Pysell

***Journal* responds:** Good grief, as a well-known cartoon character is wont to say! Evidently, the pen *is* mightier than the sword, at least in a talented illustrator's hands.

I'm sorry you've interpreted what was meant to be a lighthearted cartoon depicting the difficulties of combining several codes into one as a slap at NFPA staff, NFPA members, the fire service, and the field of safety in general. No such thought ever entered our minds, I can assure you.

Surely, the "real" attitude of NFPA toward safety is quite evident, if not in *Journal*'s continued support and coverage of it, then in NFPA's championship of the codes- and standards-making system, our development of lifesaving curricula, our publication of nationally adopted fire and electrical safety guidelines, our sponsorship of Fire Prevention Week, our various training seminars, and our alliances with other national and internationl safety organizations. Safety is NFPA's very reason for being, as any member, particularly one of long-standing, knows.

Kathleen M. Robinson
Publisher, NFPA Journal

■ Clearing up some misconceptions about Medicare

It was with great interest that I read Alisa Wolf's article on home health care in the January/February 1998 *NFPA Journal*. I would, if I may, like to correct some of the technical inaccuracies which appear in Ms. Wolf's article.

Ms. Wolf states: "In a fire, for example, hospital staff are trained to get people out of the building." Not true. Yes, the patient in immediate danger should be moved, usually to another room or compartment on the same floor. Staff in health care facilities are trained to close patient room doors to confine the fire and to transmit a fire alarm, which is arranged to ring at the fire department. Hospitals and other health care facilities are defend-in-place occupancies. *Life Safety Code*® Chapters 12 and 13 for health care occupancies are written to provide protection in place, not evacuation of the building.

Ms. Wolf states: "Though hospitals need JCAHO accreditation to participate in Medicare, HHA's...." Not true. The approximately 4,800 hospitals which are accredited by the JCAHO or the American Osteopathic Association are deemed to meet Medicare requirements by virtue of their accreditation. There are, however, over 1,400



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hospitals which are nonaccredited and participate in the Medicare program by virtue of meeting the Medicare *Conditions of Participation* in the federal regulations.

Finally, Ms. Wolf quotes Chief Deputy Fire Marshal Darl Cross of West Virginia as asking: "What's a hospice? Or a hospice house? What occupancy would that be? How much protection do you provide?" Mr. Cross should know that a hospice which participates in the Medicare program—and there are currently 2,285 participating hospices—(hospice has been a benefit provided by Medicare since 1982) must meet the health care occupancies chapters of the *Life Safety Code* of NFPA, just as a nursing home must.

Although there may be a difference of philosophy or opinion on the matter of whether staff is trained to evacuate hospital patients during a fire, there can be no difference of opinion on matters of fact regarding health care facilities which participate in the Medicare program. I invite and encourage Ms. Wolf—or anyone else, for that matter—to call me if they need any facts about health care fire protection. If I don't know the answer, I usually know who does. It would be nice to provide your readers with the accurate and correct information they deserve.

Mayer D. Zimmerman, M.S.
Life Safety Code Specialist
Health Care Financing Administration
Baltimore, Maryland

Association response: Mr. Zimmerman's comments are correct with respect to the finer points of evacuation and Medicare requirements.

The evacuation of hospital patients or nursing home residents is only considered as a last resort. There have been several cases in the last few years in which noncomplying facilities have had fires that resulted in smoke migration to all patient-care areas. In these few situations, the defend-in-place concept didn't work, due to construction deficiencies, and the occupants had to be reloacted to other facilities. Mr. Zimmerman is absolutely correct, though, in stating that relocating patients within a building is always preferred.

Based on the provisions of the *Life Safety Code*, the answer to the question of what consitutes a hospice may not be clear-cut. Hospice care comes in many forms and venues. Because the level of medical care determines which category a facility might fall into, it could be argued that some hospices actually fall into the category of a board-and-care facility, as defined in Chapter 22 of the *Life Safety Code*. It's likely that the definintion of a hospice will be an agenda item for the 2000 edition of the *Life Safety Code*.

Mr. Zimmerman makes some excellent points.

Robert Solomon
Chief Building and Fire Protection Engineer
NFPA

■ Where is NFPA's leadership?

Dr. Hall's riveting analysis of America's number one fire problem [in "The Other Way Cigarettes Kill" in the January/February 1998 issue of *Journal*] should be a clarion call to action for NFPA, its members, and associated fire service organizations dedicated to



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fire safety. One remaining aspect of the "smoking materials" fire problem which has yet to be mitigated by any regulatory action, the cigarette itself, is strangely omitted, however, from Dr. Hall's concluding paragraph of suggested actions to be undertaken to reduce the carnage from smoking materials fires.

As Dr. Hall so aptly reminds us, we have seen improved fire resistance of the related actors in this tragedy, upholstered furniture and mattresses, through either mandatory or voluntary regulations and standards, including NFPA's own NFPA 260, a mirror of the earlier UFAC fire-resistance standard for upholstered furniture. States including California, Ohio, Illinois, and Massachusetts have acted similarly with their own regulatory efforts. Although unmentioned in this article, the federal Consumer Product Safety Commission's (CPSC's) regulations improving the safety of matches and lighters most likely have been and continue to be positive contributors to the prevention of such fires, as well.

Without a more fire-safe cigarette, however, we will stall any further meaningful progress. Unfortunately, the fire service organizations most likely to carry this fight to Congress (the CPSC is currently precluded by law from regulating the safety of cigarettes) have not formed the necessary consensus to do so, notwithstanding the size of the fire problem and clearly demonstrated need for, and technical feasibility of (according to the National Institute of Standards and Technology), making cigarettes less prone to lengthy smoldering. To the contrary, the New Year's Day 1998 front-page exposé by the *Los Angeles Times*, "Big Tobacco Dollars Douse Push for Fire Safe Cigarettes," linking several prominent national fire service organizations (not NFPA) to Big Tobacco's financial largesse and those organizations' subsequent lobbying against efforts to fight the cigarette fire hazard suggests an unhealthy alliance which would degrade the credibility of any future collaborative effort. It doesn't take a fire scientist to figure out the quid pro quo. To quote a famous senator, "Where is the outrage?"

Tony O'Neill points out in the same issue [of *Journal*] that "Visibility and Credibility Count in Washington." We agree. Only NFPA has the presence, size, reputation, and data to lead this effort to apprehend Public Fire Safety Enemy Number One. Where is that leadership?

Thomas G. Daly
Vice President, Loss Prevention
Hilton Hotels Corporation
Beverly Hills, California

Association response: All of us at NFPA agree with most of what you say needs to be done, and NFPA is already doing more than was evident in my article.

First, my article did flag changes to the cigarette itself as both a possible strategy and quite possibly the most appropriate strategy. The last words in the article were, "and when appropriate, efforts on the legislative front should be pursued." Coming at the end of a section that had devoted several paragraphs to the legislative history of a more ignition-resistant cigarette, including Congressman Moakley's unsuccessful bill for CPSC to issue a standard based on the NIST-developed test, I



thought it would be clear that "efforts on the legislative front" meant efforts to change the cigarette. Rereading that passage, I realize that my language was less clear and more indirect than I meant it to be. There was no intent to downplay or ignore the cigarette-modification strategy.

But the concluding section did make the points that cigarette fires often start very close to victims and so make post-ignition strategies less effective, that fire-starting smokers are often impaired in ways that make education less likely to be effective, and that strategies to change the materials cigarettes ignite have already been used to good advantage. What's left that's likely to work and hasn't been tried? Changing the cigarette.

NFPA's provided strong leadership at every step. Several years ago, our then-Washington representative John Gerard served on the two Technical Support/Advisory Groups for the two Congressionally mandated studies that demonstrated the huge lifesaving benefits ignition-resistant cigarettes would provide, the attractiveness of changes to cigarettes from a cost-benefit point of view, and, most importantly, the technical feasibility of changing cigarettes to achieve greater ignition resistance, as well as the soundness of the test method developed at NIST to assess cigarettes for ignition resistance.

And as the article noted, NFPA statistical analysis teams collected and analyzed the fire experience data in support of those studies. We also stated our conclusions as strongly and unequivocally as the data justified. No one who read those reports could doubt the potential value of ignition-resistant cigarettes, and counter-arguments from the tobacco industry haven't challenged this point.

Both NFPA's Washington office and the Fire Analysis and Research Division continued to work with Congressman Moakley's office in making the case and building support for his last bill, which nevertheless failed to pass. Even now, we continue to indicate our willingness to work with Congressman Moakley or any other well-placed champion to take the next step.

For the past few years, the principal venue for this initiative has been ASTM's E5 Committee, which has been considering a proposal to issue the NIST test method as an ASTM standard. I and some others periodically remind key individuals that the NFPA Fire Tests Committee is another option, but so far the debate has been focused within ASTM.

Progress at ASTM has been slow and fitful, as opponents of the proposal have provided a huge amount of technical material in support of their position—which is that the test method and associated analysis procedure are too flawed to be used as a standard—and have issued unusually lengthy, multipart justifications for their negative votes. The *Los Angeles Times* article may have created the impression that NIST's Dick Gann is a lone advocate for the proposed standard, outnumbered by employees of the tobacco industry and other opponents. Anyone who attends the ASTM discussions can readily see that proponents of the standard far outnumber opponents, but the ASTM process requires



specific and substantive attention to the arguments of a proposal's opponents. When those arguments are as lengthy as the arguments have been on this proposal, it takes a great deal of time to respond to them, and even more so when some of those arguments can be resolved only with additional testing, as has been the case here.

Nevertheless, the advocates of the standard and the fair-minded members of ASTM E5 continue to work long and hard. They're determined to settle this matter on a sound technical basis. As an active member of ASTM E5, representing NFPA, I've spoken up whenever I had relevant data or arguments to offer. I remain confident that the test method is sound, and I'm optimistic that the standard will pass. But however the action in ASTM E5 ends, the NFPA Fire Tests Committee remains an option.

Either way, recognition of the test method by a top developer of model standards is essential to paving the way for any further action. To put it succinctly, you can't require a certain kind of performance from cigarettes unless you can measure performance, and that's what a standardized test method will do.

I disagree with one of your statements, in that I don't believe changes to the cigarette are essential to "any further meaningful progress." Each of the strategies has potential for significant further progress, and NFPA isn't going to put all its eggs in any one basket.

As someone who believes strongly in the merits of the proposal to reduce cigarette ignition propensity, I honestly believe that NFPA has put the full weight of its reputation, expertise, visibility, and credibility behind the initiative. I don't believe you can fairly fault NFPA for a lack of leadership on this issue. Sometimes, leadership means working with effective partners, such as ASTM and NIST, rather than grabbing the spotlight. And sometimes, even with leadership, progress is slow, and success is uncertain. Certainly, the climate in Congress is less receptive to strong action on this issue than it was when Congressman Moakley began his work in the 1980s.

Thanks for encouraging a continued strong stand by NFPA on this issue. We'll keep fighting the good fight.

John R. Hall, Jr.
Assistant Vice President, Fire Analysis and Research
NFPA

■ Editorial Correction

The cover photo on the March/April 1998 issue should have been credited to Les Stone/Sygma. We regret the error.

In the next issue

- 1997 Firefighter Fatality Report
- Arson Trends and Patterns
- Fire Protection in Big Box Stores

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■ ASTM celebrates 100 years



This year marks the 100th anniversary of ASTM. The organization was founded on June 16, 1898, when 20 engineers and professors gathered in Philadelphia to address safety concerns in the railroad industry.

Today, the society has more than 35,000 members worldwide, who have developed more than 10,000 standards in 131 different fields.

■ FEMA asks Congress for $3.1 billion 1999 budget

The Federal Emergency Management Agency (FEMA) is asking Congress for Fiscal Year 1999 budget authority of $3.1 billion, including $2.3 billion in emergency contingency funds for disasters. The 1999 budget request includes $50 million for pre-disaster mitigation.

If approved, this budget will represent a $20 million increase from the $30 million base Congress established in Fiscal 1998 and will enable FEMA's Project Impact to fund approximately 50 disaster-resistant community projects during the year.

According to FEMA Director James Lee Witt, disaster costs over the past five years have averaged $2.4 billion per year for FEMA alone, excluding the Northridge earthquake. Based on this, FEMA is asking for $2.6 billion for the President's Disaster Relief Fund, including $2.3 billion in emergency contingency funds.

FEMA's Preparedness, Training, and Exercises Directorate is also asking for $144 million to ensure that an integrated partnership of people, systems, plans, and facilities is ready to provide assistance and relief in any emergency, including terrorist acts. Approximately 90 percent of program-related funds will go directly to state and local governments through Performance Partnership Agreement grants.

FEMA wants $29 million for the U.S. Fire Administration so that it can carry out fire prevention and training, including arson prevention initiatives and specialized training

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to enhance the nation's fire departments' abilities to respond to terrorist attacks.

In addition, FEMA wants $128 million for mitigation programs to identify, assess, and reduce the nature and extent of risk from hazards, such as floods, earthquakes, hurricanes, and dam failures, and another $100 million for the Emergency Food and Shelter Program for individuals in designated areas of high need.

The budget proposal calls for 2,486 full-time equivalent FEMA employees, compared to the 2,488 requested in the current year.

■ China Fire Protection Association's biannual conference

China Fire '98, which will be held from October 13 to 16, is the seventh fire equipment and technology conference and exhibition to be held by the China Fire Protection Association (CFPA).

The CFPA, which was established in 1984, has organized China Fire every other year, starting in 1986. China Fire '98 is sponsored by The People's Insurance (Property) Company of China, Ltd. and The Fire Bureau of the Ministry of Public Security.

For more information about China Fire '98, contact Carmen Yeung, Together Expo Limited, Units A&B, 14/F, Guangdong Tours Centre, 18 Pennington Street, Causeway Bay, Hong Kong; telephone 852-2881 5889; fax 852-2890 2657.

■ Congressional Institute promotes emergency information system



Fire service representatives in the Congressional Fire Service Institute (CFSI) have agreed to support the Operation Respond Emergency Information System (OREIS). OREIS is a lifesaving communications system used during incidents involving hazardous materials and passenger train accidents. When used with CHEMTREC, OREIS dramatically increases the tools available to incident commanders when an accident occurs.

The International Association of Fire Fighters and the International Association of Fire Chiefs have joined forces to promote acceptance of OREIS in the fire community nationwide. Their first joint action was to get CFSI's support. CFSI has agreed to call on Congress and the Department of Transportation to increase the amount of funding allocated to the Operation Respond Institute, which created OREIS. The Operation Respond Institute is a not-for-profit coalition of emergency personnel and railroad and motor carriers.

The CFSI National Advisory Committee, representing a cross section of organizations with interests in fire and emergency services, is committed to ensuring OREIS is operational

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■ Allen Telecom PASS device recall

The Safety Equipment Institute (SEI), in cooperation with Allen Telecom, Inc., is recalling approximately 1,459 LifeGard V PASS Devices, model R500. The recalled devices have a production date of March 14, 1997, or later.

SEI and Allen Telecom haven't received any reports of deaths or injuries involving these devices. This recall is being conducted to prevent possible injury.

These devices failed to meet the requirements of the 1993 edition of NFPA 1982, *Personal Alert Safety Systems (PASS) for Fire Fighters.*

Consumers should contact Allen Telecom, Inc. at (800) 959-1585 or (956) 630-1585 for instructions on returning their PASS devices.

■ Recognition for the emergency management professional

The Associate Emergency Manager certification program, sponsored by the National Coordinating Council on Emergency Management (NCCEM), is designed to recognize basic competencies in the profession. The program is divided into three parts: the application, credentials, and the management essay. Recognition is maintained in five-year cycles.

NCCEM is a national organization dedicated to promoting the goals of saving lives and protecting property before and during emergencies and disasters. NCCEM is a nonprofit, educational organization whose membership includes local government emergency managers and civil defense directors; state and federal governments; and educational, military, private, nonprofit, and volunteer organizations. Membership is open to anyone practicing or interested in the field.

For more information about certification or NCCEM membership, contact NCCEM by telephone at (703) 538-1795, by fax at (703) 241-5603, or by E-mail at nccem@aol.com.

■ Factory Mutual arson grant

The Lombard, Illinois, Fire Department received a $2,000 arson grant from Factory Mutual (FM) to help eliminate arson fires.

The fire department's Fire Investigation Unit (FIU) will use the funds to buy a new computer that will enable the department to expand its fire investigation database and prepare reports.

The FIU, composed of cross-trained police officers and firefighters, was started in 1984 to investigate fires that cause more than $10,000 in damage.

FM's arson grant program was established in 1976 and provides seed money to assist in developing arson prevention and control programs. Grants are awarded to fire departments and related agencies for, among other things, investigative tools, flam-

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mable accelerant detectors, training programs, and juvenile firesetter programs.

■ Seattle becomes pilot for new FEMA initiative

On February 5, 1998, the Federal Emergency Management Agency (FEMA) designated Seattle, Washington, a "disaster-resistant" community under an agreement with city officials and other government, business, and civic leaders.

The designation is part of Project Impact: Building a Disaster-Resistant Community, a national effort that shifts the focus of emergency management from responding to disasters to initiating action before disasters to reduce potential damage.

Under the agreement, Project Impact participants will undertake home retrofit, and landslide and seismic vulnerability mapping projects. In addition, the city's schools will receive funding to improve safety by removing nonstructural hazards.

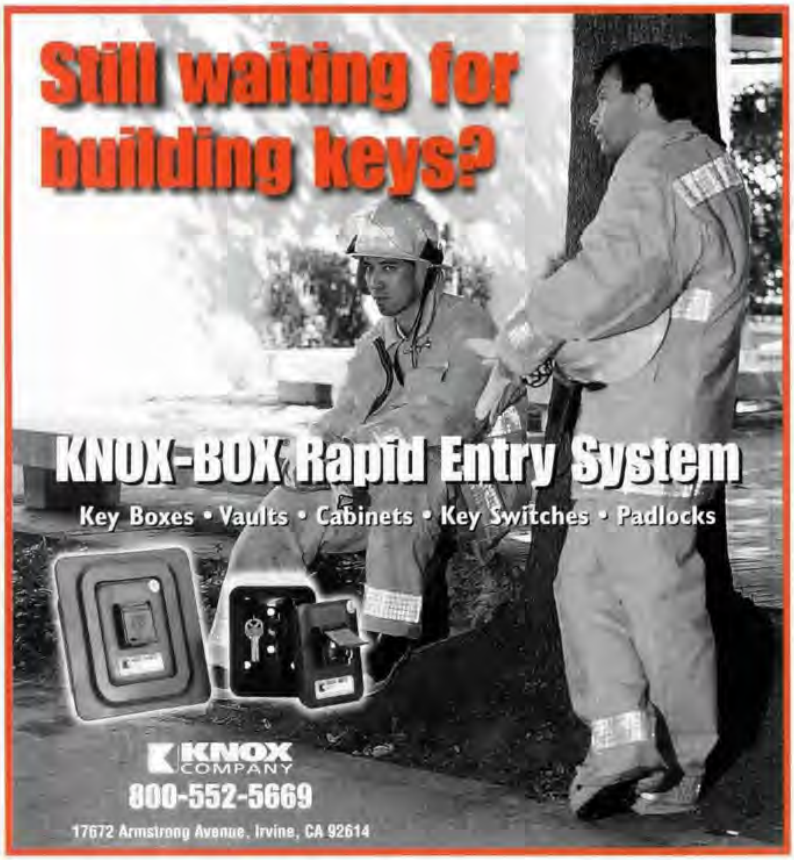
Project Impact participants include FEMA, the city of Seattle, King County, the state of Washington, the U.S. Geological Survey, Seattle public schools, and private-sector participants and organizations, such as the Phinney Neighborhood Association, SAFECO, Seafirst Bank, the University of Washington, and Washington Mutual Bank.

Under Project Impact, seven pilot communities have been selected nationwide to demonstrate the economic benefits of predisaster mitigation to state and local governments, businesses, and individuals. A Project Impact guidebook offers a formula communities can follow to become disaster-resistant. Other Project Impact communities include Allegany County, Maryland; Deerfield Beach, Florida; Oakland, California; Pascagoula, Mississippi; Tucker and Randolph Counties, West Virginia; and Wilmington/New Hanover County, North Carolina.

■ Safety Center offers proceedings

The American Institute of Chemical Engineers' (AIChE) Center for Chemical Process Safety hosted the International Conference and Workshop on Risk Analysis in Process Safety last October in Atlanta, Georgia. The conference concentrated on the present state of risk assessment from a variety of worldwide viewpoints. Two major areas were covered—risk acceptance criteria and risk-based judgment, and risk analysis and risk management.

The 808-page hardbound proceeding book contains all of the papers presented in the plenary sessions and workshops, as well as papers from the poster area. Topics include process hazards analysis, root causes and failure databases, and human reliability assessment. To order proceedings, contact AIChExpress Service Center at 345 East 47th Street, New York, NY 10017-2395; by telephone at (800) 242-4363; by fax at (212) 705-8400; or by E-mail to xpress@aiche.org.



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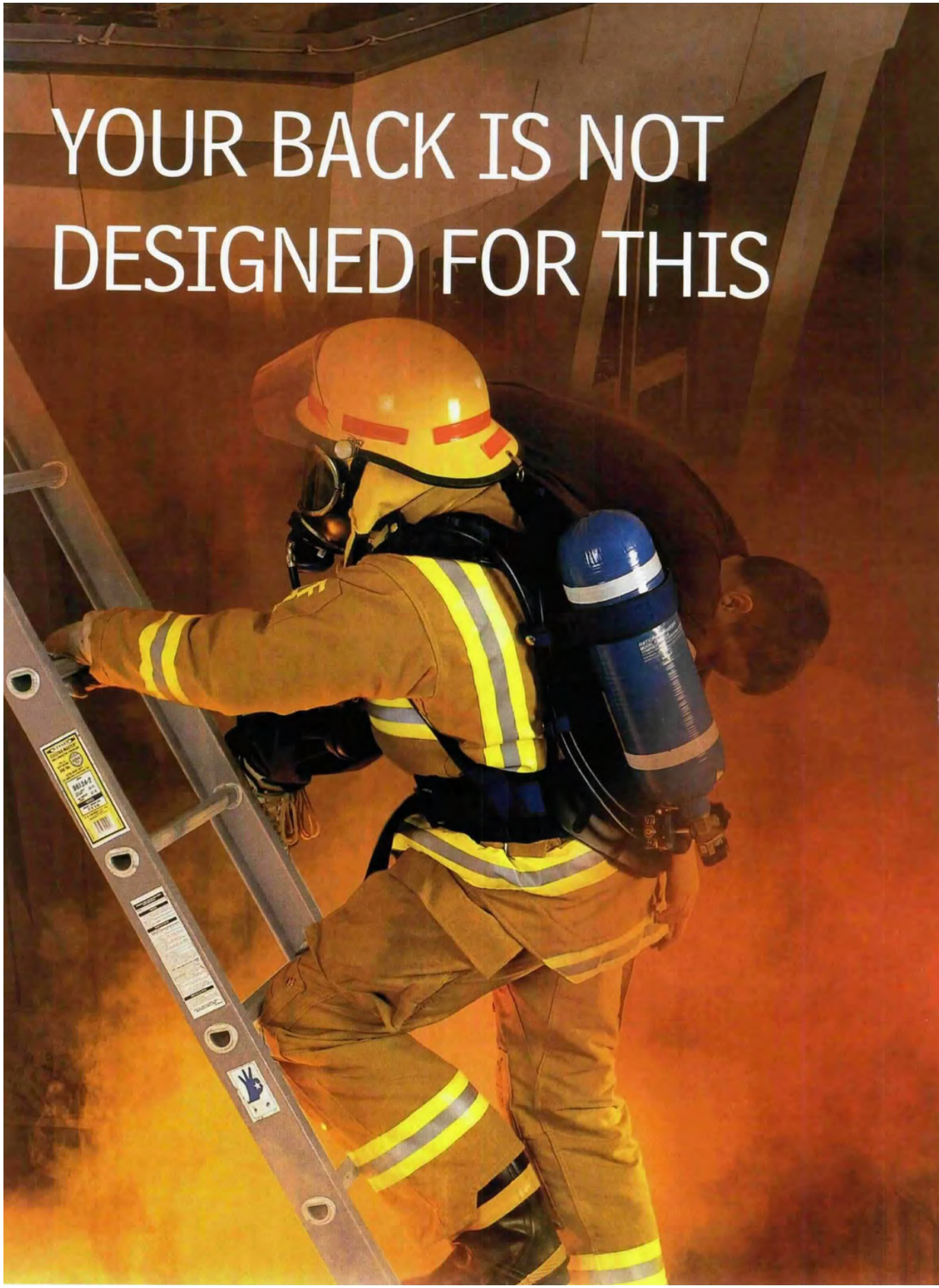
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From Our Files

Kenneth J. Tremblay

ASSEMBLY

Propane Leak Causes Blaze

CALIFORNIA

A street celebration was interrupted when propane escaping from an improperly installed tank ignited and melted a nearby natural gas regulator.

The incident occurred in the town's historic district outside a restaurant where a portable cooking grill and wooden folding tables had been set up for the celebration. The single-story building measured 128 by 24 feet and contained four occupancies. It was constructed predominantly of brick and mortar with a tar and gravel roof. An addition constructed of unprotected wood framing contained the restaurant's kitchen. The structure had no smoke detectors or fire suppression systems. At the time of the fire, the restaurant and one other occupancy were open.

The restaurant had set up a homemade propane-gas-fired barbecue, measuring 18 by 60 inches, along a wooden sidewalk just outside the kitchen. The grill, which was supported by four legs with wheels, had removable grates and a metal top. Under the grill was a metal shelf with two propane gas burners and a 5-gallon LP-Gas tank connected to the burners by a rubber hose. Because the space between the shelf and the grill was small, the LP-Gas tank was unsecured and sitting at a 45-degree angle.

A shop owner from across the street saw the restaurant manager working around the LP-Gas tank and noticed the tank venting liquid propane four or five times. Shortly afterwards, the propane ignited, and the shop owner saw a flame resembling a blowtorch coming from the tank. The flame hit a natural gas regulator on the building, causing it to fail. The leaking natural gas ignited, and flames spread along the outside of the kitchen's wooden wall to the wood shake-shingle roof and the attic. Several shop owners tried unsuccessfully to extinguish the blaze with portable extinguishers.



Photograph Courtesy of Auburn Fire Dept.

A firefighter works to extinguish a blaze that engulfed a restaurant when propane escaped from an improperly installed tank and ignited.

The fire department received numerous calls reporting the fire at 5:50 p.m., and an engine company responded from three blocks away. Firefighters used a deck gun and a hose line to try to control the blaze, which was spreading. A second engine company tried to establish a water supply line from a nearby hydrant, but firefighters couldn't remove the frozen hydrant caps. The company then advanced a hose line inside to control fire spread using water from the unit's tank until a water supply could be established. A third engine company provided water to the second company from a distant hydrant. Firefighters extinguished the blaze after the natural gas line was shut down.

Investigators interviewed several witnesses and watched a videotape that someone at the celebration had taken from the time the propane tank first vented. They determined that the improperly installed LP-Gas tank had come into contact with the bottom of the grill and that heat from the grill heated the propane, forcing it to vent through the pressure relief valve. The heated cylinder vented several times before gas ignited. The improperly installed tank exposed the supply hose, which failed, causing more propane to escape.



Photograph Courtesy of Auburn Fire Dept.

This propane-gas-fired barbecue had been set up outside the restaurant.

The restaurant manager suffered first- and second-degree burns on his arms and was brought to a local hospital for treatment. No one else was injured. Damage to the building, valued at $364,924, and its contents, valued at $100,000, was estimated at $85,000 and $10,000, respectively.

STORAGE

Child Dies While Playing with Pool Chemicals

MISSOURI

A 12-year-old boy who was reportedly "fascinated with fire" mixed together muriatic acid and a chlorinated pool chemical used in the family swimming pool in a container in his backyard storage shed, causing a hazardous chemical reaction. When the volatile mixture ignited, the boy threw the container toward the open door of the single-story shed, spreading the flames to a lawn mower and a gallon container of gasoline. As the fire intensified, it blocked the boy's only escape route, trapping him in the shed.

A neighbor noticed the fire and called 911 at 2:45 p.m. Arriving firefighters found white smoke coming from the shed, which was located in the fenced-in yard of a single-family home. The smoke quickly turned black as firefighters advanced a 1¾-inch hose line to control the flames. They found the boy's body among some shelving he'd apparently climbed in an attempt to escape.

The sides of the metal shed, which measured 10 by 12 feet,

FIRST ALERT & BRK EXHIBIT 1028
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were bowed out, indicating that a low-order explosion occurred during the blaze. The shed and its contents, valued at $1,400, were destroyed.

RESIDENTIAL

Smoke Detector Program Saves Occupants

OHIO

Smoke from an electrical fire triggered a smoke detector donated by the local fire department, alerting the residents of a single-family manufactured home. According to news accounts, the fire department distributed free detectors to people who couldn't afford them.

The one-story dwelling, which measured 70 by 14 feet, was of unprotected, wood-framed construction. Its exterior walls were covered with aluminum siding, and the entire structure was supported by a steel frame. The smoke detector was located in the kitchen. The structure had no sprinklers.

Occupants, awakened by the detector, called the fire department at 7:28 a.m. Firefighters arrived 14 minutes later to find the dwelling fully involved and fire spreading to an abandoned farmhouse and several vehicles.

Investigators determined that the fire began when a loose connection in a receptacle's electrical wiring in the living room wall overheated. The wire insulation failed, allowing flames to spread through the walls. The fire department had already responded to the dwelling six months earlier for a similar problem. They advised the occupants to have it repaired then, but they failed to do so.

No one was injured, but the property and its contents, valued at $40,000, were a total loss.

Toaster Oven Malfunctions

PENNSYLVANIA

A fire that started when a toaster oven malfunctioned and ignited nearby combustibles heavily damaged two adjoining homes.

The three-story dwellings were of unprotected, wood-framed construction. Each unit contained four rooms on the first and second floors and two rooms on the third. The dwelling of origin had battery-operated smoke detectors in the first- and second-floor hallways. It had no sprinklers.

The residents of the dwelling in which the fire began weren't home when an occupant of a neighboring dwelling heard a high-pitched noise and went outside to investigate. Seeing a fire in the kitchen window of the neighboring unit, he called the fire department at 4:14 p.m. It was later determined that the noise he heard was a smoke detector.

Firefighters arrived three minutes after the call to find flames venting from the kitchen window and heavy smoke coming from the second floor. A crew advanced a 1¾-inch hose line through the kitchen door and knocked down flames in the kitchen, then advanced the line to the second floor. The fire in the kitchen re-ignited, however, and flashed over, burning through the hose line. A backup crew advanced another hose line into the kitchen and knocked down the fire again. The fire spread to a third-floor room and to roof space before they could extinguish it.



Photograph: Ed Kosiery Jr./The Morning Call

A firefighter tries to cool down during a break from fighting the fire.

Investigators determined that the blaze began when grease built up on the power terminals of an electric toaster oven that had been shut off. The unit short-circuited and ignited combustible bread wrappers and wooden wall paneling. Investigators believe the fire burned for roughly 30 minutes before it was discovered.

Fire damage in the first dwelling was limited to the first-floor kitchen, three rooms on the second floor, and a small room on the third floor. Heat and smoke damaged all areas of the first dwelling, as well as the adjoining dwelling on the second and third floors. Damage to the structures, valued at $190,000, was estimated at $110,000 and to their contents, valued at $100,000, at $55,000. Two firefighters suffered from heat exhaustion.



Photograph: Ed Kosiery Jr./The Morning Call

Firefighters and rescue workers treat a firefighter who collapsed from heat exhaustion while battling a blaze that heavily damaged two adjoining homes.

Furnace Ignites Clothing

OKLAHOMA

A 91-year-old woman who often dried clothes near a gas-fired floor furnace died of smoke inhalation when the clothing ignited and flames spread to other combustibles in her single-family home. The woman lived alone and used a wheelchair or walker.

The single-story, 1,000-square-foot house of unprotected, wood-framed construction had a battery-operated smoke detector in the hallway near the bedrooms, but its battery had been disconnected. The house had no sprinklers.

A passerby discovered the fire and called 911 at 12:13 p.m. Firefighters arrived three minutes later and found several men near the front door using a garden hose to extinguish a few remaining flames. Firefighters believe that the fire had nearly extinguished itself, leaving only a smoldering chair and love seat.

The living room sustained significant heat damage, and heat and smoke damaged the entire house. Damage to the structure and contents, valued at $40,000, was estimated at $15,000.

Two Die When Children Play with Matches

ILLINOIS

A 2-year-old boy and his 66-year-old disabled grandfather

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Page 40 of 166

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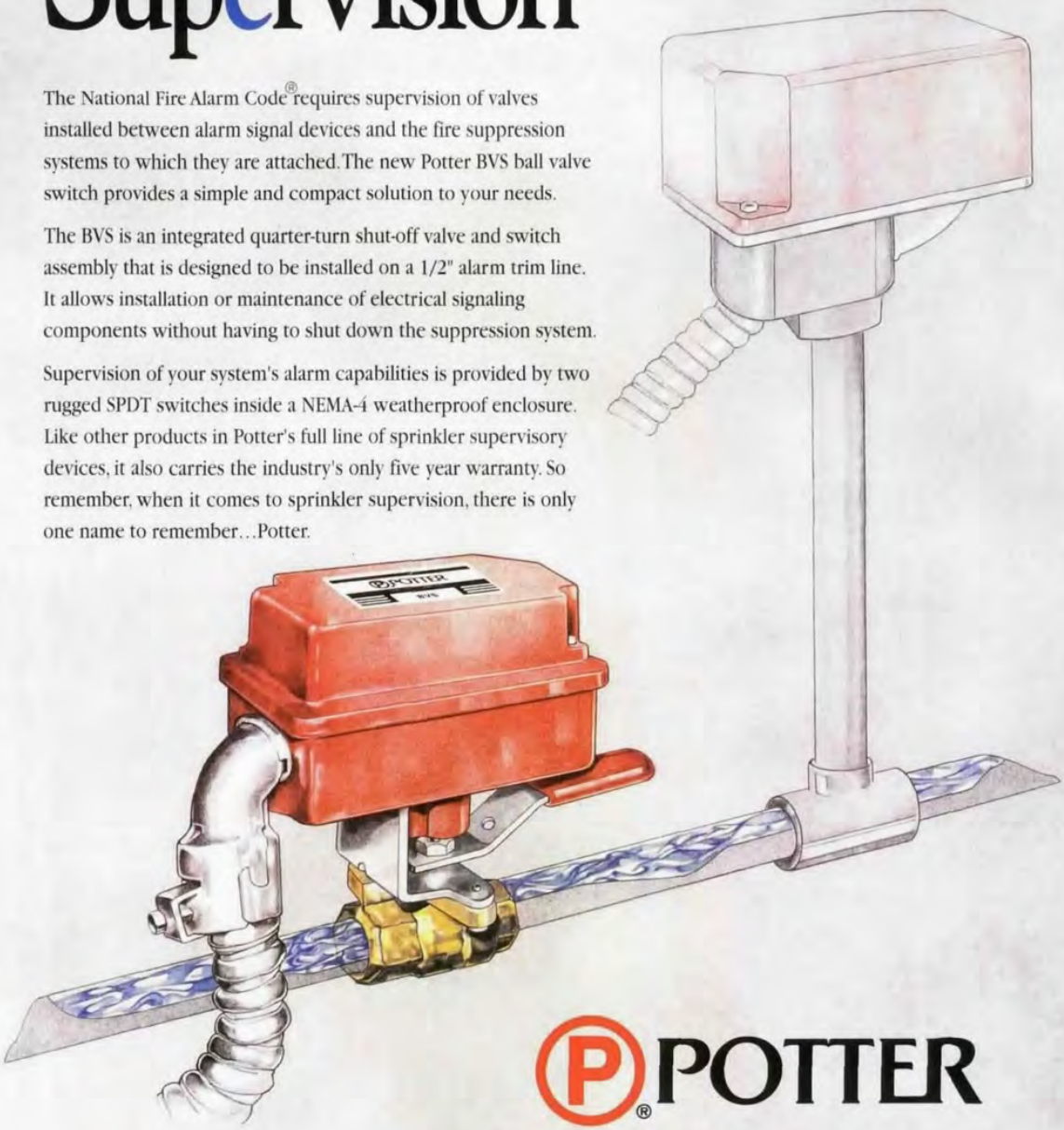
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died when the boy and his two brothers started a fire while playing with matches and a lighter.



Photograph: Doug Hamilton/Log Home

A 2-year-old boy and his grandfather died when children playing with matches started a fire that consumed this house.

The two-story, two-family structure, which measured 40 by 20 feet, was of unprotected, wood-framed construction. Its only smoke detector was located in the first-floor living room, but its operation wasn't reported. The dwelling wasn't sprinklered.

The brothers, ages 5, 3, and 2, were playing with their grandfather's matchbook collection in a first-floor bedroom. They were using a lighter to ignite the matches when one of the boys burned his hand and dropped the lit matches on the bed. All three ran from the room and closed the door.

The two older boys ran outside while the youngest went to his grandfather, who was in the kitchen at the rear of the house, and alerted him. A refrigerator blocked the back door, however, trapping them in the house. Both died of smoke inhalation.

Fire and smoke damage to the structure, valued at $20,000, and its contents, valued at $10,000, was estimated at $25,000.

Child Dies in Apartment Fire

NEW JERSEY

A blaze that began when an air conditioner's power cord overheated killed a 2-year-old girl and damaged a multifamily dwelling.

The three-story house was of unprotected, wood-framed construction and contained three units, one of which was unoccupied. The presence or operation of smoke detectors wasn't reported.

Members of an engine company were conducting an in-service inspection when they noticed smoke at a nearby intersection and went to investigate. When they discovered a fire on the second floor of the apartment house, they requested a full first-alarm response and began to attack the blaze, removing three occupants from bedrooms. A deputy chief struck a second alarm. Firefighters had the blaze under control 31 minutes after the first alarm.

Investigators determined that the fire started in the living room of the second-floor apartment when an operating air conditioner's power cord overheated and ignited nearby combustibles. Someone had spliced a smaller-gauged wire to the air conditioner, and the cord was plugged into a six-outlet power strip, which was plugged into a duplex receptacle in the living room. The air conditioner was the only appliance plugged into the power strip, and the grounding pins for all cord and plug connections had been removed. The splicing of smaller conductor sizes, improperly spliced connections, and ordinary adhesive tape that held the connection together all contributed to a high-resistance connection.

The three injured residents were taken to the hospital, where the 2-year-old died of smoke inhalation. A firefighter was also treated for back injuries at the hospital, and two other firefighters were treated at the scene for minor injuries.

The fire heavily damaged the second- and third-floor apartments. Damage estimates weren't reported.

Sprinklers Control Two Hotel Arson Fires

MICHIGAN

Sprinklers extinguished a pair of arson fires set within days of each other in a hotel.

The 16-story, 700-room hotel was constructed of protected, noncombustible components, including steel framing and brick walls. Interconnected smoke detectors and a wet-pipe sprinkler system provided full coverage.

The hotel was occupied when smoke detectors and the water flow alarm system detected a fire in a storage room on the seventh floor. Someone called the fire department, and responding firefighters, who discovered that a sprinkler had already extinguished the blaze, determined that someone used an open flame to ignite trash, paper, and cloth on a maid's cleaning cart. Three days later, another sprinkler extinguished a similar fire in an eighth-floor storage room. This time, firefighters were called as soon as the water flow alarm sounded.



Photograph: Millard Berry

Firefighters roll up hoses after responding to the second of two hotel fires.

Each fire caused $5,000 in structural damage and $1,000 in contents damage. The property and its contents were valued at $180 million. No one was injured.

MANUFACTURING

Sprinklers Control Factory Blaze

CALIFORNIA

Sprinklers controlled a fire in a large manufacturing plant that produced polyurethane foam.

The single-story, 372,100-square-foot building was constructed of concrete tilt-up walls, a concrete floor, and a wooden laminated roof. A wet-pipe sprinkler system, which included in-rack sprinklers and a water flow alarm in the risers, protected the property.

The plant was in operation when a polyol pump's suction pressure dropped low enough to trigger an alarm and stop the pump motor. Plant personnel quickly overrode the alarm, but the three-second delay that occurred while the pump restarted allowed the polyol level to drop low enough to cause an exothermic chemical reaction. The product ignited, activating several sprinklers.

The central monitoring station notified the fire department of a water flow alarm in one of the risers, and firefighters responded at 12:55 p.m. to find nine in-rack sprinklers controlling the blaze. They used on-site hoses to complete extinguishment.

The loss of the contents was

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estimated at $20,000. There was no structural damage, and no one was injured.

Sprinkler Contains Fire

CONNECTICUT
A sprinkler controlled a fire in a manufacturing plant that began in a bonderizing tank that was unintentionally left on over the weekend.

The two-story, 44,348-square-foot building was constructed of unprotected steel, with concrete walls and a metal deck roof covered with asphalt. A wet-pipe sprinkler system monitored by a central station alarm company protected the property, at which components for motors and tachometers were manufactured and coated.

The building was closed for the weekend when firefighters received a central station alarm at 10:30 p.m. They arrived minutes later to find the building secure, a water flow alarm operating, and water flowing from the building near the loading dock. Firefighters forced open a rear door and entered the building, where they discovered a single sprinkler controlling a fire in a bonderizing tank about 60 feet from the door. They used a 1¾-inch hose line to complete extinguishment. According to investigators, the sprinkler confined the fire to the immediate area of the bonderizing unit.

The central station alarm company had also notified the property owner, who arrived and helped investigators determine the fire's cause. He told investigators that the bonderizing tank was used as a dipping tank to apply a primer coat to various metal parts. The tank was normally shut off at the end of the day, but the owner and investigators discovered that the unit had been left on for approximately 48 hours. They determined that the bonderizing liquid overheated and eventually ignited.

The building, valued at $1.6 million, wasn't damaged. Damage to the tank was estimated at $3,000. No one was injured.

SPECIAL

Plumber's Torch Ignites Framing

MASSACHUSETTS
A plumber accidentally ignited a fire in the wall void of a college housing building under renovation.

The two-story building of unprotected, wood-framed construction measured 200 by 40 feet and was divided into townhouses separated by fire walls. Its fire alarm system was disconnected, and it wasn't sprinklered. At the time of the fire, the building was vacant, and all its utilities had been shut off.

Campus police patrolling the area detected the blaze and notified the fire department at 7:16 p.m. Firefighters arrived four minutes later to find smoke coming from a unit at one end of the building. They advanced a 1¾-inch hose line to each floor of the dwelling and found fire in the walls and ceilings. The incident commander struck a second alarm and called for another engine company for additional staffing, as crews placed additional hose lines into operation and pulled down ceilings and walls to stop the fire spread. A 2-foot layer of cellulose insulation in the attic blocked vertical fire spread but led to horizontal spread in the insulation, forcing crews to open all the walls and ceilings to check for extension.

Investigators determined that the blaze started in a first-floor bathroom when heat or a flame from a plumber's torch ignited structural wood framing. The contractor, who had left the building at around 4:00 p.m., saw nothing unusual. The fire smoldered and burned for roughly two hours before it was detected.

Damage was estimated at $200,000. No one was injured.

Four Injured When Fire Engulfs Boat

KENTUCKY
Four people were injured in an explosion aboard a 42-foot wooden recreational cruiser docked at a marina. The occupants had fueled the vessel with 110 gallons of gasoline and waited 10 minutes with the blower on before starting the engine. When the engine failed to start, they connected a battery charger to the battery. An explosion occurred, forcing the passengers to jump into the river. Someone cut the burning boat loose from the dock, and it began to drift down the river toward other boats as firefighters arrived. A sheriff department's boat tied a rope to the burning vessel and towed it to the shore, where it was beached until fire boats could extinguish the blaze.



Photograph: Jim Cummins, Evansville (Indiana) Courier

An explosion and fire aboard this boat injured four people.

Investigators determined that a spark created when the battery charger was connected ignited residual gasoline vapors, causing the explosion.

All four of the boat's occupants were injured. A 33-year-old man sustained first- and second-degree burns over 12 percent of his body, and a 50-year-old man received first- and second-degree burns to his legs. A 30-year-old pregnant woman was hurt when she jumped from the boat, and a 56-year-old man suffered chest pains and minor burns.

The boat, valued at $20,000, and its contents, valued at $5,000, were a complete loss.

Kenneth J. Tremblay is a fire data specialist in the NFPA Fire Analysis and Research Division and a lieutenant with the Lexington, Massachusetts, Fire Department.

The fires featured in "Firewatch" are selected to provide enough detail and diversity of occupancy, cause, relevant fire protection features and systems, and other issues to be of use and interest to most readers. They aren't statistically representative. When details are missing, we probably couldn't get them from a credible source.

Most incidents are identified through a news clipping service that looks for reports of serious fires or through information-sharing arrangements we have with kindred organizations. Incidents identified through news clips are documented principally by reports from fire departments or other credible sources. We never rely on news sources for technical details. As part of the arrangement that allows us to obtain this information, we offer anonymity about the specific locations and dates of these fires.

We also learn from our readers what details and topics are of interest, so if you have an opinion—write!

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Questions Keep Popping Up

Guy Colonna

Pyrotechnic operators are required to wear protective clothing during fireworks displays.

Q. What is the difference between consumer fireworks and display fireworks?

A. Basically, the difference is in the explosive composition of the item and how it's to be used. Specifically, consumer fireworks contain limited quantities of explosive—50 milligrams or less for ground devices and 130 milligrams or less for aerial devices. The Consumer Product Safety Commission regulates the construction, chemical composition, and labeling requirements for consumer fireworks. Their use is also regulated on a state-by-state basis by the state fire marshal's offices. Consumer fireworks are normally classed as Explosives, 1.4 G, and are described as Fireworks, UN 0336, by the U.S. Department of Transportation (DOT).

Display fireworks are regulated by the Bureau of Alcohol, Tobacco, and Firearms in the *Code of Federal Regulations, Title 27,* and their use is regulated by NFPA 1123, *Fireworks Display*. Display fireworks include consumer fireworks that are to be used in fireworks displays, as well as larger devices of similar construction and chemical composition that are classed as Explosives, 1.3 G, and are described as Fireworks, UN 0335, by the DOT. Other classifications and designations are also used. Refer to NFPA 1124, *Manufacture, Transportation, and Storage of Fireworks*, and NFPA 495, *Explosive Materials Code*.

