



NOTIFIER's Worldwide Communications Newsletter • Issue 2, 2003

## The Importance of Risk Perceptions in Building and Fire Safety Codes

By Armin Wolski, P.E.

Every year, the National Fire Protection Association publishes fire statistics.<sup>1,2</sup> From these statistics, it is not hard to determine that the risk of dying in a high-rise office building fire is much less than the risk of dying in a single-family home fire. So why have the building fire safety codes maintained such stringent requirements for high-rise offices, yet have done little about increasing safety in single-family homes?

In a democratic society, regulations are intended to address and satisfy the public mandate for managing risks and benefits of a technology. The public mandate is based on values and how the risks and benefits of various options are perceived. Choosing one risky option over another is an exercise in resolving a problem, known as a "risk problem."<sup>3</sup> Risk problems are filtered through human perceptions.<sup>4</sup> When in a given year, 10 occupants die in a single fire, such as a high-rise fire, the event is perceived as "catastrophic." Public reaction is strong. When 10 independent fires cause the death of one individual at each occurrence, such as in single-family home fires, the public reaction is muted. People react differently to different types of risk problems.<sup>5,6</sup> Catastrophic risk problems are perceived differently than noncatastrophic "ordinary" risk problems. Voluntary risk problems differ from non voluntary risk-problems. Risk problems in which control is perceived differ from risk prob-

lems where no control is perceived. In addition, risk problems with a clear perception of benefit differ from those with hidden benefits. Numerous psychological human factors come into play. At least 40 different risk factors that describe the spectrum of risk perception have been identified.<sup>7</sup> Nine of the most important of those 40 risk perception factors are highlighted in Table 1.<sup>8</sup> These factors influence society and the public mandate for regulation. These preferences filter their way through to the regulations including building fire safety codes.<sup>9</sup>

### RISK PERCEPTION IN PRESCRIPTIVE BUILDING FIRE SAFETY CODES

In the United States, the "representative" prescriptive code system has inherently, perhaps unwittingly, accommodated perceptions of risk. Evidence is found in the comparison of single-family home requirements to high-rise office building requirements.<sup>10</sup> For example, high-rise office buildings over 75 feet (23 m) in height require many protection features including fire-resistive building materials, a fire alarm and occupant notification system, a sprinkler system, smoke control equipment, a special

elevator control system, and emergency power. In comparison, for new single-family homes the code requires few fire protection measures. The code permits (from a fire safety viewpoint) almost any building material to be used, minimal levels of "local" smoke detection, and only in some cases, a second exit from an upper floor. Although much attention is given to the high-rise office building fire protection, over 70% of civilian fire deaths occur in homes and garages.<sup>2</sup> Why are there so many more safety systems in high-rise buildings when there is so much more risk in single-family homes? The discrepancy of the level of protection is due to per-

ceptions of risk. Since risk perceptions influence the public mandate, the public demands greater risk reduction from the high-rise catastrophic risk.

More evidence of how perceptions of risk have influenced the building code is reflected in the difference between the requirements in single-family homes versus apartments. People are willing to accept higher risks when they perceive control.<sup>11</sup> This is analogous to transportation. People are willing to accept a higher risk traveling (driving) in an automobile than being a passenger in an airplane. In a car, the driver perceives a higher level of control, while an airplane, the passenger

*continued on page 2*

## NOTIFIER to Introduce "Solutioneering" at ASIS

At the 2003 ASIS Show, NOTIFIER's focus will be on our comprehensive Fire/Security solutions - how we specialize not just in products but also in "Solutioneering!" Through "real-life" demonstrations, we will illustrate how security and fire professionals can solve their integration and interoperability problems with NOTIFIER.

With 33,000 members, ASIS is the preeminent international organization for professionals responsible for security and fire. The ASIS show will be well-attended by various key fire and security system decision makers, including managers and directors of security, corporate executives, consultants, architects, law enforcement officials and others.

NOTIFIER's "Solutioneering" theme will certainly set us apart from competitors who'll be at the show. Many of these companies only offer proprietary products that are difficult to integrate in a multi-vendor environment. Fortunately, NOTIFIER offers a total solution for any networked, integrated problem. The UniNet<sup>®</sup> 2000 enables building managers and owners to seamlessly integrate diverse fire and security building systems into a customized, graphics-oriented platform.