Q. Does NFPA have test methods and standards for pyrotechnics?

A. No. NFPA codes and standards pertain to model and high-power rocketry and to display fireworks. The NFPA *Inspection Manual* contains general information for fire inspectors about inspecting fireworks manufacturing plants or model and high-power rocket motor manufacturing plants.

Q. Can NFPA 1124 be used to regulate warehouse storage of consumer fireworks?

A. No. NFPA 1124 only addresses storage of consumer fireworks at manufacturing sites. Until the standard is changed, NFPA 101®, *Life Safety Code*®, provides the best guidance.

Q. Are pyrotechnic operators required to wear protective clothing for fireworks displays?

A. Yes. NFPA 1123 requires pyrotechnic operators to wear protective clothing when a display is fired. All personnel in the discharge area must wear head, eye, hearing, and foot protection. The preferred fabrics for clothing include cotton, wool, or other similarly flame-resistant, long-sleeved, long-legged clothing. The code suggests that operators and assistants wear personal protective equipment during setup and cleanup of the display, as well.



Guy Colonna is NFPA's chief chemical and marine engineer. A statement, written or oral, that's not processed in accordance with Section 16 of the Regulations Governing Committee Projects *shall not be considered the official position of NFPA or any of its committees and shall not be considered to be, nor relied upon as, a formal interpretation.*

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**Gas Research Institute Report, 1997*



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DO YOU HAVE THE RIGHT STUFF?

Safe Schools

Must we choose between security and fire safety?

William E. Koffel, P.E.

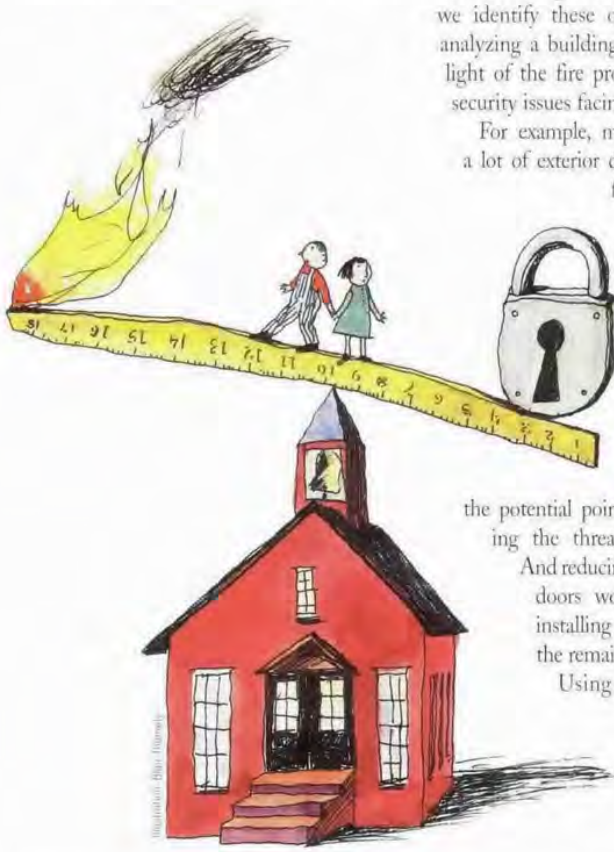
Recently, I read an article about an urban school system whose administrators were at odds with fire officials over locking exit doors while school was in session. To defend their actions, the administrators noted that students were at greater risk from such external threats to security as drugs and violence than they were from fire. The article went on to say that the technology that would make it unnecessary to lock the doors did exist, but that funds weren't available to buy it.

Based on the information in the article, I inferred that the technologies under discussion included electronic locking devices and the delayed release devices permitted by most building codes and the *Life Safety Code®*. But the article didn't indicate that other fire protection features, such as automatic sprinkler and detection systems, might also be needed if such technologies were used. And though many newer schools already have such systems, the schools mentioned in the article didn't, and the cost of installing them would be prohibitive.

So how *do* we protect children in older schools from security risks while, at the same time, keeping them safe from fire?

Given the budget limitations of many school systems, solutions that cost less than new technologies may be required. How do we identify these options? By thoroughly analyzing a building's physical attributes in light of the fire protection, life safety, and security issues facing it.

For example, many older schools have a lot of exterior doors that were installed for the convenience of students who walk to school. A detailed egress analysis could reveal that some of these doors aren't needed for life safety purposes and could be eliminated. This would reduce the potential points of entry, thus reducing the threat to students' security. And reducing the number of exterior doors would lower the cost of installing new security devices on the remaining doors.



Using the horizontal exit provisions of most building codes and the *Life Safety Code* would also cut down on the number of entrances. Because many existing schools have been added onto over the years, they're compartmentalized or have separations that can serve as horizontal exits, which the codes typically allow to serve 50 percent of the egress capacity and number of exits. Using existing compartmentation features, possibly with some modification, could further reduce the number of exterior doors required.

Another consideration is the construction of the doors themselves. A primary security concern in schools today is the amount of glazing on exterior doors. Simply replacing doors that have glass inserts with doors that don't could eliminate the need for new security devices. Though this strategy might make the school less attractive and introduce the need for additional lighting, the building would be safer, and the cost of replacing a few doors would certainly be lower than the cost of installing new security devices.

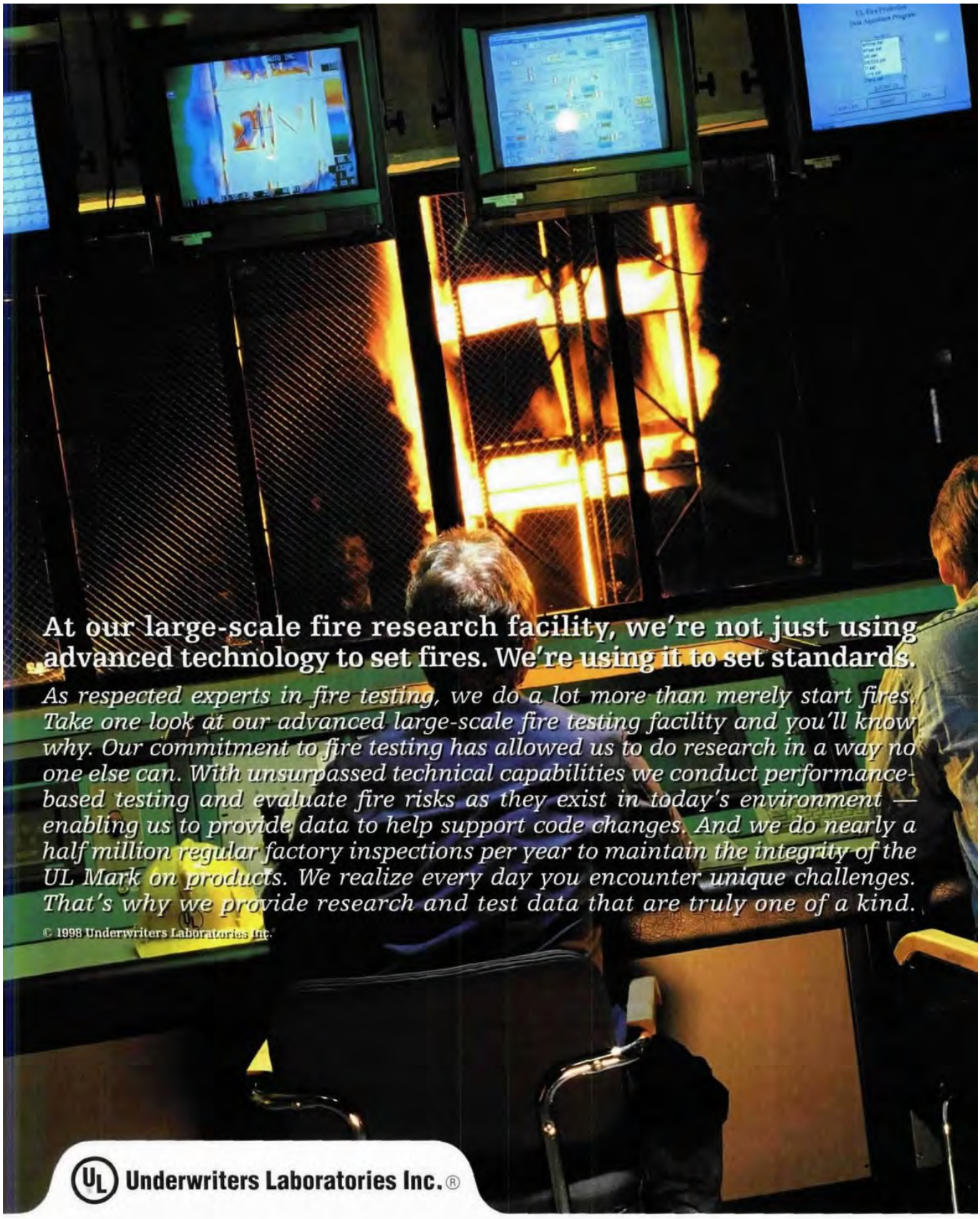
Security at the price of fire safety?

Many older schools simply weren't designed to cope with the increased security risks of today's society, and locking students and faculty in may look like an obvious solution, particularly when crime seems much more imminent a threat than fire. But fires do occur in schools, just as they do in other occupancies. What happens when smoke and flames block the few unlocked exits?

Limited budgets aren't an acceptable excuse for increasing security at the expense of fire safety. Proven fire protection strategies using a building's existing features and other innovative approaches must be considered in order to balance the fire safety risk with the security risk. There are probably very few instances in which both needs can't be met, even on a limited budget.

William E. Koffel, P.E., is president of Koffel Associates, a fire protection firm with offices in Maryland and Connecticut.

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Fire Safety in a Consumer-Oriented Society

Anthony R. O'Neill

The Consumer Product Safety Commission helps maintain the safety net Americans have grown to expect.

What federal agency affects everyday fire safety more than any other? A difficult question, perhaps, but a review of NFPA statistics on the fire problem may provide a clue.

The fire problem in the United States is concentrated in a few places, most noticeably in the home. And products in and around the home are the domain of the U.S. Consumer Product Safety Commission (CPSC), an independent federal regulatory agency created in 1972 by Congress "to protect the public against unreasonable risk of injury or death from consumer products."

Naturally, CPSC deals with many nonfire-related product safety issues, such as bike helmets. However, the commission increasingly deals with the fire safety issues of modern living, targeting such products as illegal fireworks and flammable garments made of fleece, and such problems as the open-flame ignition of furniture and mattresses and standards for child-resistant cigarette lighters.

In fact, an estimated one-third of CPSC's $42 million budget is devoted to fire hazards, and three of the commission's five strategic goals, presented in its 1997 strategic plan, *Saving Lives and Keeping Families Safe*, are vitally important to NFPA's mission. They address general fire safety, preventing carbon monoxide poisoning, and preventing electrocutions. With NFPA moving into all types of home hazards with our *Risk Watch*™ program, one could argue that everything CPSC does complements NFPA programs and vice versa.



CPSC enforces five federal laws: the Consumer Product Safety Act, the Flammable Fabrics Act, the Poison Prevention Packaging Act, the Hazardous Substances Act, and the Refrigerator Safety Act. CPSC has jurisdiction over 15,000 different types of consumer products found in and around the home—practically everything except cars and motorcycles, which are the domain of the Department of Transportation, and alcohol, tobacco, and firearms, the domain of the Bureau of Alcohol, Tobacco, and Firearms.

Getting the job done

The commission has a wide range of options available to carry out its responsibilities, including voluntary standards-setting, education, product guidelines, and cooperative product recalls. As a last resort, CPSC can ban products or require their recall, which may necessitate a court action. Such actions aren't arbitrary: Two of the three commissioners must vote for a major change after analyzing the data and doing cost-benefit analyses.

CPSC operates a hazard-identification program for which it gathers data from hospital emergency rooms. It also has a telephone hotline so it can collect hazardous product data directly from the public.

Another key to CPSC's success is partnering with other organizations such as NFPA to address the challenges of today's marketplace and home environment. NFPA routinely works with CPSC in voluntary standards activities and in data collection and analysis.

NFPA and CPSC don't always agree on fire safety issues. For example, NFPA has argued for decades that CPSC should ban all public use of fireworks for recreational purposes, and NFPA recently objected when the commission rescinded the flammability standards for children's sleepwear.

Although it would be hard to judge which federal agency contributes the most to everyday fire safety, CPSC is certainly at the top of the list, helping maintain the safety net we all expect in our consumer-oriented society.

CPSC's web site address is http://www.cpsc.gov.

Anthony R. O'Neill is NFPA's vice president of Government Affairs, operating out of our Washington, D.C., office.

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Delicate Balance

Robin F. Paulsgrove

Empowerment is important to any fire department, but it won't be effective if we're not honest with our employees.

One of the more misunderstood concepts in progressive management today—and one that can leave team members with that terrible feeling that "I've been had again"—is poor communication about what is meant by the term "empowerment." Every organization has at least one disillusioned member who can tell horror stories of spending months on a project only to have a manager reject or amend his or her recommendations. This reinforces what the employee suspected all along: that this employee participation stuff is all lip service. As leaders, our credibility depends on taking responsibility for clearly communicating our expectations, criteria, and boundaries when we delegate a task or form a committee.

An important leadership principle in any competitive fire service organization is to include team members aligned by the department's goals and objectives. Empowerment may be another of those overused buzz words, but it's a make or break part of one of our three principal goals in the Arlington Fire Department.



Illustration Morgan King

Building communications and trust

As in any dynamic organization, there's a lot going on in our department right now, including many opportunities to involve our team members in defining our future. But we also face a high-stakes risk of losing credibility if we drop the ball on communicating with one another. We've all been burned before. As we introduce problem-solving task forces, we know how important clearly communicating roles and expectations up front will be.

Building a team that empowers members challenges us to color outside the lines to find creative solutions to problems, to search not for the first right answer, but for the best answer. But progress in an organization with limited resources doesn't mean sending a group of individuals down a rabbit trail. It means telling them up front what the potential for funding support may be. It means sharing openly where the project fits with department-wide priorities. While empowerment encourages team members to be creative, effective empowerment makes sure that committees are aligned by department values and priorities—not to control, to dictate, or to stifle innovation, but to focus the organization's limited resources of time, dollars, and energy around priority needs. The objective is to maximize success and to maintain trust and credibility.

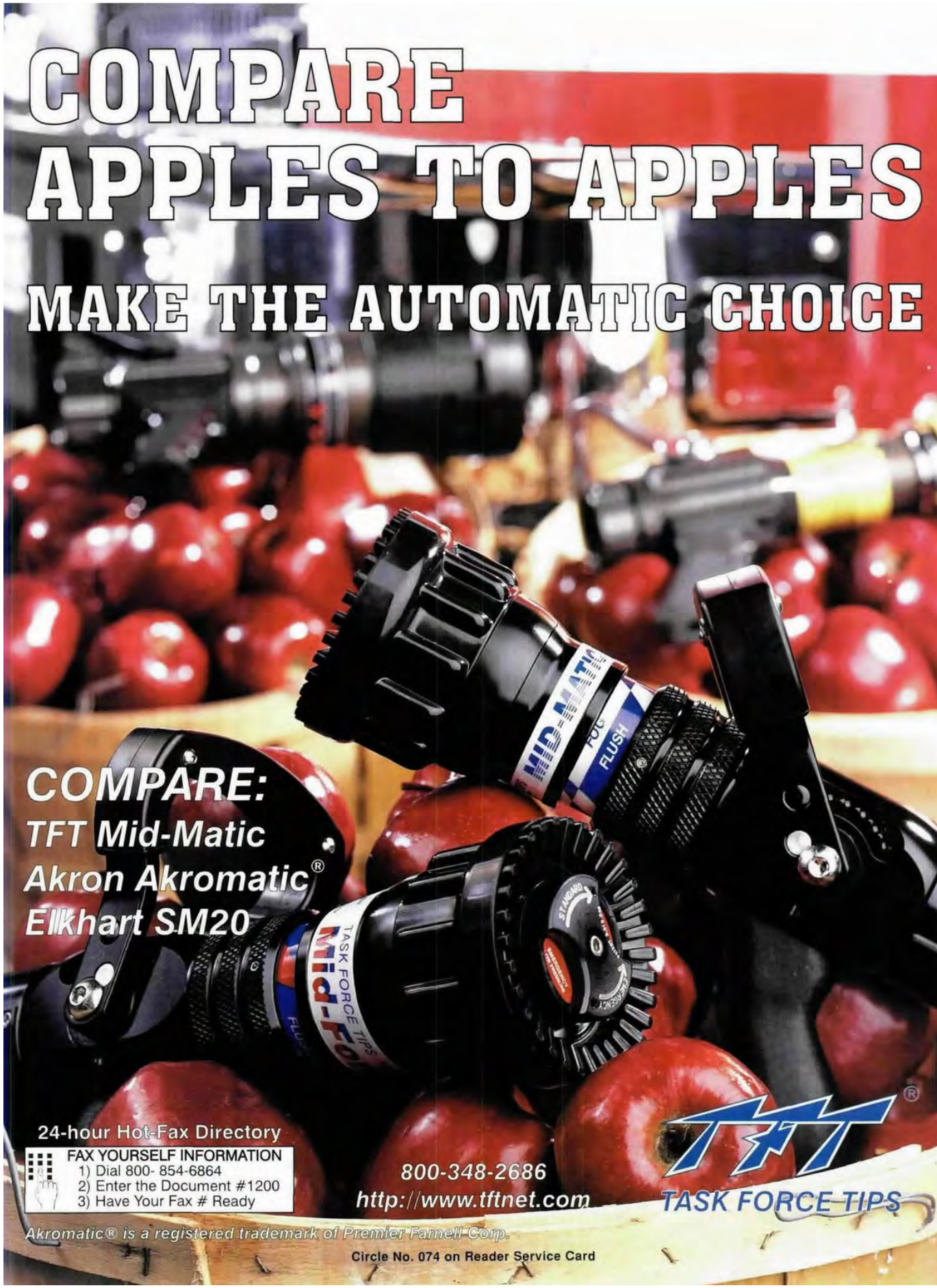
Empowerment doesn't mean democracy. It doesn't mean that every decision is a popularity contest, nor that a good boss should implement every suggestion or change simply because it's the result of a committee process. It doesn't mean there won't continue to be occasions that require decision-making with a limited opportunity for input. Empowerment doesn't change the fact that an organization's leaders maintain authority, not as a privilege of rank, but because their positions demand that they be responsible and accountable.

Empowerment does mean including the right people, at the right levels of the organization, in decision-making. It reinforces a fundamental team concept: An organization can be strengthened by applying the best each of us can contribute toward improving our service. Empowerment means asking for input—and really listening. It means treating people with respect and providing honest feedback when they've invested their time in a project. Empowerment also means including diverse opinions and encouraging challenge. It reaffirms that good ideas come from every level and division. It acknowledges what I will gladly testify to: The fire chief isn't the one with all the answers! Empowerment reinforces the fact that we have internal customers, too, and that the stakeholders affected by a decision can often contribute to improved decision-making.

To be effective, empowerment must also hold team members accountable. This means that they can't use their input solely to advance a personal agenda, but must instead evaluate options based on the best interests of the organization.

Robin F. Paulsgrove is chief of the Arlington, Texas, Fire Department and an officer of the IAFC's Metro Fire Chiefs Section.

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Sprinklers' Big Break

The topic of residential sprinklers finally made its television debut on "The Gayle King Show."

Meri-K Appy

From time to time, I get the opportunity to talk on national television about fire safety. I'm usually asked to discuss basic fire prevention tips, home escape planning, the safe use and storage of gasoline and other flammable liquids, and electrical safety—important issues that have gradually gained media exposure over the past two decades. But in a recent appearance on "The Gayle King Show," the topic was one that's been almost entirely ignored by the broadcast media: residential fire sprinklers.

It was my first time talking on television about this valuable addition to our fire safety arsenal, but not for lack of trying. Julie Reynolds and her staff in NFPA's Public Affairs Division are true believers in the life-saving benefits of fire sprinklers and work hard to convince television producers to include this angle in their programming. "Too technical for our audience," the producers often tell us. "Boring...not visual enough...too expensive for the average viewer to install, so why bother talking about them?"

Fortunately, Gayle King's producers were different. The Home Fire Sprinkler Coalition, a partnership among NFPA, the American Fire Sprinkler Association, and the National Fire Sprinkler Association, established to inform the public about automatic fire sprinkler protection in the home, pitched the story idea to Gayle, and her producers bit. The coalition offered to provide a demonstration trailer so that Gayle could experience first-hand this technological breakthrough, and they invited me to represent the coalition.

John Vendetta, fire chief in Hartford, Connecticut, and a supporter of the coalition, was Gayle's host in the trailer, a kind of "living room on wheels." As the cameras rolled, he showed how a small wastebasket fire can quickly spread to a curtain. Gayle was visibly unnerved as she watched the fire and felt the intense heat. But within seconds, one sprinkler opened and doused the flames.

Gayle also interviewed 18-year-old Melissa Slusarski, who survived a horrific fire at an apartment complex in Bremerton, Washington. Melissa, who admitted that she never planned or practiced a home escape plan, was alerted to the fire when her neighbor began pounding on her apartment door. The neighbor had called 911 on his cellular phone, but because he spoke very little English, he was having trouble communicating with the dispatcher. Melissa took the phone and spoke to dispatcher Marty Russell, who told her to stay low and avoid breathing in the toxic smoke. Firefighters eventually rescued Melissa from her balcony.

In a "made-for-TV" moment, Melissa was reunited with Marty, who gave her a tiny telephone charm on a delicate gold chain.

"Melissa lost everything in the fire," explained Marty, "and all ladies need something pretty to wear."

We do, indeed. Just as all people—men, women, and children—need a safe place to live, people to love, and possessions to cherish. The sad fact is that fire can and does destroy all of these things. That's why, when my husband and I built a new home four years ago, we installed a residential sprinkler system. For approximately $1 per square foot—about the cost of upgrading our carpet—we could have something far more valuable than a fancy floor covering.

As a working mom, I can't be there all the time to protect the people I love most from fire. But my home's fire sprinklers are the next best thing to having a trained firefighter on duty 24 hours a day. It's a message I love to share with anyone who'll listen. And for once, a television personality—herself the mother of two children—was all ears.

For more information about the Home Fire Sprinkler Coalition, see NFPA's home page on the World Wide Web at www.nfpa.org.



Photograph: The Home Fire Sprinkler Coalition

Meri-K Appy is NFPA's vice president of Public Education.

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- Aesthetically pleasing small frame design
- 'K' factor of 5.8
- Can be recessed with Model F705 two-piece escutcheon

Model	'K' factor	Orientation	Temperature ratings	Max. Coverage	Single Head Flow	Multiple Head Flow
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F983	4.4	Pendent	155°F & 175°F	20' x 20'*	20 GPM	17 GPM
F685	3.5	Sidewall	155°F & 175°F	16'W x 16'L	16 GPM	14 GPM
F984	4.4	Sidewall	155°F	16'W x 16'L	21 GPM	15 GPM
F687	5.8	Sidewall	155°F	16'W x 20'L	29 GPM	26 GPM

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The Society of Fire Protection Engineers (SFPE) has been around since the 1950s. But the atmosphere is anything but stodgy at SFPE's new offices outside Washington, D.C., with newly appointed Executive Director Kathleen Almand at the helm.

What's changing at SFPE?
Our tag line used to be "Advancing the Art and Science of Fire Protection Engineering." Now, it's "Advancing the Science and Practice of Fire Protection Engineering." That really captures it. This isn't something done by a few artists using exotic tools.

Is the organization at a major transition point?
For a long time, only a few well-qualified fire protection engineers could use the rather exotic computer models being developed. Most coped as best they could, making engineering judgments without a lot of technical tools at their disposal.



Photo: ©Martin H. Simon/SABA

Now, the discipline is maturing. Licensing boards in more than 40 states formally recognize fire protection engineering as a separate discipline. There are probably 1,000 graduates from accredited engineering schools out there. And the tools that were so tough to use are becoming more user-friendly.

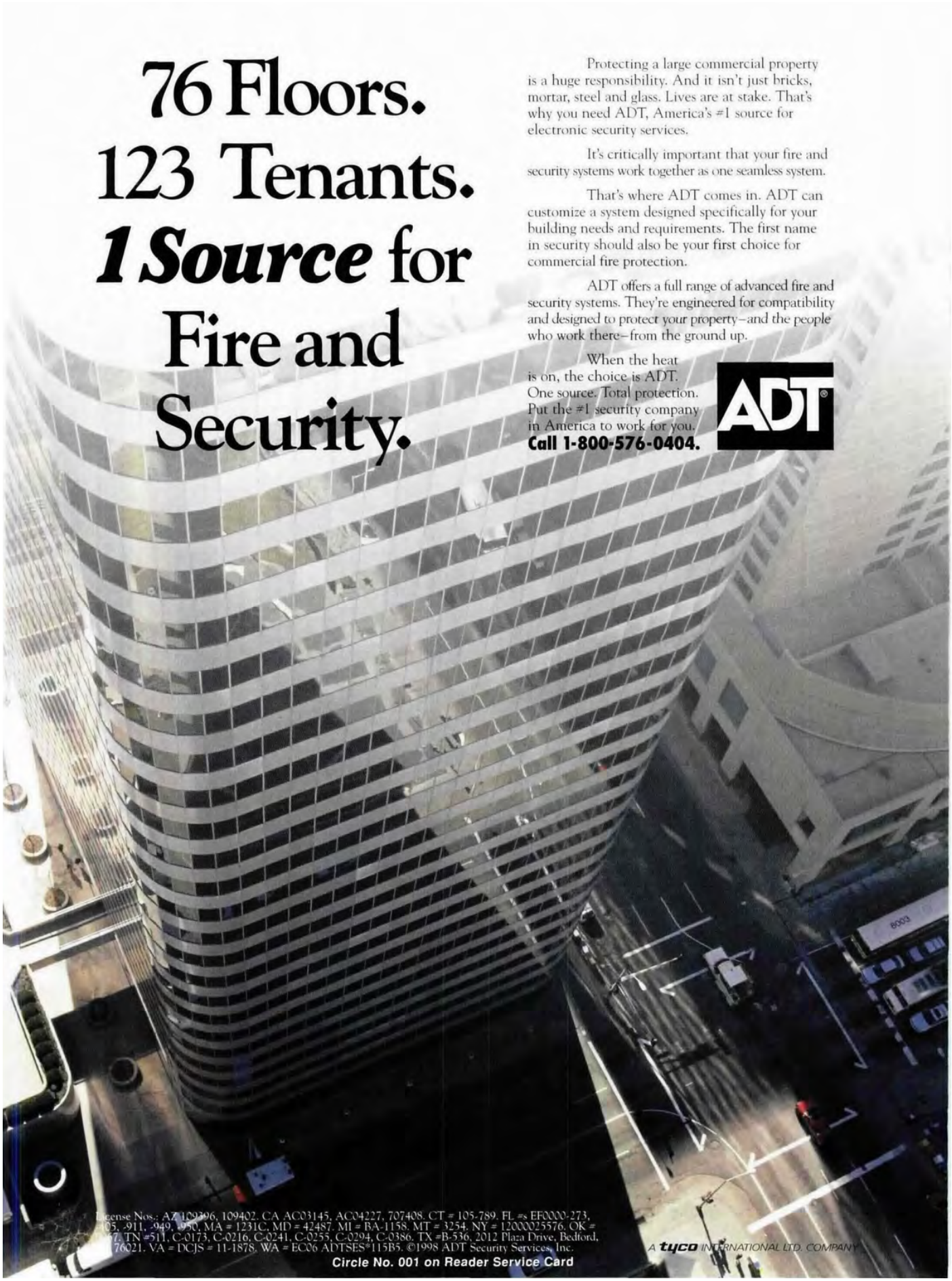
What's the biggest problem for fire protection engineers today?
Gaining recognition for these engineering tools so they become generally accepted. It's one thing for a fire protection engineer to pull something off the shelf that was done in a research lab and use it to solve a design problem. The real problem is when he or she goes to the building officials, and they say, "How do we know that the results coming out of this model are correct?" He or she wants to hold up an SFPE design guide and say, "See!"

How is the SFPE making this approach accepted?
NFPA is supporting us in the development of what will be our landmark document in this area—a performance-based design guide.

How is performance-based design different from the traditional approach?
One way to do this job is to look up standards in a code book, where you find all kinds of very specific prescriptive requirements for fire safety. The other way is to say, "What's really needed to create a fire-safe building? Let's look at the desired performance of every design element and figure out how we can provide that level of safety." That's performance-based design.

At the end of the day, it would be wonderful if a fire protection engineer could really engineer a building. This is the same vision other engineering disciplines have—an engineering, rather than a prescriptive, environment. You'll get safer buildings, more economical for the owner. But to get there, we need technical information, design tools, education programs. Fire protection engineers have a tremendous commitment, and an interest in furthering the profession is part of their professional integrity.

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Small but Mighty

Art Pullan, fire prevention officer of a small town, has a big reach.

Hallie Ephron Touger

Bordered by Ottawa to the north, Montréal to the east, and Toronto to the west, Brockville, with its population of 22,000, may seem small. But as Chief Fire Prevention Officer Art Pullan can tell you, it has a mighty reach when it comes to fire prevention education in Canada.

How did you get involved in fire safety education?
Between 1975 and 1984, we lost 18 people in fires, and our population is only 22,000. That's a per capita fire death rate of nine, and the national average was three. When a new fire chief arrived, he instructed me, as chief fire prevention officer, to increase our emphasis on fire prevention education, using the schools as a vehicle, if possible.

How did you get involved with Learn Not to Burn®*?*
I became aware of the program at a fire prevention conference in Toronto. We ordered the materials and asked teachers to review them. They were very impressed, so we introduced the curriculum into 50 schools in 17 municipalities. We were the first in Canada to implement *Learn Not to Burn* (*LNTB*) at a board-wide level. That was 10 years ago, and our commitment is as strong today as it was then.

Has the program spread?
It has. When a neighboring firefighter moved 250 miles away, he took the *LNTB* curriculum with him, and it came to the attention of Canadian Tire. Canadian Tire's Child Protection Foundation approached Fire Prevention Canada and donated $1 million to put *LNTB* into every school in Canada. You can follow the trail back to our board-wide implementation.

Has the program made a difference in Brockville?
From 1975 to 1984, 18 residents died in fires. From 1988, when we introduced the program, until 1996, we lost only two. *LNTB* played a key role in this.

What other programs have you implemented?
We've been a key player in introducing the Alarm for Life program. After a successful pilot in Brockville, it spread throughout Ontario, where fire departments bought over 100,000 smoke alarms and carbon-monoxide detectors for local distribution. And NFPA's asked us to pilot *Risk Watch®*, its new injury prevention program. We put together a team of police, health, fire, and school officials to implement the program. In one day, we raised $40,000.

How did you do it?
We held a golf marathon in which 37 golfers pledged to golf 100 holes. Our goal is to raise enough money to give all the teachers their own *Risk Watch* materials. Large departments may have more resources than we do, but, at the end of the day, it's people and commitment that make things happen.

It sounds as if there's a lot of support for Risk Watch.
We've had 10 years' experience with *Learn Not to Burn*. With more than one agency delivering the *Risk Watch* message, it should take half that long to have the same influence.

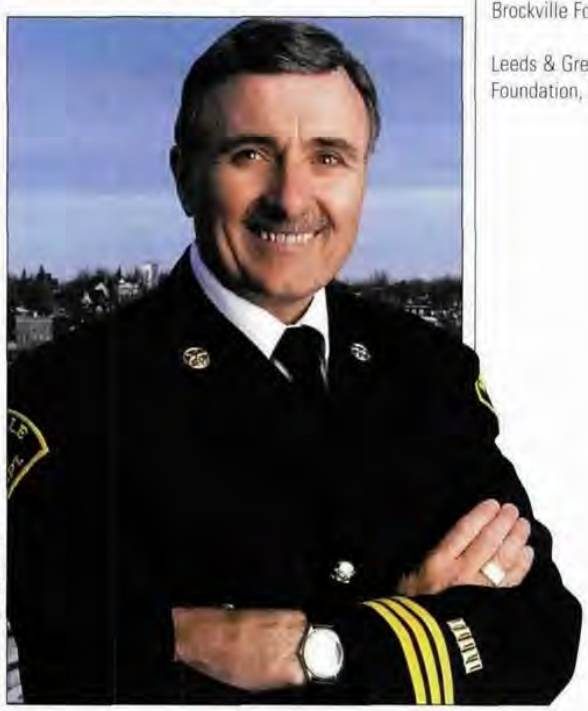


Photo: ©Christopher Morris/SABA

Art Pullan

Employment
Chief Fire Prevention Officer, Brockville Fire Department, Brockville, Ontario

Organizations
NFPA, Member, NFPA Fire Safety Representative

Ontario Municipal Fire Prevention Officers' Association, Past President

Ontario Fire Marshal's Public Fire Safety Council, Director

International Association of Fire Fighters Local 536, Past President

Brockville Foundation, Director

Leeds & Grenville Fire Safety Foundation, Director

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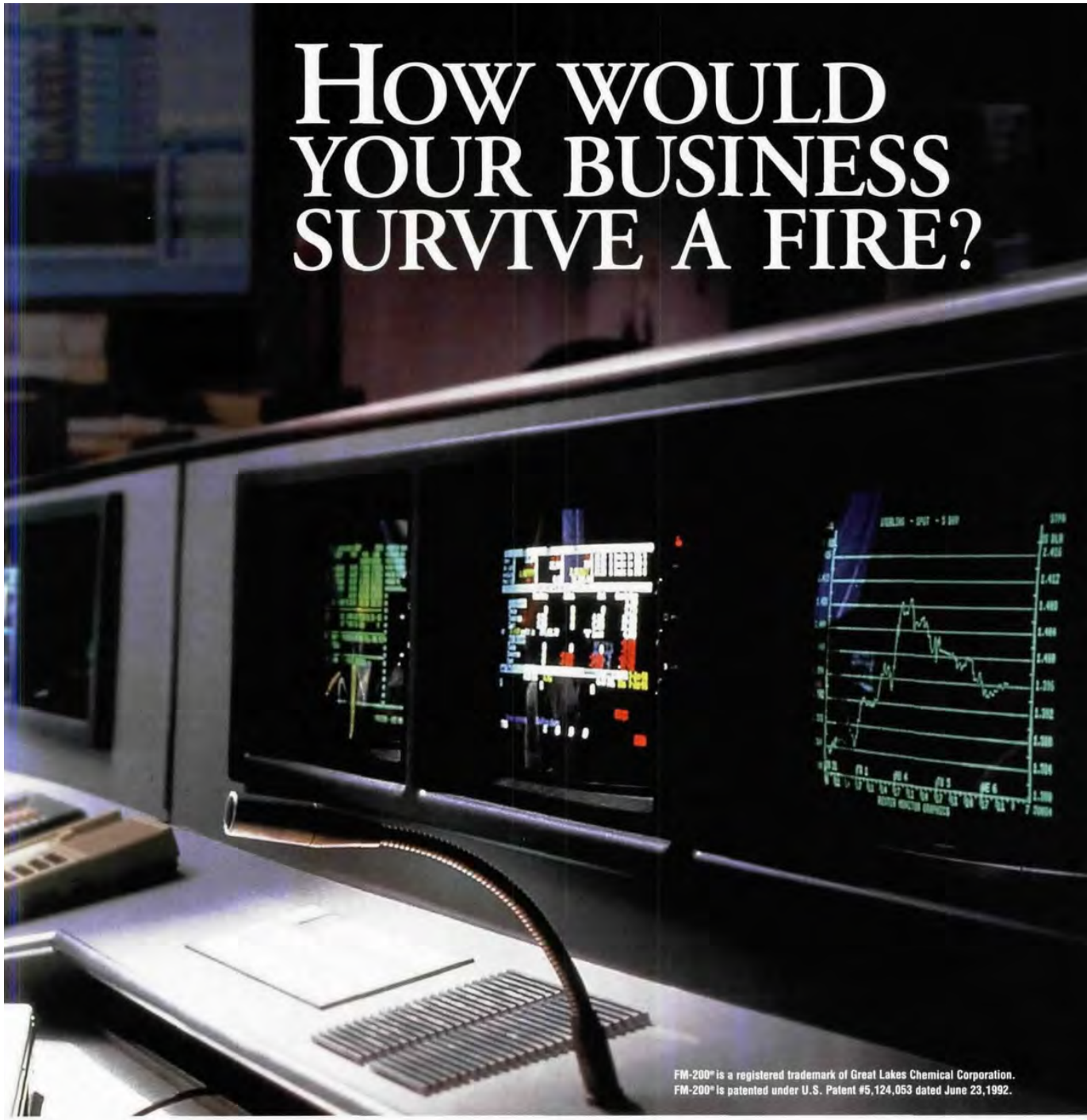


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THE AFTERMATH

Emergency crews in Florida responded to a series of violent tornadoes that struck five counties, killing 42 people in a matter of minutes.

Ed Comeau

On the night of February 22, 1998, five counties in east central Florida—Brevard, Orange, Osceola, Seminole, and Volusia — were under a tornado watch. Because such watches don't often result in significant tornadoes, however, people don't usually take precautions. And it usually doesn't matter. That night, though, it did.

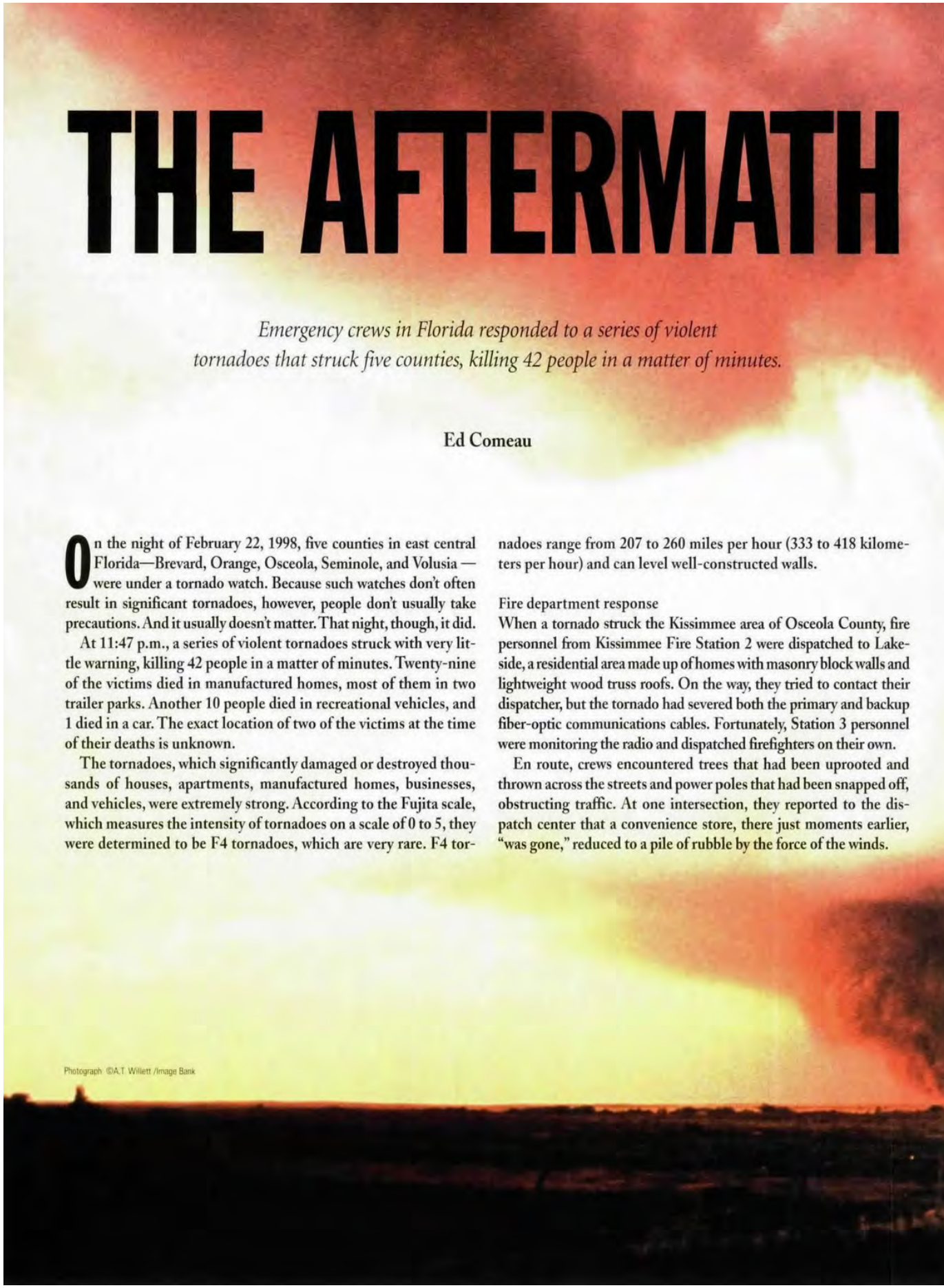
At 11:47 p.m., a series of violent tornadoes struck with very little warning, killing 42 people in a matter of minutes. Twenty-nine of the victims died in manufactured homes, most of them in two trailer parks. Another 10 people died in recreational vehicles, and 1 died in a car. The exact location of two of the victims at the time of their deaths is unknown.

The tornadoes, which significantly damaged or destroyed thousands of houses, apartments, manufactured homes, businesses, and vehicles, were extremely strong. According to the Fujita scale, which measures the intensity of tornadoes on a scale of 0 to 5, they were determined to be F4 tornadoes, which are very rare. F4 tornadoes range from 207 to 260 miles per hour (333 to 418 kilometers per hour) and can level well-constructed walls.

Fire department response

When a tornado struck the Kissimmee area of Osceola County, fire personnel from Kissimmee Fire Station 2 were dispatched to Lakeside, a residential area made up of homes with masonry block walls and lightweight wood truss roofs. On the way, they tried to contact their dispatcher, but the tornado had severed both the primary and backup fiber-optic communications cables. Fortunately, Station 3 personnel were monitoring the radio and dispatched firefighters on their own.

En route, crews encountered trees that had been uprooted and thrown across the streets and power poles that had been snapped off, obstructing traffic. At one intersection, they reported to the dispatch center that a convenience store, there just moments earlier, "was gone," reduced to a pile of rubble by the force of the winds.



Photograph ©A.T. Willett /Image Bank



Kissimmee's on-duty Battalion Chief Larry Whetsel was also on his way to Lakeside, where he established a joint command post with the Kissimmee Police Department at Cypress Elementary School, when he heard that the roads were blocked. He went around the area, even though the rain was coming down so hard he later said he could barely see the reflectors in the middle of the road. In his travels, he saw a police officer helping people out of a house that had been completely flattened.

When Whetsel arrived at the school, he and a police sergeant established a command post, using the corridors as a shelter for victims, who were already starting to trickle in. Engine companies and rescuers arriving at the school were either assigned to search specific areas of the subdivision or ordered to support command post operations. The school had been slightly damaged by the winds and had no power, so generators from the apparatus were used to run portable lights.

According to the chief, at least five seriously injured people arrived while they were still establishing operations at the school, and they had to be cared for by other victims until a fire department company arrived to help them. Eventually, a physician showed up to treat the injured and suture wounds.

In Lakeside itself, a number of homes had been severely damaged. In most cases, their garage doors had failed—they were either ripped out or blown inward—allowing the winds to enter the structures and lift up the roofs. The roofs were either partially or totally blown off a number of houses, seriously damaging the walls. The tornadoes had also tossed cars around, depositing them inside houses or on top of other cars. Ultimately, about 15 wreckers had to be brought in to drag the cars back to the street.

Firefighters from Kissimmee Station 1 also responded to Lakeside, although they were delayed by communications problems. They drove into the subdivision, where they treated a pregnant women with a broken leg and directed a number of "walking wounded," most of whom had cuts and scrapes, to the school. They were then sent to the school themselves to help with the injured.

Rescue 1 wound up transporting a number of victims to area hospitals from the subdivision itself. Another 15 people were taken to the hospital from the school, 10 by school bus and 5 by Rescue 2.

By 3:25 the following morning, the primary search for victims had been completed, and most of the residents had been accounted for. Around 6:00 a.m., mutual aid companies from Brevard County began to arrive. Each engine was assigned personnel from the Kissimmee Fire Department to serve as guides and communications liaisons, then sent to conduct secondary searches of the heavily damaged areas. During these secondary searches, firefighters located several people who had returned to their damaged homes. Despite the devastation, no one in Lakeside was killed.

The same could not be said of the Buena Ventura Lake Shopping Center, a strip mall with masonry block walls and a roof supported by a combination of wood trusses and lightweight steel bar joists. When firefighters from Kissimmee's Engine 3 arrived, they discovered that the center's roof had collapsed when the tornado passed through. Fortunately, the only business occupied at that time of night was Rosie's Pub, a bar at one end of the mall.

The Kissimmee Heights Volunteer Fire Department, which arrived before Engine 3, conducted a primary search of the building and removed five victims. According to a Kissimmee firefighter, they also found a severely injured man in the parking lot across the street from the shopping center with head wounds and a broken leg. Rescue 3 took him to a hospital, where he later died.

Up the street from Rosie's, a security camera in a Winn Dixie grocery store provided dramatic images of the tornado blowing in the store's front windows and tossing shelving and other items around as employees fled to the rear of the building to escape. Fortunately, no one in the store appears to have been injured.

It was a very different story at two mobile home parks in the area, however. One of them, the Ponderosa Trailer Park, took a direct hit.

Though it was called a trailer park, Ponderosa Park primarily contained recreational vehicles, not manufactured homes, and recreational vehicles aren't required to be tied down to withstand high winds, as manufactured homes are. When companies from the Osce-

The Damage

The Florida Division of Emergency Management prepared the following damage assessment on March 2, 1998:

- Brevard County: One single-family home was destroyed, 3 sustained major damage, and 17 sustained minor damage. One apartment building sustained minor damage.
- Orange County: One hundred twenty single-family homes were destroyed, 58 sustained major damage, and 171 sustained minor damage. Sixty-seven manufactured homes were destroyed, 47 sustained major damage, and 158 sustained minor damage. Fifty-three apartment buildings were destroyed, 47 suffered major damage, and 71 sustained minor damage.
- Osceola County: One hundred eighty-three single-family homes were destroyed, 199 sustained major damage, and 543 sustained minor damage. One hundred ninety-four manufactured homes were destroyed, 29 sustained major damage, and 52 sustained minor damage. Six apartment buildings were destroyed, 4 suffered major damage, and 126 sustained minor damage.
- Seminole County: Fifty-nine single-family homes were destroyed, 29 sustained major damage, and 58 sustained minor damage. Forty-four manufactured homes were destroyed, 6 sustained major damage, and 12 suffered minor damage. Four apartment buildings sustained minor damage.
- Volusia County: Sixteen single-family homes were destroyed, 84 sustained major damage, and 140 suffered minor damage. Thirty-three manufactured homes were destroyed, 89 sustained major damage, and 295 suffered minor damage. Thirty-six apartment buildings sustained major damage, and 162 sustained minor damage.

In all, 1,681 single-family homes in five counties were either destroyed or damaged, as were 1,026 manufactured homes and 510 apartment buildings. Of the 42 people who were killed, 29 died in manufactured homes, 10 died in recreational vehicles, and 1 died in a car. The exact location of two of the victims at the time of their deaths is unknown. No one in a single-family home or apartment building at the time of the tornadoes died.

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ola County Fire Department arrived at the scene, they were faced with widespread destruction.

Fortunately, area hospitals were already on standby, alerted to a possible influx of wounded by Bill Lindlau, a chief officer from Osceola County who'd originally been dispatched to the Buena Ventura Lake Shopping Center. When Lindlau made it to the Ponderosa Park about 45 minutes after he was dispatched, he reported that the Kings Point Volunteer Fire Department had already established command, triage, and transportation sectors and that an airlift sector had been set up at the nearby K-Mart Plaza so that helicopters could take the more seriously injured to medical facilities. An estimated 62 people were airlifted out. Ultimately, 10 people died in Ponderosa Park, all of whom are believed to have lived in recreational vehicles.

Property damage was primarily confined to the front of the park, where the tornado picked up entire vehicles and threw them through the air. The tops of a number of vehicles had been ripped from their platforms, completely exposing their occupants to the wind. The roof of the central recreation center was also torn off, and an 8-foot masonry block wall was blown over.

At the Morningside trailer park, northeast of Lakeside, the single- and double-wide manufactured homes were fixed in place, but for many of them, it made no difference. The tornado picked them up and dropped them hundreds of feet away, leaving nothing more at the original sites than a few masonry blocks, a set of steps, and the remains of utility connections. Some residents were blown out of their homes and landed hundreds of feet away in the woods and swamps. Fourteen people in this complex died.

Most of the injured ended up at three area hospitals, Osceola Regional Medical Center, Florida Hospital–Kissimmee, and the St. Cloud Hospital. According to personnel from Florida Hospital, which received 38 victims, the facility activated its disaster plan and was quickly able to mobilize personnel to begin treating incoming patients, many of whom arrived by private vehicles and ambulances. Most of the victims suffered trauma injuries, but there were some cardiac patients, as well. Five of the victims were in critical condition when they were admitted, and one died on March 5, 11 days after the tornado struck.

The Osceola Regional Medical Center, which has a relatively large emergency room with 18 beds, was able to treat incoming patients relatively quickly, partly because many of the physicians and staff responded without being called once they realized the extent of the damage. They treated 84 victims, 12 of whom were admitted, 4 into the intensive care unit. Of these four, two died of their injuries.



Photograph © Joe Burbank, The Orlando Sentinel

President Clinton comforts a tornado survivor while her husband and daughter look on. The couple's home in Kissimmee's Ponderosa RV Park was destroyed.

The Fujita Scale

The Fujita Scale measures tornadoes on a scale of 0 to 5:

- F0 tornadoes range from 40 to 72 miles per hour (64 to 116 kilometers per hour), damaging chimneys and breaking tree branches.
- F1 tornadoes range from 73 to 112 miles per hour (117 to 180 kilometers per hour), pushing manufactured homes off their foundations or overturning them.
- F2 tornadoes range from 113 to 157 miles per hour (182 to 253 kilometers per hour), doing considerable damage, demolishing mobile homes, and uprooting trees.
- F3 tornadoes range from 158 to 205 miles per hour (254 to 330 kilometers per hour), tearing down roofs and walls, overturning trains, and lifting cars into the air.
- F4 tornadoes range from 207 to 260 miles per hour (333 to 418 kilometers per hour), leveling well-constructed walls.
- F5 tornadoes range from 261 to 318 miles per hour (420 to 512 kilometers per hour), lifting homes off their foundations and carrying them considerable distances, and throwing cars as far as 328 feet (100 meters).

Source: FEMA

Damage in Orange County

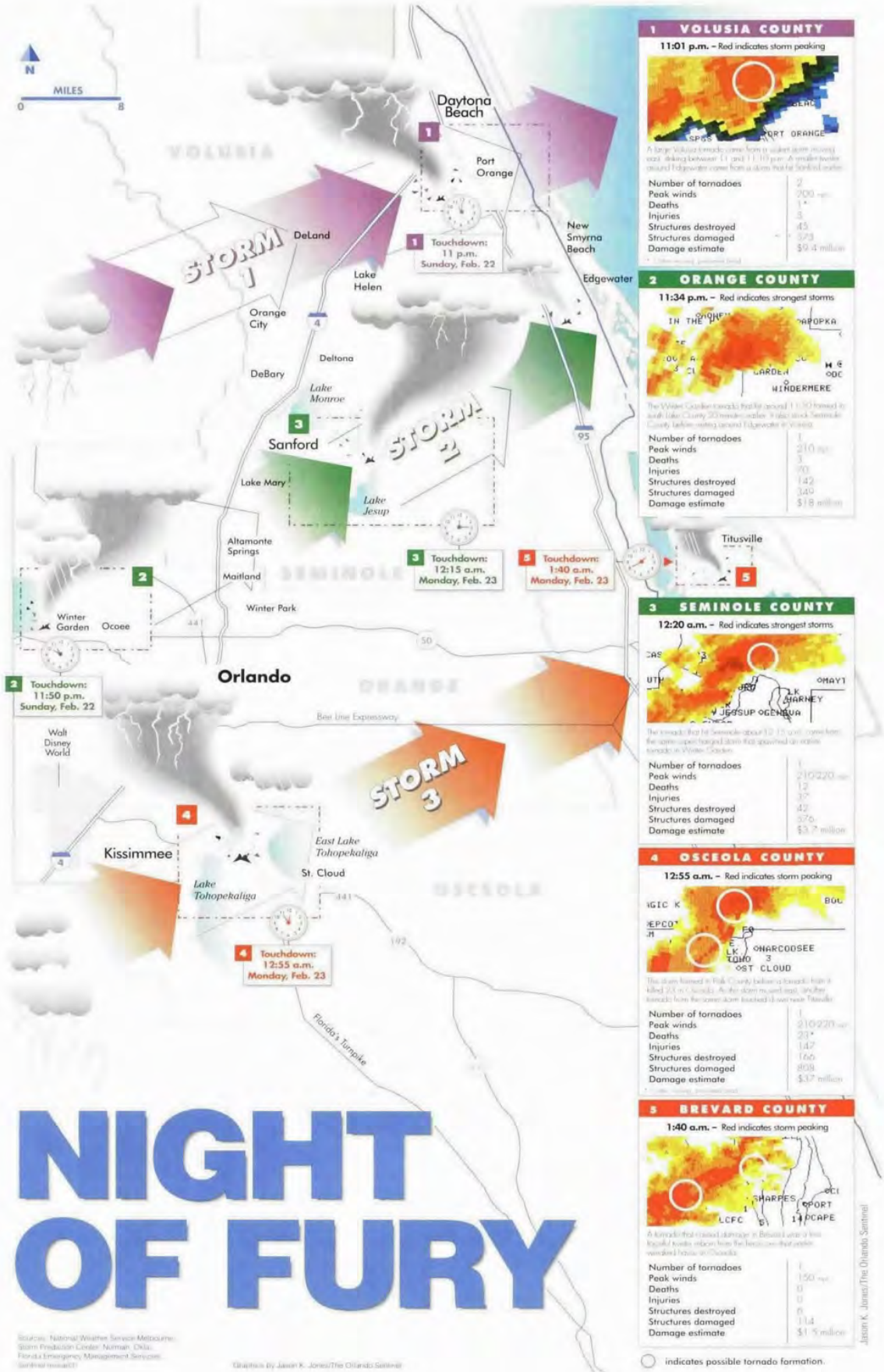
In Winter Garden in neighboring Orange County, firefighters watched in awe as a funnel cloud moved from west to east several miles from the Winter Garden fire station, blowing up electrical transformers in its path in brilliant showers of light. They reported feeling very light, almost as if they were floating. A police officer even reported to his dispatcher that his cruiser was being lifted off the ground as the tornado passed.

At Winter Garden's Hyde Park mobile home park, a number of homes actually became airborne. In fact, three people died when the wind tossed their manufactured homes about like dice. The homes of the more fortunate were merely blown several feet from their original locations, or lost their roofs and a wall or two. The natural gas service to several homes was also severed, resulting in a number of gas leaks.

At the Country Gardens apartment complex, also in Winter Garden, several of the two-story, wood-frame buildings lost their lightweight wood truss roofs or their walls, and cars were tossed around the complex like toys. The tornado even moved the tractor section of a tractor trailer 5 feet (1.5 meters) from its parking place. Despite such damage, no one in Orange County was killed.

Wherever they touched down, the tornadoes knocked out electrical power. According to the Kissimmee Utility Authority, 11,000 people in Osceola County lost power in its service area alone, and 2 miles (3.2 kilometers) of distribution lines and a mile (1.6 kilometers) of trans-

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MILES
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8
Daytona Beach
Port Orange
New Smyrna Beach
Edgewater
DeLand
Lake Helen
Orange City
DeBary
Deltona
Lake Monroe
Sanford
Lake Mary
Lake Jesup
Altamonte Springs
Maitland
Winter Park
Winter Garden
Ocoee
Orlando
Bee Line Expressway
Walt Disney World
Kissimmee
East Lake Tohopekaliga
Lake Tohopekaliga
St. Cloud
Florida's Turnpike
Titusville
STORM 1
STORM 2
STORM 3
1 Touchdown: 11 p.m. Sunday, Feb. 22
2 Touchdown: 11:50 p.m. Sunday, Feb. 22
3 Touchdown: 12:15 a.m. Monday, Feb. 23
4 Touchdown: 12:55 a.m. Monday, Feb. 23
5 Touchdown: 1:40 a.m. Monday, Feb. 23
1 VOLUSIA COUNTY
11:01 p.m. – Red indicates storm peaking
Number of tornadoes 2
Peak winds 200 mph
Deaths 1*
Injuries 3
Structures destroyed 45
Structures damaged 373
Damage estimate $9.4 million
2 ORANGE COUNTY
11:34 p.m. – Red indicates strongest storms
Number of tornadoes 1
Peak winds 210 mph
Deaths 3
Injuries 70
Structures destroyed 142
Structures damaged 349
Damage estimate $18 million
3 SEMINOLE COUNTY
12:20 a.m. – Red indicates strongest storms
Number of tornadoes 1
Peak winds 210-220 mph
Deaths 13
Injuries 37
Structures destroyed 42
Structures damaged 376
Damage estimate $3.7 million
4 OSCEOLA COUNTY
12:55 a.m. – Red indicates storm peaking
Number of tornadoes 1
Peak winds 210-220 mph
Deaths 23*
Injuries 147
Structures destroyed 166
Structures damaged 809
Damage estimate $37 million
5 BREVARD COUNTY
1:40 a.m. – Red indicates storm peaking
Number of tornadoes 1
Peak winds 150 mph
Deaths 0
Injuries 0
Structures destroyed 6
Structures damaged 114
Damage estimate $1.5 million
indicates possible tornado formation.
NIGHT OF FURY
Graphics by Jason K. Jones/The Orlando Sentinel



Photograph: ©Red Hekter/The Orlando Sentinel

The tornado picked up this automobile and deposited it in the living room of a Lakeside Estates home in Kissimmee.



Photograph: ©AP/Wide World Photos/Hans Deryk

A resident of Ponderosa RV Park sits among the ruins of his mobile home after residents were allowed to return to the park to begin picking up the pieces.

mission lines had to be replaced. Damage was estimated at $1 million.

The Osceola County telephone system was seriously damaged, as well, when the roof blew off a 12,000-line central office northeast of the Buena Vista Lake Shopping Center. All the equipment inside was soaked, and 4,100 customers lost service as a result. The office was back on line the Wednesday after the tornadoes hit, but all the equipment will eventually have to be replaced—it was inundated with water and will ultimately corrode.

No panic

Several common themes emerged during interviews conducted after the incident. One was the lack of panic. Firefighters weren't sure whether to attribute this to shock, but they noted that, for the most part, people didn't act irrationally. They realized that they'd suffered serious damage, but they coped with it well. During a secondary search of the Lakeside complex, for example, firefighters found one man with a serious foot injury who'd gone back to bed in his damaged home to wait for daylight. In other areas, people immediately began to help extricate trapped victims and secure valuables.

Firefighters readily admitted they were overwhelmed from the very beginning because the destruction was so widespread. Companies entering damaged areas initially had no idea where people were trapped, so they began a house-to-house search. In Hyde Park mobile home park, rescue personnel had to bypass a number of gas leaks to rescue victims from the rubble. When a resident eventually told a firefighter he was going to start shutting down the gas services, the firefighter gave him a wrench, and the man proceeded to shut down all the services in the park.

Miraculously, there were no reports of fire anywhere in the devastated areas. Nor were there any serious haz-mat incidents. And rescue personnel suffered no serious injuries.

The Kissimmee Fire Department's dispatch center lost communications when the tornado severed both the primary and backup fiber-optic cables, which were remote from each other. For five days, dispatchers had to use portable radios to communicate with the field units. And the large number of incoming 911 calls made it impossible to page off-duty personnel. They had to rely, instead, on the telephone, a time-consuming process at best. Elsewhere in Osceola County, fire officials reported that it was difficult to get a channel on which to communicate because so many units were working so many incidents.

In some areas, fire departments that normally rely on one another for assistance couldn't because of the extensive damage in their own jurisdictions, so aid was brought in from unaffected areas further away, such as Brevard County and Orlando. The state, county, and local emergency operations centers (EOCs) were all activated, but requests from local jurisdictions in Osceola County that would normally have been routed through the county EOC had to go directly to the state for coordination. The tornado had damaged the EOC's phone lines, so the EOC had to be moved, which delayed its opening.

Keeping track of the huge number of emergency service organizations was a challenge, and everyone interviewed agreed that the incident command system was critical to coordinating activities during the incident. Also critical were the Federal Emergency Management Agency's urban search and rescue techniques.

Tornadoes might be unpredictable, but their outcome needn't be fatal. Construction features that can help minimize the tragic loss of life can be incorporated into buildings and manufactured homes, and the public can be taught how to better ride out and survive tornadoes. We have the opportunity to make a change—let's do it.

NFPA's Chief Fire Investigator Ed Comeau and Fire Investigator Robert Duval went to Florida to document the damage and the emergency response to the disaster.

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SAFETY AT SEA

Recent fires on international cruise vessels have caused an outcry among U.S. safety experts. And in the United States, regulators are catching up with an unanticipated area of new growth.

Alisa Wolf

If you're caught in a building that's on fire, you'd be well advised, in most cases, to find the nearest unobstructed exit and make your way out to the street. On board a ship thousands of miles offshore, however, you'd have to rely on crew members to shepherd you to an area of refuge or to lower lifeboats, if the situation called for such measures. You might even have to rely on the crew to inform you of a fire on board, since the International Maritime Organization's (IMO's) Safety of Life at Sea (SOLAS) regulations allow fire alarms to sound in a ship's pilot house rather than in the area of fire origin, presumably to help keep passengers from panicking during a fire or overreacting to false alarms.

Unfortunately, this practice may have other unanticipated consequences. A National Transportation Safety Board (NTSB) investigation of two fatal fires aboard passenger cruise ships in 1996 and 1997 show that the delay in alarm due to this practice was a contributing factor in six deaths and numerous smoke-inhalation injuries.

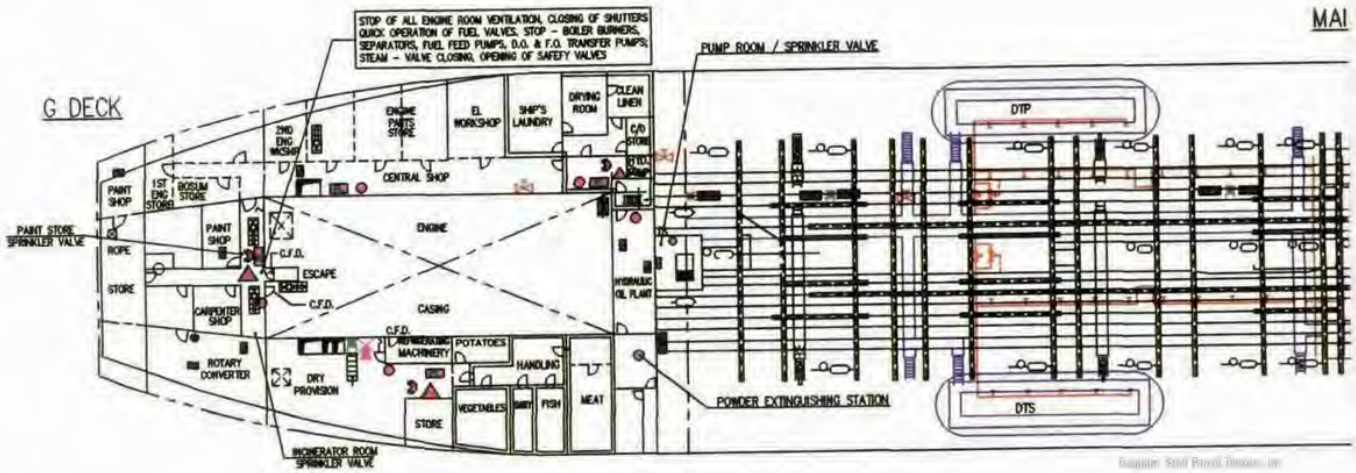
The first fire broke out around 3:00 a.m. on July 27, 1996, aboard the Universe Explorer, a Panamanian-flagged cruise ship that was near Admiralty Island, about 25 miles from Juneau, Alaska. The ship, which had 733 passengers and 274 crew members, was equipped with remote



The oil tanker Chypriote Haven exploded in Italy on March 4, 1991.

Photograph ©A. Pizzoli/Sygma





heat detectors designed to flash in the pilot house rather than alarm in the area of fire origin. According to the NTSB report, seven minutes elapsed between the time the alarm on the fire control panel sounded in the wheelhouse at 2:58 a.m. and the master ordered the general alarm. During that interval, the fire, which began in the laundry room, produced dense smoke, and heat spread up two decks to the crew's quarters. Five crew members died of smoke inhalation, two in their bunks. Responders found the bodies of the other three in the passageways. An additional 67 crew members and 2 passengers suffered smoke-inhalation injuries. Altogether, 27 people were hospitalized, 5 in critical condition.

The more recent fire occurred on April 6, 1997, aboard the Bahamian passenger ship, Vista Fjord, which had left Fort Lauderdale for the Azores with 569 passengers and 422 crew members. A fire in a storage room next to the laundry activated a heat detector alarm on the fire control panel in the wheelhouse at 1:12 a.m. Though the duty officer sounded the general alarm and the master ordered passengers and crew to their lifeboat stations shortly afterward, they weren't quick enough to avert a death. Heavy black smoke had already spread through the ship through air ducts in the three-minute delay between the time the alarm sounded in the wheelhouse and the time the ventilation system was shut down and the fire isolated to its compartment of origin. One crew member died of smoke inhalation, and six crew members and four passengers were injured.

"Like the Universe Explorer," says the NTSB report, "the Vista Fjord was not required to have, and was not equipped with, automatic smoke alarms that sounded locally in crew and passenger accommodations." The NTSB goes on to recommend that IMO require all passenger vessels to have automatic smoke alarms that sound locally in crew berthing areas and in passenger accommodation areas.

Despite the NTSB's findings, upgrades in international shipboard safety standards that went into effect in October 1997 didn't incorporate a requirement for locally sounding alarms. Some changes for the better were made, however.

Before the two fatal fires, smoke detectors were required only in corridors. SOLAS now requires smoke rather than heat detection throughout accommodation spaces in passenger vessels.

"Everyone knows heat detectors will take longer to activate than smoke detectors," says Yogesh Shah, an engineering manager at Notifier and a member of the committee developing NFPA 301, *Safety to Life from Fire on Merchant Vessels*. "Normally, they won't sound until the temperature reaches 121.11°C (250°F) or higher. Early-warning smoke detection would minimize casualties—action can be taken much faster if the control center is notified immediately of smoke."

In addition, passenger vessels must now remove direct access to stairways from high-hazard spaces such as laundry rooms, storage closets, and galleys so that smoke won't be able to enter the stairwells in the event of a fire. Only corridors and large public spaces can now open onto a stairway. And laundry rooms, which had been allowed to use heat detectors, must now be equipped with smoke detectors, despite their tendency to alarm from the steam.

However, there's still no international consensus on the issue of locally sounding alarms.

"From the industry's point of view, there's concern about panic with alarms going off," says Jack Booth of the U.S. Coast Guard. "It has to do with the master needing to have control of the vessel and not knowing how people will react. There's also concern about false alarms and people ignoring them after awhile.

"We [at the Coast Guard] think there are technical solutions to all of these problems," Booth says. "More than anything, we have to look at the data and address the casualty question."

But he suspects it might take some years before the international community agrees on this issue, which has come up before. In fact, in 1992, the international community discussed it, but no consensus could be reached.

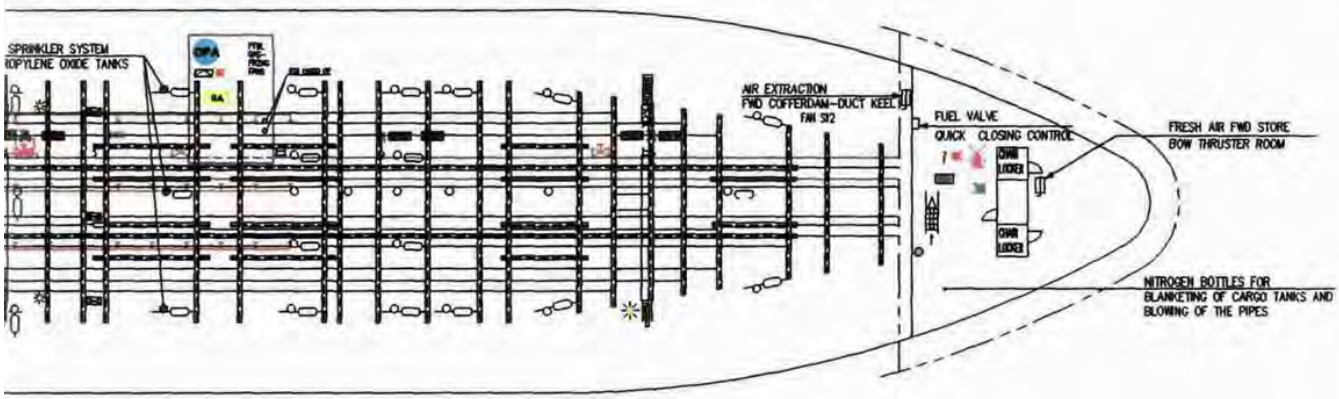
Meanwhile, the Universe Explorer is back at sea, and, like similar ships, it still doesn't have locally sounding fire alarms.

Concern over IMO sprinkler standards

IMO's requirements for automatic sprinkler protection have also undergone scrutiny recently. Fires such as the one that sank the 700-passenger Cypriot ship Romantica on October 4, 1997, on its way to Egypt focused media attention on the need for sprinklers in vessels. Luckily, Romantica's 482 passengers and 182 crew were safely evacuated from the ship, which was first commissioned in 1939. But dramatic photographs of fire at sea point to the potential for disaster.

Had the Romantica survived the fire, the recent changes in the SOLAS regulations would have required that its owners retrofit it with automatic sprinklers. However, it may take years for an industry-wide upgrade: Many vessels won't have to retrofit until 2005.

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"Generally, all ships built since 1994 have had to sprinkler accommodation and service areas," Booth says. "Ships built before 1980 have to put them on now. And the rest of the fleet has until 2005 to retrofit."

Regulations for domestic passenger ships

Though the U.S. Coast Guard has some regulatory authority over any ship that enters an American port, it can't demand that an international cruise ship follow stricter regulations than those required by IMO. Almost all cruise lines register their ships with the lowest-cost nations, such as Liberia, the Bahamas, and Panama. While the United States has a voice in the international standards-making process, it's only one of many. As a result, Coast Guard standards have more of an impact on domestic passenger ship safety than they do on the international cruise industry.

And now, a federal mandate that requires phasing in privately developed consensus standards in lieu of federal regulations where feasible has given NFPA the opportunity to develop its first standard devoted to shipboard safety since the 1940s.

What makes NFPA's new marine safety standard unique is its use of the same fire protection philosophy employed in the land-lubbing NFPA 101®, *Life Safety Code®*. As with the *Life Safety Code*, which contains requirements based on different occupancies, NFPA 301 recognizes that a tanker functions differently from a day-long whale watch excursion boat, a gambling boat, or a sightseeing vessel. And like the *Life Safety Code*, which categorizes buildings as mercantile occupancies, board-and-care facilities, health-care facilities, and so on, NFPA 301 addresses the different functions on board a vessel. Though the standard can, in theory, be adapted for use in designing fire protection features that cover a range of passenger vessels, from the largest cruise ship to the smallest harbor cruise boat, in practice, it'll probably have the greatest impact on passenger vessels that stay within U.S. borders.

In fact, NFPA 301 is most likely to have the greatest effect on excursion vessels, such as casino boats and dinner cruises, a class of vessel that began a growth spurt in the early 1990s. Unlike cruise ships with overnight passengers, the primary purpose of such vessels is entertainment. Accommodations aren't needed, since passengers are only on board for a few hours. Other services that cruise ships require, such as medical and child-care facilities, are also unnecessary.

The demand for this type of vessel challenged designers to ensure both fire safety and profitability. According to Morgan Hurley, formerly a fire protection engineer for the U.S. Coast Guard and chair of the NFPA 301 committee, fire safety requirements specifically addressing this type of vessel have lagged behind the industry's growth.

"The regulations we had in place were written around vessels with overnight accommodations, not just day passengers," says Hurley. "Designers were trying to figure out how to make the designs fit [the model used for cruise ships with overnight passengers]."

This was one of the issues that led to the formation of the committee to draft NFPA's first maritime safety document for many years.

"We thought NFPA would be the best forum for getting together all the concerned parties," says Hurley, who points out that before the NFPA Standards Council established the NFPA 301 committee in 1993, NFPA didn't really have construction requirements associated with commercial vessels.

"NFPA 302, *Motor Craft*, was written around smaller vessels," Hurley says. "Designers used requirements in the Coast Guard and federal regulations that essentially covered commercial vessel construction."

Using NFPA 301 could give designers greater design flexibility. But just how flexible the standard should be when it comes to sprinkler protection is an issue that's been contested among committee members representing different stakeholders.

How stringent should sprinkler requirements in 301 be?

At this month's Annual Meeting, where NFPA 301 will be voted on, the biggest issue will probably be its sprinkler requirements. As it stands now, sprinkler requirements would only apply to vessels carrying 3,000 day passengers or more than 50 overnight passengers. The accommodation spaces of vessels with 50 or more overnight passengers would have to be fully sprinklered, and some committee members perceive this as being too lenient, Hurley says.

"The IMO standards governing international ships would require sprinklers in new construction for overnight accommodations of more than 36 passengers," Hurley says. "In NFPA 301, vessels carrying fewer than 50 overnight passengers wouldn't have to be sprinklered."

The intent, says Guy Colonna, NFPA's chief chemical and marine engineer, "is to allow some vessels to use less combustible materials in the construction, thus reducing the potential fire load contribution without requiring automatic sprinkler protection.

"Passenger vessels in certain categories have that option in NFPA

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Tanker Fire Safety

It's the little stuff that gets you," says Bill Sullivan, assistant marine safety officer for Stolt Parcel Tankers and member of the NFPA 301 committee. As in any occupancy, fires on board a tanker are often caused by carelessness. But in these vessels, which carry flammable cargo ranging from tanks full of petroleum products to edible food oils to tallow to liquefied gases, strict regulations and enforcement contribute to a higher level of safety.

Nevertheless, says Sullivan, there's no way to "human-proof" every situation. He cites smoking materials as one example of a common fire risk on tankers. But smoking policies are strictly enforced on tankers, and every fire—even a trash can fire—is treated on Stolt ships as an all-hands emergency.

"A common scenario is for a smoke or heat detector alarm to go off," says Sullivan, who adds that ships are very well alarmed, making it fast work to isolate a fire. "If it's a small fire that's close to the sensor, as in a fire caused by smoking in bed, you would go in with hoses and extinguishers and do a thorough overhaul operation and firewatch." Such precautions are taken even in a fire that's "as simple as a snuffed out cigarette left smoldering in an ashtray," Sullivan says.

Because of the tremendous risk of explosion and fire on board a tanker, this class of vessel is well protected.

"To me, the greatest risk is in the engine room," says John Poulos, sail captain at Sea River Maritime, who cites hazards ranging from oil-soaked laggings (insulation around pipe lines) to electrical equipment to a piece of motor burning to a fuel line rupture to leaks and sprays, all potential fire risks if they occur near an engine room's ignition sources.

Firefighting tactics on board tankers

Most land-based occupancies are ventilated to get rid of heat by opening a roof or knocking out windows. But you can't do this at sea.

"Anytime you ventilate, heat will rise," Sullivan says. "If you have an engine room fire and decide to ventilate, the most likely way to let heat out will be through the smoke stack. And if that comes up through accommodation areas with no open air all the way up, the temperature is going to rise in any compartment that's up against the funnel. Basically, you keep the fire sealed in until you have a way to fight it."

Big fires on tankers are sometimes the result of sparking caused by collision. On April 11, 1991, for example, an oil tanker collided with a car ferry near Livorno, Italy. The resulting explosion and fire killed 140 crew members. Only one of the crew members survived. In another case two years later, a welding spark ignited an explosion on board a 660-foot-long U.S. tankship anchored near Galveston, Texas. The welder was repairing a small leak in the bulkhead, causing a cargo tank to explode, according to the National Transportation Safety Board accident report. Three people were killed: the welder and the firewatch, who were inside the ballast tank, as well as the vessel's pumpman, who was working on deck. The accident was partly due to the fact that the ship's crew hadn't properly cleaned the gas tank.

One reason such fires don't occur more often on ships carrying petroleum products, according to David Whiting, safety consultant for ARCO Marine, is because of inert gas systems developed in the late '60s and implemented in the '70s, which help reduce the danger of explosion during transport, tank cleaning, and other operations. An inert gas blanket is applied to the free space in a cargo tank, limiting oxygen to less than 8 percent and making an explosion virtually impossible.

Historically, says Whiting, "We've had some major tank fires and explosions because of operations that produced an incendiary spark—possibly a mechanical spark—that ignited the flammable mixture in the air. With inert gas, this just can't happen."

Combining fire safety with function

Fire safety systems are designed around some unique tanker features.

"Due to greater potential for fire, we have greater control, compared to a cruise ship," Sullivan says. "Our people are far better trained. We have a more knowledgeable crew, and we don't have passengers who don't know the ship." In addition, all hands know firefighting techniques and use breathing apparatus several times a week during routine duties. A typical tanker has anywhere from 17 to 30 trained crew members aboard, and because the living space is limited and crew members know the vessels inside and out, sprinklers aren't typically required in accommodation areas.

Tankers also use additional systems to bolster safety. Whiting cites deck foam systems, water spray systems in embarkation areas where lifeboats are stored, and breathing apparatus carried on lifeboats in the event of evacuation into a burning pool. Structural fire protection measures such as double hulls, a requirement written into the 1990 Oil Pollution Act, are also employed. And to protect against engine room fires, tankers are typically equipped with CO_2, halon, or fixed foam systems.

According to Poulos, the most important aspect of prevention and mitigation is training

"We have a tremendous amount of training, with weekly drills and sometimes elaborate scenarios. We send our officers and other crew to firefighting school."

Strict compliance with codes and standards translates into a pretty good fire record in the tanker industry, at least as far as huge disasters go.

"The regulations are very severe, which they should be," says Sullivan. "A mistake is not allowable."

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Photograph: Aspect Force Photo

An engine fire on the Cypriot cruise liner Romantica started on October 4, 1997, and continued to blaze into the next day. The ship had 487 passengers and 186 crew aboard, all of whom were safely evacuated and rescued.

301," Colonna explains, "and there are other spaces on a vessel where they may not have to have automatic sprinkler protection."

Colonna adds that NFPA 301's requirements are based on interior flame-retardant, fire-resistive construction that meets stringent ASTM and NFPA materials test requirements for flame spread rates and fire retardancy.

The type of vessel that would most benefit from NFPA 301's design flexibility would include whale watch boats that don't have overnight accommodations and are furnished with plastic chairs or molded benches.

"There are no wood floors, wood bulkheads, wood columns, or ornate design elements," Colonna says, "like you might have on a riverboat that's got overnight accommodations or a fancy cruise ship where they want to make it look like you're in a hotel."

He points out that the biggest source of problems in such excursion vessels is the engine room, which has its own fire protection systems that are "consistent with domestic as well as worldwide regulations," Colonna says.

"The document reflects the philosophy that, if you treated those vessels the same way as you do overnight ships, you'd run the excursion people out of business," says Colonna, "and you wouldn't necessarily provide any increased margin of safety for their passengers by requiring automatic sprinklers."

However, some stakeholders are concerned about NFPA's reputation as a sprinkler proponent if the Association passes sprinkler requirements that are less stringent than IMO's. In the final committee ballot, even the Coast Guard came down on the side of more stringent sprinkler regulations.

"We said we believe that, even if the threshold for sprinkler requirements were lowered, designers would still choose to follow NFPA 301 instead of Coast Guard regulations," said Hurley. NFPA 301 would allow exceptions to requirements for non- or low-combustible finish in sprinklered areas, Hurley explains. In other words, if a designer wanted to build with wood finish to make an excursion ship look posh, sprinklers would be required, no matter what the passenger load.

Pete Lauridsen, technical consultant of the Passenger Vessel Association and a member of the NFPA 301 committee, says the industry supports NFPA 301's sprinkler requirements as they now stand.

"We've tried to integrate all we know about sprinklers, noncombustible materials, and vessel layouts and capability to come up with a consensus as to what serves the overall purpose and mission of the standard," says Lauridsen. "We felt that those requirements that differed from IMO's were justified. We started with a blank sheet. What you see in NFPA 301 is the consensus developed in the committee process."

Whether the sprinkler requirement becomes an issue on the floor at Annual Meeting remains to be seen. No matter how it gets resolved, though, NFPA 301 will still provide design flexibility.

"Instead of saying 'you have to,'" says Hurley, "the committee created incentives to say, 'here's what you can do.'"

Shipboard safety at home and abroad

NFPA 301 addresses the issue of locally sounding alarms by following the NTSB recommendation for smoke alarms to sound locally. If you were on a cruise ship that adhered to the requirements of NFPA 301, you'd be alerted to a fire in the immediate vicinity in much the way you would if your smoke detector went off at home.

In the unlikely event that a cruise ship company registered a vessel like the Romantica or the Universe Explorer in the United States and voluntarily adopted the requirements of NFPA 301, it would have to provide sprinklers and locally sounding smoke alarms. Until that happens, it's up to consumers to make sure their vessels' accommodation spaces are fully sprinklered for shipboard safety on international waters. And if those staying closer to shore on a dinner cruise or a whale watch follow the crew's instruction in a fire emergency, chances are good that, if combustibles are kept to a minimum and the staff is well-trained, no one will be forced to jump overboard.

Alisa Wolf is editor of the NFPA Journal.

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The Great Escape



Illustration: David Coen

Most people have no idea how quickly smoke, toxic gases, and heat can fill a room, blocking exits, reducing visibility, and causing disorientation and death.

Alisa Wolf

Most people think they're more at risk of dying in a hotel room fire than in their own homes, in a shopping mall fire than in their own cars. In fact, the opposite is true. People are more at risk of fire death in their homes and cars than they are in a mall or a hotel room. Unfortunately, most home fire deaths don't get a lot of media attention because most people who die in homes die in ones and twos, and when their deaths show up in the newspaper, they're more likely to be lost on page 17 than they are to make it to page 1.

For years, fire safety educators have been trying to figure out why these misconceptions persist and how to get people to react when a fire alarm goes off. Of the 500 U.S. adults questioned for the National Fire Escape Survey, commissioned by NFPA in October 1997, only 45 percent of those who'd actually responded to an alarm in a public building said they left immediately. More than half either waited for instructions, did nothing, investigated or fought the fire, or alerted others. In the home, more than half of the respondents wrongly assumed they'd have plenty of time to escape a typical living room fire. Most had no idea how quickly smoke, toxic gases, and heat can fill a room, blocking exit paths, reducing visibility, and causing disorientation and death.

Public misconceptions about fire's behavior and how to escape fire death or injury don't come as a surprise to anyone who works in fire protection and prevention, but this doesn't make the public's attitudes any less disturbing.

"If you look at the statistics," says Julie Reynolds, NFPA's director of Public Affairs, "you see that approximately 5,000 people died as a result of fire in the United States in 1996. That's up from previous years. It's not a trend yet, but it's worrisome."

In fact, the United States still holds the dubious honor of having one of the highest fire death rates among all industrialized nations worldwide.

"We know from our 1996 Centennial survey that people don't think fire will happen to them," Reynolds says. But how do you put a human face on fire? It's one thing to get the message out and quite another to get people to hear it. And that, Reynolds says, is where a survey can help.

Documenting public awareness

According to John R. Hall, Jr., assistant vice president of NFPA's Fire Analysis and Research Division, the survey was conducted much like the surveys designed to show which brand of toothpaste or political candidate most people favor. How reliable a barometer is it?

"It's pretty reliable," Hall says. "Even if it's off a few percentage points, if the survey says 55 percent aren't reacting to an alarm in a public building, then we can still safely assume that the true number is high, and probably a majority."

Though the survey asked people how they responded to fire alarms outside the home, it focused on home escape. And although about half of all respondents said they had an escape plan to follow in the event of a fire, only 31 percent of them said they'd practiced it. This means that, overall, only 16 percent of the respondents had both developed a home escape plan and practiced it.

According to Meri-K Appy, NFPA's vice president of Public Education, evidence of inaction was the most significant finding.

"With this survey, we have documentation about how few people have actually taken steps to save their own lives in the event of a fire," she says. "When you pair that with concrete knowledge about how quickly conditions become life-threatening and how little time people actually have to get out, the fact that they're not practicing escape is alarming."



NFPA created a graphic illustrating the discrepancy between people's beliefs and real fire behavior. It shows that a typical living room fire can kill in as little as two minutes, and it pairs this information with the amount of time most people believe they have to escape a fire. It shows that only 42 percent of the respondents understood how quickly they'd need to get out to survive. Fifty-eight percent—or more than half—thought they had more than two minutes. And 24 percent of those respondents believed they had 10 minutes or more to escape.

"At that point," says Reynolds, "they're dead!"

Because it tells a compelling story, says Reynolds, this graphic got media attention.

"It turned out to be the best news hook for the story," she says, "because most people didn't realize how little time they had."

It also put the human face on fire that got the public to sit up and take notice.

"When you see survey results like these, you ask yourself, 'where would I fit in?'" Reynolds says.

Two million people heard Appy talking about the survey on local television stations, and most of the interviewers focused on the graphic comparing actual fire behavior to people's perceptions—or misconceptions. Such exposure helps, but, according to Hall, it's still not enough.

"We know that people need to hear a message reinforced over and over again in order to really get it," he says, "and, to the best of our knowledge, two million people heard it exactly once. We have some

Other Key Findings

Who has a plan to follow in the event of a fire?
- Of all respondents, 53 percent have an escape plan to follow.
- Of those with a plan, 31 percent have practiced it, and 69 percent haven't.
- Overall, only 16 percent of respondents had developed and practiced a home escape plan.

If not, why not?
- When those who don't have a plan were asked why not, 55 percent said they'd never thought about it.
- When those who have a plan but never practiced it were asked why not, 27 percent said they'd never thought about it.

How did male and female responses differ?
- Of the 53 percent who have a home escape plan, male respondents were more likely than female respondents to have practiced it.
- Overall, male respondents were slightly more likely to have a home escape plan than female respondents.

Which respondents were more likely to have a home escape plan?
- People in homes with children were more likely to have a plan than those in adult-only households.
- People with a household income of at least $45,000 a year were more likely to have a plan than those who made less.
- People who went to college were more likely to have a plan than those who didn't.

Who had an alternative escape route?
- Only about half of all respondents had a primary escape route planned.
- Of these, 72 percent also had an alternate plan.
- Of all alternate escape plans respondents had, less than 30 percent had ever been practiced.
- Overall, 11 percent of respondents had practiced an alternate escape route.

What if the normal escape route was blocked?
- Four out of five respondents, or 81 percent, said they would jump or drop from a window, balcony, or deck, but most haven't practiced this alternate route, often because they regard it as too dangerous. Would this make them hesitate to jump if confronted with a real fire?
- Of all respondents, 15 percent said they would go to an alternate door if their primary exit was blocked. Have they considered what they'd do if fire blocked their paths to all doors, as can easily happen to occupants in upper-floor bedrooms?

What if the smoke alarm sounded in the middle of the night and residents smelled smoke?
- Sixty-three percent of respondents said they'd leave the house immediately.
- Thirty-four percent said they'd investigate or fight the fire.
- Thirty-two percent said they'd wake others.
- Twenty-two percent said they'd call 911.
- Three percent said they would gather their belongings.

How have people responded to a fire alarm in a public place?
- Twenty-nine percent of respondents had been in a public place when an alarm went off. Of these:
- Forty-five percent said they found the nearest exit and left immediately.
- Forty-three percent followed procedures or waited for instructions.
- Ten percent investigated or fought the fire.
- Ten percent did nothing.
- Six percent alerted others.

260 million people in the United States. That means that a lot of people still haven't gotten the message."

What's NFPA doing about it? In the tradition of teaching fire safety in the focused, experiential mode that's helped make "stop, drop, and roll" a household phrase, NFPA will be making some changes over the next three years to Fire Prevention Week (FPW).

The Great Escape

Previously, NFPA has adopted a different fire safety message for FPW each year. Starting in 1998, however, the theme for three years will remain "Fire Drills—The Great Escape." This approach, Appy says, will reinforce the message from one year to the next and allow NFPA to track its success in getting the word out.

"Ultimately, our goal here is behavior change. We're trying to move people to action," Appy says.

For FPW 1998, NFPA is committed to an ambitious project: a North America-wide event to get people to plan and practice their strategies for escaping a home fire.

What Appy has in mind is a North America-wide fire drill.

"We're calling for it to be on Wednesday, October 7, at 6 p.m., but we'd be happy if fire departments do it any time during FPW," Appy says. "Using NFPA's annual community awareness kit, we're going to provide fire departments in the United States and Canada with the tools to do it."

The Great Escape might be ambitious, but it's not entirely unprecedented. In fact, several communities have run such drills locally. Eileen Crowley Magin, a public education specialist in Spencerport, New York, has run nine consecutive home fire drills through the schools.

"We developed a questionnaire for the family to fill out and instructions," Magin says. And firefighters go out to support and advise people on the evening of the drill.

Spencerport's experience has turned up some interesting conclusions from which any community doing a similar drill can learn. For example, Magin has run a community-wide drill every day of the week over the years, and at different times of the day. And it turns out that drills run on Wednesday at 6:00 p.m. have garnered the best response.

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"The materials are sent home with the students on Monday," says Magin, "and this gives families two days to think about it, do it, and get the questionnaire back by Friday."

Not coincidentally, The Great Escape, on which Magin has consulted, will also take place on a Wednesday at 6:00. As in Spencerport, the fire department will signal a community-wide drill, using station horns, the emergency broadcasting system, and local media.

"The kids will already have received instruction about doing a home escape plan at school through materials provided by participating fire departments," Appy says, "and they'll already have sat down with their families to figure it out." And on this day, just as families have been doing for nine years in Spencerport and other communities in North America, everyone will actually have a chance to walk through it.

The city of Anaheim, California, also ran a fire drill during FPW 1997. According to Robyn Butler, fire inspector and educator, 135 businesses and 25 schools participated. Families were encouraged to conduct fire drills at home at 7:00 p.m.

"We didn't know what we were getting into," Butler says. "But it was very rewarding." Several businesses reported that the event called attention to deficiencies in their alarm systems, and others wrote that the community-wide drill was the first time evacuation procedures were discussed and practiced among their employees. In addition, says Butler, the drill helped to build a sense of community, which is no small feat in a city as large and diverse as Anaheim.

The Great Escape may be ambitious, but it's not entirely unprecedented. Several communities have run home escape drills locally.

Among other features that these community-wide drills have in common with The Great Escape is cooperation in the schools, support from the fire department, and help from other businesses and agencies.

In Anaheim, the Disneyland Fire Department assisted at a military academy and gave out "I participated in Fire Prevention Week" buttons to all 245 cadets. Ralphs Grocery Stores disseminated flyers advertising the event. And the American Red Cross supported the effort at 11 selected business sites and schools, where representatives came to witness the event, answer questions, and pass out disaster-preparedness brochures.

Planners both in Anaheim and Spencerport are planning to continue running their community-wide drills. Because the best way to change behavior, says Magin, is through repetition.

"You have to be consistent and do the same thing, even though you might think, 'I've done this before.' Never change the message. Do it again and again until it's automatic. The first time, people may not even get it. Then maybe the fourth or fifth time, something will sink in."

After the drill

Though the drill is at the heart of The Great Escape, the follow-through will be just as important. After it's over, an adult will sign the plan to prove that it's actually been practiced and drop it at the fire department, where each plan will be reviewed for safety and accuracy. Fire departments will be asked to record the total number of escape plans submitted that have been signed by a parent or legal guardian. From all the plans that pass muster, one will be picked at random to be sent to NFPA for another random drawing at the end of October, with the grand prize winner to be announced at NFPA's 1998 Fall Meeting.