Also being demonstrated is NOTIFIER's new NOTIFIER Web Server (NWS)

and the new UniNet On-Line (UOL). These new products are designed so that the user can utilize the Internet or an Intranet, to conveniently access information on their panels when they are away from their facility.

By positioning NOTIFIER as a solution provider with our "Solutioneering" theme, we will present potential customers with a much-needed alternative. At the ASIS Show, NOTIFIER will feature many of its key products. BUT...the focus of the show will be solving customer problems with NOTIFIER solutions. Rather than formal group presentations, NOTIFIER booth personnel will be working one-on-one with attendees, listening to their problems and using VISIO<sup>®</sup> CAD software to provide clear-diagrammed solutions. Customers will actually be able to take a printout of the solution back to their organization to review the capabilities.

With this "Solutioneering" approach, NOTIFIER will not only provide attendees with true value and real solutions, but it will also help NOTIFIER stand out in the crowd!

Visit  
NOTIFIER at Booth # 1441 at  
ASIS  
September 15-18 in  
New Orleans, LA

### Also In This Issue:

Honeywell Awards  
Scholarships

Power Plant Mall A Safer Place

NFPA 2003 Recap

# Risk Perception, cont.

perceives no control. In our building fire safety example, owner/occupants in single-family homes have control of the amount and type of smoke detection they install, and are in control of common ignition sources such as heating systems and cigarette smoking.<sup>2</sup> On the other hand, in rental properties such as apartments, occupants perceive less control. A renter cannot easily change the fire protection system in his/her building, nor do they have control of the fire safety "practices" of a neighbor. Prescriptive regulations accommodate this lack of control through more rigorous fire protection provisions. A quick review of any one of the three regional codes, the Uniform Building Code, the BOCA National Building Code, and the Standard Building Code, would reveal that apartment houses require significantly more protection (fire-resistive construction, smoke detection and fire alarm systems, fire sprinklers) than do single-family homes.<sup>13</sup>

Another example regarding the issue of perceived control is reflected in the sprinkler retrofit ordinances in many major U.S. cities. In the 1970s and 1980s, many major jurisdictions (e.g., Los Angeles, Boston) required the retrofit of automatic fire sprinkler systems in high-rise occupancies such as offices and hotels.<sup>13</sup> High-rise condominiums were exempted. Occupants in high-rise office buildings and hotels have no control of their building's design. Occupants in condominiums own their units and, as an association, have collective control of the fire safety systems installed in their building. This issue of control may help explain why society did not see a "need" to regulate and increase safety in condominiums.

A third example involves the risk perception factor "perceived benefit." As the perceived benefit increases, so does the acceptance of risk. Many recreational sports, such as snow skiing,<sup>11</sup> are examples of this factor. It seems that people are concerned more with the risk of climbing a mountain on a chair lift, but think nothing of the risks associated with skiing down the hill. Although other risk perception factors come into

play (control, severity, volition), people accept the risk of skiing because they like to ski – they perceive a benefit from skiing. Fire safety in historic buildings is approached differently than fire safety in new buildings. Many jurisdictions have special building code requirements for the renovation of historic buildings. These codes usually include less-stringent fire protection requirements for historic structures so that damage to the historic fabric may be avoided. Less-stringent requirements generally mean a higher level of risk is accepted. More risk is accepted because of a perceived aesthetic architectural benefit that the building provides the community.

## RISK PERCEPTIONS IN PERFORMANCE-BASED BUILDING FIRE SAFETY CODES

Most performance-based building fire safety designs are based on deterministic approaches: using fire models and egress models to develop a design.<sup>14</sup> Using a deterministic approach, the design should be such that, in a fire scenario, adequate time is provided for occupants to reach a safe place before the interior environment becomes untenable. The approach is based on providing enough protection such that occupants can exit the building before the fire adversely affects them. This solution is independent of whether one is analyzing a high-rise office or a single-family home. Will this lead to fire protection engineers designing high-rise buildings such that they are as "safe" as single-family homes? Based on what we know from the prescriptive code and concepts of risk perception, such an approach does not likely reflect the current social mandate.