The lucky winner will receive more than a handshake and a pat on the back. KIDDE Safety, the manufacturer of fire extinguishers, smoke and fire alarms, carbon monoxide detectors, and escape ladders, has agreed to sponsor The 1998 Great Escape by funding a family vacation to Walt Disney World. The company has also funded Sparky® the Fire Dog stamp sets, which NFPA will send to every U.S. and Canadian fire department this spring as part of the free FPW Community Awareness Kit. Fire departments will use the stamps to mark valid home escape plans for entry into the grand prize drawing.

"The NFPA's Fire Prevention Week message ties in perfectly to our 'Welcome to a Safer Home' project," says KIDDE Safety's Cathy Prudhomme. "It fits with our philosophy on everything. Our objective is to increase awareness of safety issues so that when you look at the statistics about fire and carbon monoxide poisoning, you're going to be able to see a difference in the number of deaths."

In addition to sponsorship from KIDDE Safety, USAA Educational Foundation, a nonprofit organization promoting consumer awareness, has generously donated its production and distribution services to create an NFPA video that inspires and educates fire departments carrying out The Great Escape locally.

And another crucial sponsor, the American Red Cross, will co-logo the community awareness kit, as it has done in past years, and work with NFPA and other fire safety advocates to get the word out about The Great Escape. According to Rocky Lopes, senior associate for Community Disaster Education, it's a natural alliance.

"Every day, the Red Cross delivers services in communities. Many volunteers eat, work, and breathe right in the community they're serving. By collaborating with fire departments, they can help make such an event a great success."

Putting the fun in fire safety

It will take such grassroots activists to make The Great Escape a success, says Lopes.

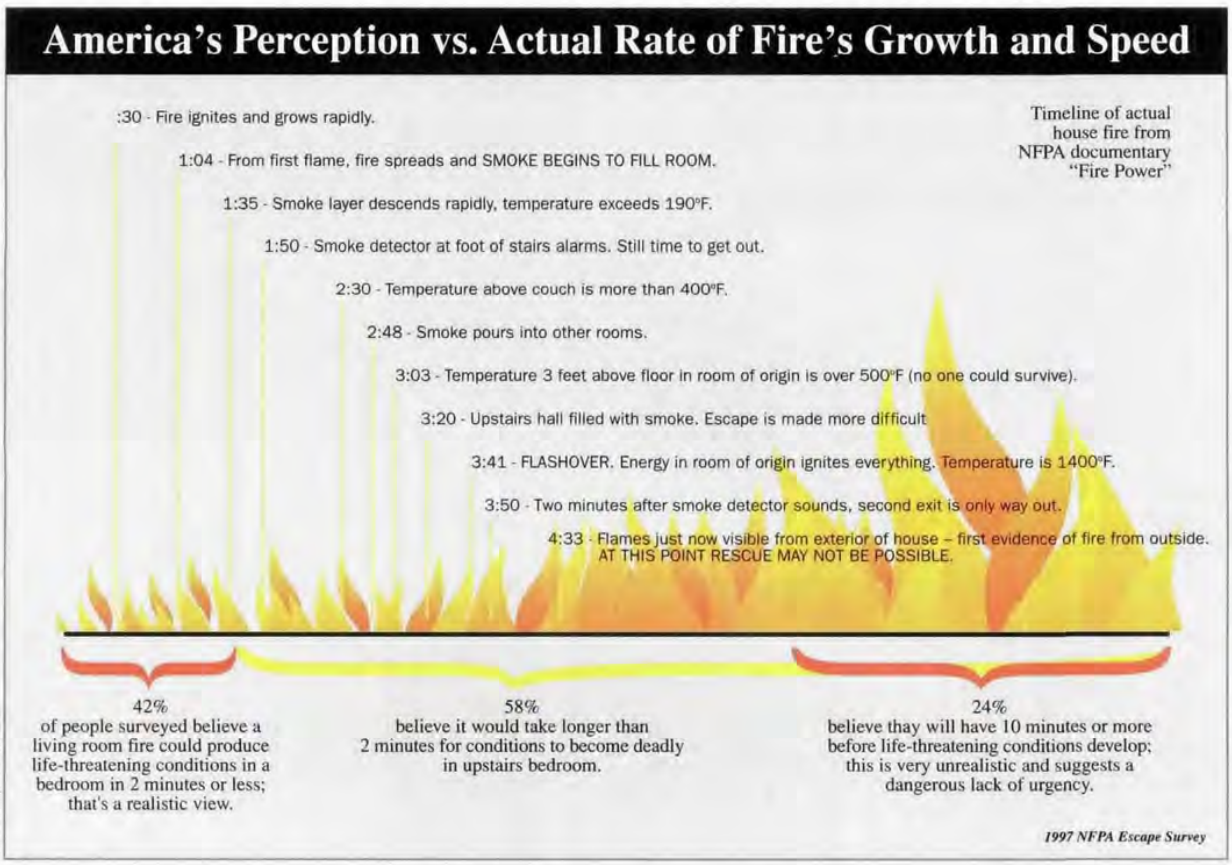
"No matter what NFPA or the American Red Cross do on the national level, the event will take place community by community. Local fire departments and Red Cross chapters and other interested parties will get together and make it work."

What NFPA can do is give people an incentive not only to draft a home escape plan but to walk through it.

"A big part of what we're trying to do in these public fire safety campaigns is to help people understand that they're accountable for their own safety," says Reynolds. "A lot of people think they can wait for firefighters to rescue them, but firefighters can only do so much."

As a case in point, Reynolds describes an apartment fire in Decem-

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ber 1997 that killed six people in Medford, Massachusetts. The building was located across from the fire station, so the response was almost immediate, but the fire had already progressed undetected for so long that firefighters couldn't save everyone.

Despite such tragedies, people continue to believe that they'll never experience a fire themselves. Is it because people don't hear a message they find too scary? NFPA's North American fire drill will test this theory by offering an activity and a prize rather than reinforcing people's fear.

"We're putting some fun into fire safety," Appy says.

"NFPA has never done anything on this scale," she adds, and to make sure it works, we've gotten some celebrities to help.

To set the tone, Bil Keane, creator of Family Circus®, the most widely syndicated cartoon strip in America, will design all the FPW campaign products. And illusionist David Copperfield has also signed on to promote the event.

For more incentive, NFPA is offering $1,000 worth of educational materials to the fire department that submits the winning The Great Escape grand prize entry. This kit will include NFPA's new video.

"Of course, the biggest incentive," says Appy, "is that having people actually enact a plan will reduce their risk of dying in a fire."

Having people enact an escape plan will reduce their risk of dying in a fire

What you can do

A lot of people out there aren't practicing fire safety, and NFPA has only about 67,000 members worldwide. But you can help make The Great Escape a success by participating in many ways.

"If we, as NFPA staff and members, are lackadaisical about fire," says Reynolds, "then the public is exponentially so."

She suggests taking the survey results published here to a local newspaper or radio station, or sharing them with any other media contacts you may have. And Appy urges members to participate in The Great Escape.

"Do it yourself," she says. "If all our members create and practice their home escape plans, they'll set an example."

Appy also suggests influencing those around you, "your kids at college, your mother-in-law, your colleagues."

You can also help spread the word through fire departments and the business community. Ask your employer to sponsor a home escape drill.

"We're trying to get people to write down their escape plans, practice them, and submit them to fire departments," says Appy. 'The more 'Great Escapers' we can inspire, the better!"

Alisa Wolf is editor of the NFPA Journal.

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Illustration: Stephan Daigle

Marty Ahrens

How we know what we know about fire.



All Fired Up

Around the country, fire officers and, occasionally, firefighters complete incident reports after returning from a fire. Some fill out paper forms, while others enter the report directly into their computers. But fire officers from Alaska to Florida use the same data classification and the same basic structure. Because each state report also provides data to the National Fire Incident Reporting System (NFIRS), an officer provides information that analysts can use to look at the national fire problem as well as the state and local picture, and to compare fire problems in different jurisdictions.

What is NFIRS?

NFIRS is a national database designed to document and report fires and the casualties caused by fire. Fire departments can document other activities they find—a Hazardous Materials Incident Report Form module was developed to document hazardous materials incidents in the late '80s—but only fire and explosion data are actually forwarded to the United States Fire Administration (USFA), which administers NFIRS. Every state submitting data has agreed to use the same classifications for the same thing or, if the state uses a different coding scheme, to convert its classifications to the standard.

NFIRS includes three types of reports: the incident report, the civilian casualty report, and the fire

service casualty report. If the fire department was never notified of a fire, if no one in the department completed the report, or if the report wasn't submitted to the state, the fire isn't counted. For statistical purposes, it didn't occur.

Of course, most people, including firefighters, dislike paper work. Recording information about an incident can seem a tedious aspect of an otherwise exciting job. Yet the information collected from thousands of firefighters is shared with a host of other public and private organizations, including NFPA, the Consumer Product Safety Commission (CPSC), and the National Highway Traffic Safety Administration (NHTSA), and incorporated into public fire education programs, fire and building codes, and public policy. With accurate data, policymakers can develop better policies, public fire educators can cultivate better programs that target specific groups, and code developers can establish and validate realistic codes.

Every firefighter who completes a fire incident report is a data collector for a wide variety of research projects, contributing data that will help answer a wide variety of questions. Are the numbers of fires going up or down? Are there changes in what causes the most fires? Who gets hurt or dies in fires? Are certain brands or types of equipment involved in a significant number of fires? What types of fire problems are common in single-family homes, apartments, schools, or hospitals? What types of fires are the most dangerous to firefighters?

History of NFIRS

How did NFIRS start? In 1972, the President's Commission on Fire Prevention and Control issued a document called *America Burning!*, which led to the National Fire Prevention and Control Act (and Administration), Public Law (PL) 93-498, in 1974. Section 9 of this act established the National Fire Data Center to "provide an accurate, nationwide analysis of the fire problem, identify major problem areas, assist in setting priorities, determine possible solutions to problems, and monitor the effectiveness of programs to reduce fire losses." The act also established the USFA and NFIRS.

Before NFIRS was established, local departments used their own documentation systems. For many small fires, the department log was the only record. Although some departments developed their own coding systems, most reports were narratives—and pulling statistics from narratives is an exercise in frustration at the local level and nearly impossible at the state and national levels. Fire service leaders and NFPA had long recognized this problem. In fact, NFPA had already identified data elements and developed standardized classifications for recording and reporting fires, which it published in NFPA 901, *Uniform Coding for Fire Protection.*

The first step toward uniform fire reporting was actually taken in 1938, when the International City Manager's Association published a fire incident reporting system prepared by NFPA. The next milestone occurred in 1951, when NFPA's Committee on Fire Casualty Statistics was formed. Its report, adopted as NFPA 3, *Definition and Classification of Fire Casualty Statistics,* in May 1953, noted that "the absence of accurate and detailed statistics on fire casualties has hindered attempts by educational and other means to reduce the number of deaths and injuries from fire."

NFPA's Board of Directors called a national conference on fire reporting in 1961. Two years later, NFPA formed a technical committee to develop a uniform and useful system of fire reporting that could be adapted for the U.S. and Canadian fire service. In 1969, the committee's standards were adopted as NFPA 901, which replaced NFPA 3 and has been updated periodically since then. NFIRS uses the 1976 edition of NFPA 901 as the basis of its classification system for fire incident reports and civilian casualty reporting, and the 1981 edition as the basis of its classification system for fire service casualty data.

In December 1978, the USFA's National Data Center published the first edition of *Fire in the United States,* which noted that better fire data were needed. According to the report, "detailed data on fire causes were available for a full year for only two states, California and Ohio. A few other states had detailed data but not in a form that was easily comparable. The limited state data available were supplemented by data from seven cities in other states with compatible data systems." California's data were for 1975, and Ohio's were for 1976.

In the late '70s and early '80s, the USFA provided states with funding and other resources to help them implement NFIRS. By the time the second edition of *Fire in the United States* was published in 1982, it included full-year data on fires that had occurred in 1978 for 15 states. Other volumes have appeared since then, usually annually or semiannually.

Thirty-nine states and the District of Columbia submitted data in 1995, and other states plan to submit data in the future. Because of fiscal, technical, or personnel issues, however, some participating states have had years in which they were unable to participate. The long-term goal is 100 percent participation.

How does NFIRS work?

NFIRS is a three-tiered system in which local fire departments, state fire agencies, and the federal government all play a role.

All NFIRS data originally come from local fire officers and firefighters. Approximately 14,000, or almost half, of the nation's public fire departments report at least one fire to NFIRS each year.

Without their efforts at the local level, the system couldn't work. By completing a fire report, a fire officer does two important things. First, he or she makes a public record that documents the incident. And second, he or she provides data on the time of the fire, the occupancy, the area in which the fire started, what ignited, what started the fire, property damage, casualties, whether sprinklers and detectors were present, and whether they worked. In addition to documenting what went wrong at big fires, they provide data on what kept small fires from growing. Each report is reviewed for completeness and accuracy, then submitted to the state.

More and more fire departments see NFIRS as a tool for local use. Many NFIRS software programs offer on-screen look-ups that not only help the fire officer choose the correct code for each field but also allow the fire chief to use the data to determine which companies are busiest, what the leading fire problems were in the community the previous year, and how many incidents of each type occurred. Some departments use the statistics to justify budgets or apply for grants.

Some departments also integrate NFIRS into their activities using the personnel and equipment modules software vendors have developed. After completing an incident report, an officer can list who responded and what equipment they used. This helps a department

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with payroll. Some systems even transfer the computer-aided dispatch information directly into the appropriate incident report fields.

Local fire departments generally use forms provided by the state. Some states use the standard NFIRS forms without modification, and others add data elements or change the formatting. A few states have modified NFIRS to meet their own needs. These states convert the data back to the standard format before forwarding it to the USFA.

To run NFIRS, the USFA provided states first with mainframe and then DOS-based PC software. Local departments can buy a version of this outdated software at a nominal cost, but it has none of the bells and whistles of the newer commercial software.

The new computer technology has made the system more efficient, but it also introduces complications. Getting data electronically cuts costs and saves time, but the data has to come from the local departments in a format the state computer can process. Vendors selling NFIRS software must make sure their software collects all the information states require, and local departments should check with the state before making a purchase.

Quality control issues can also become more complicated with computer-generated reports. Most programs do some error-checking for allowable values, and some check the data to see if it makes sense. Unfortunately, computers have no common sense. As long as the data meet the criteria, they'll pass through the system. It can actually be easier to spot inconsistencies or patterns of problems by visually scanning the paper forms than by checking coded electronic data.

State fire agencies administer NFIRS in various ways. In some states, one person is responsible for the whole system, from training and quality control to entry, analysis, and report writing. In others, the responsibilities are divided among several individuals or divisions.

After the NFIRS data have been entered and checked for errors, state NFIRS administrators periodically send the data compiled on each incident to the USFA. Most states also send feedback reports to local fire departments describing their fire experience in the past year or six months, and many states produce annual reports describing fire experience statewide.

The National Fire Data Center at the USFA processes the data the states submit and periodically publishes it in *Fire in the United States* and other analyses. Every state and metropolitan fire department protecting a population of at least 500,000 becomes a member of the National Fire Information Council (NFIC).

The USFA and the NFIC, which USFA funds through a cooperative agreement, work together to manage NFIRS and promote fire incident reporting. The NFIC is composed of representatives from 42 state fire agencies, the District of Columbia, and 32 metropolitan departments protecting populations of at least 500,000, who bring the concerns of firefighters to the process, discuss common problems, and share ideas. NFIC provides specialized training and the opportunity to learn from others doing the same work. It also identifies states with reporting system problems, provides technical assistance to states upon request, and answers coding questions that stump state program managers. The Systems Committee of NFIC tests vendor software for compatibility with the national standard, and NFIC certifies vendors that demonstrate that they can provide their data in a readable format. NFIC doesn't evaluate any of the analysis tools, however, and certification doesn't mean that software meets a given state's requirements.

Twice a year, the USFA and NFIC jointly sponsor an *NFIRS program management* course at the National Fire Academy. Designed for new and current state, metropolitan, and NFIRS fire program managers, the course covers data collection, processing, analysis, and presentation of useful, timely, and accurate information about fire department activities, enabling participants to better promote, support, and manage NFIRS data collection.

NFIRS evolves

NFIRS isn't perfect. Originally, for example, the civilian casualty report was used for all casualties, civilian and firefighter. The firefighter casualty report was only added later to provide more specific information relevant to the job. NFIRS couldn't distinguish between a small brush fire and a large wildland fire, either. Nor could it address EMS runs and haz-mat incidents.

To address these problems, the USFA and NFIC began developing a new version of NFIRS, *Version V*, in 1989. NFIC members surveyed fire departments of different sizes to see what they liked and didn't like about the system. They also consulted NFIRS consumers, such as NFPA, the CPSC, and the NHTSA, about their data needs. All agreed that the data requested should be reportable, collectable, and usable.

On paper, the new version of NFIRS looks like more forms, but users will only be asked questions relating to a specific incident. The system's requirements will be hardware- and software-independent, and the system will be modular. The basic module will collect the dispatch information, and there will be additional modules for fires, structure fires, arson, firefighter casualties, civilian casualties, EMS, hazardous materials, wildland fires, personnel, and apparatus, although the national system won't require that the last five modules be used. The USFA and NFIC have been working with the National Interagency Fire Statistics Information Project to ensure that the wildland module will capture the information needed by both municipal fire departments and federal wildland agencies, such as the U.S. Forestry Services and the Bureau of Land Management. The USFA and the Bureau of Alcohol, Tobacco, and Firearms are working together on the arson module, which will also contribute data to the new National Arson Data Repository.

In addition, the incident type field will be expanded to identify such specific incidents as oil burner blow back; small, contained stove fires involving food; and various types of detector and sprinkler malfunctions.

The new NFIRS will ask firefighters for less information about so-called confined fires than the old program did. This is a calculated gamble. Some analyses will be harder to do without data on all fires, regardless of size, and some people may be tempted to code fires in a way that reduces paperwork. However, this new requirement balances the needs of the data collectors—the firefighters—and the data users. And two decades of experience have shown that America's fire service will give the most accurate information it can.

The new program will also capture more relevant information about detectors and sprinklers, on-site materials, and fire suppression factors,

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such as building construction and design, contents, delays, occupants, and weather. And it'll capture multiple causes of ignition and identify incidents in which age was a factor. The new NFIRS will also distinguish between fires in which the cause is under investigation and those in which the cause remains undetermined after investigation. The incident type codes are being expanded to include a wider range and more detailed description of department activities, so states will forward information collected on all the incidents, not just fires. In the future, NFIRS will be about fire department responses, not just fires.

The switch from the old system to the new won't be without difficulties. The new NFIRS will be able to translate the old data into the new data elements, but local departments will want to carry forward historical information, such as occupants, owners, and fire addresses. Departments that store their data electronically will have to be able to print the original reports they completed, and vendors will have to upgrade their software, which will have to be tested. Fortunately, the new system will be able to identify the software and version that generated a report. States must also be able to receive and process the new data, and they, too, will need historical data.

The USFA plans to maintain a Web site on which states can store and process their data. Once state program managers are satisfied with the quality of the data, they may release the information for public use. They'll also be able to download and install software fixes instantly.

According to Larry Burnette, assistant director of the Kentucky State Fire Marshal's Office and president of the National Fire Information Council, "fire departments that have reviewed the new system are very enthusiastic and looking forward to its implementation. The NFIC is providing assistance to state fire marshal's offices and their local fire departments to help with the transition. Several states are very interested in pilot-testing this new program."

In fact, a basic agreement has been reached on the forms and codes, and pilot testing is now under way. The USFA expects to be ready to receive 1998 data in the new format, although it anticipates that it will receive both new and old data for several years. Fire departments should check with their state fire agencies for timetables in their areas.

"The new NFIRS means we'll have to change some of our ways of doing things," says Dr. John R. Hall, Jr., NFPA assistant vice president of Fire Analysis and Research. "We expect a few bumps, but we're excited by the new information that will be available. The NFPA cares deeply about NFIRS and is determined to support the efforts of the USFA, NFIC, and the fire service to make the new NFIRS a success." Information on the progress of the new NFIRS can be found on the Web at www.usfa.fema.gov/newnfirs.

NFIRS and NFPA

NFPA uses the data collected by NFIRS in conjunction with its own annual survey. Some firefighters wonder why they're asked to fill out reports on individual fires, then complete a survey for NFPA. The answer is simple: the NFPA survey and NFIRS are complementary. NFPA's survey provides the big picture, while NFIRS fills in the details.

"Every year, we await the arrival of NFIRS data with great anticipation," says Hall. "Our survey gives us the big picture, but we rely on NFIRS to identify specific problems. Without NFIRS, we'd have to develop new studies and ways of collecting data every time we wanted to look at a new issue or see what's changed. Even worse, many people would be forced to use anecdotes instead of statistics, as we did before NFIRS. Because people tend to remember the unusual most vividly, it's dangerous to make decisions based on anecdotal information."

There's also the issue of timeliness. For example, NFPA released its report on the overall fire experience for 1996 in the first week of September 1997. Generally, the NFIRS database doesn't become available until six to eight months later.

When NFIRS was developed in the mid-'70s, the USFA, NFPA, and the CPSC worked together to develop the "national estimates" approach to fire statistics. NFIRS is the only national fire incident database in the United States that provides detailed information on reported fires, regardless of size. But some states don't participate, some fire departments in participating states don't participate, and some departments only send information on some of their fires. And in many cases, there's no information available on the population these departments protect.

To identify what portion of the country's fires were reported to NFIRS, analysts agreed to use a second database. That second database—the NFPA surveys—revealed that approximately one-third to one-half of the fires reported to fire departments make it into NFIRS. Unfortunately for statisticians, these reported fires aren't based on a random sample. Departments from states with mandatory reporting submit data more often than those with voluntary reporting, and serious structure fires are more likely to be reported than dumpster fires.

By surveying the largest fire departments and a random sample of departments protecting smaller populations, NFPA's survey provides the best statistical snapshot of the total U.S. fire problem—excluding fires not reported to fire departments, of course. And because NFIRS doesn't collect information on nonfire responses at the national level, the NFPA survey is the only national source of these data.

By comparing the totals from NFPA's survey to the corresponding totals in NFIRS, analysts can estimate what fraction of total U.S. fires, deaths, injuries, and lost dollars the NFIRS sample captured. These fractions are inverted into ratios that are used to "scale up" the NFIRS numbers on specific fire problems to national estimates of the total size of these problems. Different ratios are used for residential structure fires, nonresidential structure fires, vehicle fires, and other types of fires. Within each group, analysts use different ratios for fires, injuries, deaths, and direct property damage.

How reliable are NFIRS data?

When I worked at the Massachusetts State Fire Marshal's Office, I told firefighters in the Massachusetts NFIRS classes that the data were as accurate and complete as the firefighters made it. We found a few consistent problems that could be broken into two basic types: systemic and human nature.

Systemic problems include such things as coding errors, which are made in some cases because the codes aren't clearly defined. If a 9-year-old sets a fire, is the cause listed as "incendiary" or as "child playing with fire?" New technology and occupancy types aren't clearly captured in

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the 1976 codes NFIRS currently uses, either. And some coded fields, such as number of stories in a building or number of firefighter responses, can be mistakenly interpreted as requiring a direct entry.

At least one state still uses an older version of NFIRS that makes data for some of the elements in the current version unavailable. And those states and fire departments that have developed their own systems occasionally lose data when they convert it back to the standard.

Fortunately, studies have shown that most coding errors cancel themselves out. And analysts from NFPA, CPSC, and the USFA have developed ways of dealing with other errors that seem to stem from misinterpretation. For example, solid-fueled portable heaters are rare. When we see an entry for them, we can generally assume that they're really fixed heaters, probably wood or coal stoves.

Some people ask if fire officers are inclined to "favorite" causes. Do they code a fire as electrical, arson, or children playing when they're unsure of the cause? Again, no evidence supports this. Today's fire officers are among the best-trained ever, and more emphasis has been placed on cause and origin training.

Nonetheless, a fire report requires more documentation than a smoke scare, and once in a while, this will lead to some miscoding. "Undetermined" and "unclassified" are valid responses to different fields. Indeed, sometimes they're the only appropriate responses. Occasionally, however, someone will consistently use these responses to avoid looking up the appropriate codes.

Quality control should be ongoing. In some departments, a chief or some other officer reviews every report. Other departments check a portion of the reports to identify problems ranging from a misinterpretation of the codes to incomplete reporting.

Sometimes, a report is filed before the final cause is determined. In the absence of better information, NFPA generally assumes that fires with unknown information can be proportionally allocated among the known causes. If the report isn't updated, the original information—or lack thereof—is used for statistics. When new causal information is found, departments should file change reports with the state.

What can local departments do to improve NFIRS?

Firefighters see the same types of fires over and over. Because they see people making the same mistakes, because they see the same code violations, and because they see fires caused by defective products, they're often the first to notice a new problem or identify a defective item, which allows them to give analysts clues about what to look for in the data.

Unfortunately, firefighters don't often see the results of their paper work, and it's hard to be enthusiastic about filling out records no one seems to look at. We encourage firefighters and fire officers to use and share fire data. Using the data leads to better data, and seeing how the data is used makes it easier to code reports.

Analysts want to learn from firefighters' experience, so talk to the people who analyze fire data in the local department, at the state level, at the USFA, CPSC, or NFPA about what you see in the field. One observation or one question often leads to another—and a questioner generally becomes more willing to provide data that will become answers.

Marty Ahrens is a fire analysis specialist in NFPA's Fire Analysis and Research Division.

Other Sources of Data

Uniform Crime Reporting System

The FBI's Uniform Crime Reporting System (UCR) collects standardized reports about crimes and offenders from law enforcement agencies around the country. Most of the agencies contributing to UCR are police departments, but other agencies, including state fire marshal's offices, also make arrests. Agencies protecting about 90 percent of the U.S. population submit at least some reports, but reports over the full year come from agencies protecting roughly half the country's population. Different rates of participation by communities of different sizes may introduce some systematic bias in national totals. As with NFIRS, UCR's goal is complete participation.

NFIRS indicates whether a fire is incendiary or suspicious, but it doesn't collect offender data. That comes from the UCR, which provides information about the ages and genders of arrestees. And the FBI regularly publishes crime statistics in the *Crime in the U.S.* series.

Congress has recently appropriated funding to the Bureau of Alcohol, Tobacco, and Firearms (ATF) to develop a national database to capture information on arson and explosions. This database will expand on ATF's existing database and draw on others, such as NFIRS and UCR. Investigators will be able to access this database to look for similar patterns among documented cases and open cases that may be arson.

NFIRS Version V at a Glance

NFIRS Version V:

- Is software- and hardware-independent and has a modular system that breaks information into usable categories, such as structure fires, arson, firefighter casualites, civilian casualties, EMS, hazardous materials, wildland fires, personnel, and apparatus.
- Captures wildland fire information needed by both municipal fire departments and federal wildland agencies.
- Includes an arson module that provides additional information on arson fires to be shared with ATF.
- Expands on the incident type field to identify specific incidents, such as oil burner blow back, small stove fires involving food, and various types of detection and sprinkler malfunction.
- Asks for less information about confined fires to cut down on firefighters' paperwork.
- Captures more relevant information about sprinklers, on-site materials, fire safety factors, and multiple causes of ignition, and identifies incidents in which age was a factor.
- Distinguishes between fires under investigation and those in which the cause remains undetermined.
- Captures information on a wider range of department activities in more detail so that states can foward information collected on all incidents, not just fires, to USFA.
- Is designed to show what the fire service is doing today.

Information on the progress of the new NFIRS can be found at www.usfa.fema.gov/newnfirs.

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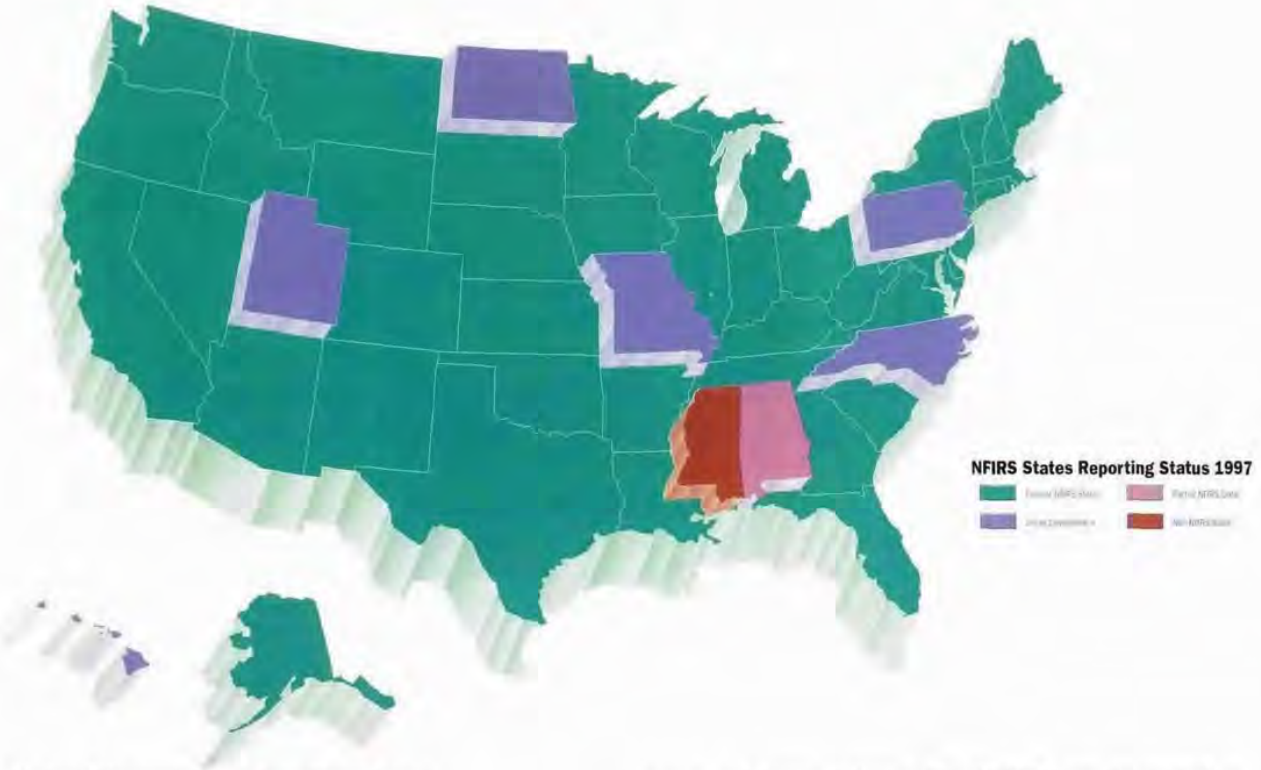


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National Electronic Injury Surveillance System

Through its National Electronic Injury Surveillance System, the CPSC tracks injuries involving consumer products that were treated in emergency rooms. This information is used to identify unsafe products and unsafe practices when using the products. The CPSC also maintains a web page and an on-line database (www.cpsc.gov). Users may search on-line for specific products or issues, and product recalls are grouped by month.

National Highway Traffic Safety Administration

The National Highway Traffic Safety Administration (NHTSA) and the Department of Transportation (DOT) maintain a variety of databases. NHTSA has separate databases on complaints, investigations, and recalls, which on-line users may query for specific years, makes, models, and problems. Users may also report vehicle problems. The NHTSA and the DOT also maintain a variety of databases about crashes, performance, and human behavior. The NHTSA can be reached at www.nhtsa.dot.gov, and the DOT and NHTSA web sites are linked.

Glossary of Abbreviations

AFIRS - Australian Fire Incident Reporting System
ATF - Bureau of Alcohol, Tobacco, and Firearms
CPSC - Consumer Product Safety Commission
CSIRO - Commonwealth Scientific and Industrial Research Organization
DOT - Department of Transportation
NFIC - National Fire Information Council
NFIRS - National Fire Incident Reporting System
USFA - United States Fire Administration
NHTSA - National Highway Traffic Safety Administration
UCR - Uniform Crime Reporting System

How do other countries collect fire data?

In some countries, fire data collection is a government function. In others, it's done by the insurance industry. In Canada, as in the United States, the system is three-tiered. Local fire departments report data to the provinces, which, in turn, forward it to the federal government.

The Australian Fire Incident Reporting System (AFIRS) is structured similarly. Fire brigades in the Australian Assembly of Fire Authorities collect data on each incident, which is entered into a database at the Commonwealth Scientific and Industrial Research Organization (CSIRO). The Australian states collected data for several years before AFIRS first requested it from them for fiscal year 1989–1990. While most states used the 1983 edition of the Australian Standard AS 2577, *Collection of Data on Fire Incidents*, as their basis for reporting, the fire service in each state modified some elements to meet their own needs. They've been working on ensuring standardization. The data classification system for AFIRS is similar to NFIRS.

In Sweden, the insurance industry collects fire data, so it's likely that fires in uninsured properties or fires that don't trigger a claim are underreported. Only fire deaths are reported to the government.

Fire brigades in the United Kingdom report their fires directly to the Home Office in London. In addition, the British Crime Survey includes questions about fire experience and provides some information about unreported fires. These databases are managed by the national government. However, the government doesn't collect monetary loss information; that task is left to the insurance industry.

Fire departments in Japan also report their fires directly to a national government office.

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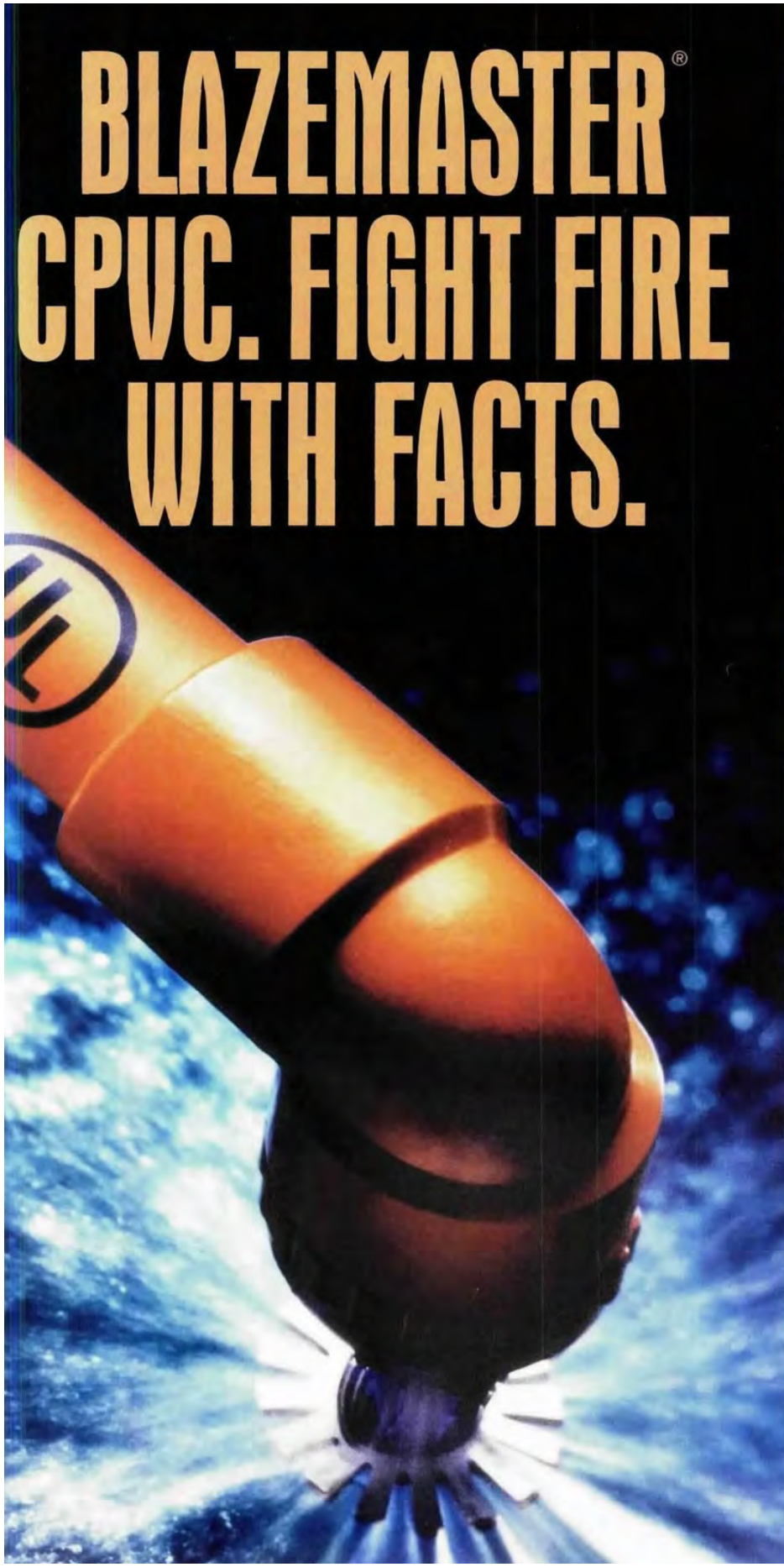
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ATF ON CALL

ATF's National Response Teams can help local agencies investigate fires that are too big for them to handle alone.

Ed Comeau

Any fire investigation, no matter how small, requires a range of skills and disciplines. A smaller incident may be investigated by a few people from the local fire department or state fire marshal's office. If an incident is of such catastrophic proportions that an investigation would exceed the abilities of the local authority, however, there's a resource to call upon: the Bureau of Alcohol, Tobacco and Firearms' (ATF) National Response Team (NRT).

There are four NRTs distributed across the country made up of agents from throughout ATF. By bringing together a team of specialists to work on an incident, it's possible to "blitz" the incident with resources in a very short time—which is critical when conducting a fire investigation. Until proven otherwise, every fire scene is treated as a crime scene. If a crime has been committed, it's critical to gather the necessary evidence and try to apprehend the guilty party. Unless the site is secured, evidence may be lost or destroyed quickly, and witnesses' recollections can become distorted, or even fade, with time. Applying the wide range of resources available through an NRT, the local fire department has the opportunity to process a scene quickly but thoroughly.

At the request of the local authority having jurisdiction (AHJ), ATF will mobilize at least 15 NRT members and provide the local incident commanders with extensive support in determining the cause and origin of a fire or explosion. Even though ATF is a law enforcement organization, the goal of the NRT investigation isn't always to determine criminal intent. While a number of NRT investigations have resulted in arson prosecutions, the outcomes of others have determined that the fires weren't incendiary.

History of the NRTs

The first two NRTs were established in 1978 after the Organized Crime Control Act of 1970 granted ATF the authority to investigate and prosecute incidents involving explosive devices. While the act originally limited the scope of the NRTs' investigations to explosions, Special Agent Ed Garrison notes that "enterprising ATF agents managed to prosecute a case where the defendants used gasoline to burn a commercial building. The theory was that gasoline, when combined with air, met the definition of an explosive and thus qualified as a crime."

Realizing that it couldn't effectively respond within 24 hours of an incident using only two teams, ATF established two more NRTs in 1980. The four teams are located in the Midwest, the Northeast, the Southeast, and the Western regions of the United States. In 1982, Congress expanded ATF's jurisdiction to include incidents involving fires as well as explosives through the Glenn Amendment, introduced by Senator John Glenn of Ohio.

Since 1978, NRTs have been activated 392 times to conduct investigations involving 492 deaths, 2,465 injuries, and property damage estimated in the billions of dollars. Among the NRTs' investigations are the World Trade Center bombing in New York City in 1993, the Oklahoma City bombing in 1995, the TWA 800 crash off Long Island in 1996, and the Olympic bombing in Atlanta in 1996.

Other investigations have included a warehouse fire in New Orleans that destroyed a 1-million-square-foot building; a fire in Seattle, Washington, that killed four firefighters; an apartment building fire in Bremerton, Washington, that killed four residents; and a bourbon distillery fire in Kentucky that resulted in more than $5 million in damage.

Responses reached an all-time high in 1997 when the NRTs were activated 39 times. They were deployed 22 times in 1996, and 19 times in 1995. In the first three months of 1998, the NRT had already been activated five times.

Structure of the NRT

Each NRT regional team involves 30 ATF agents and specialists, and each is self-sufficient in terms of skills and disciplines. An average NRT response will include 15 agents and specialists cross-trained in several of these disciplines.

Team members include a team leader, who's responsible for coordi-

Photograph: AP/Wide World Photos


ATF

nating the NRT's operations with local officials, and a team supervisor, who manages the team, determining the team members' assignments and ensuring that they have the necessary tools and equipment to perform their jobs. Each team also has at least one certified fire investigator (CFI), responsible for determining the origin and cause of the fire; an explosives enforcement officer (EEO), responsible for evaluating any explosive devices or remains found on the scene; and a fire protection engineer (FPE), a relatively new addition to the team. An FPE is invaluable in evaluating a building's design features, determining the role of suppression systems in a fire, and analyzing fire spread through computer modeling.

The team also includes a photographer to thoroughly document the scene. The scene is also documented with schematics of the structure and its contents, the locations of the victims, and evidence.

A forensic chemist, a canine accelerant handler, and an evidence technician are also part of an NRT. The forensic chemist is responsible for gathering evidence that will be sent for further analysis to a local or state forensics laboratory or to one of ATF's labs in Rockville, Maryland; Atlanta, Georgia; or San Francisco, California. The canine handler uses dogs to determine whether accelerants were used. ATF has roughly 45 dogs paired with state or local authorities throughout the United States. The evidence technician coordinates the collection of evidence, keeps the evidence logs, and maintains the evidence chain of custody until it's turned over to the local law enforcement agency.

There are several specialties that only qualified personnel can fill, but many NRT members are cross-trained in a variety of disciplines and can fill different positions at an incident. This versatility allows for a much stronger, integrated team approach.

Training NRT members

NRT training is extremely varied because of the unusual conditions team members encounter during incidents.

"One year, the entire team was trained to use Bobcats™ for debris removal," says Special Agent Jack Malooly, who's been with the NRT program since 1980 and is both a CFI and an EEO. According to Malooly, it's often necessary to use these small front-end loaders and, since a fire scene is a potential crime scene, ATF wanted to reduce the number of civilians in such areas.



Photograph: ATF

ATF agents sift through evidence after the Oklahoma City bombing.

Other training programs have included how to operate oxyacetylene torches, as well as teaching sessions by a pathologist. The recent addition of surveying equipment on response trucks calls for still more specialized training.

"This equipment allows us to locate and map, very accurately, the layout of a building and the location of evidence in relation to the building," says Malooly.

The team leaders and team supervisors have also been sent to advanced EPA hazardous materials schools, and this year's training program included topics such as evidence spoliation, critical incident management, court testimony, case studies, and interviewing—all in addition to the normal training required annually.

Equipment on the NRT

To support the NRTs, ATF has 38 vehicles distributed across the United States that are essentially rolling fire investigation toolboxes. Each vehicle's equipment ranges from pop-up shelters to latex gloves. Because digging out a fire scene and collecting evidence is manual labor, each truck carries a collection of shovels, saws, brooms, and other tools.

The trucks also carry a variety of personal protective equipment, including helmets, gloves, turnout clothing, respirators, and splash suits. As part of scene safety, teams implement an accountability system using name tags for each agent.

NFPA and ATF Partnership

NFPA's fire investigators often work closely on fire scenes with ATF in a partnership that's grown over the years as each organization realizes the skills and abilities the other has to offer. With the addition of fire protection engineers to the NRT callouts, this alliance has become even closer.

Some recent incidents at which NFPA has worked in conjunction with ATF include the World Trade Center explosion in New York; the Oklahoma City bombing; a warehouse fire in Seattle, Washington; a warehouse fire in New Orleans; the Treasury Building fire in Washington, D.C.; an apartment building fire in Bremerton, Washington; and a retail store fire in Mableton, Georgia.

In addition to these responses, ATF uses NFPA's investigators as guest lecturers during training programs. NFPA is also a partner in the development of an interactive CD-ROM training program for fire investigators and is participating in the design of the new ATF fire test center in Maryland. In turn, ATF has helped NFPA develop the script for and film a new six-part video series, "Fire Investigations."

This alliance has greatly enhanced the NFPA's fire investigations team's ability to gather critical information at fire scenes and has given ATF greater access to NFPA's broad expertise. Such a partnership has been a significant "win-win" situation for both organizations.

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Among the equipment used to document a fire scene are 35-mm cameras, video cameras, drafting equipment, and tape recorders. The trucks also carry a fax machine and a copier, as well as reference books, such as NFPA's *Fire Protection Handbook* and the *Fire Protection Guide to Hazardous Materials*.

In the truck are areas in which witnesses can be interviewed, videotapes watched and copied, and equipment repaired.

ATF brings technology to the fire scene by using electronic surveying equipment, which allows investigators to map a building and the locations of debris and evidence much more accurately than they could using a tape measure. Other high-tech applications include computer models to help recreate fire scenes. All CFIs are also provided with rugged, military versions of laptop computers to use during investigations.

To help identify critical areas of a building, NRTs use global positioning systems. By identifying the longitude and latitude of a building, says Malooly, agents can get information about potential lightning strikes from the National Weather Service.

Evidence contamination is a big concern at any fire scene. To avoid cross-contamination of evidence, tools are thoroughly washed after every use and when they're being used in different areas. And wash lines are set up so everyone entering and leaving the fire scene can clean their footwear.

The trucks also carry power tools such as saws and drills. To avoid introducing any gasoline to the fire scene that might be mistaken for an accelerant, however, these tools are electrically powered by a generator on the truck.



Photograph: ATF

ATF NRT members use a canine to look for evidence after a bombing.

Activating an NRT

When NRTs were first formed, the threshold for activation was property damage over a million dollars or significant loss of life or injury. However, this has been changed over the years to allow for more latitude in determining when an NRT is needed. A team can now be called in when the resources needed to investigate an incident exceed those available locally.

According to Mike Bouchard, chief of ATF's Arson and Explosives Branch, getting in touch with the local ATF special agent in charge (SAC) is the first step in activating an NRT. The local fire department or law enforcement agency asks the SAC to look into its problem, and the SAC sends a representative to evaluate the incident. If they feel that an NRT callout is required, ATF headquarters in Washington is notified. The team leader for the NRT in that area is then notified and assembles the team from the agents available in the region. These agents are usually drawn from those assigned to the region's team, but agents from across the country can be called upon to fill out the response.

The objective is to assemble the team and be on the scene within 24 hours of activation. The local ATF office plays a pivotal role in the initial stages of an incident by providing agents to help secure the scene, to identify potential witnesses to be interviewed, and to make logistical arrangements, such as lodging and transportation. Local ATF agents continue to assist throughout the investigation in a variety of roles.

When the NRT arrives on the scene, the team leader and the team supervisor get an initial briefing from local fire and police officials. The function of the NRT is to support the local efforts.

"ATF doesn't come in and 'take over' an incident from the local incident commander," according to Bouchard. "Our goal is to work with the local authorities."

Throughout the course of the on-scene investigation, briefings are held twice a day, once in the morning before work starts to outline the objectives for the day, and again at the end of the day to summarize the findings and correlate all of the information obtained. These briefings are critical to a smooth operation, since information is gathered from so many different sources. Information provided by a witness, for example, can be critical in determining the direction that the on-scene digging may take.

The NRT has two major functions: interviewing and scene documentation and reconstruction. Both are critical in recreating the sequence of events surrounding a fire or explosion.

Interviews help the NRT identify potential witnesses who can help determine cause and origin. An agent is placed in charge of coordinating all the interviews, and a center is established to manage the activities of the interview teams and to correlate the information they obtain. Whenever possible, ATF agents and local law enforcement or fire officials conduct the interviews together.

Information from the interviews is collected in a centralized computer database called ASCMe, which stands for "advanced serial case management." This system correlates the data gathered from the myriad interviews and helps determine either common factors in, or discrepancies between, people's accounts.

Scene documentation is an arduous and time-consuming process in which all of the phases of debris removal and evidence collection are painstakingly recorded. Removing debris can be as simple as shoveling wreckage into wheelbarrows, or it may involve the use of Bobcats or heavy equipment.

Scene documentation can be physically demanding. One of Special Agent Lynne DeMent's more memorable experiences occurred one

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Photograph: ATF

ATF NRT members were called in to assist at the Centennial Park bombing during the 1996 summer Olympics in Atlanta, Georgia.

July at a hazardous materials scene in Houston, Texas, where all of the investigators spent the week wearing SCBAs in 95°F weather.

"What a week *that* was," says DeMent.

When an investigation is completed, the ATF agents and the local officials meet to determine the next course of action based on the evidence uncovered. If a criminal prosecution is warranted, the local district attorney and the local U.S. attorney become involved to decide whether the case will be tried locally or on the federal level. At this point, all the information and evidence gathered during the investigation is turned over to the local ATF office and the local authority.

On average, an NRT is on the scene for three to four days, at a cost of about $15,000, all at no cost to the local jurisdictions.

Chief Superintendent Warren McDaniels of the New Orleans Fire Department has used NRTs four times since 1991. When asked to describe how they operated, his immediate response was "highly professionally." Chief Al Duke of the Bremerton, Washington, Fire Department echoes McDaniels' sentiments. He recently asked the NRT to assist at a large apartment complex fire in which four residents died.

"The ATF brings resources to bear on an incident that are simply not available within our department," Duke says. "We would have been there three weeks trying to dig out the scene." Both chiefs emphasized how careful the ATF is to avoid the appearance of taking over an incident. At all times, the NRT team leader made sure that the team worked under the chief's direction.

As part of the federal Government Performance Review Act (GPRA), government agencies are now required to ensure that they're responding to the needs of the people they serve. To this end, ATF conducts a follow-up survey with the AHJ after an incident is over. Bouchard notes that most surveys come back indicating overwhelming satisfaction with the level of service provided. One of the major complaints, if it could be called a complaint, is that local authorities wish the teams could remain on the scene longer.

International Response Team

Recently, the concept of the NRT was expanded to the international arena through an International Response Team (IRT).

"The IRT is activated at the request of the Department of State for any fire or explosion in the world against U.S. interests," says Bouchard. A formal agreement between ATF and the Department of State's Diplomatic Security Service was initially designed to support the Diplomatic Security Service's own investigations, but it has since been expanded to provide "technical/forensic assistance and oversight to foreign governments on foreign territory."

The IRT has responded to 13 incidents throughout the world, including vehicle bombings, embassy attacks, and assassinations in countries such as Peru, Argentina, El Salvador, Ecuador, Pakistan, Grenada, Korea, Macedonia, and Surinam. A typical IRT response is composed of at least two people—a supervisory agent and a CFI or EEO, depending upon the nature of the incident.

As the use of NRTs expands, their effectiveness improves. Faster response times, improved training and equipment, expanded staffing, and more expertise in the field are creating a valuable federal resource.

Ed Comeau is NFPA's chief fire investigator.

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Detectors in one-fifth of homes that have them don't work, usually because their batteries are dead or missing.

From 1975 to 1984, the United States experienced remarkable growth in the use of home smoke detectors, principally single-station, battery-operated, ionization-type detectors. This rapid growth in use, coupled with clear evidence of their lifesaving effectiveness, made the home smoke detector the fire safety success story of the decade.

Marty Ahrens

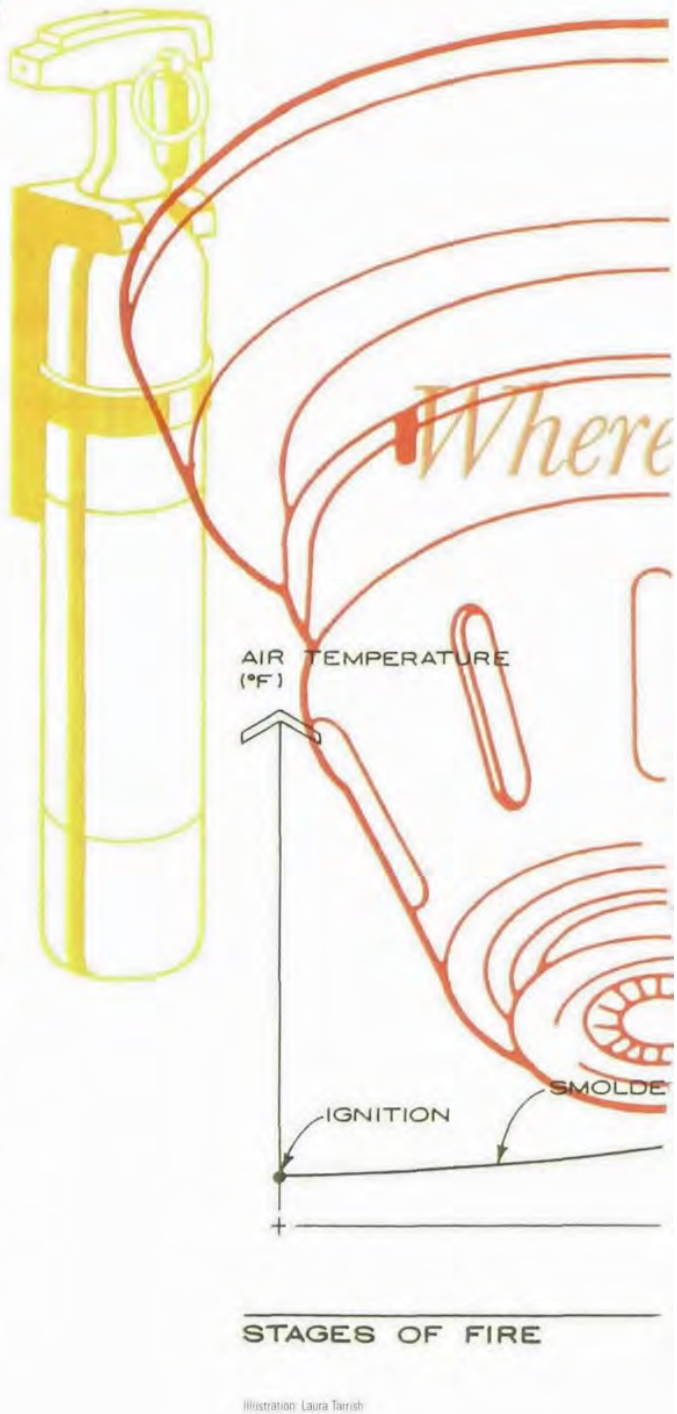


Illustration: Laura Tarrish

CHECKLIST FOR RESIDENTIAL FIRE PROTECTION

1 Use smoke detectors to protect the following (in decreasing order of importance):
a Every occupied floor and basement.
b Sleeping areas and basement near stairs.
c Sleeping areas only.

2 Use heat detectors to protect remote areas (e.g. basement shops, attics etc.) where serious fires could develop before smoke would reach smoke detector or in areas such as garages or kitchens where smoke detectors would be exposed to high smoke levels during normal conditions.

3 Locate smoke detectors on ceilings near center of rooms (or on the upper walls 4 to 12 in. from ceiling) where smoke can collect. In long corridors, consider using two or more detectors.

4 Use closer spacing between detectors where ceiling beams, joists, and the like will interrupt flow of smoke to detector.

5 Do not place smoke detectors near supply air registers or diffusers, or near air grilles where air could remove smoke from the area before it reaches the detector.

6 For guidelines on fire detection for residences, refer to Chapter 2 of NFPA 72, National Fire Alarm Code.

here's smoke there's fire....

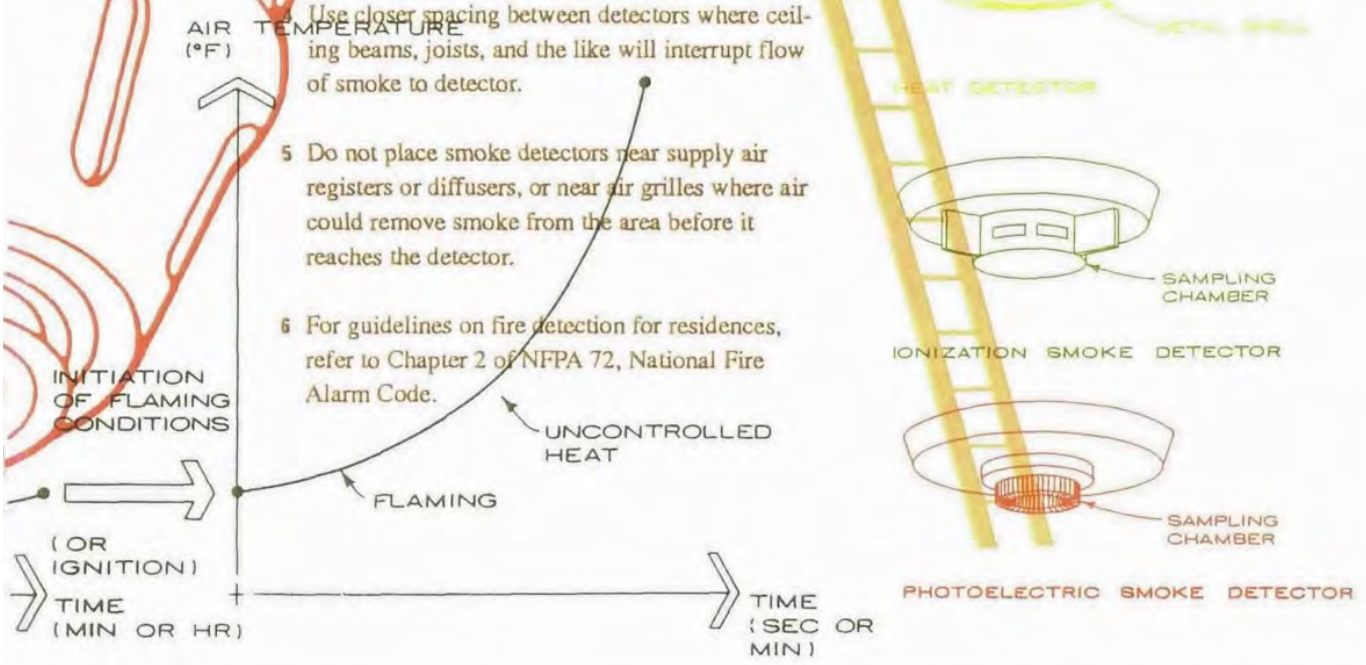
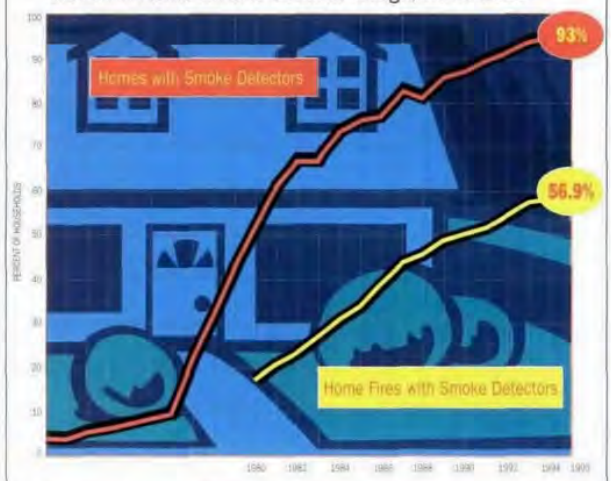


FIGURE 1

Growth in Home Smoke Detector Usage, 1970-1995



Sources for homes with smoke detectors: 1977, 1981, 1982 estimates from sample surveys by the U.S. Fire Administration; 1983-1995 estimates from Louis Harris surveys for Prevention Magazine.

Table 2.

Lifesaving Effectiveness of Home Smoke Detectors

Year	DEATHS PER 100 FIRES: Detector Present	DEATHS PER 100 FIRES: No Detector Present	How Much Lower Is the Death Rate With Detector Present?
1981	0.53	0.92	42%
1982	0.43	0.90	52%
1983	0.55	0.90	39%
1984	0.43	0.84	49%
1985	0.62	1.02	39%
1986	0.55	1.07	49%
1987	0.59	0.99	40%
1988	0.66	1.16	43%
1989	0.65	1.06	39%
1990	0.61	1.14	46%
1991	0.53	0.84	37%
1992	0.57	1.03	45%
1993	0.50	1.03	51%
1994	0.51	1.04	50%
1995	0.60	1.13	47%
Last 10 Years Averaged (1986-95)	0.57	1.04	45%

Source: NFIRS, NFPA Survey.

Since 1984, the growth in use has been much less rapid, but it remains fairly steady. As of 1995, in fact, only 1 U.S. home in 14 remained unprotected (see Figure 1).

Interestingly, there are, proportionally, many more smoke detectors in homes in general than in homes in which fires have been reported. One reason may be that households that have fires tend, for a variety of reasons, to be the kind that would be less likely to buy or own smoke detectors. Another may be that smoke detectors discover some fires so early that the occupants can control them without involving the fire department. There's no way to conclusively analyze the relative importance of these two factors, but some exploratory analysis suggests that the more significant factor is the impact of smoke detectors in detecting fires early so that people are able to control them without involving the fire department.

The major population groups at risk from fire have all been included in the United States' strong move to smoke detector use. All national surveys that have examined smoke detector use by major population group have found that smoke detector use for all groups is far higher than it is in homes that have fires (see Table 1). To some degree, households that are poor or have other risk-related characteristics still lag behind the others in smoke detector use, but the gap isn't large enough to explain the high concentration of fires in homes without smoke detectors. Apparently, households that still don't have smoke detectors are more risk-prone, but in ways that don't correlate strongly or neatly with the socioeconomic characteristics of poverty, race, age, and so on that usually correlate with the risk of having a fire.

Table 1.

Detector Usage by Major Population Group in 1982, 1989, and 1991

Group	Percentage of Group Having Home Smoke Detectors: 1982	1989	1991
Total population	67	85	88
Apartments	63		
Rural households	62		83*
Households headed by person over 65 years of age	62		83
Households headed by person who didn't complete high school	61	72	83
Households in the South	60	80	85
Households not headed by married couple	56		
Households with incomes below $7,500 per year	55	79	84
Non-white households	53		86**
Smokers			87
Heavy drinkers			83
People who ever use drugs			83
Homes with fires	23	47	50

Sources: 1982 figures from Figure 1 (homes with fires) and John R. Hall, Jr. and Sid Groeneman, "Two Homes in Three Have Detectors," *Fire Service Today*, February 1983, pp. 18-20; 1989 and 1991 figures from The Prevention Index '90 and '92, Prevention Magazine, 33 East Minor Street, Emmaus, PA 18098, 1990 and '92. Some figures available for 1982 were not available for 1989. Some additional material on these demographics for 1991 were provided to NFPA by Prevention Magazine.

* Outside SMSA but not necessarily rural.

** Black households specifically.

Charts and Tables: Christopher J. McCusker

How effective are home smoke detectors?

Smoke detectors cut the risk of dying in a home fire by 40 to 50 percent, although the estimated impact of smoke detectors on death rates fluctuates somewhat from year to year (see Table 2). In the 16 years between 1980 and 1995, there was a slight downward trend in the estimated impact of smoke detectors, which may be attributable to increased problems in keeping them operational.

Table 2 probably understates the power and value of home smoke detectors. First, the death rates for homes that have smoke detectors include those that occurred in homes with nonoperational smoke detectors or incomplete smoke detector coverage.

Second, the figures in Table 2 are based on reported fires only, and, as noted, smoke detectors discover some fires so quickly that the occupants can extinguish them before they have to notify the fire department. Indeed, smoke detectors may cut the number of fires reported to fire departments by 75 to 80 percent. Still, analysis of this

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Table 3.
Characteristics of Fatal Victims in Home Fires, With and Without Smoke Detectors Present

	ONE- AND TWO-FAMILY DWELLINGS		APARTMENTS	
Characteristic	Detector Present	No Detectors	Detector Present	No Detectors
Victim in room of fire origin at ignition	39.8%	39.6%	52.7%	46.4%
Fire spread flames beyond room of origin	73.6%	84.2%	68.3%	76.7%
Fire spread smoke beyond room of origin	94.1%	93.1%	94.0%	90.6%
Victim physically or mentally handicapped, or impaired, or too young or old to react	28.6%	29.8%	31.6%	28.5%
Victim age 65 or older	25.5%	26.6%	25.4%	14.8%
Victim age 5 or younger	23.0%	21.1%	19.8%	26.6%
Victim unable to act or irrational	19.8%	17.6%	19.7%	20.6%
Victim attempting fire control or rescue	6.0%	5.6%	5.9%	4.6%
Victim incapacitated before fire	14.8%	12.4%	13.6%	10.6%
Fire between victim and exit	19.1%	18.7%	21.3%	25.3%
Victim's clothing on fire	6.7%	5.1%	8.2%	3.9%
Victim blocked by locked door or illegal gates or locks	3.3%	3.5%	2.2%	3.6%

Source: 1986-95 NFIRS, NFPA survey.
Note: Victims with characteristic unknown have been proportionally allocated.

Table 4.
Estimated Percentage of Fire-Involved Homes* With Smoke Detectors Whose Smoke Detectors Were Operational

Year	Single-Family Dwellings, Duplexes and Manufactured Homes**	Apartments**
1980	75.7%	76.0%
1981	72.5%	73.9%
1982	71.5%	71.1%
1983	68.3%	70.5%
1984	67.4%	67.9%
1985	62.5%	69.7%
1986	68.0%	69.4%
1987	68.0%	70.4%
1988	67.1%	68.9%
1989	68.1%	69.3%
1990	68.2%	68.0%
1991	67.5%	69.4%
1992	67.5%	69.6%
1993	69.1%	70.4%
1994	69.8%	70.8%
1995	69.5%	70.9%

*Homes are all structures that households may occupy, other than properties such as hotels, boarding homes, dormitories, or bar racks, where households share some building services. The dwelling category encompasses one- and two-family units, including manufactured homes, while apartments include all other homes, i.e., buildings containing three or more housing units.

**Estimated as percentage of fires where detectors activated within set of fires deemed large enough to activate an operational smoke detector. Set excludes fires coded as too small to activate smoke detector, fires with extent of smoke unknown or unclassified or confined to object or area of origin, and fires originating in room without smoke detector and having smoke confined to room of origin.

Source: 1980-95 NFIRS, NFPA Survey

issue is uncertain because the limitations of available data require an indirect analysis, and some estimates of the likely range for values can't be directly measured.

A 10-year analysis that separates single-family dwellings, duplexes, and manufactured homes from apartments, townhouses, and condominiums produces a surprisingly large difference in the statistical estimate of the lifesaving effectiveness of home smoke detectors. In dwellings, duplexes, and manufactured homes, smoke detectors are estimated to reduce the risk of dying in a fire by 51 percent. In apartments, townhouses, and condominiums, however, the estimated reduction is only 14 percent, based on fires that occurred between 1986 and 1995.

According to our best estimates, the problem of nonoperational detectors is of equal size in both types of homes, so that apparently isn't the reason for the discrepancy. Perhaps apartments have fewer or longer escape routes, less complete coverage, or more success in preventing fires from growing large enough to report. It's also possible that apartment fires are more dangerous, that more apartment dwellers are unable to act on an early warning, or that more apartment dwellers ignore detectors, assuming that any alarm from outside their unit is a nuisance alarm.

Interestingly enough, just under 40 percent of the victims of fatal fires in single-family dwellings, duplexes, and manufactured homes are in the room of fire origin at the time of ignition (see Table 3). Roughly half the apartment victims are that close to the fire. This suggests that there are proportionally more people in apartments who are so close to the fire that they may not have time to escape, even if they have an operational detector. Perhaps the fact that one-third of fatal apartment fires begin in bedrooms, compared to slightly more than one-fourth of fatal fires in single-family dwellings, duplexes, or manufactured homes, may help to explain why fire victims in apartments are closer to the fire in so many cases.[1]

How many home smoke detectors are operational?

The U.S. Consumer Product Safety Commission's National Smoke Detector Project surveyed smoke detector operability in 1992 by sending field investigators into people's homes to ask questions and to test their detectors. Published in 1993, the survey covered the general public, not just people who had fires. According to the National Smoke Detector Project, one-fifth of homes that have smoke detectors have detectors that don't work. Since we already know that homes that have fires are much less likely to have smoke detectors than homes in general, we might also suspect that homes with detectors that have fires are more likely than those that don't have fires to have allowed their smoke detectors to become nonoperational. The argument would be that having a fire correlates with a lower concern for fire safety, which might be expected to produce a lower rate of smoke detector use and a higher rate of nonoperational smoke detectors.

The percentage of operational smoke detectors is roughly the same for apartments as it is for single-family dwellings, duplexes, and manufactured homes (see Table 4). Where they differ, the percentages for apartments are usually better, although not significantly so, except in 1985. This may seem surprising to urban fire experts accustomed to seeing a disproportionate level of smoke detector system problems in poor,

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FIGURE 2

Smoke Detectors in Dwelling Fires, 1980-1995

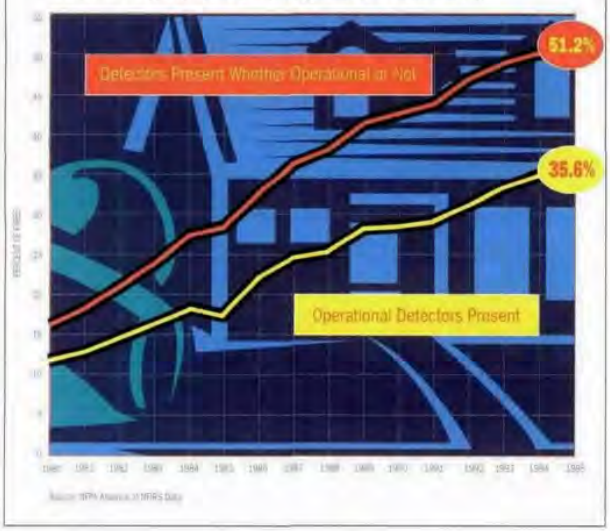
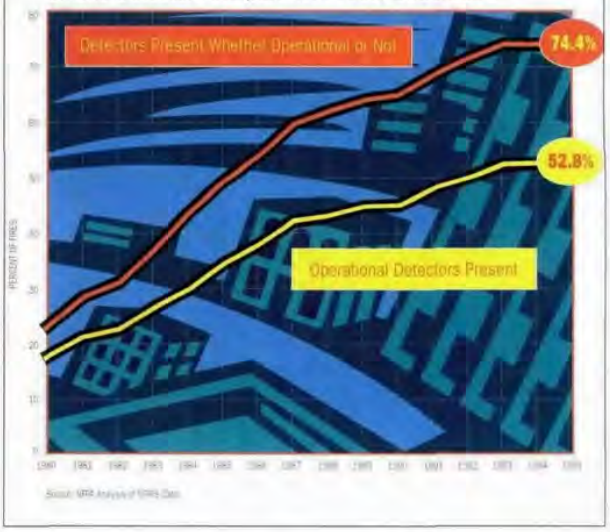


FIGURE 3

Smoke Detectors in Apartment Fires, 1980-1995



multifamily housing. We should remember that, in the United States, poverty and the other household characteristics one might expect would correlate with poor smoke detector maintenance are found in rural dwellings and manufactured homes as often as they are in urban, multifamily housing. Of course, we don't know whether the operational status of smoke detectors correlates to poverty, although most measures of fire frequency and use of fire protection equipment do.

Problems with nonoperational home smoke detectors have produced a widening gap between the percentage of fires in dwellings and apartments with smoke detectors and the percentage of fires in dwellings and apartments with operational smoke detectors (see Figures 2 and 3). In 1985, the decline in operationality actually overtook the rise in smoke detector presence in dwellings that experienced fires, resulting in a net decrease in the percentage of dwelling fires that occurred in dwellings with operational smoke detectors. Since then, however, the trend has reversed again, and each year has seen a higher percentage of homes with operational smoke detectors.

Why are so many smoke detectors nonoperational?

The principal reason so many smoke detectors are nonoperational is because their batteries are dead or missing. In a study conducted in 1983, dead or missing batteries and other power source problems accounted for 69 percent of the 314 cases in which smoke detectors failed to activate for known reasons in fires that produced enough smoke to cause activation.[2] The other principal problems the study identified were incorrect installation, which accounted for 12 percent of the cases, and incorrect location, which accounted for 11 percent. The installation errors included placement in a dead air space, too low on a wall, too close to an air return, and without a cover. In other words, the principal problem is the human factor: lack of knowledge, neglect, and misapplication.

The National Smoke Detector Project found that the 20 percent of households whose detectors were nonoperational could be further subdivided into households in which the detector's battery was missing, dead, or disconnected, or in which the AC power source had been disconnected. Batteries were missing in 11 percent of households without operational smoke detectors, dead in 5 percent, and disconnected in 3 percent, while the AC power source had been disconnected in 1 percent.[3] Clearly, dead, missing, or disconnected batteries account for nearly all the nonoperational detectors, and battery-powered detectors are much more susceptible to power source problems that leave them inoperable.

The use of battery-powered detectors as opposed to AC-powered detectors follows some patterns that would be expected in light of recent codes and regulations. Overall, 72 percent of the detectors were battery-powered only, compared with 23 percent hard-wired AC detectors, 2 percent plug-in AC, and 2 percent AC with battery backup. Seventy-six percent of the smoke detectors in single-family dwellings, excluding manufactured homes, had battery-only detectors. In apartments, 62 percent were battery-only detectors. And in manufactured homes, which have been required to have hard-wired, AC-powered detectors since 1976, only 38 percent were battery-only detectors. In addition, homes built in 1980 or later, including apartments and manufactured homes, had 31 percent battery-only detectors, while homes built before 1980 had 81 percent battery-only detectors. This parallels the requirement for hard-wired smoke detectors in new construction that's been in place for several years in such codes as NFPA 101®, the *Life Safety Code®*.

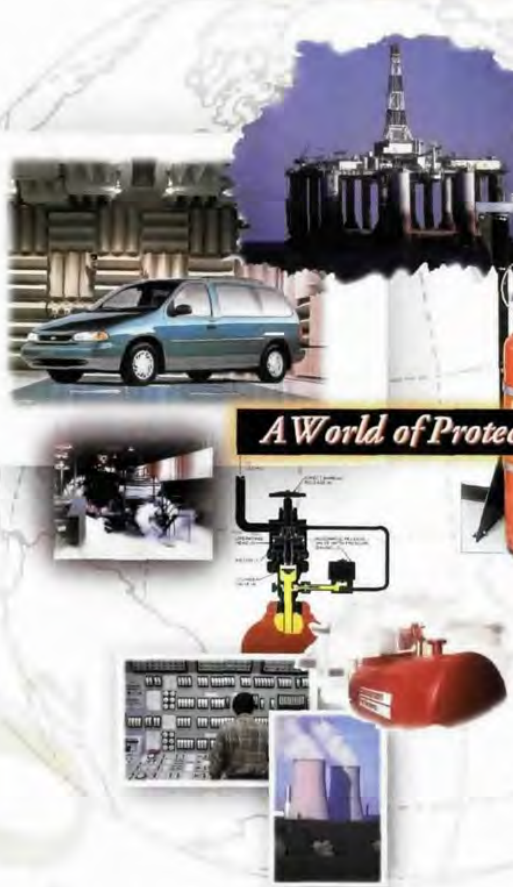
The leading reason that batteries were missing or disconnected was that they'd been deliberately removed because of nuisance alarms. The leading nuisance alarm problems cited were responding to cooking fumes and responding continuously when powered. Alarming too often for unspecified reasons was the next most frequently cited nuisance alarm problem. And reacting to steam or humidity was cited about one-third as often as either of the two leading problems.

Nuisance alarms can often be reduced by moving the detector or by switching from ionization detectors to photoelectric detectors. One-

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third of the detectors that reportedly produced nuisance alarms in the National Smoke Detector Project were less than 5 feet from a potential source of smoke, steam, or moisture that was sufficient to produce a nuisance alarm. In addition, 97 percent of the detectors were ionization detectors, which accounted for 87 percent of all detectors in the study. Particles associated with cooking smoke are generally small enough to activate ionization-type detectors. Photoelectric detectors are generally activated by larger particles.

The leading reason that batteries were missing or disconnected was that they'd been deliberately removed because of nuisance alarms.

The likelihood of nuisance alarms can also be reduced by decreasing a detector's sensitivity. The National Smoke Detector Project found that the detectors involved in nuisance alarms were more sensitive, on average, than those that weren't involved in such alarms. However, reduced sensitivity could adversely affect a detector's ability to provide timely warning of a real fire.

Roughly half of the inoperable detectors studied were more than 10 years old—older than the currently recommended replacement age. Among the problems of aging detectors is "sensitivity drift," which refers to a shift in the range of visibility obscuration or particulate density that will activate the smoke detector. Such a shift can mean either an increase in nuisance alarms or a decreased ability to react promptly to real fires.

The few studies of field experience with nuisance alarms have shown consistently that detectors produce far more nuisance alarms than real alarms. A 1989 study of Veterans Administration hospitals found 15.8 nuisance alarms for every real alarm, or 1 nuisance alarm for every 6 detectors per year.[4] And an earlier study of home smoke detectors in Texas found 27 nuisance alarms for every real alarm, or nuisance alarms in 6 of every 7 homes each year.[5]

While both studies identified a number of steps that could be taken to reduce the rate of nuisance alarms, the current rate is so high that neither study predicts that nuisance alarms can be made to occur less frequently than real alarms. Thus, nuisance alarms may continue to induce smoke detector owners to deactivate their detectors.

In a recent survey conducted for NFPA, 39 percent of the respondents with smoke detectors reported that a detector had sounded at least once in the previous 12 months.[6] Cooking fumes or heat triggered 73.4 percent of the alarms, while 16.3 percent of the respondents reported hearing the low-battery chirping.



INFRARED FLAME DETECTOR

Everyone who reported that a detector had sounded was asked what his or her first thought was after hearing it. Forty percent thought that food had burned (again); 11 percent were annoyed at what they assumed to be a nuisance alarm; 10 percent weren't concerned because they knew what caused it; 9 percent wondered how to turn off the detector; and 8 percent figured that the detector had a low battery. Only 7 percent thought there was a fire and that they should get out. Another 4 percent didn't recognize the sound as a smoke detector and wondered what it was; 3 percent noted that the smoke detector worked; 2 percent thought they should have used an exhaust fan; and 7 percent reported other responses.

It's obvious from these responses that most people don't automatically assume a smoke detector's alarm indicates an emergency. In some cases, they know what caused the alarm and that they're safe. However, lives have been lost when real alarms were mistakenly thought to be false. Nuisance alarms can generate a dangerous sense of complacency.

What other issues must be addressed?

Most smoke detector owners don't test or maintain their smoke detectors as often as they should. As of 1982, 60 percent said they didn't test them as often as once a month, and 16 percent said they never tested them.[7]

The value of testing was borne out by the National Smoke Detector Project. Of those surveyed, 78 percent believed that all their detectors worked, usually because they'd tested them. Of that 78 percent, 88 percent actually did have working detectors. Another 11 percent of those surveyed didn't know whether their detectors were working, and of those, only 61 percent proved to have working smoke detectors. The final 11 percent of those surveyed believed that at least one of their detectors wasn't working, usually because they knew the battery was dead or missing or that the power source had been disconnected. Of this 11 percent, only 40 percent actually proved to have working smoke detectors—and it's surprising the percentage was that high.

Even among households that test their detectors, many haven't developed escape plans that would allow them to use to best advantage the extra warning time the detectors provide. One 1985 study found that 9 percent of the population had developed an escape plan.[8] But a 1980 survey found that the

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majority—56 percent—of households with escape plans had never practiced them.[9] If these two figures can be used together, then only one-fourth of U.S. households have developed escape plans and practiced them. Obviously, there's considerable room for improvement.

Most homes need more than one smoke detector to comply with code requirements for complete protection, so even if a home has one working smoke detector, there may be room for improvement here, as well. The National Smoke Detector Project found that 26 percent of the households surveyed had fewer than one detector per floor, which indicates too few detectors for code compliance. Other households may have had too few detectors to protect widely separated sleeping areas on the same floor. Closed doors that delay the spread of smoke may also delay smoke detector response. The project also estimated that 43 percent of the households had fewer than one working smoke detector per floor.

Smoke detectors now on the market have a silencer button, which can be pressed to silence the alarm for up to three minutes.

The *Life Safety Code*® requires that smoke detectors in all new housing be powered by the house electrical service. The *Code* also requires indirectly—by performance requirements—that smoke detectors in the dwelling be interconnected. Since single-station, battery-operated units still predominate in most existing homes, the wider use of hard-wired smoke detectors might lead to an improvement in the home smoke detector problem. The National Smoke Detector Project also found that smoke detectors in 6 percent of households that had them were connected to a central alarm system, which provides even more protection than interconnected detectors alone.

Test Your Detectors

Inexpensive household smoke detectors can mean the difference between life and death. They sound an early warning in the event of fire, waking people before they're overcome by smoke and giving them time to escape. After prevention, smoke detectors are your best line of defense against fire and can cut your risk of dying in a home fire nearly in half.

But a smoke detector can't save your life if it isn't working. The following maintenance tips will help ensure that your smoke detector is in working condition.

- Test your smoke detectors' batteries, following the manufacturer's instructions, once a month, and replace any battery too weak to sound the alarm.
- Most detectors "chirp" when their battery power is low. When you hear the warning, replace the batteries; don't just disconnect the unit.
- Replace smoke detector batteries routinely on the same day each year. NFPA suggest the last Sunday in October—the day you roll the clocks back from Daylight Saving to Standard Time each fall. Change your clocks; change your batteries.
- Too often, people disable smoke detectors by removing their batteries for other uses. Never borrow batteries from a smoke detector.
- Smoke detectors aren't recommended for use in kitchens, bathrooms, or garages—where cooking fumes, steam, or exhaust can set off the alarm when there's no fire. Yet many people simply disconnect poorly placed smoke detectors in an effort to prevent these nuisance alarms. If your home is plagued by false alarms, don't disable your detector—relocate it away from the kitchen or bathroom, or install an exhaust fan. Cleaning your detector regularly, according to manufacturer's instructions, may also help. If nuisance alarms persist, replace the detector.
- Smoke detectors have a life expectancy of about 10 years. Replace any detector that's more than 10 years old.

Buying and installing smoke detectors

Buy only smoke detectors that carry the label of an independent testing laboratory.

Install a smoke detector outside each sleeping area and on every level of the home, including the basement. On floors without bedrooms, detectors should be installed in or near living areas.

Be sure everyone sleeping in your home can hear your smoke detectors' alarms. If any residents have hearing impairments or sleep with the bedroom doors closed, install additional detectors inside sleeping areas, as well. There are special smoke detectors for people with hearing impairments which flash a light in addition to sounding an audible alarm.

Mount detectors high on a wall or on the ceiling. The top of wall-mounted units should be 4 to 12 inches from the ceiling. A ceiling-mounted detector should be attached at least 4 inches from the nearest wall.

Don't install a smoke detector too near a window, door, or forced-air register where drafts could interfere with its operation.

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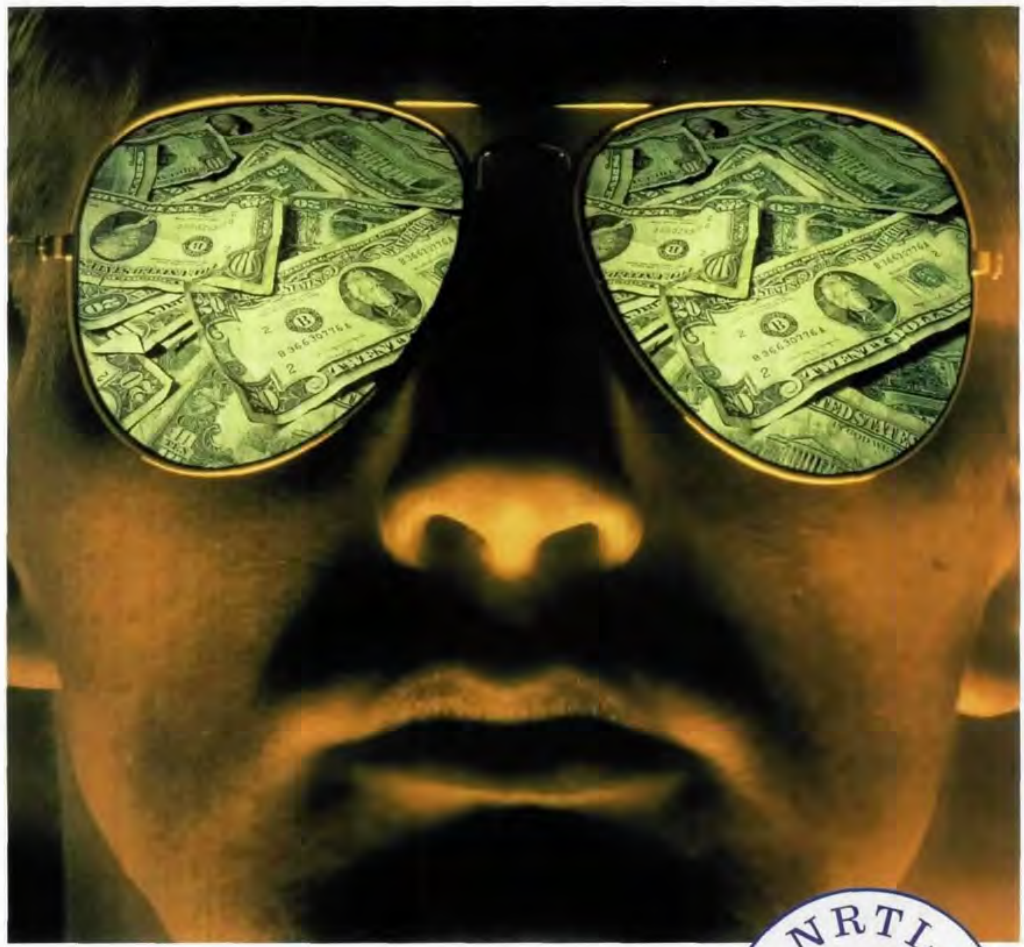
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What we recommend

If 93 percent of homes now have smoke detectors and 20 percent of those have non-operational smoke detectors, then 7 percent of homes have no smoke detectors at all and another 19 percent have smoke detectors that don't work. Thus, 74 percent of homes—or three out of every four—have at least one working smoke detector. Even though the homes without detectors still have nearly half of the fires, restoring operational status to the nonworking smoke detectors could have a major impact and should be considered a priority, along with installing smoke detectors in the remaining homes that have none.



Strategies for dealing with the problem of nonoperability haven't all been evaluated in the field, but two observations seem consistent with the evidence. First, hard-wired detection systems don't require periodic power source replacement, don't permit occupants to remove their power sources for use elsewhere, and are statistically much less susceptible to power source interruption.

Second, the reduction of the nuisance alarm problem, which is closely linked with the problem of disconnected or missing batteries, would also reduce the possibility that people will come to assume that all smoke detector alarms are nuisance alarms because of the very high percentage that are. Nuisance alarms can be reduced by moving detectors, substituting photoelectric detectors for ionization detectors, reducing detector sensitivity, and cleaning detectors more frequently or effectively.

A number of new technologies may also help address the nuisance alarm problem. Some detectors now on the market have a silencer button, which can be pressed to silence the alarm for up to three minutes. If the smoke around the detector is too dense, however, the unit will continue to sound until the smoke is no longer heavy enough to suggest a serious situation.

In 1989 and 1991, NFPA's Learn Not to Burn® Foundation's Technical Advisory Council issued several recommendations for testing and maintaining smoke detectors. These include installing new batteries in all smoke detectors on the day you change your clock from daylight to standard time or when the detector chirps, warning that the battery is dying. You should also replace all batteries as soon as you move into a new home. Detectors should be tested monthly, in accordance with NFPA 72, *National Fire Alarm Code*, using the test button or an approved smoke substitute, and cleaned in accordance with the manufacturer's instructions. An open-flame device shouldn't be used because of the danger the flame could pose. Finally, the batteries should always be left in smoke detectors, never borrowed for other purposes.

Certain design problems with the detector unit itself must also be considered. The National Smoke Detector Project identified some cases in which the detector's horn deteriorated and others in which corrosion led to detector failure. However, the project was unable to determine whether regular testing produces a "self-wiping" effect that eliminates this problem, as manufacturers maintain, because most, though not all, of the problem detectors hadn't been tested as often as recommended.

Home smoke detector use also needs attention. Most homes that need more than one smoke detector have at least one smoke detector, but most don't have as many as they need to comply with the code requirements for every-level protection. And though most households say they have an escape plan, they've never rehearsed it.

The U.S. fire service, fire protection professionals, and the media all played a large role in placing detectors in most U.S. homes. Indeed, many fire departments continue to promote home smoke detectors, installing and maintaining them in high-risk households. Perhaps it's time for these agencies to take on the equally important role of teaching the public how to maintain and test their smoke detectors, letting them know how many smoke detectors are needed for full protection, and telling them where the detectors should be placed.

Marty Ahrens is a fire analysis specialist in NFPA's Fire Analysis and Research Division.

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Site Testing Smoke Detectors In Commercial Occupancies

Maintenance organizations and system owners must commit themselves to regular and thorough detector upkeep.

W. J. Rossiter and J. A. Ventrella

Most smoke detectors spend their working lives in almost perfect condition and rarely have to perform the duty for which they were originally installed—detecting smoke from a real fire. Until a detector actually encounters smoke, however, it's impossible to know precisely how it will react or whether all the system's components are communicating correctly.

To make sure detectors perform as designed, all detectors, both analog and conventional, should be tested regularly, using a credible procedure. Because conventional smoke detectors can't usually monitor their own condition, independent testing is vital. The internal electronics and changes in the quiescent, or clean air, condition of analog detectors and of the newer conventional detectors are monitored at the system control panel, which can modify the smoke sensitivity alarm thresholds for individual detectors and initiate a test. However, such tests can't indicate whether a detector's air inlets are blocked or contaminated, or if changes in the detector's environment have rendered it unable to perform correctly. For this, independent testing is still required.

For much of the world, NFPA 72, *National Fire Alarm Code*, provides the minimum requirements for inspection, testing, and maintenance. Countless other national, state, and local standards draw upon this standard, although some require more stringent procedures.

NFPA 72, which places responsibility for the fire alarm system and its maintenance on the building owner or the owner's designated representative, states that all smoke detectors must be visually inspected semiannually after their initial acceptance test and functionally tested annually. NFPA 72 also requires that the sensitivity of every detector be checked within a year of installation and every other year after that.

The period between sensitivity tests may be extended after the second test to a maximum of five years, as long as the detector hasn't moved outside the acceptable sensitivity limits. To verify this, records of nuisance alarms are required, and any detector that's shown an increase in nuisance alarms over the previous year should be sensitivity-tested or calibrated. In some cases, the detectors may have to be replaced, and systems that have been modified or repaired must be retested before they can be reaccepted. NFPA 72 recommends that all components known to be affected "be 100 percent tested." It also recommends testing 10 percent of the initiating devices that haven't been directly affected.

Of course, these are just the minimum requirements. The authority having jurisdiction may require more frequent testing, and NFPA 72 allows the use of more stringent procedures.

Test methods

The 1996 edition of NFPA 72 highlights a number of smoke detector test methods, specifying that "nothing…is intended to prevent the use of alternate test methods or testing devices, provided…[they're]… equivalent in effectiveness and safety and meet the intent of the requirements." As a result, a wide variety of devices and techniques are used to test smoke detectors on site, ranging from those specifically designed for the purpose to those put together in someone's basement. The latter include incense sticks, smoke bombs, smoldering ropes or wicks, cigarette smoke, burning waste paper, and smoke produced by chemical reaction.