It is the building code's responsibility, not the engineer's, to provide a framework that determines whether the appropriate level of safety is met given a particular risk problem. Depending on the facility, the building fire safety risk problem is perceived differently. It is therefore the building code's responsibility to provide a framework that accommodates risk perceptions. Because the performance-based approach is based on quantification methods, accommodating risk perceptions can be much more difficult.<sup>15</sup> How have the two current U.S. performance-based building fire safety codes addressed the issue?

## THE INTERNATIONAL CODE COUNCIL PERFORMANCE-BASED BUILDING CODE

The ICC International Performance Code<sup>16</sup> provides the designer some guidance such that risk

perception is considered. The Code requires that the designer consider at least two or three of the nine identified risk perception factors listed in Table 1. In Chapter 3 of the Code, the designer is required to establish a performance level for the facility under consideration. In order to do so, the Code directs the designer to Appendix A for guidance on how to characterize the facility. In Appendix A, a variety of occupancies similar to those found in traditional prescriptive codes are discussed. Some risk perception factors are included in the discussion. The designer is encouraged to consider risk perception factors such as severity and volition. With that knowledge, the user is guided to a worksheet in Appendix B that helps her/him establish the "importance" of a building. This Appendix is also intended as a tool to assist in choosing the appropriate design performance levels when a unique set of circumstances exists. For example, a town with one primary centralized employer, such as an automobile factory, will probably perceive the severity of the factory loss as catastrophic, whereas that same facility in a larger city with a diversified economy will perceive the severity of the factory loss as ordinary. Therefore, a higher performance level may be chosen in the first scenario than in the second. With these additional

considerations, a performance level is established for the facility. Once the performance level is established, the designer turns to a matrix to find the proper level of safety required for the facility under design. (See Figure 1.)

Application of the matrix results in the designer choosing the appropriate level of safety for the facility. This process results in forcing the designer to provide a higher level of safety for facilities that are perceived as more hazardous (high-rises) than others (single-family homes).

The concepts of reliability and durability are also addressed within the Code through rigorous administrative requirements and a chapter relating specifically to the subject. The administrative provisions contain information on qualifications, maintenance, documentation, etc. As discussed in the next section, addressing reliability can be a key factor in addressing risk.

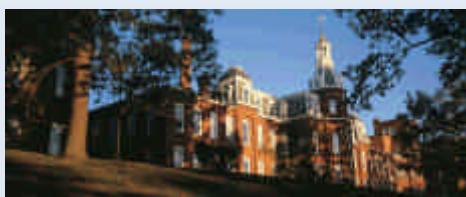
## CHAPTER 5, PERFORMANCE-BASED OPTION, NFPA 101 LIFE SAFETY CODE

The performance-based option in NFPA 101<sup>17</sup> may indirectly accommodate perceptions of risk. The Code does not discuss risk perception factors explicitly. However, the Code contains language that may result in designs that, to some extent,

|  |                           | PERFORMANCE GROUPS<br>INCREASING LEVEL OF BUILDING PERFORMANCE |                      |                       |                      |
|--|---------------------------|--|----------------------|-----------------------|----------------------|
|  |                           | Performance Group I  | Performance Group II | Performance Group III | Performance Group IV |
| MAGNITUDE OF DESIGN EVENT<br>INCREASING MAGNITUDE OF EVENT | VERY LARGE<br>(Very Rare) | SEVERE   | SEVERE               | HIGH                  | MODERATE             |
|  | LARGE<br>(Rare)           | SEVERE   | HIGH                 | MODERATE              | MILD                 |
|  | MEDIUM<br>(Less Frequent) | HIGH   | MODERATE             | MILD                  | MILD                 |
|  | SMALL<br>(Frequent)       | MODERATE   | MILD                 | MILD                  | MILD                 |

Figure 1. ICC International Performance Code Performance Matrix.<sup>16</sup> Each facility or occupancy is characterized and assigned to a Performance Group. The higher the Performance Group, the greater amount of safety is required for a given fire event.

continued on page 4



# Honeywell Awards Scholarships to Top Worcester Polytechnic Institute Students

Honeywell Fire Solutions Group has awarded scholarships to three fire protection engineering students at the Worcester Polytechnic Institute (WPI) Center for Firesafety Studies. These scholarships are awarded to exceptional students, based on academic excellence, character, leadership and a demonstrated personal commitment to fire safety.

This year's recipients are Melissa Barter of Westborough, MA, Tanya Gilbreath of Spencer, MA, and Walter (Ted) Dow of Laconia, NH. All three are currently undergraduate mechanical engineering majors at WPI, and will be entering the Fire Protection Engineering degree program.

Ms. Barter held the position of Vice-Chair of the Student Chapter American Society of Mechanical Engineers from 2000-2001 and Chair of the organization from 2001-2002. Melissa is currently Secretary of Pi Tau Sigma, the mechanical engineering honor society, and President of Tau Beta Pi, the engineering honor society. She has accepted a summer internship with FM Global, a world leader in fire and materials research. Melissa plans to enter the Fire Protection Engineering master's program in 2005.

Ms. Gilbreath was recently admitted to WPI's Fire Protection Engineering master's program, class of 2004. In addition to her exceptional academic performance, she has worked in WPI's Office of Diversity and Women's Programs and served as student coordinator for Camp Reach. Camp Reach is a summer academic program with an engineering focus. The program is aimed at seventh grade girls, designed to build self-confidence and encourage an interest in education.

Mr. Dow, is a member of both the Pi Tau Sigma and Tau Beta Pi honor societies. During the summer Ted is an intern in his hometown of Laconia at an engineering firm called Rist Frost Shumway Engineering. In his free time, Ted enjoys playing the guitar and frisbee. He is a member of the class of 2004.

"We are proud to provide this financial support to students interested in the field of fire protection," says Mark Levy, President of Honeywell's Fire Solutions Group. "Honeywell continues to be committed to the academic development of fire safety engineering and the future of its young professionals."

Located in Worcester, Massachusetts, WPI offers a one-of-a-kind degree program focusing on fire protection engineering. Graduates receive an undergraduate degree in one of the traditional engineering disciplines (e.g. mechanical, electrical, civil, chemical engineering) and a master's in fire protection engineering. WPI also offers a PhD program in fire protection engineering, and a distance learning program for practicing professionals.

Professor David A. Lucht, Director of Center for Firesafety Studies, states, "We are delighted to receive this continuing support from Honeywell. These scholarships are targeted to promising young scholars who show an early interest in fire safety. The Honeywell scholarship program not only provides needed financial assistance, but this gesture from a major industrial leader is a source of encouragement and inspiration as well."

Congratulations and best wishes to all the recipients!

## Advanced Fire Safety System Makes Philippines Mall a Safer Place

Located in Makati city in the Philippines, the Power Plant Mall is a four-level shopping center designed to provide a uniquely carefree and convenient shopping and entertainment experience. One of the reasons the experience can be so carefree for visitors is the facility's attention to safety, and particularly fire safety.

Protecting a mall of this size is not the easiest of tasks. Over 120,000 square meters large, the \$50 million mall is home to 250 stores including a large supermarket, various restaurants, multiple cinemas, and an enormous underground parking garage that can house 2000+ automobiles. The generous garage is one of many features designed to provide mall guests with "quick-in and quick-out" convenience. The sheer size and extraordinary amenities of this mall all work to differentiate it from the smaller, more cramped and less "user-friendly" shopping centers in the Manila area.

To find a system to protect the mall's occupants and guests from fire, the facility's owner, Rockwell Land Corporation, turned to Yek Yeu Merchandising, an established fire alarm distributor. After carefully evaluating the Power Plant's unique goals and requirements, Yek Yeu recommended a fire safety system from NOTIFIER, the world's largest manufacturer of engineered alarm systems.

According to Peter Chua of Yek Yeu, "NOTIFIER has a strong record of reliability and quality compared to its competitors. The flexibility of NOTIFIER software allows the distributor to create a program that is most suitable to the retail mall requirements for monitoring and control."

Yek Yeu installed a network of six AFP-400 intelligent fire alarm control panels. The network includes two Intelligent Network Annunciators (INAs) that are used to monitor and display information from the entire network on an 80-character display and control keypad. The system also includes a Network Control Station (NCS), which monitors and controls the system in a graphical format on a Windows®-based PC.

"In a building this large, a wasted second can be life-threatening in an emergency," said Peter Chua. "We really needed a system that lets us locate with pinpoint accuracy the exact place in the mall where the fire alarm is sounding. With the NOTIFIER system, we can accurately provide fast,



remote fire protection to every section of the facility."