The most basic test, the Level 1 Check, is a visual test, in which the

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Table 5.
Trends in Detector Presence by Major Property Use, 1986–1995

	PERCENTAGE OF STRUCTURE FIRES WHERE DETECTOR WAS PRESENT*									
Property Use	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
Dwellings, duplexes, and manufactured housing	33.5	37.1	38.7	42.0	42.8	44.2	46.9	49.0	50.2	51.2
Apartments	53.9	59.7	62.1	64.1	65.2	68.7	71.6	74.0	74.2	74.4
Public assembly	23.9	26.7	29.9	31.9	33.2	34.0	36.3	36.9	38.3	40.8
Educational	46.2	51.3	54.6	56.1	59.3	59.4	63.9	64.8	63.6	65.9
Care of aged	86.0	88.1	90.2	90.8	90.9	91.8	92.7	93.0	92.8	93.0
Care of young	70.7	75.6	79.4	81.6	84.7	84.1	86.8	88.3	89.1	90.3
Hospitals and clinics	85.5	86.0	86.4	87.0	87.3	87.2	89.1	88.1	89.9	89.9
Prisons and jails	41.6	63.7	74.2	86.4	79.7	86.7	91.3	91.4	89.2	91.6
Care of mentally handicapped	73.9	82.8	85.4	89.8	92.1	90.0	93.0	93.3	92.7	93.8
Hotels and motels	63.8	66.7	9.6	72.4	71.9	74.3	75.4	75.1	77.4	76.9
Dormitories	81.1	80.5	82.6	87.3	88.4	90.6	90.8	91.7	92.1	94.3
Stores and offices	18.8	23.4	26.3	28.7	28.1	30.6	32.1	34.2	35.0	34.2
Industry and manufacturing	20.6	22.5	23.9	24.7	26.8	27.4	28.8	30.8	29.8	32.7
Storage (excluding dwelling garages)**	4.2	5.1	5.3	5.5	6.3	6.2	6.0	6.2	5.9	6.1

*Estimated as number of structure fires with detector present divided by number of structure fires with detector status known. Does not distinguish type of detectors or completeness of coverage.
**"Storage" facilities include tool sheds, barns, silos, and other storage buildings that are not the warehouses one might think of in connection with this category.
Source: NFIRS

How Operational Are Detectors Outside the Home?

Figures revealing the percentages of fires in which detectors were present in nonresidential properties (see Table 5) and the percentages of fires in detector-equipped buildings for which the detectors were operational (see Table 6) are much less dependable than the figures for homes for several reasons.

For some property classes, the sample sizes are low enough that statistical uncertainty becomes a concern. In addition, nonresidential properties are more likely to use heat detectors than smoke detectors or to have very limited partial coverage. Note, too, that some properties use automatic suppression systems such as sprinklers to detect and control fires, and these systems probably aren't coded as detection systems at all.

Nevertheless, we can draw several interesting conclusions. First, as we might expect, the percentage of residential detectors that are operational is lower than the percentage of operational detectors in most other property classes (see Table 7). The only occupancies that had a comparably low level of operational detectors in 1995 were public assembly occupancies, stores and offices, and storage facilities other than dwelling garages.

One would also expect that properties that care for the sick, the very young, or the very old would have both high use of detectors and high operationality. Unfortunately, this hasn't always been true, and this is a cause for concern.

Further, nearly all property classes, except storage facilities, have shown dramatic increases in the 1990s in the percentage of fires in properties in which detectors were present.

Another difference between detectors used outside the home and those used in the home is the reason given for nonoperationality. Some of the reasons recorded in the NFPA's Fire Incident Data Organization (FIDO) for the failure of detectors used outside the home illustrate this difference. Human actions, such as shutting down the detector system as part of a renovation or maintenance activity or in response to an earlier alarm, were cited in several instances. These are the nonresidential counterparts to missing batteries in home detectors. Mechanical problems, such as sprinkler water flow switches sticking, were also cited, although a water flow alarm shouldn't be relied on for detection. Also given as reasons for nonoperability were the weather, including lightning strikes and high winds that disabled the detection system or the telephone or electrical systems that support it; and the effects of fire, including burnthrough of the telephone lines that relayed detector alarms to a central station.

These human and mechanical problems can be addressed through appropriate testing, maintenance, and inspection provisions, and some of the weather and fire effects can be mitigated by the provision of appropriate backup.

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Table 6.
Trends in Detector Operationality in Fires, by Major Property Use, 1986–1995

	PERCENTAGE OF STRUCTURE FIRES WHERE DETECTOR WAS PRESENT AND OPERATIONAL*									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Dwellings, duplexes, and manufactured housing	68.0	68.0	67.1	68.1	68.2	67.5	67.5	69.1	69.8	69.5
Apartments	69.4	70.4	68.9	69.3	68.0	69.4	69.6	70.4	70.8	70.9
Public assembly	65.2	68.6	69.0	68.4	67.0	72.0	68.4	69.2	71.0	71.8
Educational	72.9	80.9	76.5	77.2	79.6	80.7	80.4	75.7	78.4	79.7
Care of aged	84.0	82.1	86.7	86.6	85.8	86.1	87.0	86.7	88.1	87.8
Care of young	88.2	82.1	84.0	87.5	87.4	85.0	85.0	89.8	82.6	86.2
Hospitals and clinics	80.9	82.1	85.2	84.2	87.2	85.4	86.0	89.4	87.5	88.3
Prisons and jails	81.0	81.9	84.0	89.1	84.7	85.2	85.5	87.1	84.5	88.9
Care of mentally handicapped	88.5	89.5	84.9	88.3	88.9	87.3	93.5	90.5	86.7	85.6
Hotels and motels	82.2	77.5	78.4	77.9	78.5	77.8	76.4	77.4	78.8	75.2
Dormitories	83.5	88.6	87.8	82.0	84.2	89.0	89.6	93.6	93.2	88.2
Stores and offices	73.3	71.0	71.4	72.8	75.7	71.1	73.1	71.9	71.9	67.8
Industry and manufacturing	80.5	81.0	78.1	80.4	79.1	79.9	80.5	81.6	80.8	81.6
Storage (excluding dwelling garages)**	67.9	71.6	62.9	68.6	69.9	68.9	68.3	67.2	67.9	68.1

*Estimated as percentage of structure fires where detectors activated within set of structure fires deemed large enough to activate operational detector. Set excludes fires coded as too small to activate detector, fires with extent of smoke unknown or other or confined to object or area of origin, and fires originating in room without detector and having extent of smoke confined to room of origin. CAUTION: This procedure may be less dependable as a proxy for true reliability in properties that use primarily heat detectors as that tend to have very limited partial systems.
**"Storage" facilities include tool sheds, barns, silos, and other storage buildings that are not the warehouses one might think of in connection with this category.
Source: NFIRS

Table 7.
Overview of Detector Operationality, by Major Property Use, 1995

USAGE	OPERATIONALITY LOW (Under 75%)	MEDIUM (75–80%)	HIGH (Over 80%)
LOW (Under 40%)	Public assembly Stores and offices Storage*		Industry and manufacturing
MEDIUM (40–65%)	Dwellings, duplexes and manufactured homes		
HIGH (Over 65%)	Apartments	Hotels and motels Educational	Care of aged Care of young Hospitals and clinics Prisons and jails Care of mentally handicapped Dormitories

*Excludes dwelling garages.

Based on 1995 NFIRS statistics. Usage measured as percent of fires, not percent of properties in general. For example, usage levels for dwellings (51.2%) and apartments (14.4%) were taken from the fire-based statistics in Table 3, not the general-population usage level for all homes (93%) in Figure 1. Reliability estimated as percent activations in fires deemed large enough to activate operational detector, for fires where detector was present.

flow of air through the inlet screen is examined. To make sure the inlet screen is clean, the tester may have to remove the detector from the system. This can be done using scaffolding, ladders, or specially designed tools which ensure that detectors in positions difficult to reach aren't left out of the testing process. Visual inspections should also ensure that the detector's environment hasn't changed. Environmental modifications include changes in the use of the room, partitioning, or the introduction of a ventilation system.

Electronic tests and panel interrogations make up the Level 2 Check. These may be performed at the detector itself, usually by activating a Reed switch with a magnet, or at the system panel. A pin or card test may also be performed on detectors that have holes or slots into which pins or cards can be inserted. In practice, however, this test may be difficult to perform, since inserting a pin into a hole from 20 feet away is no small feat.

Because the electronic tests of the Level 2 Check don't involve introducing smoke into a detector's sensing chamber, they aren't a true test of the detector's ability to react to a fire. This ability is more fully tested during a Level 3 Check, in which real or simulated smoke is used.

Tests using real or simulated smoke have the apparent advantage of authenticity, since smoke is what detectors are supposed to detect. However, smoke and its characteristics vary depending on the product being burned, and the test smoke may not, in fact, reflect the components of smoke that would be produced in an actual fire. Real smoke may also contaminate the detector.

Synthetic smoke tests, which use pressurized canisters of synthetic aerosols, are the most common tool for functionally testing smoke detectors. They produce a fine mist with characteristics similar to the type of smoke the detectors have been designed to detect and generally provide a mix of particles that cause both photoelectric and ionization detectors to activate quickly.

Many aerosol smoke detector test products have no special dispenser, and they can contaminate the detectors. For this reason, some detector manufacturers try to prohibit the use of aerosols on their detectors. Contaminating residues generally accumulate when the aerosol is used too close to a detector and large particles concentrate on it. The time between residue deposit and dissipation depends on the volatility of the aerosol, the amount of residue deposited, the ambient temperature, the

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airflow past the residue, and even the ambient humidity. The principal danger of a residue is that it can attract dust, which can change the detector's sensitivity. Used correctly, however, aerosol products are attractive because they're easy to use and inexpensive.

A number of organizations use special aerosol dispensing apparatus ranging from inexpensive tubes that attach to the aerosol canister to highly developed cup-type dispensers. The former ensure that the aerosol travels the required distance, but they do little to conserve the aerosol or prevent premature dissipation. Cup-type dispensers generally enclose the detector, keeping the cloud of aerosol in a contained area while ensuring that minimum distance requirements are met. Any residue is left in the cup, not on the detector. Because a detector can take anywhere from 2 to 60 seconds to activate, enclosing the aerosol limits the amount needed and saves money. Cup-type dispensers also slow the aerosol reaching the detector, adding realism and further controlling residue, and they can be attached to telescoping poles, which allow them to reach detectors installed at high locations or in awkward positions.

Sensitivity testing

Functional tests confirm that the components of a fire alarm system are working together correctly, but they tell us nothing about the sensitivity of the detector or its ability to detect different quantities of smoke. While overly sensitive detectors may cause false alarms, thus making themselves known to a building's occupants, detectors that aren't sensitive enough can delay alarms, thereby reducing the time occupants need to fight or escape a fire. Insensitive detectors may even fail to activate altogether. And unless they're tested, they may not be recognized in time to prevent a tragedy.

A fire alarm system's design is based on the sensitivity of its detectors. If the detectors no longer work to the designed sensitivity, there's no guarantee that the system will still work as expected, which increases the chance of false or late alarms.

"Smart" detectors—the latest in analog detectors—can actually "tell" the control unit when they're out of sensitivity adjustment or when they're dirty. Some manufacturers of smart detectors say that theirs need no external stimulus for the sensitivity test, although visual inspections and functional tests that introduce a stimulus through the vents into the sensing chamber are still required. Nonetheless, administering a measured quantity of smoke or simulated smoke and evaluating a smart detector's response may give you more confidence in the detector's true sensitivity because it allows you to verify that the detector responds to a external factors, as well as to its own self-testing. A quantified, external sensitivity test would indicate such problems as blocked detector vents and malfunctioning electronics in the control panel or detector.

If you're not dealing with smart detectors, testing a detector's sensitivity is the only way to ensure that the original design conditions are maintained. In the case of system smoke detectors, NFPA 72 dictates that the responsible party shall ensure that each smoke detector is within its listed sensitivity range using a calibrated test method, the manufacturer's calibrated sensitivity test instrument, listed control equipment arranged for the purpose, a smoke detector/control unit arrangement that allows the detector to signal the control unit when it's outside its acceptable sensitivity range, or some other calibrated test method acceptable to the authority having jurisdiction. Detectors found to be outside the listed sensitivity range must be cleaned and recalibrated or replaced.

Sensitivity checks are divided into those performed in situ—that is, detectors are tested while connected to a system—and those performed on detectors that have been removed from the system.

The Level 4 Check involves detectors taken out of the system. In one test, detectors are removed from their bases and installed in a unit where an external voltage is applied to the sensor circuit output. The amount of voltage increase required to activate the detector is measured by reading the output voltage of the sensor chamber on activation. Because this test doesn't involve any smoke or other stimulus, it can't be described as fully realistic. It's also time-consuming, since each detector must be removed, a replacement inserted and tested, the original tested, passed, exchanged with the replacement, and retested in situ for function. In addition, a different device may be required for each make of detector.

A more advanced Level 4 test uses a smoke source instead. This test unit is designed to be used on site, although some versions require 120V AC power, which limits their portability. The detector is removed from its base and placed in a sealed box with a reference detector of known quality. Smoke from an incense stick is then introduced, and the reaction of the detector being tested is compared to that of the reference detector.

The Level 5 Check involves an in situ sensitivity test in which an aerosol of known quality and concentration is introduced through the detector's vents to the sensing chamber. The reaction of the detector or system, whether conventional or analog, to this stimulus can then be compared to the expected results, and conclusions can be drawn about the detector's sensitivity. This type of test truly examines the detector's sensitivity, its ability to respond to a defined smoke stimulus, and its ability to communicate with the panel and raise an alarm. The system's integrity is maintained while its performance is fully evaluated, and time is saved because the detector needn't be removed from its base.

The operating principles of Level 5 devices vary. Older, traditional products require manual set-up, and a number of tests must be performed on the same detector, challenging both the upper and lower limits of sensitivity before narrowing the bands if necessary. Newer products reduce time and labor costs by incorporating automatic set-up and test cycles, as well as advanced test modes that allow everything to be accomplished in a single test.

We may never perfect tests that will predict detector performance in all real-life situations. However, we must educate people about the need and about the ways in which detectors can be tested. Maintenance organizations and system owners must commit themselves to regular and thorough maintenance, which can only be done by committing funds to routine testing. Otherwise, false alarms, fire deaths, and property losses may increase.

William J. Rossiter is managing director of NoClimb Products, located in Hertfordshire, United Kingdom. John A. Ventrella is president of Systems Sales Corporation, located in Neptune, New Jersey. Both are members of NFPA.

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Matt O'Connor

SETTING THE STANDARD FOR EXCELLENCE

As recently as 20 years ago, the job of fire inspector was seen by many in the fire service as a way station to retirement, largely because the scope and demands of the position were so limited.

A lot has changed over the last two decades, however. The built environment is more complex. We know a lot more about the way fires develop and spread. And the codes, standards, and systems we use to prevent, detect, and contain fires have become infinitely more sophisticated. All of these changes have had a dramatic impact on the fire service in general and on the fire inspector in particular. In addition to being a code enforcer, today's fire inspector must also be part detective, part reporter, part technical consultant, part missionary, and part salesperson.

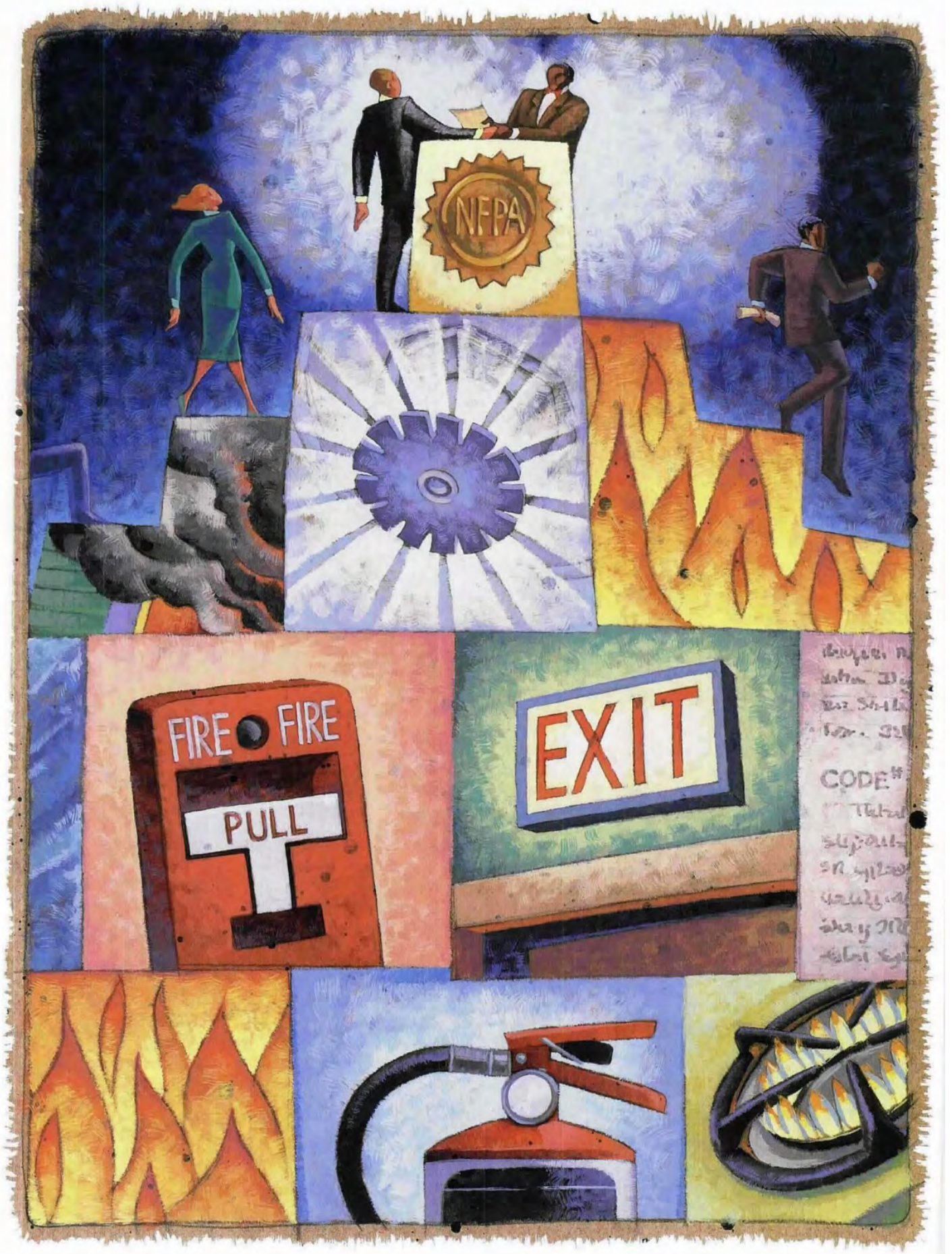
Yet certification requirements for the job vary widely. In states and municipalities with rigorous job requirements and well-designed certification programs, the fire inspector may be one of the most skilled and educated members of his or her department. Unfortunately, such cases are the exception, rather than the rule. There are simply too many inconsistencies among programs, and, as a result, certification doesn't always guarantee competence.

That's why, for several years now, fire inspectors, state agencies, and independent organizations such as insurance companies have appealed to NFPA to develop and implement a nationwide certification program and act as the certifying body. In response, NFPA recently introduced its new Fire Inspector I Certification Program. Based in large part on the 1993 edition of NFPA 1031, *Professional Qualifications for Fire Inspectors*, the program also incorporates a number of suggestions made by members during a 1996 survey regarding the program's design and content.

According to Steven Sawyer, the program's manager and NFPA senior fire service specialist, the certification program accomplishes several important goals. First, and most important, it establishes a consistent standard of professionalism in the fire inspection field. Second, it helps inspectors become familiar with NFPA codes and standards and teaches them how to use them. Third, it makes certification available and affordable to everyone. Fourth, it provides nationally recognized evidence of competence that's "portable" from state to state. And finally, it promotes continued education by requiring recertification every five years.

NFPA is undertaking the program in cooperation with partner agencies, including fire academies, insurance companies, and trade associations representing large industries such as chemical manufacturing. Sawyer says the program can be used to fill voids where no certification programs currently exist or to augment existing programs. An agency can adopt the whole program, he says, or it can elect to adopt only the components that complement its existing program. If an agency chooses the latter option, however, its program must be reviewed and approved by NFPA in order to earn certification.

Illustration: Kate Muerig


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How the program works

The fire inspector certification program consists of six stages: application; preparation, which includes either case studies or case studies combined with supplementary training; an open-book written exam; a practicum that involves site inspections of various types of facilities; certification; and recertification.

The first step in the process is the application, which participants can obtain from NFPA or a partnering agency. After submitting the application, a participant is assigned a program manager and receives a packet of materials, including a study guide and case studies, designed to help him or her prepare for the written exam and practicum. The case studies, which serve as a refresher and help candidates experience using NFPA codes and standards, are carefully crafted to cover all major areas of the fire inspector's job, as well as any applicable documents, theories, and practices.

By focusing on specific types of facilities, such as assembly occupancies, manufacturing facilities, and apartment buildings, the case studies teach candidates how to accurately and completely perform many types of inspections. They also give candidates a deep understanding of the issues related to different types of inspections, including such things as exit signs, emergency lighting, fire doors, interior finishes, occupancy loads and building usage, and flammable liquids storage.

The candidate is given 60 days to complete the case studies and return them to the program manager. Once the program manager verifies that he or she has completed the case studies, the candidate is sent a booklet that contains the appropriate case study responses. The candidate must use the responses to evaluate his or her own performance, based on correct application of standards, case study analysis, and calculation of math problems. At this point, the applicant also makes an appointment to take the written exam, which must be done within 60 days of completing the case studies.

For applicants who feel the need for additional preparation, there's an optional training program consisting of a self-study guide, applicable standards, and sample exams. Candidates may either complete the self-study guide on their own or participate in a 40-hour classroom program offered by a partner agency. The program curriculum is drawn from NFPA standards, IFSTA documents, and existing National Fire Academy programs. Candidates have 60 days to complete the optional training program, after which they must take the written exam.

The written exam and practical exercises

The open-book written exam, which takes four hours to complete, is designed to evaluate a candidate's job knowledge and code application skills, as described in NFPA 1031. The exam may be taken at a university or college testing center—in which case, the candidate is responsible for any fees charged by the testing center—or under the direction of a regional proctor who is registered with NFPA. Test results are sent out roughly 45 days after the exam date. Only if the candidate passes the written exam may he or she enter the practicum phase.

According to Sawyer, the practicum is the most important step in the certification process because it provides hands-on learning opportunities, as well as proof of the candidate's field experience and practical knowledge.

The practicum begins when the candidate receives a workbook containing 13 practical site inspections of various occupancies and corresponding performance checklists. Seven of the 13 inspections must be conducted and their checklists completed. In particular, a site visit and performance checklist must be completed for at least one sprinklered facility and one commercial kitchen, either in a restaurant or in a school or hospital cafeteria. Site visits and performance checklists must also be completed for at least five of the following types of occupancies:

- Assembly occupancy for 50 or more people;
- Apartment building with 16 or more units and two or more stories, or a hotel/motel with 20 or more guest rooms;
- Business office measuring up to 5,000 square feet;
- Mercantile occupancy measuring between 3,000 and 12,000 square feet;
- Elementary school;
- Full-service gas station or convenience store with gas sales and an automotive repair facility;
- New construction site, other than single-family residence;
- Manufacturing facility measuring between 5,000 and 30,000 square feet;
- Hot work shop, such as a cutting or welding shop;
- Assisted living facility; and
- Storage facility with noncombustible components on wood pallets.

Each of the candidate's checklists must be verified by either the building owner or property manager or by a supervisor, fire chief, fire prevention officer, or state agency training officer who's responsible for confirming that all activities have been completed. If the candidate chooses to have his or her checklist verified by a supervisor, fire chief, fire prevention officer, or state agency training officer, he or she must identify a single individual before the practicum begins, and this person must sign all the candidate's performance checklists.

Once all of the inspections and their corresponding checklists have been completed, the candidate returns the workbook to the program manager, who audits the checklists and verification forms. If the manager finds no problems during the audit, the candidate is certified—but the process doesn't end there. To ensure that certified inspectors keep up with new technology and code changes, recertification is required every five years. Applicants must either submit evidence of 100 hours of continued training, such as course certificates or a college transcript, or take a written exam.

Although the program is still in its pilot stage, Sawyer believes it will go a long way toward establishing a standard of professionalism in the fire inspection field.

"The program gives candidates all the knowledge, preparation, and practical experience they need to competently perform the job at the Fire Inspector I level," he says. "It teaches them how to work with codes and look up answers, and how to identify and solve specific problems. It's a great professional development tool."

Matt O'Connor is a writer and editor specializing in business and technical communications. His work has appeared in Digital News, Kids Fashions, *and* The Small Business Advisor.

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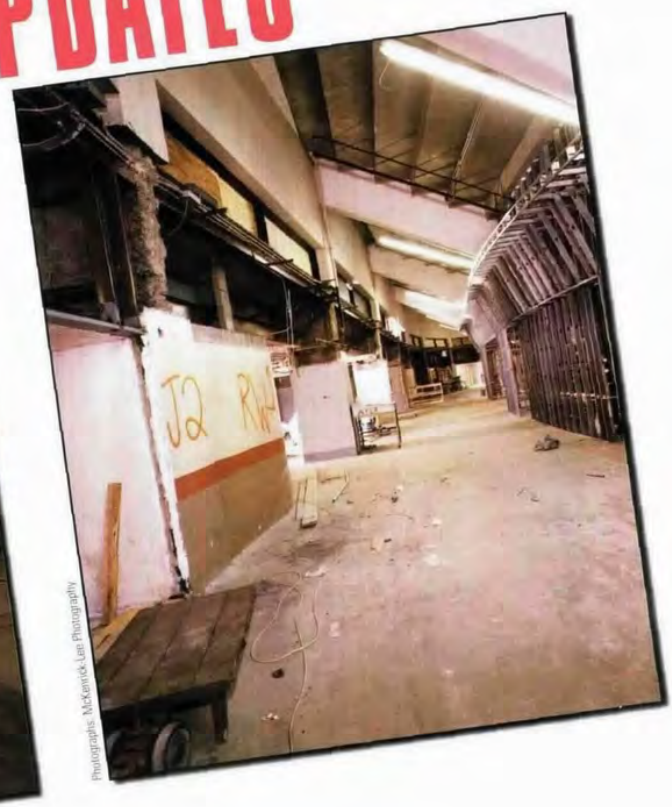
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Eileen Mongeau

ARENA UPDATES





Photographs: McKenrick-Lee Photography

At five stories and 346,000 square feet, The Crown Coliseum, formerly known as the Riverfront Coliseum, is the largest indoor facility in the greater Cincinnati area. In addition to being home to the Cyclones hockey and Silverback soccer teams, the building hosts more than 150 other events each year, including concerts, rodeos, and tractor pulls. Last year, more than one million people attended events at the Ohio arena.

"Because of the sheer number of people, life safety is extremely important in this type of facility," says Victor Barson, fire specialist with the Cincinnati Fire Department.

When The Crown Coliseum underwent major renovations last year with Hammes Company and Dugan & Meyers leading the way as construction man-

When Cincinnati's 17,000-seat coliseum underwent major renovations last year, a prime concern was upgrading the facility's 25-year-old fire detection and alarm system.

FIRE PROTECTION SYSTEM





agers, all areas of the building, including the arena and seating area, the concourse, private suites, restaurant and concession stands, and restrooms, were completely renovated. Most of the work to the event floor and public areas was done while the facility was closed for four months between the last graduation ceremony in May and the first fall concert. The rest of the work was scheduled around events.

Improvements to the fire protection system

From the project's start, improvements to the fire protection system required input from, and coordination among, key players, including architects, engineers, local building and fire service officials, and vendors.

"The old fire detection and alarm system was a 1973-vintage manual system of






pull stations and horns," explains Peter Kauffman, mechanical coordinator for Dugan & Meyers. "The new Simplex voice system was selected because it meets a number of criteria that were considered optimal for this type of facility, which falls under the 'amusement' occupancy codes."

The new system, which is addressable, encompasses versatile audible/visible speaker/strobes that meet the Americans with Disabilities Act (ADA) requirements. In addition, it hooks into the public address system to notify people in the arena of an emergency.

Smoke detectors

During The Crown renovation, the contractor made major upgrades to the early warning smoke detectors throughout the building. This included installing them in the air ducts of the heating, ventilating, and air conditioning (HVAC) equipment.

"Prior to the renovation, some air handler units had localized detectors that would shut down if there was a problem," says Kauffman, "but they weren't connected to the fire alarm system as they are in the new system."

According to Rick Schriewer, building department inspector for the city of Cincinnati, the original fire detection system's structure—that is, the main line and the branches—is the same.

"However, all of The Crown's old smoke detectors were replaced with Simplex analog smoke and heat sensors, and many new ones were added to bring the building up to code," he says.

With the new system, both photoelectronic and ionic sensor sensitivity can be selected at the control panel. Information from the panel is used to identify which sensors should be made more or less sensitive. For instance, sensors in smoke-free areas can be programmed to be more sensitive than those in smoking areas. In addition, dual sensitivities can be selected so the local sounder operates at one sensitivity level, while the building's fire alarm system is actuated at a higher level.

The system can also be programmed to provide automatic variable sensitivity by time of day. By investigating sensor data history, local conditions can be defined to determine when changing the sensor sensitivity is appropriate. For example, different sensitivities can be set in smoking areas during occupied versus unoccupied hours.

The system also identifies smoke sensors that need cleaning before their selected sensitivity changes and triggers a false alarm. If the smoke sensor gets so dirty that it becomes more sensitive than selected, it informs the panel that it needs to be cleaned.

Kitchen suppression system

Before the renovation, the stadium had one central kitchen that distributed food to the concession stands, which didn't have their own cooking facilities. During renovations, The Crown increased efficiency not only by increasing the number of concession stands, but by equipping five of them with kitchen appliances such as grills and fryolators. Because these appliances produce grease-laden vapors, however, the contractor, Dalmation Fire, Inc., installed local hood exhaust systems to protect the cooking areas. This was a challenge because the exhaust had to be run through the existing building up to the roof, which is 60 feet high.

"The duct work had to be wrapped with a fire-resistant insulator blanket," says Kauffman.

Chemical fire suppression systems, which dump dry chemicals on the fire, were also installed in the cooking areas and hooked into the main fire alarm system.

Intelligent, addressable system

In addition to replacing the smoke detectors, addressable devices replaced The Crown's old "zoned" manual stations and notification alarm circuits.

Each of the 100 devices—pull stations, smoke detectors, duct detectors, and chemical suppression units—now has its own code, which identifies its exact location in the building on the LCD display of three separate alarm panels. These panels are connected to a central station that monitors the system and, when required, notifies the local fire department.

A fire department representative monitors the main panel, located in the mechanical room, during events that are considered risky, such as tractor pulls. The fire specialist can see what's happening in the arena and bypass the system if there's likely to be a false alarm.

A remote panel connecting field wiring is located on the suite level, and the third panel, a remote annunciator with LCD display, is located near the facility's main entrance. As soon as firefighters arrive at the scene, they know the type of device in alarm and its exact location, a major improvement over the old zoned system.

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Meeting ADA requirements

The stadium's original fire notification system consisted solely of horns. Now, approximately 70 combination speaker/strobes are installed in all public areas, such as the main concourse, corridors, restrooms, locker rooms, and skybox suites. The new system, which meets ADA requirements, has visible strobes and audible tones, as well as voice messages instructing patrons during an emergency. In addition, the number of devices has doubled, substantially increasing audibility.

The new system is very flexible in that different devices can use different tones, depending on the type of activity going on in a particular section of the building. The wattage of individual devices can also be increased as needed. For example, it can be made louder in large, public areas and softer in small, private suites.

"This type of flexibility is really advantageous in a facility like this, which holds such a wide variety of events, ranging from concerts to rodeos, each with different types and levels of noise," says Schriewer.

The audible/visible speaker/strobes are ideal for the concourse level, restaurants, private suites, locker rooms, and corridors. One of the challenges Simplex faced in designing the fire alarm system was developing a reliable mechanism to notify people in the arena of an emergency. Since it wasn't feasible to rely on the speakers in public areas to reach the arena over the noise of both the crowd and the events themselves, another solution was needed.

In the new arena, the fire alarm system is hooked directly into the sound system. In the event of an emergency, the system overrides any input from the sound system, such as music or an announcer's voice, and broadcasts a prerecorded message that notifies the audience of the emergency and gives evacuation instructions.

Testing the system

According to Schriewer, testing a fire alarm system in this type of facility is difficult because it's hard to simulate the noise of certain events—like the circus, for example.

"However, because we've had 25 years of experience with this facility, we have a sense of how loud the devices need to be in certain areas," explains Schriewer.

Barson of the Cincinnati Fire Department adds, "We try to test the alarm system based on the most severe conditions it could encounter."

The system is also tested during rehearsals and practices and will be monitored and modified as new types of events are held in the stadium.

Sprinkler system upgrades

When the coliseum was built in 1974, it was also equipped with the appropriate number of sprinklers. As storage and other rooms were added to the facility, however, new sprinklers weren't always installed. During renovations, the sprinkler system underwent major upgrades to bring it up to code. Dalmation Fire, Inc. added new sprinklers, and those in the concession stands and restrooms, areas that were completely gutted and moved, were relocated. In addition, the old pendent sprinklers on the concourse level and in the skybox suites were replaced with concealed sprinklers.

The current sprinkler system is divided into four zones, each with an addressable waterflow detection device in the standpipe. Initiating devices in the sprinkler risers monitor water flow, and any water detected in the standpipe will activate the fire alarm system.

The electrical contractor, Ayer Electric, also added several enhancements to the stadium's life safety system. First, an emergency generator was installed to replace the individual battery packs previously used. Next, the contractor installed nearly 100 of ESL's theatrical-style spotlights, which hang from the arena's ceiling and focus on specific areas.

"There are very few stadiums that have this type of emergency lighting system," says Kauffman.

In addition, small lights, which also shine on the floor, were milled into the bottom of the arm rests in areas that were difficult to reach with a spotlight. This system lights the way for people who must leave the building during power outages.

Other improvements

Changes were also made to exit doors. Although the arena had the proper number of exits, they were poorly laid out. So contractors relocated them closer to the building's natural egress points.

"Whenever you have a situation in which thousands of people are entering and exiting events en masse, efficient traffic flow is important," explains Kauffman. "In an emergency situation, it's critical."

Fire extinguishers were also moved and added as needed, bringing the building up to current fire codes.

The Cincinnati Fire Department is very pleased with The Crown's new system. As Barson explains, "It passed all of our tests and has demonstrated that it performs its duty and meets all necessary codes."

Eileen Mongeau, principal of Innovative Marketing Solutions, is a freelance writer and marketing communications consultant.







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Exhibitors' Showcase

The 1998 Fire Safety Exhibit, to be held May 17 to 19 at the NFPA Annual Meeting in Cincinnati, will feature more than 125 exhibits and demonstrations of new fire safety equipment, safety advances, and services to help you work smarter in your field. Exhibit hours are Sunday from 12 p.m. to 5 p.m., Monday from 11 a.m. to 5 p.m., and Tuesday from 10 a.m. to 5 p.m. This gives you plenty of time to talk to the industry experts.

You can also learn firsthand about new products, ideas, and services from leading suppliers at the Exhibitors' Forums scheduled for Sunday afternoon, Monday, and Tuesday. Participating exhibitors in the forums will answer your questions face to face.

Read on to find out about some of the companies and the products they'll be displaying at the exhibit. And turn to page 150 for a complete list of exhibitors and their booth numbers and a map of the exhibit hall.

This information was compiled on April 2, 1998.

Fire and Life-Safety Manager Series

ADT introduces the new Fire and Life-Safety Manager Series. This series incorporates the current popular Unimode control panels featuring simple, cost-effective solutions. The new products include the ADT 400 multinet and the MULTI-NET Manager. These systems can provide basic fire alarm to entire system networking from a single workstation. The MULTI-NET's open architecture enables you to seamlessly move from existing to new expansion system configurations. Visit Booth 316.
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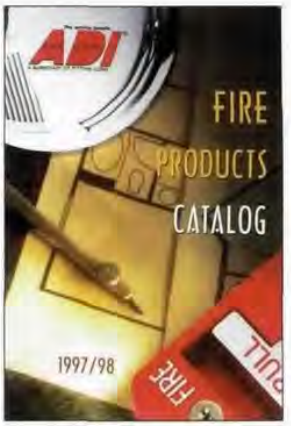
Angus Fire is one of the world's premier brands of fire hose, water distribution hardware, foam, and foam equipment, as well as an industry leader in product design and innovation. Featured products include Hi-Volj Large Diameter Hose, Hi-Combat Attack Hose, and Super Aquaduct 8", 10" and 12" products, for firefighting and portable water supply. Visit Booth 617.
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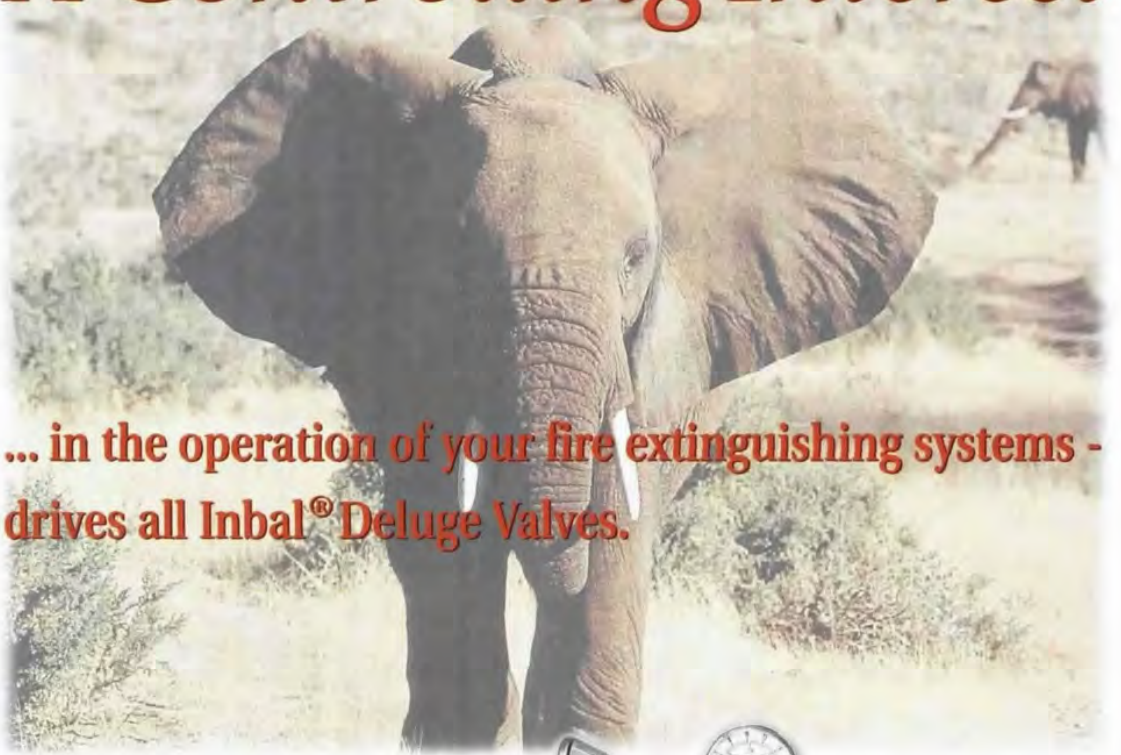
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Clean Agent Fire Extinguishers

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A Controlling Interest



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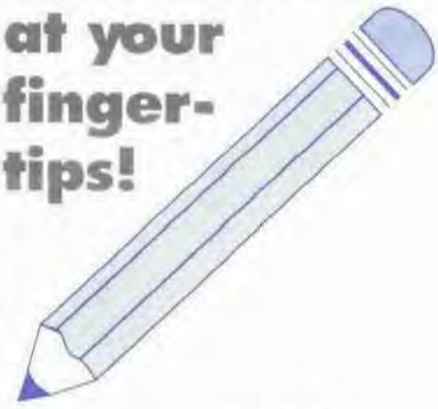
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SpecSeal FIRESTOP PRODUCTS

Elastomeric Firestop Spray



And We're Flexible Too...

Firestopping linear applications is always a problem. But with the new SpecSeal® Elastomeric Firestop Spray, those problems have just been solved.

SpecSeal® Elastomeric Firestop Spray was designed to provide the same **HIGH QUALITY** smoke and fire protection that you have come to expect from Specified Technologies, Inc. Because it's highly **ELASTOMERIC**, it will easily handle any joint movement caused by thermal expansion and contraction, or normal floor span loading. This new **WATER-BASED** technology contains no solvents. It is non-toxic and easy to clean up. SpecSeal® Elastomeric Firestop Spray demonstrates **EXCELLENT ADHESION** to virtually all construction materials, and since it's **INSOLUBLE** in water, it's sure to provide years of reliable service. Spray application greatly increases productivity making SpecSeal® Elastomeric Firestop Spray extremely **COST EFFECTIVE**.

At STI we are as flexible as our new elastomeric spray. To learn more about this product and the entire line of SpecSeal® Firestop Products, call today....1-800-992-1180.

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SIMPLICITY... What a Concept!

The Hazardous Material Manager
Simplify your regulatory compliance and risk management efforts while managing your inventory. Fully integrated inventory, MSDS and regulated chemical management systems are perfect for companies that store, use, produce, and dispose of hazardous materials. Available in multi-user, client-server, and Intranet-ready configurations that are tailored to each site. *Circle No. 091 on Reader Service Card.*

Professional MSDS Library Management System
Reduces compliance, management, and training costs while simplifying employee access to hazardous information. Ideal for companies that must comply with OSHA and EPA reporting requirements. Supports library management, electronic distribution of hazard information, active/retired MSDS tracking. Includes Integrated List of Regulated Chemicals. Available in multi-user, client-server, and Intranet-ready configurations that are tailored to each site. *Circle No. 092 on Reader Service Card.*

NIOSH Pocket Guide to Chemical Hazards
Integrated NIOSH, EPA, and OSHA chemical information, with lightening-fast access to all entries through multiple search fields and sorts. Chemical tables can be sorted by chemical name, CAS No., RTEC No., and DOT ID. Integrated Help includes the user manual and text and figures from the Guide. *Circle No. 093 on Reader Service Card.*

North American Emergency Response Guidebook, Electronic Edition
Handle hazardous material emergencies with easily accessible information on one computer screen. We've integrated EPA and OSHA chemical lists with NIOSH Pocket Guide cross reference data to create quick search commands by chemical name, DOT ID, guide number, topic, or key word, and single, integrated screens with everything first responders need to know. *Circle No. 094 on Reader Service Card.*

Simplicity's Integrated List of Regulated Chemicals
We've integrated EPA and OSHA chemical lists with NIOSH's Pocket Guide cross reference to create a uniquely useful tool for Environmental Health and Safety professionals. Comprehensive chemical lists are augmented with the text from associated regulations. Full manual and regulatory text are accessible through the help screens. It comes with one full year of updates, and low-cost maintenance thereafter. *Circle No. 095 on Reader Service Card.*

ISONetwork, LLC, Providing ISO14000 and EMS Support Services
Achieve organizational management excellence and ISO registration with our unique world-class approach to integrating environmental, health, safety and quality management with the best practices of the ISO international standards. We offer education, training, assessments, pre-certification audits, ISO registration facilitation, and management systems development. *Circle No. 096 on Reader Service Card.*

Visit www.simplicitydata.com for information on our regulatory products and Intranet/Internet business solutions.



Minimum Requirements:
MS Windows95 or NT 4.0/Mb Disk Space 16Mb RAM. Additional support needed for Intranet/Internet capable systems.

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COLORADO 80539
970.667.5717
800.773.SIMP
Fax 970.667.4103
www.simplicitydata.com
simply@simplicitydata.com

simplicity
DATA SYSTEMS, INC.

buildings as high as 45 feet, with 40 feet of storage. Since this is an ESFR sprinkler, in-rack sprinklers aren't required, and due to the low pressures, elimination of a fire pump is very possible. Visit Booth 211.
Circle Reader Service Card No. 126

Clean Agent Fire Protection Material

Chemetron Fire Systems recommends FM-200 as the best people-compatible, clean agent fire protection material for vital facilities and has designed systems for compatibility and maximum effectiveness. It's environmentally acceptable, safe to use on sensitive equipment, fast-acting, and effective. The U.S. EPA accepts FM-200 for use in occupied space protection at up to 9% v/v without egress times, or up to 10.5% v/v with mandated egress times. Visit Booth 417.
Circle Reader Service Card No. 127

Windows-Based Inspection Program

An efficient and affordable solution to help manage inspection, testing, and maintenance. Compliance-25 is a Windows-based program written especially for the fire protection professional to assist in the implementation of rigid inspection standards. Compliance-25 makes un-needed paperwork and storage a thing of the past. Visit Booth 976 to find out more about Compliance Software.
Circle Reader Service Card No. 128

Fire Pump Controllers

Cutler-Hammer, a part of Eaton Corporation, has over 50 years' experience in manufacturing a complete line of fire pump controllers. Cutler-Hammer Diesel and Electric "LMR" controllers are microprocessor-based and full of added features—at no extra cost. For more information, visit us at Booth 271 or E-mail us at firepump@ch.etn.com.
Circle Reader Service Card No. 129

New Flame Detector for Wet Benches

Det-Tronics' Dual Spectrum PM-5MP Flame Detector is capable of responding in less than one second and has built-in fire and fault relays. Built in a polypropylene housing, this compact unit offers direct mounting inside the wet bench. A preterminated wire pigtail simplifies wiring into any fire suppression panel. Visit Detector Electronics at Booth 613 to learn more.
Circle Reader Service Card No. 130

New Digitize System 3500

Digitize introduces its new System 3500, "a new direction" in integrated monitoring of proprietary fire, security, and building management alarms. System 3500 is fully compatible with and retains all the features of its world-renowned predecessor, the System 3000. It incorporates a dramatically enlarged display screen and information-rich, high-visibility graphics. Digitize will be at Booth 577.



Circle Reader Service Card No. 131

Fire Extinguishants

The FE family of DuPont fire extinguishants, coupled with fire suppression equipment from leading manufacturers, offers the total solution for fire suppression, explosion suppression, and inerting applications. In response to the phaseout of Halon 1301 and Halon 1211, DuPont developed

Our new microprocessor based smart appliances the Series NS/NH strobes and horns were designed to prevent this from happening to your budget.

- Low current
- Zero inrush
- Patent pending Universal Mounting Plate
- 15, 15/75, 30, 75 and 110 cd strobe intensities
- Continuous tone 90 or 95 dB
- Temporal Code tone 92 or 97 dBA
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Our new Series NS/NS4 Horn Strobe & NH Horn Appliances provide you with the kind of features and benefits that save you time, money and extra headaches down the road.

Give us a call today toll-free 1-800-631-2148 to find out more about how we can help you save money on your next project. Because we think you have better things to do with your budget then to let it go up in smoke.

2 Versions are available: our (patented) 2 wire models for both horn & strobe (NS) & 4 wire model with 2 wire functions (NS4).