The NOTIFIER system delivers the necessary level of coordinated annunciation and response for large operations like the Power Plant Mall. With this fire system network, each fire alarm control panel maintains its own area of protection, while monitoring and interacting with other panels. All the nodes, remotely linked to the fire alarm control panel, react to network events with coordinated programmed responses.

"We greatly appreciated the fact that each panel could operate independently from the rest," said Angela Bella of Rockwell Land Corporation. "So if one panel breaks down, we do not have to worry about all the other links in the chain."

Along with providing command center operators with network control and panel programming, and clear, accurate system information, NOTIFIER's Network Control Station communicates network events and provides individual control of network points or nodes. So the command center operators can quickly obtain a complete grasp of the situation and relay proper voice instructions through the building. Operators can also remotely manage airflow and smoke extraction, as the system is interfaceable with other facility controls.

Fast installation was also of extreme importance to the mall's owners because any delays in the opening of the Mall would be costly. So the system's minimal wiring was a big plus. In fact, the NOTIFIER system utilized only one small-gauge twisted pair unshielded wire throughout the system loop.

The Power Plant Mall is proud to offer its visitors one of the most complete and accessible shopping experiences in the area. And with the installation of the NOTIFIER's advanced fire safety control system, they can also be sure their shoppers are receiving the best fire protection possible.

## Honeywell's President's Club Honors Fire Solutions Group Employees for Outstanding Performance

The President's Club is a global reward program designed to recognize employees for their outstanding contributions to Honeywell business initiatives, vision and goals. The individuals chosen to receive this prestigious award have consistently demonstrated superior performance within their stated targets and objectives for growth.

Over 200 top performers worldwide were elected to the President's Club this year, based on their 2002 achievements. The Fire Solutions Group is proud to have had ten employees chosen for this honor. We are extremely proud of these individuals' achievements, and equally as proud to share them with you.

This year's Fire Group recipients include Allen Fritts, Jr., Fire-Lite Alarms Regional Sales Manager, Mid South; Charlie Gallardo, Silent Knight Regional Sales Manager, West Coast; Marc Trembley, NOTIFIER Regional Sales Manager, Southeast; Todd Warner, NOTIFIER Director Product Management; Stephen Ames, System Sensor National Sales Manager, Canada; Bob Doran, System Sensor Security Sales Manager, USA; Mark Gilmore, System Sensor Security Sales Manager, USA; Carl Johnson, VP of Sales, Security System Sensor; and Tom Potosnak, Director of Marketing, Security System Sensor.

Please visit <http://honeywell.toattend.com/presidentsclub> for more information on the President's Club.

## NOTIFIER Scores with its Online Solutions at NFPA 2003

Everything is bigger in Texas, and that included the NOTIFIER booth at this year's National Fire Protection Association (NFPA) World Safety Conference & Expo held in Dallas. The football-themed booth showed attendees that you are always driving toward the goal-line when using

NOTIFIER's innovative online fire protection solutions: Onyx, NOTIFIER Web Server (NWS) and UniNet® 2000.

The NWS and UniNet On-Line offer remote fire alarm control panel read status via the Internet/Intranet and/or dial-up. Operators can cross-examine systems on or off-site, and obtain a "snapshot" of the entire Noti•Fire•Net network. UniNet 2000 enables users to seamlessly integrate diverse fire and security building systems into a customized, graphics-oriented platform - creating a unified command center for monitoring and controlling building safety systems.

"Between the strategic location of the NOTIFIER booth, as well as our ability to have all of the other brands from the Fire Systems Group in close proximity, we were a force at NFPA this year," said Pete Clark, V.P. of Marketing, Honeywell Fire Systems. "Even with attendance low this year, we were still able to garner a large number of quality leads, but more importantly we were able to spend time with our customers and other members of the fire protection engineering community."

The NOTIFIER booth was a real draw for the NFPA attendees. Thanks to such highlights as the product demonstrations, the Dallas Cowboy Cheerleaders and Daryl "Moose" Johnston, it was obvious which company received the most traffic. After booth visitors had their pictures taken with the cheerleaders, they were greeted by NOTIFIER representatives who were ready to show individuals how NOTIFIER Web Server and UniNet On-Line would best fit their specific needs. Todd Burgart of Fire Systems Design said, "You couldn't help but feel welcome and eager to learn more about the products and services offered by NOTIFIER." Jeffrey Krebs of Christiana Care exclaimed, "Obviously the booth had a certain, 'curb appeal,' but more importantly it was staffed with knowledgeable people who knew their products and were happy to assist with design application questions."

"Unlike other companies that have selected a more 'conceptual' booth design that offers little to no product information, the inviting design of NOTIFIER's booth allowed visitors the opportunity to see product demonstrations and speak directly with company representatives," stated Jena Murphy of Gray & Rice Public Relations. "The line comprised of customers, engineers, facility managers, firemen and editors of trade magazines snaked around the booth and was a testament to the great interest in NOTIFIER."

This year's keynote speakers were Chris Matthews and Norman Schwarzkopf. Each regaled the audience with humorous political tales and offered excellent insight into leadership and foreign policy. Due to the NFPA's schedule changes this year, the keynotes and seminars did not run concurrently with the exhibit hours. According to one attendee, "I was able to visit more vendors and obtain more accredited education than in past conferences."

Keeping with tradition, NOTIFIER again hosted a Customer Appreciation Reception. Leslie Craddock, Vice President of Corporate Communications exclaims, "We are always delighted to host this mid-year event. Every opportunity we can spend time with our customers is priceless. And the NFPA show allows us to do just that."

## Risk Perception, cont.

accommodate perceptions.

Notably, the Code and the guidance provided in the appendix to the Code emphasize the issue of reliability. The standard regards reliability as crucial to both the design process and in the design solution.

Design Process related:

Section 5.1.3. Approved Qualifications. The performance-based design shall be prepared by a person with qualifications acceptable to the Authority Having Jurisdiction.

Section 5.1.5 Independent Review. The Authority Having Jurisdiction shall be permitted to require an approved, independent third party to review the proposed design...

Design Solution related:

Section 5.4.7. Post-construction Conditions. Design characteristics... that affect the building to meet the stated goals and objectives shall be specified, (and) characterized sufficiently for evaluation of the design.<sup>17</sup>

The issues of risk, uncertainty, and reliability are intertwined.<sup>18</sup> The greater the emphasis on reliability, the greater the potential of resolving the risk problem successfully. In addressing uncertainty and reliability issues, the Code allows for judgment by the design professional and the Authority Having Jurisdiction (AHJ). Keeping in mind the judgment is affected by perception:

5.1.6 Final Determination. The Authority Having Jurisdiction shall make the final determination as to whether the performance objectives have been met.

5.6.3.3. Uncertainty and Conservatism of Data. Uncertainty in ...data shall be... as determined appropriately by the Authority Having Jurisdiction, addressed through the use of conservative values.

### 5.7 SAFETY FACTORS

5.7.1 General. Approved safety factors shall be included in the design methods and calculations to reflect uncertainty...

And finally in the commentary in Annex A:

A.5.3.8... The Authority Having Jurisdiction will determine which level of performance... is acceptable, given the very low probability (that is, the system's unreliability probability) that the system will not be available.<sup>17</sup>

These sections place the AHJ in a distinct role. Not only does the

AHJ act as a representative of society, the AHJ wields significant power. In the performance design process, the AHJ is offered more influence on the design than in the prescriptive design process. And because the AHJ is subject to biases similar to those in the general population, risk perceptions will affect their judgment. This is the area where risk perceptions will affect a performance-based design.

For example, the AHJ will likely be concerned more with the reliability of a performance-based design of a high-rise hotel than a two-story office building. The high-rise hotel presents a potentially catastrophic risk, and the nature of the hotel risk is one where occupants have less control and/or familiarity. (Granted, the high-rise hotel may require specialized fire protection features because of fire fighting concerns.) Even so, biases stemming from these risk perception factors may reflect itself in the AHJ having a predisposition to require more reliability (more safety) in the high-rise hotel. For example, assume that in either facility, the design is highly dependent on the successful operation of the fire sprinkler system. The AHJ may not accept that a single fire pump system is reliable enough for the hotel high-rise, but may be reliable enough for the two-story office building. Because of these biases, the AHJ may require additional safeguards to increase the reliability in the hotel's sprinkler system. The high-rise hotel may be required to have a redundant fire pump system and/or redundant water supply for the sprinkler system, whereas the two-story office building may be required to have only one fire pump. This effectively results in a safer facility for the one that is perceived as potentially catastrophic, less controllable, and less familiar.