SERIES NS/NS4



SERIES NH

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Circle No. 087 on Reader Service Card

FE-36™, FE-13™, FE-25™, and FE-241™ to meet the fire threat in every application. Visit DuPont at Booth 807.
Circle Reader Service Card No. 132

Suppression, Detection, and Monitoring Systems

Fike Protection Systems manufactures the finest suppression, detection, and monitoring systems available, including Fike's FM-200 Suppression System,



advanced analog addressable and conventional fire detection and alarm systems. To learn more about Fike's products, including our SHP (single hazard panel), Rhino, and Cheetah, visit Booth 557 or Fike's website at http://www.fike.com.
Circle Reader Service Card No. 136

A New Generation of Faraday Firewatches



FireWatch-200 (2 IDC/1 NAC) and FireWatch-400 (4 IDC/2 NAC) join the already extensive FireWatch, LifeWatch, and MPC Fire Alarm product families! These conventional-style B/Y, Class B/B controls have features and performance for all of your small system needs. Compatible with our other system products—a truly complete systems solution! Find out more at Booth 765.
Circle Reader Service Card No. 135

Pull Station

Federal Signal's Model MMPS Modular Manual Pull System in an ADA-compliant, key reset pull station designed for multiple applications through utilization of a variety of options to meet changing fire system requirements. Options include a dual-action shield for a double-action station, voice module, sounder module, LEDs, additional switch modules, institutional feature, and fire phone jack. Find out more at Booth 265.
Circle Reader Service Card No. 133

Life Safety Equipment

Edwards Systems Technology is in business for life...yours and those you are responsible for protecting. Multisensor technology, the latest in control systems, and over 125 years of experience—ready to respond to your life safety needs. For additional information, please call 1-888-EST-2DAY, or stop by Booth 525.



Circle Reader Service Card No. 134

Fire Alarm Voice Evacuation System

Fire Control Instruments will feature the FireVac® 7200 Distributed Fire Alarm Voice Evacuation System with integrated voice/alarm signaling,

New Version-2.0 • *New Price-$1,800* • *Unlimited Capacity*

Affordable Inspection Software

Compliance 25

Finally, a Windows based PC program written especially for the fire protection professional in the implementation of rigid inspection standards.

Compliance-25 makes unneeded paperwork and storage a thing of the past.

This program is designed to let you establish a unique data base to simplify the archiving of records, while scheduling and managing future requirements.

Unlike some other software, *Compliance-25* is designed to work with your existing hardware system, making additional expensive purchases unecessary.

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Intrinsically Safe Self Contained Controls
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Circle No. 051 on Reader Service Card

FINALLY, FIRE PREVENTION OVER DETECTION



Can Electrical Fires Be Prevented?

With FIRE SHIELD™ you can stop power cord fires!

Fire Shield™ appliance and extension cords combine TRC's proven ground fault sensing circuit with a smart cord. A mesh shield surrounds each live conductor to continuously monitor the flow of current.

In the event of a fault, the plug mounted electronics will safely disconnect power before combustion can occur.





For a **FREE video tape** demonstrating this remarkable new technology

CALL 813/535-0572

or Fax 813/535-4828

TRC TECHNOLOGY RESEARCH CORPORATION

E-mail us at fireshld@aol.com. or Visit our Website at www.techrsrch.com



Circle No. 075 on Reader Service Card

FINALLY, FIRE PREVENTION OVER DETECTION

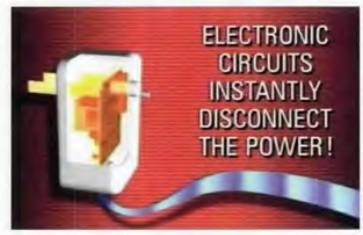


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With FIRE SHIELD™ you can stop power cord fires!

Fire Shield™ appliance and extension cords combine TRC's proven ground fault sensing circuit with a smart cord. A mesh shield surrounds each live conductor to continuously monitor the flow of current.

In the event of a fault, the plug mounted electronics will safely disconnect power before combustion can occur.







For a **FREE video tape** demonstrating this remarkable new technology

CALL 813/535-0572

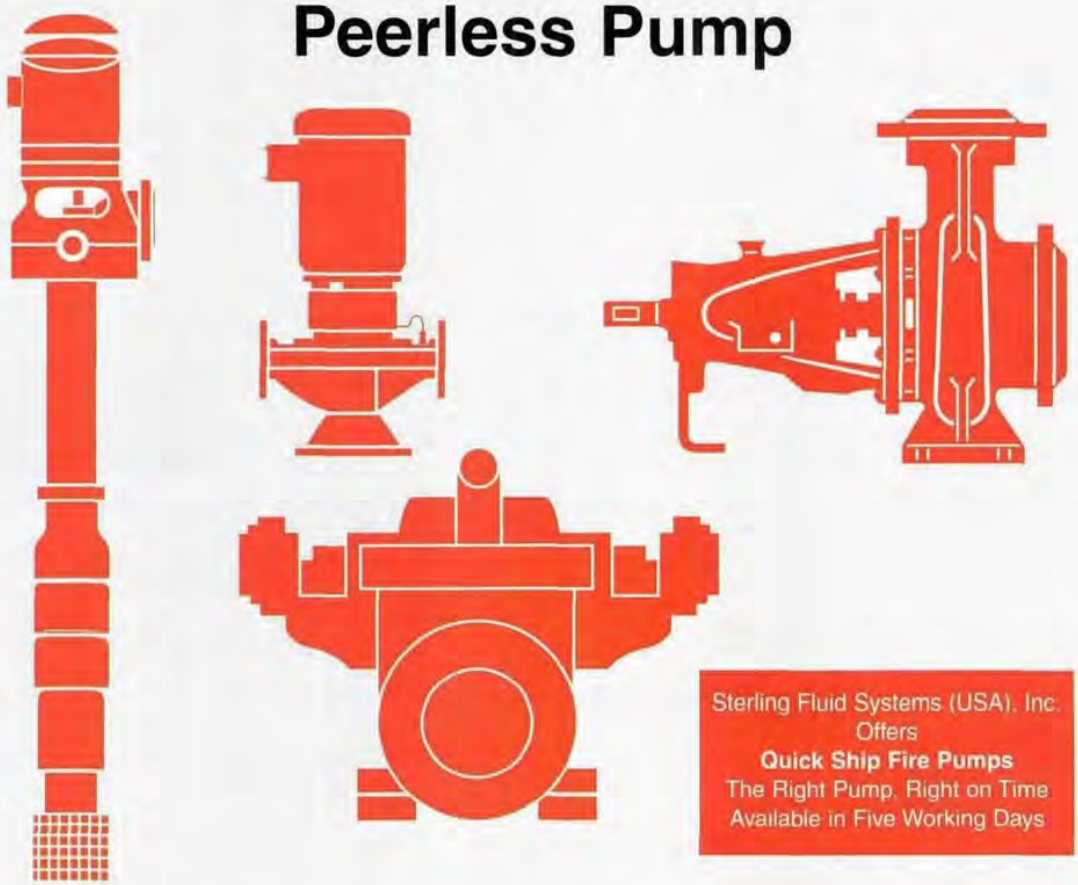
or Fax 813/535-4828

TRC TECHNOLOGY RESEARCH CORPORATION

E-mail us at fireshld@aol.com. or Visit our Website at www.techrsrch.com

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Peerless Pump



Sterling Fluid Systems (USA), Inc.
Offers
Quick Ship Fire Pumps
The Right Pump, Right on Time
Available in Five Working Days

World Leader in Approved and Listed Fire Pump Packages.

Looking for pump performance? Look for PEERLESS®.

Peerless high-speed, high-capacity AEF fire pumps give you big performance in a compact package. Need vertical in-line fire pumps? Our PVF series handles big jobs in less than one-third the space.

As a matter of fact, Sterling Fluid Systems (USA), Inc. offers a complete range of horizontal, vertical turbine, end suction and in-line fire pumps, with diesel or electric drives, in rates of flow to 5,000 U.S. gpm and pressures to 509 psi.

Sterling can also design and build anything from a simple skid-mounted pump and drive to a fully-enclosed, completely integrated packaged pump system, with your choice of drives and all the required controllers, fittings and ancillary equipment.

For a free brochure (B-1500) covering the complete line of Peerless fire pumps contact:

STERLING
PEERLESS PUMP

Sterling Fluid Systems (USA), Inc.
P.O. Box 7026 • Indianapolis, IN 46207-7026
Phone: (317) 925-9661 • Fax: (317) 924-7388
Website: http://www.sterling-sihi.com

Peerless Pump has changed its name to Sterling Fluid Systems (USA), Inc.
This is to identify the Company as a member of the Sterling Fluid Systems Group.

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75
YEARS OF EXCELLENCE

See Us In Booth 1132 At The NFPA Fire Safety Exhibit

Circle No. 072 on Reader Service Card

and extinguish a spark in a pneumatic duct in a fraction of a second, thus preventing the spark from entering filtration units and storage bins where violent explosions and fires are likely to occur. Learn more about FLAMEX products at Booth 349.



Circle Reader Service Card No. 142

Complete Line of Fire Protection Products

Gentex Corporation offers a complete line of high-quality fire protection products, including photoelectric smoke detectors, visual and audible signals, speakers, and protable smoke detector/visual units. Our engineering department designs each product to meet or exceed all codes and standards requirements, including the American with Disabilities Act (ADA) and strict state and local codes, as well as the performance and installation requirements of NFPA, UBC, and Underwriters Laboratories. Stop by Booth 676.



Circle Reader Service Card No. 143

Analog Addressable Alarm System

The IdentiFlex 650 is a full-featured analong addressable system capable of monitoring up to 1,008 points and/or 128 conventional zones. Self-programming (SmartStart) control is modular, expandable, and features drift compensation, sensitivity adjustment/control, virtual inputs/outputs, serial annuncation devices, and much more. Networkable through Gamewell's SmartNet Building Network System (RS-422/Fiber). Visit the Gamewell Company at Booth 623.



Circle Reader Service Card No. 144

Compressor/Dryer System

General Air Products, Inc., manufacturer of a complete line of base-, tank-, and riser-mounted compressors for dry pipe sprinkler systems, is proud to announce FM approval on our DRY AIR PAC™. Visit us at Booth 1227 and see our compressor/dryer system, engineered to provide moisture-free compressed air to sprinkler systems located in freezer, cold storage warehouses, or any environment which requires moisture-free compressed air. Call 1-800-345-8207 for more information.

Circle Reader Service Card No. 145

Fire Extinguishing Agent

Great Lakes FM-200® is the leading clean gaseous fire extinguishing agent for the protection of high-value assets in data processing, telecommunications, medical, power generation, and many other critical applications. FM-200® fire suppression systems have achieved worldwide acceptance and have received the Underwriters Laboratories listing and Factory Mutual Research Corporation approval. Great Lakes Chemical Coporation will be at Booth 546.

Circle Reader Service Card No. 146

Spark Detection and Extinguishment System

The GreCon Spark Detection and Extinguishment System prevents dust fires and explosions in pneumatic conveying systems by detecting and extinguishing sparks instantaneously before they reach the filter. Production is uninterrupted, equipment damage is reduced, and personnel injuries from fires and explosions are eliminated. For more information, drop in at Booth 929.



Circle Reader Service Card No. 147

Annunciators, Smoke Control Panels

The H.R. Kirkland is a manufacturer of annunciators (graphic, directory, exterior, and backlighted), smoke control panels, custom control panels, and graphic maps. All interior Kirkland graphic displays are produced in full color for the same cost as black and white. The H.R. Kirkland has been committed to providing outstanding product quality and service since 1930. Stop by Booth 922.

Circle Reader Service Card No. 148

Patented Soffit System

Grice Engineering, Inc., is the manufacturer of the Soffi-Steel™ system, a patented soffit system designed to conceal and protect fire sprinkler piping in new and retrofit applications. Custom-designed and fabricated for each unique application, Soffi-Steel is the most versatile and aesthetic solution on the market. Available in commercial and security/institutional grades. Find out more at Booth 490.



Circle Reader Service Card No. 149

New Sidewall Sprinklers

Grinnell's dream team of residential fire protection introduces two new members—the Model F685 low flow horizontal sidewall sprinkler and the Model F687 wide coverage area horizontal sidewall sprinkler. Both have aesthetically pleasing small frame designs and join our Model F680, Model F983, and Model F984 residential sprinklers to provide the best defense in residential fire protection. Grinnell Supply Sales & Manufacturing will be at Booth 701.

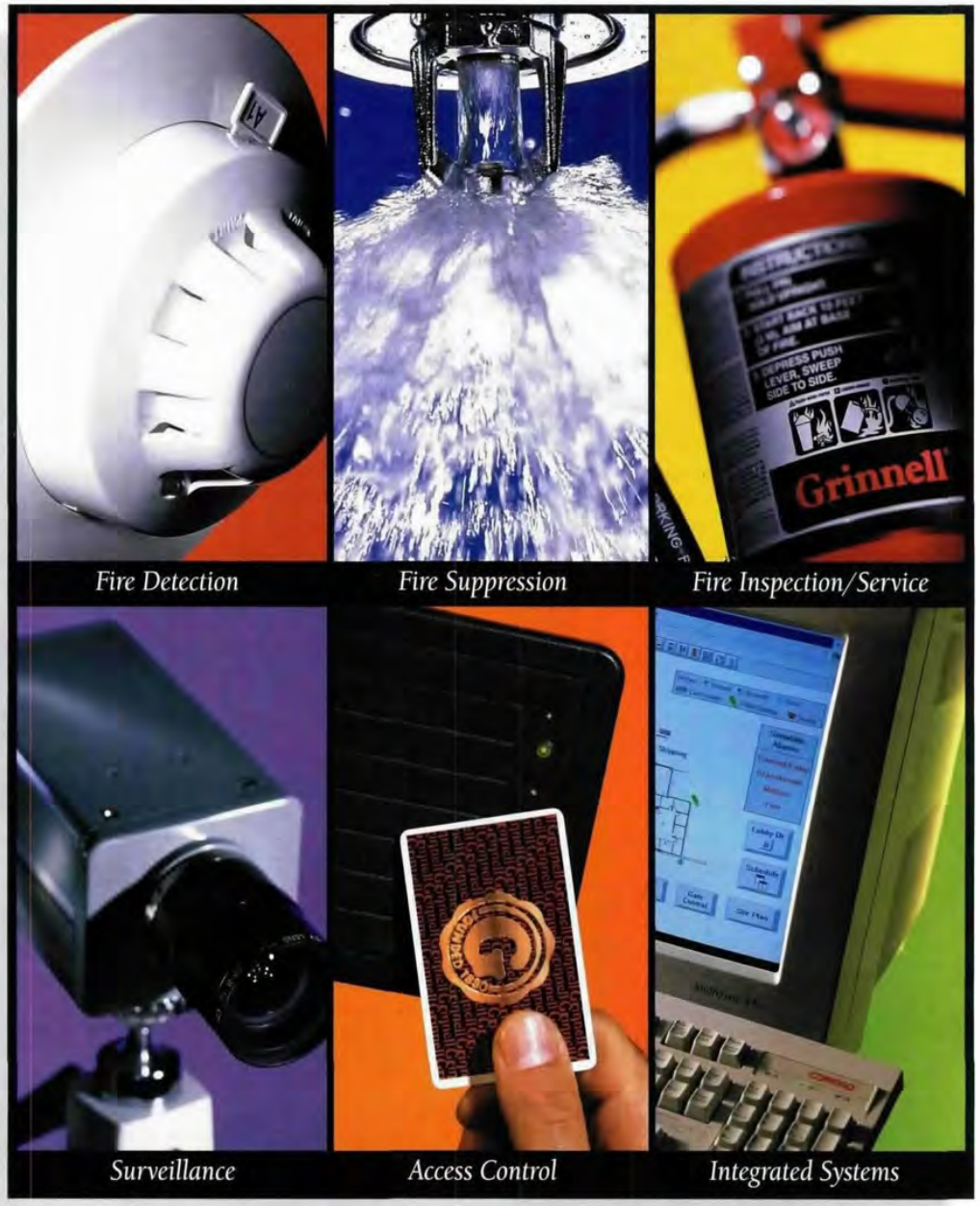


Circle Reader Service Card No. 150

Analog Addressable Fire Alarm Panel

Visit Booth 401 to see Grinnell's new AUTOCALL TFX-400 analog addressable fire alarm panel. Housed in a small cabinet, the TFX-400 has large system functions, including 198 points,

FIRST ALERT & BRK EXHIBIT 1028
Page 140 of 166



EVERYTHING UNDER ONE ROOF TO PROTECT EVERYTHING UNDER YOUR ROOF.



You may know us as the North American leader in fire detection and suppression products, systems, inspection, and service. But we're also a leader in surveillance, security, access control, and integrated facility management, too. For your nearest Grinnell office, call 440/899-5445, or write us at 835 Sharon Drive, Westlake, Ohio 44145. We've got all the protection you need. All under one roof.

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BOOTH #401

Grinnell®
FIRE PROTECTION SYSTEMS COMPANY
featuring Autocall life safety systems

A tyco INTERNATIONAL LTD. COMPANY

Circle No. 036 on Reader Service Card

network interface, and the exclusive Virtual Front Panel feature. Fully upgradeable, the system is ideal for retrofit applications. See http://www.grinnellfire.com for more information.



Circle Reader Service Card No. 151

Fire Protection Software

HRS Systems presents the HASS® family of fire protection software, including HASS® for sprinkler analysis, COOSA® for CO_2 analysis, HALCYON® for Halon 1301 analysis, ESTIMATORS (for those listed above), HASS HOUSE® for residential sprinkler analysis, and HAMMER for water hammer analysis. HRS Systems will be at Booth 576.

Circle Reader Service Card No. 152

Halon Replacement Agent

Halotron™ I, a replacement agent for Halon 1211, is a clean agent that's affordable and available worldwide. UL- and ULC-listed extinguishers; EPA SNAP list-approved for commercial, industrial, maritime, and military use; U.S. Coast Guard approved for portable extinguishers; and FAA-approved for airport firefighting. Halotron, Inc., will be at Booth 977.

Circle Reader Service Card No. 153

Lightning Protection Products

Heary Brothers Lightning Protection Co. will be displaying its comprehensive lightning protection products, including direct strike systems, indirect strike systems (surge protection equipment), grounding equipment, and lightning/storm detection equipment. Stop by Booth 491 to learn more about these products.

Circle Reader Service Card No. 154

Product Safety Certification

Intertek Testing Services is an international leader in third-party product safety certification and performance verification. Products evaluated to support NFPA include electrical, wire, cable, telecom, building products, lighting, and firefighter equipment and clothing. Laboratories and offices worldwide. Factory follow-up inspections, field labeling, and ISO 9000 registration servies. Visit Booth 353 for more information.

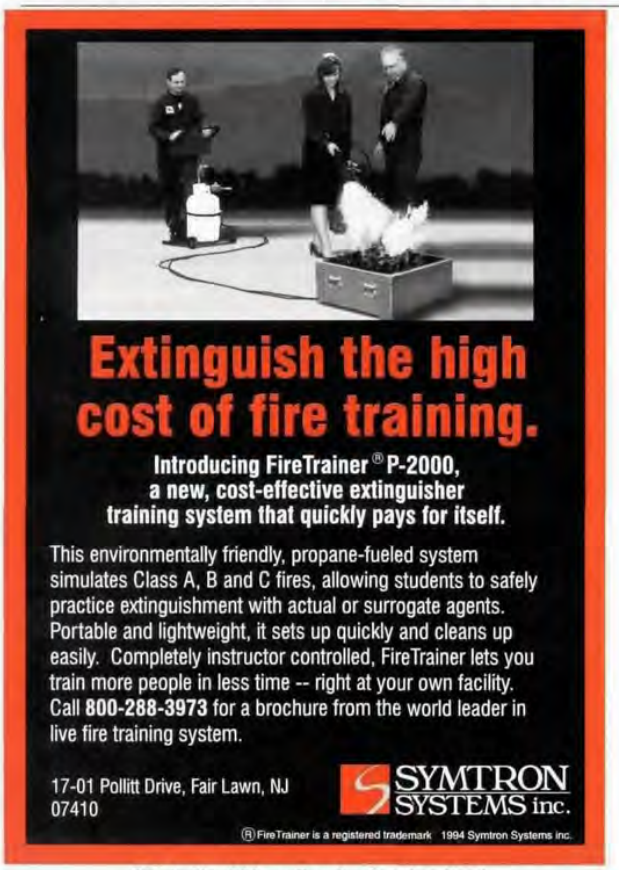
Circle Reader Service Card No. 155

Fire Detection Products

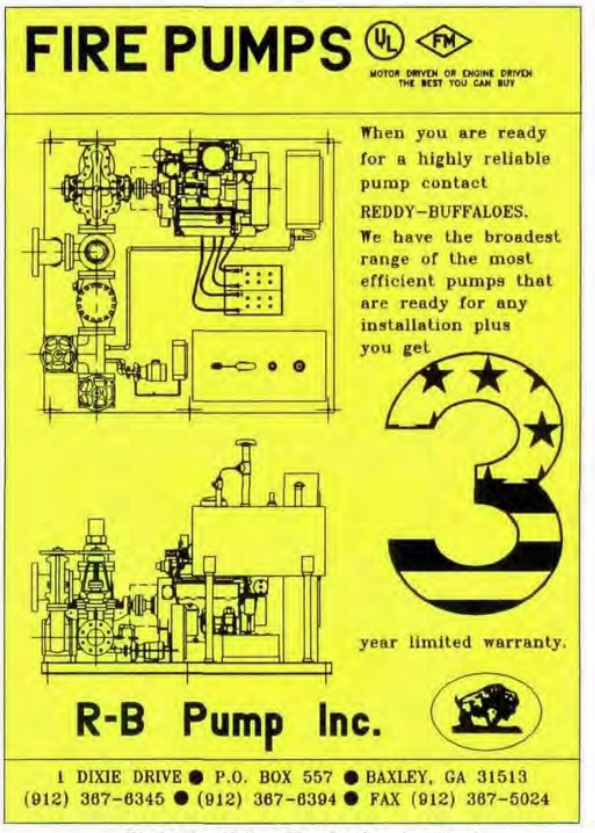
Hochiki America Corporation features a broad product line, including conventional fire detection products, digital fire detection products and accessories (utilizing our exclusive DCP protocol), residential and security fire detection products, special application detection products, and testing equipment. We pride ourselves in researching, manufacturing, and selling the world's finest smoke detectors. Hochiki complies with, and in most cases exceeds, the requirements of domestic and international agencies. Visit Booth 641.



Circle Reader Service Card No. 156



Circle No. 030 on Reader Service Card



Circle No. 099 on Reader Service Card



DuPont FE-36™ is the first true replacement for Halon 1211 in portable fire extinguishers with zero ozone-depletion potential.

DuPont FE-36™, the zero-ozone-depletion replacement for Halon 1211 from DuPont, is now available in portable fire extinguishers.* It's as effective as Halon 1211, yet safe for the user. Plus, DuPont FE-36™ is remarkably clean—it won't leave a residue that can damage property or shut down critical operations. And DuPont FE-36™ can be used on Class A, B and C fires. DuPont FE-36™: the new extinguishant you can use with confidence.

To learn more about the benefits of DuPont FE36™, call **1-800-441-9410.**

DUPONT

DuPont Fire Extinguishants

*Contact an Ansul distributor.

Circle No. 027 on Reader Service Card

Fire Protection Products

Long-established British fire protection company Hygood is at the NFPA exhibition for the first time, showing a number of products that are sure to interest specifiers and installers. These include Hygood's FM-200 clean, safe, and environmentally friendly gaseous extinguishant, and Hy-Sense, an ultra-sensitive aspirating smoke detection system. Visit Booth 297 to find out more about HyGood's products.



Circle Reader Service Card No. 157

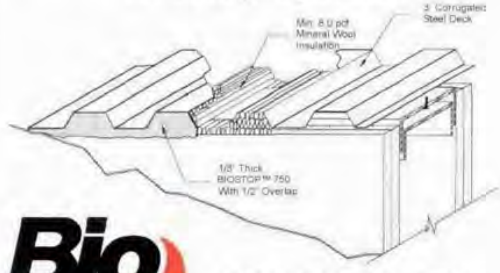
Carbon Monoxide Detector Tester

Home Safeguard Industries' COCHECK is another industry "first." It tests carbon monixide detectors by exposing them to a specially formulated pellet. When moistened, the pellet generates a nontoxic gas that simulates carbon monoxide. Find out more about Home Safeguard Industries' products at Booth 900.



Circle Reader Service Card No. 158

The CONTRACTOR FRIENDLY Firestop System!



Bio FIRESHIELD **BIOSTOP™ 750**

Firestopping continuous construction joints can be costly and labor intensive. **BIOSTOP™ 750** Firestop Mastic from RectorSeal® is a latex-based sealant that is:

- Easily installed by spraying, brushing or troweling.
- Unlike other brands contains no solvents or VOCs.
- Provides a smoke seal as well as up to a 2 hour fire rating in accordance with UL 2079 test standards.
- Fast and easy clean up with soap and water.

To learn more about BIOSTOP 750 and the entire line of Bio Fireshield™ products, call today . . . (800) 231-3345.

Visit us at booth #0406

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Circle No. 062 on Reader Service Card

Fire Protection Systems

ITT A-C Pump fire protection systems are UL- and ULC-listed, Factory Mutual-approved, and meet the requirements of NFPA Pamphlet 20. System capacities range from 35 to 5,000 GPM with pressures to 600 PSI. A-C Pump manufactures factory-tested (ISO-certified) systems and house units utilizing a full range of end suction centrifugal, horizontal split-case, vertical turbine, and in-line pumps. Stop by Booth 753.

Circle Reader Service Card No. 159

Tester for Fire Pumps, Standpipes

The Hose Monster® is the safest and most accurate way to flow-test fire pumps, roof-top standpipes, and hydrants. The patented design makes it safe—no hold-downs required. The internal pilot, UL Nozzle Inserts, and precise orifice make it accurate. Conduct flow test any time of day without interfering with traffic or causing property damage. Visit Hydro Flow Products at Booth 1122.



Circle Reader Service Card No. 160

Fire/Security Alarm Receiving System

The Keltron DMP703 Fire/Security Alarm Receiving System multiplexes supervised contacts and FACP point addressable serial outputs plus receives derived channel, DACTs, direct connects, coders, radio, and generates a multiplicity of outputs. Its touchscreen CRT and printer mean easy operator interfacing. All message displays, printouts, and outputs are field-programmable. Visit Booth 823.

Circle Reader Service Card No. 161

Flame Detectors

The Omniguard® Sensors Division of Meggitt Avionics Inc. announces that the Series 850 Fire Chief™ ultraviolet-infrared flame detectors have been designed to incorporate the latest microcircuit technology for superior high-speed flame detection and patented FEA (Fire Event Analysis) for the ultimate in false alarm immunity. Find out more at Booth 901.



Circle Reader Service Card No. 162

High-Sensitivity Smoke Detection

The KIDDE ORION family of air sampling-type, high-sensitivity smoke detectors use a laser particle counter to detect highly diluted smoke concentrations as low as 0.003% obscuration per foot (0.01% meter). Advanced signal processing electronically discriminates products of combustion from dust, dirt, etc. Built-in smoke level history and event log. UL-listed and FM-approved. Visit Booth 501.

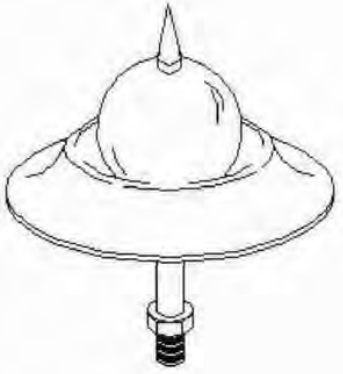
Circle Reader Service Card No. 163

Key Boxes, Cabinets

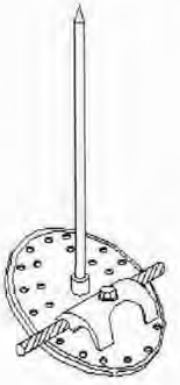
Prefire planning includes adoption of a proven method for fast and safe emergency entry. Assist fire department personnel by installing a Knox Rapid Entry System. More than 4,500 fire departments nationwide use Knox Company's key boxes, cabinets, switches, and padlocks to

Heary Bros.

- 5th generation lightning protection specialist
- Established 1895
- North America's leader in design, consulting, manufacturing and new lightning protection technologies
- dealing in both Faraday and ESE systems



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Circle No. 038 on Reader Service Card

shorten reponse time, prevent forced entry damage, and provide faster fire spinkler system shut-off. Visit Booth 450.
Circle Reader Service Card No. 164

Earthquake Sway Braces
Loos and Company, Inc., offers a complete line of earthquake sway braces that dramatically reduce the cost of design, materials, and installation. Braces are available in two-way and four-way models and are material-ready for installation, including fasteners. Braces are UL-listed. Learn more at Booth 1028.
Circle Reader Service Card No. 165

Built-In Paperless Pressure and Alarm Recorders
The model PR4001 digital paperless recorder with through-the-door readout provides a reliable, permanent record of pressure and alarm conditions from your EC series electric fire pump controller. It eliminates paper charts, messy ink pens, and chart winding required by traditional recorders. It meets the new NFPA 20 pressure recorder requirements without paper. Visit Master Control Systems at Booth 549.



Circle Reader Service Card No. 166

Fire Pump Control Panels
Metron, Inc., is the largest manufacturer of fire pump control panels and associated peripherals. With two manufacturing locations, Metron, Inc., is unsurpassed in total quality fire protection products and service worldwide. Please stop by Booth 481 to find out more about our products.
Circle Reader Service Card No. 167

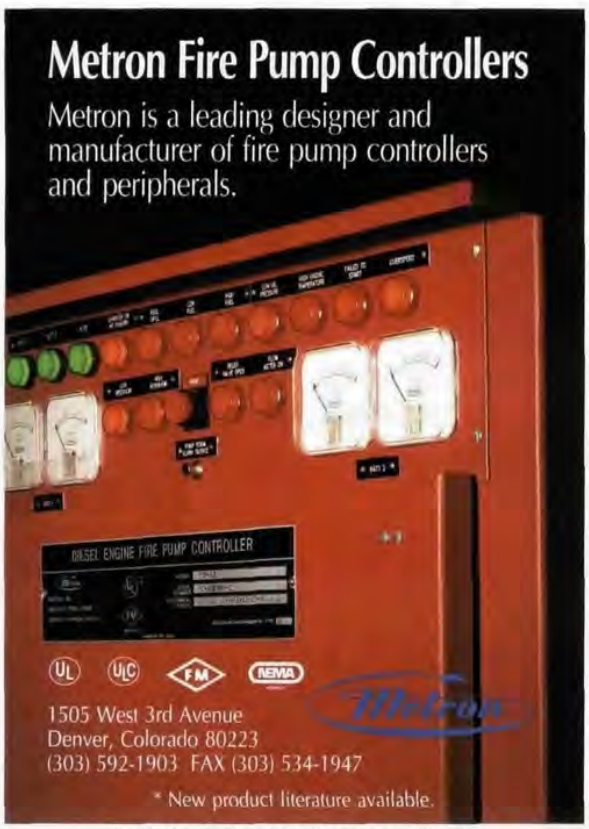
Fire Hose, Extinguishers
Nantong Jiangshan Fire Equipment Co., Ltd., provides fire hose, couplings, extinguishers, and sprinklers. Stop by Booth 1103 to find out more about these products.
Circle Reader Service Card No. 168

Mobile Training Vehicles
Mobile Concepts by Scotty (formerly known as Serro Scotty R.V.) manufactures the Fire Safety House, the Life-Safety Sprinkler House, and the Command Post Vehicle for the emergency services industry. With the little black scotty dog remaining as a familiar trademark, our name change reflects our primary focus: the custom design of mobile training vehicles and speciality trailers. Call us at 1-800-783-0213 or stop by Booth 970.

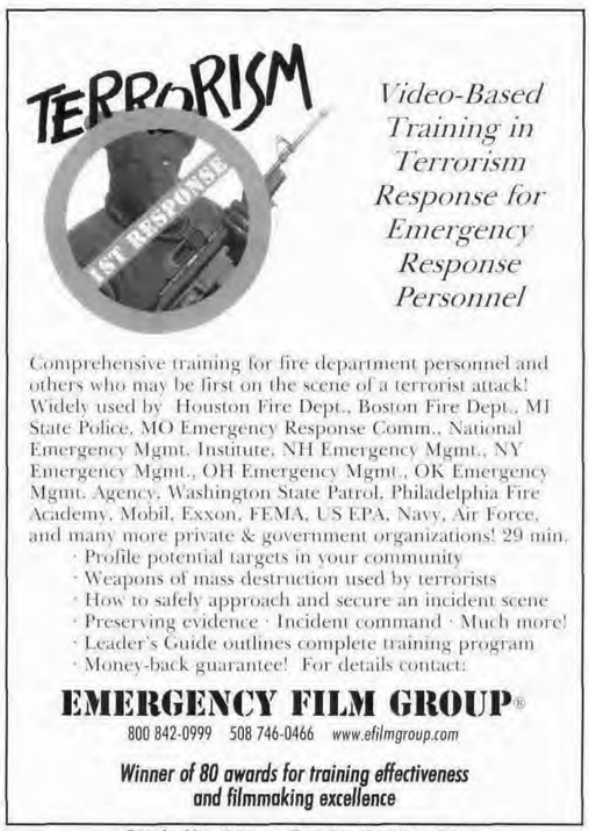


Circle Reader Service Card No. 169

Foam Concentrate
National Foam will feature its newly introduced, environmentally responsible KnockDown high-performance Class A foam concentrate. National Foam's new Gladiator mid- (500 to



Circle No. 071 on Reader Service Card



Circle No. 024 on Reader Service Card

1,000 GPM) and high- (1,500 to 3,000 GPM) capacity nozzles will also be displayed at Booth 413. The Gladiator is the latest advancement in foam nozzle technology.
Circle Reader Service Card No. 170

Fire Pumps Manufacturer
Peerless Pump, a member of the Sterling Fluid Group, is the world's leading manufacturer of UL-listed and FM-approved fire pumps. Peerless offers a full line of horizontal, vertical, end suction, and in-line fire pumps with diesel or electric drives. Peerless can also design and build packaged pump systems. Find out more at Booth 1132.
Circle Reader Service Card No. 171

Smoke Detector Testing
Professional and smoke detection testing and servicing is childs' play with No Climb Products Ltd. Universal products to suit all detector testing needs, including TRUTEST™ for in situ smoke sensitivity testing; SOLO™ interchangeable extraction/replacement tools, heat and smoke functional testing equipment, and telescopic access poles; and a battery-powered cordless heat detector tester. U.S. and European distribution networks are well-established. Find out more when you stop by Booth 593.



Circle Reader Service Card No. 172

Design Software for Windows
OmniCADD SDS for Windows—AutoCAD 13 or 14. It's fast, it's ready to take away your design worries. OmniCADD is the complete package from drawing, stocklisting, and hydraulic calculations. Many of the new functions include the AUTOBL, CUSTOM CROSS MAINS, and the all-new AUTO HEAD SPACING. Visit Booth 392.
Circle Reader Service Card No. 173

NOTIFIER Integrated Systems
NOTIFIER Integrated Systems, the pioneer in fire system integration, introduces the Uni•Fire•Net, the cutting-edge technology in local area and wide area system monitoring. Providing a bridge between various manufacturers and aging technology, the Uni•Fire•Net provides system owners with a migration path to the future. See the future in action at Booth 731.



Circle Reader Service Card No. 174

NOTIFIER Fire Systems
NOTIFIER, the leader in early warning fire detection, will be demonstrating the latest innovations in detector technology. Whether your need requires sensitive detection for those extremely delicate environments



As a safety consultant, you try to protect your clients from unforeseen catastrophe.

Do you have the same protection for your business?

Professional Safety Consultants Advantage
Professional Liability Program

Broad Coverage for Maximum Protection

Financial Strength
The program's insurance carrier holds the industry's highest ratings: A.M. Best's A++, Standard & Poor's AAA, Moody's Aaa

For more information, contact
Edward E. Yates, CPCU, CIC, AAI
Yates & Associates, Inc.
300 Ozark Trail Drive, Suite 210,
Ballwin, MO 63011
Phone: 314-394-0245
Fax: 314-227-7035
Toll Free: 888-394-0245

Circle No. 028 on Reader Service Card

AlarmSaf
POWER Line!
The Broadest Selection of Power Supplies
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Visit our Web site!
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For the latest information about AlarmSaf power supplies, battery chargers, timers, relay modules, siren drivers, transformers.
Free PowerCad! software

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Look for AlarmSaf at NFPA, Booth #1107

65A Industrial Way, Wilmington, MA 01887-3499
Phone: (978) 658-6717, Fax: (978) 658-8638

ALARM SAF

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or the harshest dirty environment you can imagine, NOTIFIER has the detection solution. See the true innovation leader for yourself at Booth 719.



Circle Reader Service Card No. 175

Sprinkler Supervisory Products

As Potter Electric Signal celebrates its centennial, commitment to providing superior products continues. Potter's vane-type waterflow switches and pressure supervisory and valve tamper switches meet every application and code requirement. Stop by Potter's Booth 781 to see a complete line of sprinkler supervisory products and watch the entertainment.



Circle Reader Service Card No. 176

Powhatan

Powhatan, a 100-year-old U.S. manufacturer renown for quality service and new product development will be displaying its new large-diameter Storz Fire Department Connection, new class of Industrial Nozzles, and new 4" Single Check Valve available in NPT x NPT and Grooved x Grooved connections. These products are only part of Powhatan's full range of interior products. Visit Booth 617.

Circle Reader Service Card No. 177

Fire Pumps



Patterson Pump Company is the industry leader in prompt delivery of all standard model fire pumps worldwide. These include horizontal split case and vertical in-line and vertical turbing pumps with electric motors, diesel engines, dual-drive combinations, or steam turbines. Highly efficient Pre-Pac® is designed to minimize labor, engineering, and installation time. Stop by Booth 697.

Circle Reader Service Card No. 179

Fire Alarm Control Panels

Radionics fire alarm control panels and fire product accessories meet the most demanding industry requirements. From our three-zone digital alarm communicator transmitter (DACT) to our high-end integrated, intelligent fire alarm controls, each system is designed to provide accurate, local response to all types of hazards. Visit Booth 743.

Circle Reader Service Card No. 178

Fire Alarm Covers

Safety Technology International, Inc.'s durable protective covers designed to stop vandalism and accidental damage to the

Thermax LAND MARINE

Fire Protective Hard Core Building Board

Non Combustible
Non Toxic
100% Inorganic
Non Asbestos

No Fibers
No Formaldehydes
UL/USCG Certified
Machineable

Interior Fire Protection Applications:
ceilings, doors, claddings, cable trays, joist, linings ventilation systems, wall panel & partition systems furniture, decorative bulkheads, cabnets, cores.

Specifications:
Thickness Range: 8mm - 40mm
Dimension: 4'x8' other sizes on request
Thermal Conductivity: 0.16 W/mk
Compressive Strength: 6.8 N/mm²
ISO 9001 Registered & Certified
SOLAS 74 & IMO Regulation A 472 (XII)

THERMAX is a construction building board incorporating all the workability traits of fire rated particle board & chipboard, but is classified as non-combustible and has passed the highest toxicity safety test.

THERMAX can be used as a raw board or decorative surface for all types of laminates, veneers, mirrors, wall papers, and polished metals.

Panel Specialists, Inc.
3115 Range Road
Temple, TX 76504-1240
800-947-9422
Ph 254-774-9800
Fx 254-774-7222

Circle No. 057 on Reader Service Card

FIRE HOSE TESTER
Rice FH-3



FIVE YEAR WARRANTY

✔ *Safer* ✔ *Less Expensive*
✔ *More Efficient*

No need to damage your pumper with high pressure or risk an injury from a wild line. Get the newest technology in fire hose testers from **RICE HYDRO,**
THE WORLD LEADER IN HYDROSTATIC TEST PUMPS!

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2020 South Vineyard Avenue
Ontario, CA 91761
1-800-245-4777

NFPA-J-5-98

Circle No. 080 on Reader Service Card

strobe/horn signal units of a fire alarm system are now UL-listed. The Fire Alarm Signal Damage Stopper® is constructed of clear, 1/8" thick polycarbonate material with horizontal slots to allow the horn to be heard within standards. Visit STI's website at www. sti-usa.com or stop by Booth 473.



Circle Reader Service Card No. 180

Haz-Mat Storage Building

Safety Storage's Model 1610FS FireShield™ is a prefabricated, relocatable building for the storage, handling, and use of flammable and combustible liquids and hazardous materials. It comes with a two-hour fire rating and is designed to accommodate up to 28 55-gallon drums. It's fabricated from heavy gauge steel and structural channel and tubing in combination with UL-classified fire-resistive gypsum board and may come with chemical-resistant coatings or stainless steel. Stop by Booth 287.

Circle Reader Service Card No. 181

Aboveground Storage Tank

Recovault, Inc.'s EcoVault® "UL 2085 Protected Aboveground Storage Tank" has a concrete outer shell precast in two sections, keeping the primary stell cylindrical tank accessable. EcoVault® has a true interstitial air space between the tank and the vault. Exceeds all requirments for NFPA 30 and NFPA 30A. For more information, call 1-800-326-8285, or stop by Booth 286.



Circle Reader Service Card No. 182

Fire Sprinkler Piping Products

Spears Manufacturing Company and Harvel Plastics are leading manufacturers of quality CPVC fire sprinkler piping products in sizes ranging from ¼" through 3" diameter. The comprehensive selection of components and uncompromised quality provide economical fire protection with superior water delivery and simplified design/installation for light-hazard and residential sprinkler systems. Visit Booth 847.

Circle Reader Service Card No. 183

Fire Alarm Control Units

Secutron Inc. is proud to announce the MR-2200 and MR-2602, new additions to its Model-R™ line of fire alarm control units. The MR-2200 is a networkable, two-loop addressable panel, and the MR-2602 is a two-zone, conventional fire alarm. Also new is the Windows™ version of our Modul-R Human Interface Database Editor. See Secutron at Booth 923.

Circle Reader Service Card No. 184

Linear Heat and Fire Detection Equipment

The Protectowire Company is the world's leading manufacturer of linear heat and fire detection equipment. Systems consist of a proprietary heat detection cable and one of several available commerical or industrial-type control panels. When the monitored temperature reaches a preset level, the Protectowire® detector cable initiates a signal back to a control panel that displays a digital readout, in feet or meters, of the location of the overheat condition. Find out more at Booth 855.

Circle Reader Service Card No. 185

Passive Fire Protection Systems

Premier Refractories International, through distributors worldwide, supplies high-quality, cost-effective Pyroscat® passive fire protection systems, including Pyroscat FP Duct Wrap, which provides one and two hour-rated UL® and UL-C® classified/listed systems for grease and air (ventilation) ductwork as an alternative to fire-rated shafts/enclosures. SBCCI-ES- and BOCA-ES-listed. Visit Booth 799.



Circle Reader Service Card No. 186

Early Warning Fire Detectors

SAFE Fire Detection is proud to announce two new early warning fire detectors. The New "IFD Cirrus" has been upgraded and redesigned with many features, and the "Stratos Laser," the lastest in laser-based air sampling detection, utilizes an artificial intelligence guaranteeing optimal performance and reliability. SAFE Fire Detection will answer your questions at Booth 545.



Circle Reader Service Card No. 187

Full Line of Valves

Victaulic® will feature a new line of alarm check, dry, deluge, and pre-action valves. The innovative new designs are up to one-half the weight of typical competitive offerings. Available grooved-by-grooved in 1½" through 6" sizes and flanged-by-grooved in 4" and 6" sizes, the valves also feature substantially reduced trim components for a much smaller space-saving footprint. See Vitaulic® at www.victaulic.com or at Booth 333.

Circle Reader Service Card No. 188

Signaling Devices

Amseco is a world leader in audible and visual signaling devices for the fire alarm industry. Featured at Booth 432 will be new low-profile 25V and 70.7VRMS speakers with multiple wattage taps, a new SELEC-A-STROBE high-intensity strobe with selectable cadela, the lowest current draw MOTOR-BELLS, and MOTOR-HORNS with built-in suppression varistor elements to eliminate RFI and EMI interference.

Circle Reader Service Card No. 189

FIRST ALERT & BRK EXHIBIT 1028
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Audible, Visual Alarms

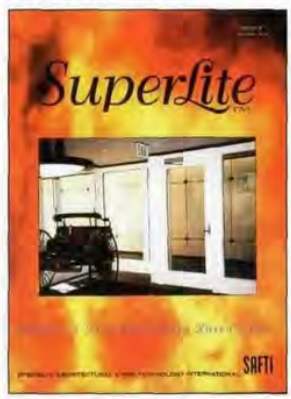
Clifford & Snell, a division of Signature Industries, Ltd., designs, develops, and manufactures audible and visual alarms. Clifford & Snell offers world class experience in a range of products to suit many diverse and specialist applications, including fire and security, process and industrial control, and hazardous area locations. Visit Booth 386.
Circle Reader Service Card No. 190

Halon Specialist

H3R is your halon specialist. H3R buys, sells, and recycles Halon 1211 and 1301, and supplies halon fire extinguishers and halon replacement products. Find out more at Booth 876.
Circle Reader Service Card No. 191

Fire- and Safety-Related Glazing Products

SuperLite™ fire- and safety-related glazing products offer a wireless solution to fire-rated glazed openings. SuperLite™ and the GPX fire-rated flaming systems carry ratings of 20, 45, 60, 90, and 120 minutes. Visit SAFTI at Booth 282.



Circle Reader Service Card No. 192

Fire Pump Controller

Firetrol presents FireCat, the interactive fire pump controller electronic catalog and specification writer. FireCat will be demonstrated throughout the show at Booth 907. See the D3ATA System that monitors, displays, and records fire pump system status. Also on display, Firetrol's FTA1100-D Diesel Engine Fire Pump Controller with digital display and printer/recorder.
Circle Reader Service Card No. 193

Fire Pump Systems

Aurora Pump manufactures a broad line of fire pump systems, including Model 383 vertical in-line pumps for 50 to 750 gpm, electric and diesel-driven Model 481 horizontal split case pumps for 250 to 4,000 gpm, and our unique Model 483 vertical split case pumps for 250 to 2,500 gpm. Stop by Booth 223.
Circle Reader Service Card No. 194

Firestopping Products

The SpecSeal line of firestopping products is based on a unique technology of "two-stage" intumescence. This broad product line includes intumescent and nonintumescent sealants, putty, wrapstrips, collars, silicone sealant, silicone foam, fire-rated mortar, cable spray, and elastomeric joint spray. For more information, stop by Specified Technologies, Inc., at Booth 497.



Circle Reader Service Card No. 195

Fire Alarm Control Panel

The ESL 2500 Series Fire Alarm Control Panel & Power Booster with CleanMe® offers an expandable modular design to reduce equipment costs and meet the needs of changing environ-

The semiconductor industry asked for a Det-Tronics' flame detector.

They got it.
Dual Spectrum PM-5MP.



DET-TRONICS

Detector Electronics Corporation
(612) 941-5665 or (800) 765-FIRE
http://www.detronics.com

Circle No. 016 on Reader Service Card

Fire Protection That's Cost Effective and Easy to Install . . .

metacaulk®
Firestopping Products



Metacaulk 1200 is contractor friendly with easy soap-and-water clean up and contains no solvents or VOCs.

Applying firestopping sealants to horizontal joints and hard-to-reach areas can be a slow and time consuming process. However . . .

Metacaulk® 1200 Firestop Mastic from RectorSeal® is a latex-based sealant designed for those difficult jobs. It can be sprayed, brushed or troweled and is ideal for top-of-wall construction joints and deflection track wall systems. Bonds quickly to surfaces. Systems using Metacaulk 1200 provide a flexible smoke seal as well as up to a 2 hour fire rating in accordance with UL 2079 test standards.

Call today and find out more about Metacaulk 1200 and our entire line of firestopping products . . .

(800) 231-3345.

Visit us at booth #0406

RECTORSEAL

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Circle No. 063 on Reader Service Card

It's time for...
Risk Watch™

...NFPA's new injury prevention program for kids.



The NFPA's new *Risk Watch*™ curriculum, designed for kids in preschool through grade eight, gives kids the skills and knowledge they need to recognize and avoid risks in the following eight areas:

- motor vehicle crashes
- fires and burns
- choking, suffocation and strangulation
- poisonings
- falls
- unintentional firearms incidents
- bike and pedestrian hazards
- water hazards

Join the fight against preventable injuries. Make *Risk Watch* part of your community's teaching efforts. To order the new curriculum or to receive a *Risk Watch* sample packet, call 1-800-344-3555. To reach the *Risk Watch Information Line* call 617-984-7979.

Special Introductory Offer!

Through September 30, 1998, *Risk Watch* is available for $50 per module or $250 for all five age-appropriate modules. Beginning October 1998, pricing will be $62.50 per module or $265.50 for the set.*

NFPA®

Risk Watch *is a trademark of the National Fire Protection Association.*

* Anyone who purchases the complete set of *Risk Watch* before October 1998 will receive a free, one-year membership to NFPA — a $115 value! (If you're already an NFPA member, please designate a friend or colleague to receive the free membership.)

ments. The panel indicates when smoke detector cleaning is required. It can also be used as a power booster, and it features a battery-saver mode. For more information, visit Sentrol at Booth 539.



Circle Reader Service Card No. 196

Fire alarm Controls

Silent Knight's product portfolio continues to expand, encompassing a full range of fire alarm controls from two-zone conventional to 381 points of distributed analog, as well as digital communication equipment for the transmission and receipt of alarm signals. Recent developments include a new line of economy controls, the introduction of two new central station receivers, and many additions to the IntelliKnight product family. Visit Booth 833.

Circle Reader Service Card No. 197

Duct Insulation

Unifrax will exhibit ceramic fiber products used for passive fire protection applications, including FyreWrap® Duct Insulation, a high-temperature insulation designed to provide one- and two-hour fire ratings around ducts. Find out more at Booth 181.

Circle Reader Service Card No. 198

Addressable Fire Alarm System

Simplex has introduced the 4010 TrueAlarm® Fire Alarm System, an addressable system designed specifically for use in small- and medium-sized buildings. The new 4010 provides the functionality, flexibility, and price that contractors, engineers, and building owners told Simplex they wanted in an addressable system for those small- and mid-sized applications. For more information, visit Booth 423.



Circle Reader Service Card No. 199

Intelligent Smoke Detectors

System Sensor introduces Filtrex™ intelligent smoke detectors, which provide smoke detection in harsh and dirty environments where other smoke detectors aren't practical or reliable. Filtrex™ detectors use an air intake system with a high-performance, patent-pending filter to remove airborne particles water mist while still sensing smoke. System Sensor will be at Booth 655.

Circle Reader Service Card No. 200

Automatic Firefighting Nozzles

The 600-4000 GPM Typhoon is Task Force Tips' newest addition to the world's broadest range of automatic firefighting nozzles. Joining the 300-2000 GPM Monsoon, and the 150-1250 GPM TFT Master Stream, the Typhoon features unique user-selectable operating pressure control. The Typhoon can provide users the highest flow and longest stream reach of any constant pressure/variable flow

Imagine if you took the world's number one flame detector and improved it.

We just did.
X3300.



DET TRONICS

Detector Electronics Corporation
(612) 941-5665 or (800) 765-FIRE
http://www.detronics.com

Circle No. 017 on Reader Service Card

"A Lighter Is Not a Toy" video helps save kids' lives

Children playing with matches and lighters is the leading cause of fire deaths among young children.

With fire safety education, and proper storage of matches and lighters, deaths and injuries can be prevented. That's why the National Fire Protection Association Center for High-Risk Outreach, with funding from the Lighter Association, Inc., produced *"A Lighter Is Not a Toy"* video for the parents and caregivers of young children.

The eight-minute VHS video and instructional leader's guide are available for $9.95 by calling
1-800-516-9983.

nozzle in the world. Visit Booth 586 to find out more about Task Force Tips.



Circle Reader Service Card No. 201

Automated Management Systems

TISCOR designs and develops PROTRAC automated management systems, which are used to document fire and life safety inspections and provide compliance with NFPA, OSHA, NRC, and JCAHO. Increase productivity and eliminate paperwork with PROTRAC! See TISCOR at Booth 918.



Circle Reader Service Card No. 202

Sprinkler System Valves

A complete line of Pressure-Tru™ fire sprinkler valves, and fire hose valves, and backflow prevention devices will be the attraction at the Zurn/Wilkins Booth 376. The Pressure-Tru™ valves are designed for use in high-pressure standpipes to control pressure to an automatic sprinkler system under both flow and no-flow conditions. The valves meet UL standards and can be field or factory set. The new Model 350DA in-line double check detector assembly backflow preventer will also be on display.

Circle Reader Service Card No. 203

Wireless Fire-Rated Glass

Technical Glass Products supplies a wide range of products from the world's leading manufacturers of wireless fire-rated glass. The company's product line includes FireLite, FireLite Plus, FireLite NT, FireLite IGU, Pyrostop, and Pyroswiss. These products carry fire ratings from 20 minutes to 3 hours and many offer impact safety ratings. Stop by Booth 680 or call 1-800-426-0279.

Circle Reader Service Card No. 204

Electrical Safety Products

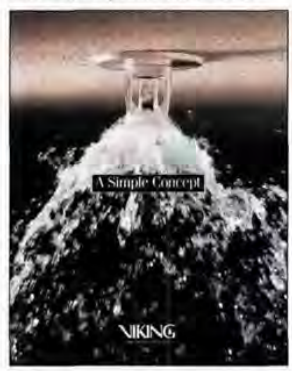
TRC, the leading manufacturer of portable GFCIs, introduces the Safe Living Smart Products™ line of electrical safety products. Anchored by Fire Shield, the world's only cord designed to eliminate cord fires and provide ground fault protection, this product line provides economical solutions to electrical hazards in the home and workplace. Visit Technology Research Corp. at Booth 351.



Circle Reader Service Card No. 205

Fire Suppression System

Protect your building from fire and water damage with The Viking Coporation's Firecycle III system. Its intelligent design provides fire suppression when you need it and prevents needless water damage to valuable assets when you don't. Firecycle III is available in pre-action, wet, and deluge sprinkler systems, which makes it ideal for most applications. It can be purchased as a pre-assembled, prepackaged unit for easy installation. For more information, visit Booth 375.



Circle Reader Service Card No. 206

Restaurant Fire Suppression Systems

Wells Fargo Pyro Technologies—the name the world trusts for fire protection—is a leading manufacturer of pre-engineered restaurant cooking area fire suppression systems, industrial fire suppression systems (typically used in lieu of sprinklers), and gasoline fueling area fire suppression systems. All systems are UL-listed. "Wanted: Export Distributors." See us at Booth 486.

Circle Reader Service Card No. 207

Dry Chemical Fire Extinguishers

The Ceasefire product line consists of self-contained, automatic, dry chemical fire extinguishers which contain a patented blend of EPA-approved agents and our patented gelled ABC powder. This blend reduces weight and minimizes toxicity. It enables a single 49-pound unit to protect 2,400 cubic feet. Visit Booth 1109.

Circle Reader Service Card No. 208

Audible and Visual Signaling Products

Whelen Engineering designs and manufactures audible and visual signaling products for public and industrial warning applications. Products include explosion-proof warning lights, various size strobe lights, rotating beacons, and outdoor/indoor high-power audible waring and evacuation systems.

Circle Reader Service Card No. 209

Horn Appliances

Wheelock's Series NS/NS4 Horn Strobe and NH Horn Appliances feature low current, zero inrush, 2 selectable tones and dB levels, and patent pending Universal Mounting Plate. The NS/NS4 come with 15, 15/75, 30, 75, and 110 cd strobe intensities and with nonsync operation in one. Synchronization requires the SM or DSM Sync Module. The Series NS4 is a wired model. Visit Booth 465.



Circle Reader Service Card No. 210

Backflow Prevention

FEBCO's Master Series Backflow Preventers provide up to 80% shorter lay lengths with the shortest dimensions in the industry. Reduce your total installed cost by up to 40% and achieve the lowest overall head loss around. In-line vertical and N-shape models allow you maximum flexibility for fitting into any application. FEBCO will be at Booth 447.

Circle Reader Service Card No. 098

FIRST ALERT & BRK EXHIBIT 1028
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Fire Safety Exhibitors

3M Company	0311
ADEMCO Mfg.	1019
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Advanced Innovation, Inc.	0968
AFC Cable Systems, Inc.	0292
Aim Safety Co., Inc.	0482
Alarm Saf	1107
Altronix Corporation	0454
Amerex Corp./Getz Manufacturing	0771
American Fire Sprinkler Assn.	0283
American Risk Consultants Corp.	1211
American Sensors Electronics Inc.	1101
American Society of Safety Engineers	1221
AMSECO (American Security Equipment Co.)	0432
Angus/Powhatan	0617
Ansul Incorporated	0709
Aurora Pump Company	0223
Automation Displays	0448
B.F.Goodrich	0480
Badger	0517
Bermad Control Valves	0277
BICC Pyrotenax	0689
Bilco Company	0458
Buckeye Fire Equipment Co.	0893
C/S Group	0487
CAD Zone, Inc.	1009
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Cease Fire by Dis-Cover	1106
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Chemguard Inc.	0875
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Clarke Detroit Diesel-Allison, Inc.	0647
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Clopay Bldg. Products Co.	0380
CMB Industries Inc.	0447
Compliance Software	0976
Conbraco Industries, Inc.	0397
Consulting-Specifying Engineer	0825
Convault, Inc.	0219
Cornell Communications Inc.	0898
Creative Systems Inc.	0792
Croker Div. Fire-End and Croker Corp.	0891
Cutler Hammer	0271
D & S Technologies Inc.	0928
Delmar Publishers	0361
Detection Systems Inc./ Radionics Inc	0743
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Digitize Inc.	0577
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DOT First Aid & Safety	0892
Dukane Corp.	1217
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Edwards Manufacturing Inc.	0789
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Faraday, Inc.	0765
Federal Signal Corp.	0359
Federal Signal Corp. Commercial Products Group	0265
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Fire-Lite Alarms, Inc.	0633
FireAcad (Division of C&H Fire Suppression)	0974
Firecom Inc.	0466
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First Alert Inc.	0367
Flag Fire Inc.	1007
Flame Out Fire Retardant Ltd.	0398
Flamex Inc.	0349
FPE Software Inc.	0871
FRC International Inc.	0488
Gamewell	0623
Gas Tech, Inc.	0393
Gemini Scientific Corp.	0869
General Air Products	1227
General Fire Extinguishers	0817
Genesis Cable Systems	1023
Gentex Corporation	0676
Globe Fire Sprinkler Corp.	0496
GMR International Equipment	0293
Great Lakes Chemical	0546
GreCon Inc.	0929
Grice Engineering, Inc.	0490
Grinnell Supply Sales	0701
Grinnell Fire Protection Systems, Inc.	0401
Guardian Fire Equipment, Inc.	0902
H.R. Kirkland Co. Inc.	0922
H3R, Inc.	0876
Halotron, Inc.	0977
Hamamatsu Corporation	0788
Harrington Signal Inc.	0587
Hazard Control Technologies, Inc.	1207
Heary Bros. Lightning Protection Co. Inc.	0491
Hebel Southeast L.P.	0399
Hilti, Inc.	0598
Hochiki America Corp.	0641
Home Safeguard Industries	0900
Hot Box®	0879
HRS Systems, Inc.	0576
Hubbell Industrial Controls	0933
Hydratec, Inc.	0815
Hydro Flow Products Inc.	1122
Hygood Ltd.	0297
ICI Explosives	0590
IFSTA	0787
Innovative Tech Systems, Inc.	0449
International Protective Coatings	0317
International Code Council	1203
International Fire Resistant Systems, Inc.	0975
International Protection Security System	1114
Intertek Testing Services	0353
ITI Interactive Technologies	1025
ITT A-C Pump	0753
Joslyn Clark Controls, Inc.	0231
Kelly Simon Productions	0290
Keltron Corporation	0823
Kidde-Fenwal	0501
Kidron Industrial Materials Ltd.	0172
King-Fisher Company	0441
Knox Company	0450
LCN Division Ingersoll-Rand	0648
Light Engineered Displays Inc.	0327
Loos & Company, Inc.	1028
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Matsumoto Kiko Co.	0343
Maxi-Signal Products Co.	0391
Meggitt Avionics Inc.	0901
Metron, Inc.	0481
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Nantong Jiangshan Fire Equipment Co., Ltd.	1103
Nat'l Bd. of Boiler & Pressure Vessel Inspectors	0281
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National Foam Inc.	0413
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Omni CADD, Inc.	0392
Patterson Pump Company	0697
Peerless Pump Company	1132
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Potter Electric Signal Company	0781
Potter-Roemer / Tristar Skylights	1201
Premier Refractories Int'l	0799
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Protectowire Co., Inc.	0855
Raynor Garage Doors	0913
Recovault	0286
Rectorseal	0406
Reliable Automatic Sprinkler	1013
Rockbestos-Surprenant Cable Corp.	0698
RoxCorp	0290
SAFE Fire Detection, Inc.	0545
Safety Storage	0287
Safety Technology Int'l Inc.	0473
SAFTI, Division of O'Keeffe's Inc.	0282
SDM Magazine	0827
Securiplex Inc.	0919
Security Magazine	0829
Secutron Inc.	0923
Sensor Electronics Corporation	0964
Service Brass & Aluminum Fittings	0389
SES - Cease Fire	1109
Shafton Inc.	0791
Sierra Monitor Corporation	1125
SigCom (Signal Communications)	0691
Signal Cable Co.	0357
Signature Industries Ltd.	0386
Silent Knight Fire Systems	0833
Simplex	0423
Smoke Guard Corporation	0396
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Space Age Electronics, Inc.	0870
Spears Manufacturing	0847
Specified Technologies Inc.	0497
Spectrex Inc.	0321
Spectronics Corp.	0897
Star Sprinkler Corp.	0426
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Systems Distributors, Inc.	1209
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Underwriters Labs Inc.	0572
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Victaulic Co. of America	0333
Viking Corporation	0375
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Von Duprin	0644
W. H. Safety Products	0801
W.S. Darley & Co.	0395
Watts Regulator	0859
Wells Fargo Pyro Technologies	0486
West Penn Wire/CDT	0914
Wheelock Inc.	0465
Wilkins/Zurn Industries	0376
Williams Fire & Hazard Control	0596
Yates & Associates	1215

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Fire Risk & Hazard Symposium ■ Rhode Island adopts NFPA 1



IABPFF members and NFPA staff. From left: Sherman Carthen of Oklahoma City; Johnny Franklin of Natchez, Mississippi; Jonathan Parries of Cleveland; Meri-K Appy, vice president of NFPA's Public Education Division; John Ruffins of St. Albans, New York; Kwame Cooper; IABPFF President; Oshiyemi Adelabu of Milwaukee; Sharon Gamache, director of the Center for High-Risk Outreach; Karen Miller of Boston; Kim Rohr, NFPA fire and statistical analyst; and Larry Gray of Cleveland.

■ NFPA, IABPFF hold planning session

NFPA held a strategic planning session with representatives of the International Association of Black Professional Fire Fighters (IABPFF) on December 4, 1997, at NFPA's Quincy headquarters. The group developed a plan to mobilize leadership to reduce injuries, deaths, and property loss from fires in low-income and high-risk communities. The meeting was facilitated by Kwame Cooper of the Los Angeles City Fire Department, a consultant to NFPA's Center for High-Risk Outreach.

■ Third Fire Risk & Hazard Assessment Symposium

The National Fire Protection Research Foundation will conduct the third Fire Risk & Hazard Assessment Research Application Symposium at the Hyatt Fishermans' Wharf in San Francisco from June 24 to 26, 1998. The symposium will focus on sources and uses of new fire risk and hazard information, especially from the fire protection engineer's and fire prevention officer's perspective. NFPA Board member Ken Richardson of the National Research Council of Canada will deliver the keynote speech. Twenty papers will be presented on topics such as recent fire test programs; performance-based design; techniques of modifying materials; fire toxicity of materials, furnishings, wire, and cable; and risk and hazard in fire and building codes.

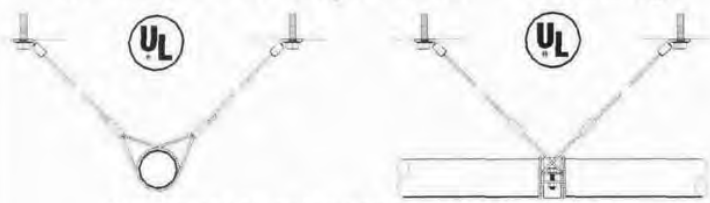
Call Eric Peterson, conference coordinator, at (617) 984-7281 for program and registration information.

■ IEC '98 General Meeting to take place in Houston

NFPA is an official host of the International Electrotechnical Commission's 62nd General Meeting, which will be held from October 12 to 23, 1998, in Houston, Texas. This is the first time in decades that this event will take place in the United States.

IEC '98 will be held in conjunction with the International Conference and Exhibit of ISA, the International Society for Measure-

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For more information on attending the meeting, contact Charles T. Zegers, Secretary USNC, American National Standards Institute, 11 West 42nd Street, New York, NY 10036; telephone (212) 642-4936; fax (212) 398-0023; E-mail czegers@ansi.org. For updates on IEC '98, check out the website at www.ansi.org/iec_top.html.

■ Rhode Island adopts NFPA 1

The Rhode Island Fire Safety Code Board of Appeal and Review has adopted NFPA 1, *Fire Prevention Code*, effective February 1, 1998. Rhode Island is one of eight states that have adopted the code.

"As a true consensus code, NFPA 1 reflects a unique balance of practicality and the most modern fire safety techniques. We're pleased to have adopted the latest version of the *Code*, and are confident it will help Rhode Island communities become even more fire safe," says Tom Coffey, Esq., executive director of the Rhode Island Fire Safety Code Board of Appeal and Review.

"The adoption of NFPA 1 represents a solid commitment to fire safety in Rhode Island," says Rhode Island State Fire Marshal Irving Owens. "We've been very pleased with the results of using NFPA 1 since our original adoption of the 1992 edition in 1996, and so it was the next logical step to adopt the latest edition. The *Code* will certainly afford us the opportunity to provide our residents with even greater protection from unwanted fire."

■ Invitations to detection, suppression research advisory councils

The National Fire Protection Research Foundation is inviting applications for membership on two new research advisory councils, one on fire suppression and one on fire detection.

These councils follow the establishment of the Effects of Decomposition/Offgas Products Research Advisory Council, which examined materials and product flammability and toxicity. Each council enables fire research users to meet regularly with researchers in their respective areas of expertise to hear the status of the newest research in progress and to recommend future research directions.

The Fire Detection Research Advisory Council will address opportunities and innovations in fire signatures, detection, data processing, signaling, communications, integration technologies, and related research. And the Fire Suppression Research Advisory Council will address new fire research opportunities and innovations in all suppression technologies in occupancies ranging from residences to industrial plants to facilities that pose special hazards.

The Foundation provides an independent, neutral forum for these multi-industry councils from which unbiased recommendations will be generated. The councils' recommendations won't be limited, and reports of the recommendations will be published annually. Private and public sector users, codewriters, fire technology innovators, and researchers are invited.

The concept for these councils has been recommended at several recent conferences and symposia, as well as by NFPA and ISO technical committees and by Foundation research project technical advisory committees. Council participants will have no direct relationships to Research Foundation projects and won't write standards.

The Effects of Decomposition/Offgas Products Research Advisory Council has reviewed current research and is making research recommendations about the fire effects of burning products and materials. Its recommendations will be published shortly.

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Each council is limited to 20 members and meets once or twice a year. For further information or to apply, please submit a letter of interest and a resumé to the National Fire Protection Research Foundation, One Batterymarch Park, Quincy, MA 02269 by May 15, 1998.

■ Fire investigations summaries available in several languages

NFPA's Fire Investigations Department now publishes select fire investigation summaries in different languages. A summary of the Düsseldorf Airport terminal fire that took place in Düsseldorf, Germany, on April 11, 1996, is now available in English, Spanish, German, and French. To order a copy of this summary or any other summary or report, contact the Fire Investigations Department by phone at (617) 984-7467, by fax at (617) 984-7056, or by E-mail at investigations@nfpa.org.

You may also obtain a copy of the Düsseldorf investigation summary and others by visiting NFPA's fire investigations page at www.nfpa.org/investigations.html. The summaries are available as Adobe Acrobat PDF computer files, which can be read on either Macintosh or PC platforms using the Adobe Acrobat reader program. The reader program can be downloaded from our home page at http://www.nfpa.org/pdfpage.html.

■ Miller to keynote Health '98 in Scotland

NFPA President George D. Miller will deliver the keynote address at the first Health '98 Conference scheduled for June 17 to 19, 1998, in Edinburgh, Scotland. Health '98 is being held in conjunction with the annual International Conference for Hospital Engineers in order to draw the widest audience possible for those affected by the various operational and safety concerns associated with hospitals.

The three-day conference will focus on the magnitude of fire safety problems in hospitals, design and operational features to manage these potential problems, and the balance among construction, detection, and suppression features that will make healthcare facilities safe from the effects of fire. Speakers will describe the approach to fire safety in hospitals in various parts of the world. The conference will also feature a small exhibit.

Health '98 is organized by the Loss Prevention Council and the National Association of Hospital Fire Officers. NFPA, CFPA Europe, and The Fire Service College are among the organizations supporting this event.

■ International Symposium on Human Behaviour in Fire

The 1st International Symposium on Human Behaviour in Fire will be held August 31 through September 2, 1998, in Belfast, Northern Ireland. Organized by the Safety Engineering Research and Technology Centre of the University of Ulster, the symposium will provide a forum for the discussion of human behavior in fire with respect to the application of fire protection engineering in the design and management of buildings, as a critical component in the development of economic designs, and as a means of reducing fire losses. With advances in the development of performance-based regulatory systems and codes, the symposium presents a timely opportunity for practitioners, researchers, and regulators to meet and discuss the latest developments in the field of human behavior in fire and develop strategic plans for future endeavors.

Approximately 80 speakers from around the world will present original work and application concepts on topics that will include Fire-Related Human Behavior: Fire Regulations and Codes; Learning from Human Behavior in Real Fire Situations; Evacuation of Disabled People From Fire; Determining Evacuation Time and Evacuation Performance Measures; The Assimilation, Evaluation, and Use of Information by People Exposed to Fire; Occupants Response and Escape Through Smoke; and Characterization of Building Occupancies and Complex Environments. Professor John Bryan of the University of Maryland, Brian Meacham of the Society of Fire Protection Engineers, Professor J. Keating of the University of Alaska Fairbanks, and H. MacLennan of Holmes Fire and Safety in New Zealand are among those who will speak at the symposium.

For more information, contact the Conference Secretariat, The Short Course and

Professional Development Unit, University of Ulster at Jordanstown, Newtownabbey, Co. Antrim, BT37 OQB Northern Ireland; telephone 44-1232-366680; fax 44-1232-366060; E-mail scpdu@ulst.ac.uk, or check out the symposium website at www.ulst.ac.uk/faculty/eng/SCOBE/hbif.html.

■ NFPA investigates bulk retail store blaze

On March 21, 1998, an incendiary fire broke out in a bulk retail store that sold general home improvement merchandise in Tempe, Arizona. The fire caused significant damage before firefighters and sprinklers could extinguish it. Although there were more than 100 people in the store at the time of the blaze, no one was injured.

NFPA sent Ed Comeau, chief fire investigator, Bob Duval, fire investigator, and Chris Dubay, fire protection engineer, to investigate the incident. NFPA's Fire Investigations Department is preparing a report that will analyze the incident and the fire protection components, based on NFPA codes and standards.

This is the third fire in this type of occupancy that NFPA has investigated since 1995. The other two occurred in Quincy, Massachusetts, and in Albany, Georgia. The later incident involved pool chemical/oxidizers. Full reports on both incidents are available by calling NFPA's Charles T. Morgan Library at (617) 984-7445 or by e-mailing the library at library@nfpa.org. They can also be found on the Fire Investigations website at www.nfpa.org/investigations.html.

■ Home Fire Sprinkler Coalition update

The Home Fire Sprinkler Coalition (HFSC), a partnership of NFPA, the American Fire Sprinkler Association, and the National Fire Sprinkler Assocation, is expanding its education awareness campaign in 1998.

The campaign, created in 1996, provides accurate information to consumers about the lifesaving value of automatic home fire sprinklers. The coalition launched a pilot program in Connecticut in 1997 and plans to conduct campaigns this year in Illinois and Oregon.

To date, the HFSC campaign has garnered local and national media coverage, reaching nearly 11 million people.

Funding has come exclusively from the HFSC's three founding organizations. To extend the campaign to other areas of the country, however, HFSC must raise additional funds. Therefore, the coalition is seeking support from organizations and individuals. Donors who contribute $25,000 annually will be named as steering committee members and will be allowed to vote on future operational decisions. Donors who contribute $1,500 annually will be recognized as affiliate members. The New England Association of Fire Marshals and the Connecticut Fire Marshals Association recently signed on as HFSC's first two affiliate members.

For more information about HFSC partnership programs and to receive a free information package containing educational materials samples, call Gary Keith, Home Fire Sprinkler Coalition, at (617) 984-7260 or E-mail him at gkeith@nfpa.org.

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NFPA Automatic Sprinkler System Seminars
Dates and Places: June 1–3, 1998, Albuquerque, N.M.; June 15–17, 1998, Nashville, Tenn.
Description: Attend all three days for a comprehensive review of the basics, the latest technologies, and the code requirements of both NFPA 13 and 25 (2.4 CEUs). Or take the two-day option for a briefing on the latest automatic sprinkler installation standard (1.6 CEUs).

NFPA Seminars on 1997 *Life Safety Code®*
Dates and Places: June 1–4, 1998, Albuquerque, N.M.; June 15–18, 1998, Nashville, Tenn.
Description: Review the fundamentals of the *Life Safety Code®* and focus on the latest requirements and essential revisions. Cover the entire *Code* in four days (3.2 CEUs), or take the three-day option for a solid introduction to the *Code* (2.4 CEUs).

NFPA Fire Alarm Systems Seminars
Dates and Places: June 3–5, 1998, Albuquerque, N.M.; June 17–19, 1998, Nashville, Tenn.
Description: Get a complete overview of today's alarm systems, from fundamentals to reducing fire alarms to acceptance testing. You'll learn effective plans review, with special emphasis on the latest technologies and code requirements (2.4 CEUs).

For registration, further information, or a complete list of NFPA's continuing education seminars and workshops, contact the Continuing Education Department, NFPA, One Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101; telephone (800) 344-3555.

NFPA Annual Meeting
Date: May 17–21, 1998
Place: Cincinnati, Ohio
Description: The theme of this year's meeting is "Building a Bridge to a Fire Safe World."
Contact: The registrar; telephone (617) 984-7310

NFPA Fall Meeting
Date: November 16–18, 1998
Place: Atlanta, Ga.
Description: The theme of this year's meeting is "Fire Safety Through Education."
Contact: The registrar; telephone (617) 984-7310

International Hazardous Materials Response Teams Conference
Date: June 4–7, 1998
Place: Baltimore, Md.
Description: The theme of this conference is "Mission Possible: Working Together, Industry, Emergency Response, and Government."
Contact: IAFC Professional Development Department, 4025 Fair Ridge Drive, Fairfax, VA 22033-2868; fax (703) 273-9363

Burn Building Design and Construction Symposium
Date: June 9–10, 1998
Place: Philadelphia, Penn.
Description: This symposium, sponsored by the University of Maryland and the Maryland Fire and Rescue Institute (MFRI), is intended for organizations planning to construct or refurbish live fire training facilities.
Contact: MFRI; telephone (301) 220-7250

Expert Witness Seminar
Date: June 13–14, 1998
Place: Seattle, Wash.
Description: This seminar is designed to help safety, health, and environmental professionals develop the knowledge, skills, and tools to become effective expert witnesses.
Contact: American Society of Safety Engineers; telephone (847) 699-2929; E-mail customerservice@asse.org

ASSE Annual Professional Development Conference and Exposition
Date: June 14–17, 1998
Place: Seattle, Wash.
Description: The theme of the American Society of Safety Engineers' (ASSE) 37th annual professional development conference and exposition is "Safety Summit '98: Global Solutions for People, Property, and the Environment."
Contact: ASSE; telephone (847) 699-2929; fax (847) 296-3769; E-mail customerservice@asse.org

Healthcare Safety Training Courses
Dates and Places: June 15–17, 1998, Columbus, Ohio; July 15–17, 1998, Nashville, Tenn.
Description: These courses provide an opportunity to take the certification examination for the Heathcare Safety Professional (CHSP) and are sponsored by the Board of Certified Healthcare Safety Management.
Contact: Hal Gordon; telephone (301) 770-2540

Fire Service Administrators Institute
Date: June 15–19, 1998
Place: Monmouth, Ore.
Description: The course is titled "Fire Personnel Management."
Contact: Sheri Barber; telephone (503) 378-2100, ext. 219

ASTM Committee D-26 on Halogenated Organic Solvents and Fire Extinguishing Agents
Date: June 17–18, 1998
Place: Atlanta, Ga.
Description: The American Society for Testing Materials' (ASTM) meetings are open to all interested individuals.
Contact: Cathryna Blackwell, ASTM; telephone (610) 832-9737; E-mail blackwe@astm.org

Healthfire '98 Conference and Exhibition
Date: June 17–19, 1998
Place: Edinburgh, U.K.
Description: This conference is being organized by the Loss Prevention Council and the National Association of Hospital Fire Officers.
Contact: Conference Administrator, Healthfire International '98, Loss Prevention Council, Melrose Avenue, Borehamwood, Herts. WD6 2BJ, United Kingdom; telephone +44 (0) 181 207 2345; fax +44 (0) 181 236 9701

Millennium 2000 Haz-Mat Explo
Date: June 22–26, 1998
Place: Las Vegas, Nev.
Description: This conference will explore the latest procedures in handling hazardous materials and firefighting training.
Contact: Millennium 2000 Haz-Mat Explo website at www.co.clark.nv; E-mail gwp@co.clark.nv.us

Principles of Fire Protection Engineering
Dates and Places: June 22–26, 1998, Calgary, Alberta; July 20–24, 1998, Plano, Tex.
Description: The Fire Marshals Association of North America's (FMANA) Fire Protection Institute is offering two Principles of Fire Protection Engineering courses to any interested fire protection-orientated person.
Contact: Steven Sawyer, Executive Secretary, FMANA, 1 Batterymarch Park, Quincy, MA

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02269-9101; telephone (617) 984-7424; fax (617) 984-7056; E-mail fmana@nfpa.org

National Association of State Fire Marshals Annual Conference and Exposition
Date: June 25–28, 1998
Place: Denver, Colo.
Description: This is the 9th annual convention and exposition of the National Association of State Fire Marshals (NASFM).
Contact: NASFM; telephone (800) 437-1016

Construction Specifications Institute's Annual Convention and Exhibit
Date: June 25–28, 1998
Place: Baltimore, Md.
Contact: Lisa Derby, CMP, Manager, Convention and Exhibits; telephone (800) 689-2900, ext 772; fax (703) 684-0465; E-mail lderby@csinet.org

Disaster Forum '98
Date: June 26–July 1, 1998
Place: Edmonton, Alberta
Description: This is an international conference focused on emergency preparedness, response, recovery, and mitigation.
Contact: Disaster Forum '98, Suite 437, 11215 Jasper Avenue, Edmonton, Alberta T5K 0L5, Canada; fax (403) 422-1549; E-mail disaster@freenet.edmonton.ab.ca

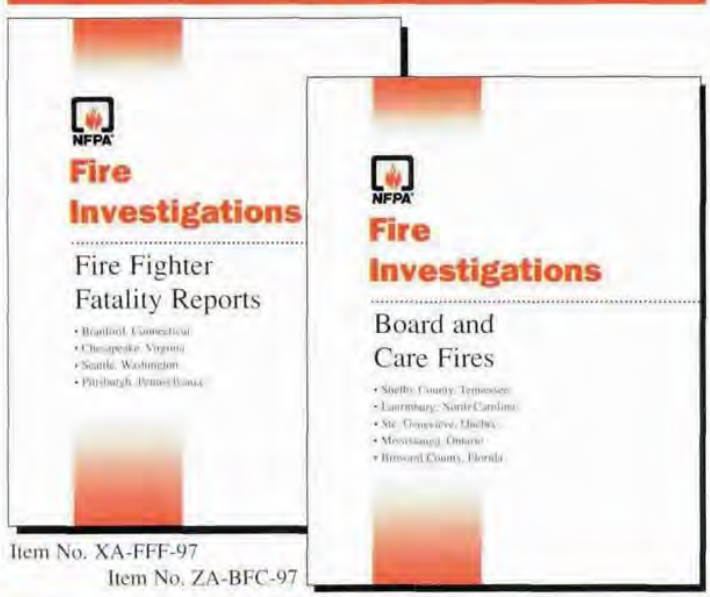
Rescue/EMS Expo and Conference
Date: June 27–29, 1998
Place: West Springfield, Mass.
Description: There will be more than 250 exhibits of equipment, apparatus, and ambulances on display. Admittance and parking are free.
Contact: Chief Richard K. Wehter (Ret.), Secretary/Treasurer, New England Association of Fire Chiefs, Inc.; telephone (617) 741-8126

1998 Conference on Precision Electromagnetic Measurements
Date: July 5–10, 1998
Place: Washington, D.C.
Description: This conference will provide a forum in which the international metrology community can discuss the most recent developments in physics and electrotechnology that apply to precision electromagnetic measurements and international standardization.
Contact: Norman Belecki, NIST, Building 220, Room B146, Gaithersburg, MD 20899-0001; telephone (301) 975-4223; fax (301) 926-3972; E-mail norman.belecki@nist.gov

ClinCon '98
Date: July 9–12, 1998
Place: Tampa, Fla.
Description: The Florida Emergency Medicine Foundation (FEMF) is sponsoring the 1998 Clinical Conference (ClinCon) on out-of-hospital emergency care.
Contact: ClinCon '98 Registrar, FEMF, 3717 South Conway Road, Orlando, FL 32812-7607; telephone (407) 281-7396 or (800) 766-6335

If you'd like us to include your event in "Date Book," please submit full details at least four months before the event to NFPA Journal, *One Batterymarch Park, Quincy, MA 02269-9101, or fax the information to (617) 984-7090.*

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NFPA's renowned Fire Investigations Team has compiled some of its most valuable and requested reports into two stand-alone documents— **Fire Fighter Fatalities** and **Board and Care Fires.**

Fire Fighter Fatalities, which addresses four recent incidents, contains analysis of the incidents, as well as valuable "lessons learned" that fire departments around the world can use to help avoid similar tragedies.

Board and Care Fires contains five reports on fires in a variety of facilities that all had tragic outcomes. This collection of reports on what may be a growing problem not only outlines the incidents, but offers detailed analysis of what went wrong based on current NFPA documents.

Join the thousands of fire safety professionals that have already received these reports by ordering your set today!

Fire Protection Engineer

The American Fire Sprinkler Association (AFSA) is seeking an engineer for its Technical Services Department. AFSA is a national association located in Dallas, Texas, which provides educational and technical services to sprinkler contractors. Activities will include providing informal interpretations and participating on NFPA committees. Minimum qualifications:

- B.S. in fire protection engineering (or other field, if registered in fire protection engineering).
- 2–5 years experience with sprinklers (installation, design, or AHJ).
- Obtaining P.E. registration in near future is mandatory.
- Team player with good interpersonal and communication skills.

Interested parties mail resume, including salary history, to Roland Huggins, P.E., AFSA, 12959 Jupiter Rd., Suite 142, Dallas, TX 75238.

Sandia National Laboratories, Albuquerque, N.M., Fire Protection Engineer– 3535-0113

Responsible for consulting and advising personnel on the interpretation and implementation of fire and life safety codes; review research and development experiment designs and operations; conduct fire hazard and fire loss potential analysis/assessments; inspection and acceptance of construction projects; and provide fire protection training.

Required: Registered Fire Protection Engineer or credentials to obtain a Fire Protection Professional Engineering License. BS degree in Fire Protection Engineering or allied engineering discipline; or MS degree in Fire Protection Engineering plus three years of engineering practice in diverse fire protection engineering work.

Please send resumes to **Sandia National Laboratories, P.O. Box 5800, MS 1023, Org. 3535-0113, Albuquerque, NM 87185; or via e-mail to sghill@sandia.gov, reference 3535-0113.**

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NFPA'S ADVERTISING ACCEPTANCE GUIDELINES

Objectives

NFPA solicits and accepts advertising for its publications to fulfill two objectives: 1) for income to support the Association's mission; and 2) to impart information to NFPA members and other readers on the availability of products, systems, and services.

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In general, NFPA uses the following criteria in deciding which advertisements to accept for its publications, but reserves the right to reject any advertising for any reason whatsoever. All accepted advertising is subject to the conditions listed.

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"A Lighter Is Not a Toy" video helps save kids' lives

Children playing with matches and lighters is the leading cause of fire deaths among young children.

With fire safety education, and proper storage of matches and lighters, deaths and injuries can be prevented. That's why the National Fire Protection Association Center for High-Risk Outreach, with funding from the Lighter Association, Inc., produced *"A Lighter Is Not a Toy"* video for the parents and caregivers of young children.

The eight-minute VHS video and instructional leader's guide are available for $9.95 by calling 1-800-516-9983.

Blow Out the Candles, and…

…wish for a decline in the number of home candle fires in the United States. Better yet, let's all do what we can to cut down on these fires—without relying on birthday wishes.

In the past 15 years, the number of home fires caused by candles has continued to increase. In fact, home candle fires reached an all-time high of 8,440 in 1995, the last year for which data are available. Homes include dwellings, duplexes, manufactured housing, and apartments.

Between 1991 and 1995, an average of 6,780 home fires reported to public fire departments each year were started by candles. These fires caused an average of 81 deaths, 731 injuries, and an estimated direct property loss of $86.1 million.

More home fires were started by candles in 1995 than in any of the previous 15 years. In 1980, the first year for which data were available, candles started 8,240 home fires. Candle fires generally declined in the 1980s, falling to a low of 5,540 in 1990. Since then, however, such fires have risen to the 8,440 reported in 1995, which killed 76 people, injured 914, and did $117.6 million in property damage.

Almost 9 of every 10 fires started by candles in the United States, or 88 percent, occurred in homes. Another 1.5 percent occurred in dormitories, 0.9 percent in churches, and another 0.9 percent in hotels or motels.

Where do home candle fires start?

Between 1991 and 1995, an average of 44 percent of candle fires each year started in bedrooms. Another 20 percent started in living rooms, family rooms, or dens; 10 percent started in bathrooms; 7 percent started in kitchens; and 4 percent started in dining rooms.

How and what do these fires ignite?

Thirty-five percent of these home fires were the result of unattended, abandoned, or inadequately controlled candles. Another 17 percent occurred because some form of combustible material was left too close to the candle. Children were playing with candles in 10 percent of these fires, while 5 percent started when the occupant fell asleep and left a candle burning.

Mattresses or bedding were the first item ignited in 13 percent of these fires. Cabinetry was ignited first in 10 percent of the incidents, curtains and drapes in 8 percent, and interior wall coverings in 6 percent. Upholstered furniture; decorations for special events; clothing that wasn't being worn at the time; and newspapers, magazines, and writing paper were ignited first in 5 percent of the fires. Rugs and other floor coverings and towels and other linens, but not bedding, each accounted for the first item ignited in 4 percent of the fires.

How to reduce these fires

Keep candles away from combustible items, such as clothing, books, paper, curtains, Christmas trees, and flammable decorations. Make sure any candles you use are in sturdy, noncombustible holders that won't tip over and are big enough to collect dripping wax. When buying or using candles, consider what would happen if they burned low. Would they ignite the candle holder or decorative material nearby?

Remember to extinguish all candles when leaving the room or going to sleep, and keep candles—and all open flames—away from flammable liquids. Don't use water to extinguish candles or any fire involving burning wax because the wax can splatter or the flame could flare.

Don't place lit candles in windows, where blinds or curtains can inadvertently close over them, and don't use them in places where children or pets could knock them over.

Never leave a child unattended in a room with a lit candle and don't leave candles lit in a room in which a child is sleeping. Keep all matches and lighters up high and out of sight and reach of children, preferably in a locked cabinet.

During a power outage, flashlights and other battery-powered lights are much safer light sources than candles. If you must use candles during a power outage, try to avoid carrying them around while lit. Never take a candle into a closet to look for things. Never use a candle for light when fueling equipment such as a kerosene heater or lantern. And always extinguish all candles when leaving the house or going to bed.

Compiled by Jenna Von Dietsch



Illustration: Jon McIntosh

For the complete report, Candle Fires in U.S. Homes and Other Occupancies, *by Marty Ahrens, call the One Stop Data Shop at (617) 984-7460.*

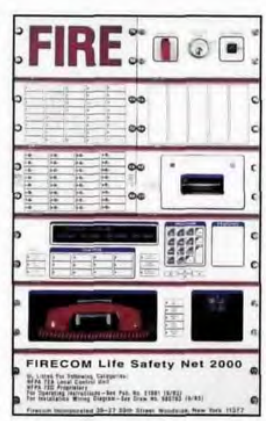
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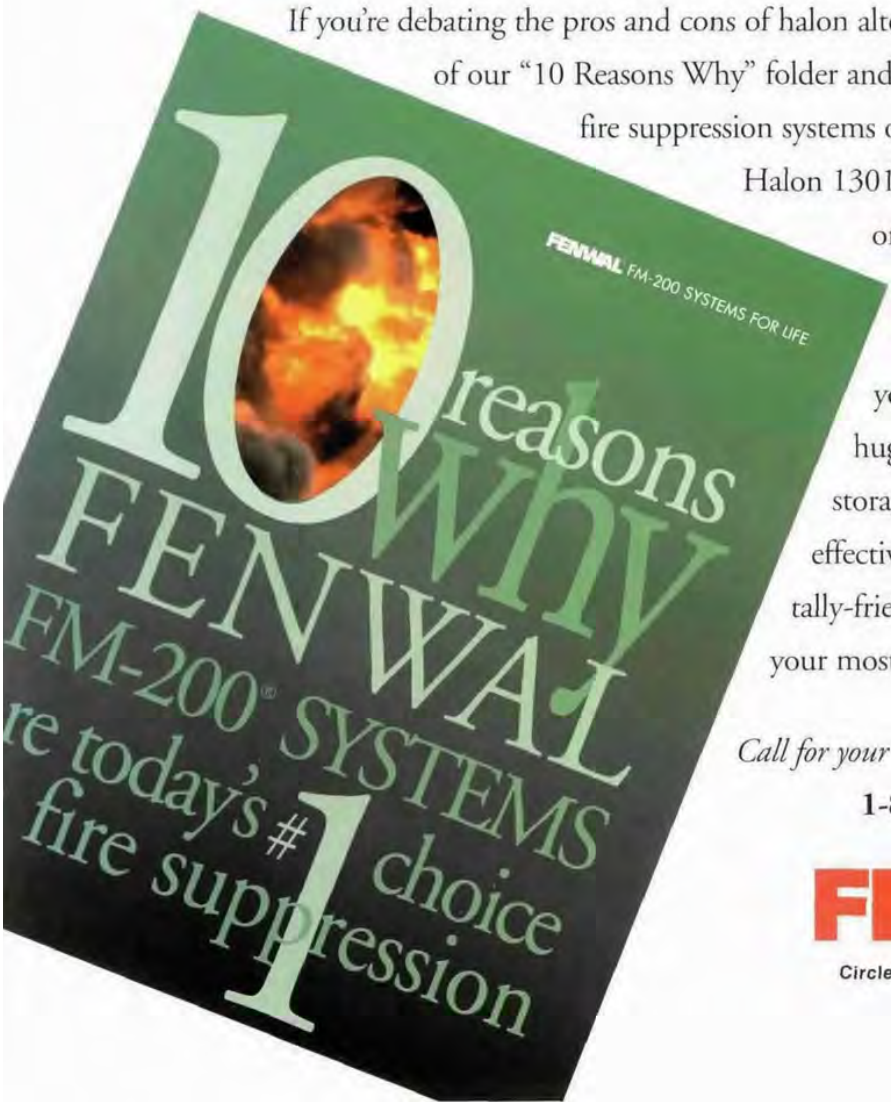
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