Building fire safety regulations, both performance-based and prescriptive-based, establish a standard for design that is intended to provide an acceptable level of risk from fire. In order to provide an acceptable level of risk that meets the public mandate, a building fire safety code should accommodate social perceptions of risk. It seems as if the representative, evolutionary nature of the prescriptive code indirectly addresses the issue of risk perception. The prescriptive code has had the benefit of addressing risk perceptions without the need to quantify safety. A performance-based building fire safety code is a step in the direction of quantifying safety in a way that the prescriptive code never has. The two current performance-based building fire safety codes in the United States appear to have mechanisms that will, to a certain extent, address risk perception. Only with time will we discover which, if any, adequately addresses the issue. Those responsible for the development of the performance codes are advised not to lose sight of the importance that risk perception has in society.

Armin Wolski was formerly with Schirmer Engineering.

### REFERENCES

- 1 Typically published yearly in the September/October issue of NFPA Journal. For an example, see: Karter, M.J. Jr., NFPA Journal, September/October, "1999 U.S. Fire Loss Report," pp. 80-87, 2000.
  - 2 Hall, J., U.S. Fire Problem Overview Report through 1994, Fire Protection Handbook, 17th Edition, National Fire Protection Association, 1996.
  - 3 Fischhoff, B., Lichtenstein, S., Slovic, P., Derby, S., Keeney, R., Acceptable Risk, Cambridge University Press, 1981.
  - 4 Lowrance, W., Of Acceptable Risks, Kaufman, 1976.
  - 5 Slovic, P., "Perception of Risk," Science, 236: pp. 280-285, 1987.
  - 6 Starr, C., "Social Benefit Versus Technological Risk," Science, 165: pp. 1232-1238, 1969.
  - 7 Rowe, W.D., An Anatomy of Risk, Wiley, New York, 1977.
  - 8 Litai, D., Rasmussen, N., The Public Perception of Risk, The Analysis of Actual Versus Perceived Risks, 1983.
  - 9 Wolski, A., Dembsey, N., Meacham, B., Accommodating Perceptions of Risk in Performance-Based Building Fire Safety Code Development, Fire Safety Journal, 34:3, April 2000, pp. 297-309.
  - 10 Uniform Building Code, 1997 Edition, International Conference of Building Officials, Inc., 1997.
  - 11 Starr, C., General Philosophy of Risk Benefit Analysis, Energy and the Environment, Pergamon Press, 1976.
  - 12 Uniform Building Code, 1994 Edition, International Conference of Building Officials.
  - 13 City of Los Angeles, Memorandum of General Distribution - No. 88 Regarding High-Rise Retrofit Ordinances - No. 16386 and No. 165319, September 6, 1990.
  - 14 Custer, R. L. P., Meacham, B. J., Introduction to Performance-Based Fire Safety, Society of Fire Protection Engineers, 1997.
  - 15 Rasbash, D.J., "Criteria for Acceptability for Use with Quantitative Approaches to Fire Safety", Fire Safety Journal, 8 (1984/85) pp. 141-158.
  - 16 International Code Council, Final Draft - ICC Performance Code for Buildings and Facilities, August 2000.
  - 17 Chapter 5, Performance-Based Option, NFPA 101 Life Safety Code, 2000 Edition, National Fire Protection Association, 2000.
  - 18 Stern, P.C., Understanding Risk, National Research Council, 1996.
- For an online version of this article, go to [www.sfp.org](http://www.sfp.org).

#### Contributors:

Gray & Rice Public Relations  
"Importance of Risk Perceptions"  
reprinted with permission from the Spring 2001 Issue of Fire Protection Engineering.

Graphic Design: Kris Bylan-Rydel

To contact us, please email [leslie\\_craddock@pittway.com](mailto:leslie_craddock@pittway.com), or visit us on the web at [www.notifier.com](http://www.notifier.com)



12 Clintonville Road • Northford, CT 06472-1610 USA

ADDRESS SERVICE REQUESTED