More on the use of HAZARD I

Mark Chubb's letter regarding the use of HAZARD I and Richard Bukowski's response in the July/August issue raise some important concerns. As one of the beta testers of the program who has seen it through real-world tests and one lawsuit resulting from a tragic fire, I feel I have become a living appendage to the software. My experiences, after much retrospection, have led me to some basic conclusions as to how the program fits into today's practice of fire science and where it belongs in the future.

First, we must understand that the vast majority of people—including most professional fire fighters, their supervisors, and fire cause and origin investigators—are unwilling to accept anything that hasn't been proven by the test of time and experience—other people's experience. That is human nature and is certainly one of the reasons why NFPA codes are so well accepted. HAZARD I is still in its infancy, and we can't be offended by those who are reluctant to push it into a run.

For the present, users of HAZARD I must recognize the need to present their results and opinions in a cogent, unintimidating fashion. Printouts of seemingly mystical data foster mistrust and skepticism. Charts and diagrams must be prepared that demonstrate pictorially the meaning of the data in a form that can be grasped quickly and is not forgotten as soon as the presentation is concluded. Preparing such a presentation is no small task; in fact, in my experience, it dwarfs the work required to build and run the model. This is the real challenge if the current cadre is to bring HAZARD I into acceptance in the near future.

If I harbor any disappointment about HAZARD I, it is not with the software or its limited acceptance by the fire services, but with the hesitancy of design professionals to use it as an analytical tool to evaluate and enhance the firesafety of construction and renovation projects. This hesitancy is due not to reluctance to accept the data, but to unwillingness either to spend the time to learn it themselves or the money to have others perform the work.

The most eager consumers of the product's results are lawyers, who use it to prove their cases against landlords, designers, product manufacturers, and fire service officials. While our goal is, as Mark Chubb so eloquently put it, "helping mankind reduce fire-related losses," their goal is helping their clients recover fire-related losses. The message is clear: Learn to use it, or expect it to be used to prove that you should have used it.

One previously unmentioned value of HAZARD I is its usefulness as a teacher. It is true that proper use of HAZARD I requires a good knowledge base and lots of diligent study. By the time I had achieved a full grasp of the program, I found much of my original fire science education substantially amplified and redistilled. In the process, I developed a great deal of respect for Richard Bukowski, Richard Peacock, Walter Jones, C. Lynn Forney, and other Center for Fire Research staffers, who merit high recognition and acclaim for their dedication and competence. It would be a disservice for me to conclude without hearty praise for their achievements in the production of HAZARD I.

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Disagrees with letter writer

After reading Philip DiNenno's sidebar to "Fire Models: The Future is Now!" in the March/April issue and the letter by H. Brendon Guest in the September/October issue, I did not come to the same conclusion as Mr. Guest regarding the use of analytical fire models. Furthermore, I doubt that the fire protection engineer of 1990 needs to be greatly concerned about job preservation.

. . . my interpretation of the sidebar is that a little knowledge is dangerous. While electrical distribution models of existing or expanding systems can model failure modes and corrective actions accurately, the use of fire models, which are generically programmed, is limited to application in situations with similar boundary values or assumptions. The point of Mr. DiNenno's charge is to emphasize that thorough knowledge of a fire model's design basis is *required* before its application.

The most appropriate uses of fire models are as an extension to engineering judgment, for design, and as a tool to determine root cause after a fire. If all fire protection design was as NFPA codes suggest, what would the fire protection engineer's job be? Strict application of a code often is not an engineering task. Innovative design and code deviation are the engineer's job, and correctly applied fire models can be the basis for equivalent protection.

Undoubtedly, the ability to identify and quantify the evolution of a fire is our best methodology to further improve the life safety of the public. Being able to model a fire to assess building components and determine tenability is the engineer's best tool to ensure that we learn from previous mistakes.

The use of fire models should be left to people with the technical knowledge to assess their application. The concepts of flame spread, mass burning rate, and ventilation, to name a few, must be understood [in order] to aptly apply many of the available fire models. I, for one, did not have a grasp of these concepts when I graduated from high school.

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A new view of the Cocoanut Grove fire

Casey Grant's article on Boston's 1942 Cocoanut Grove nightclub fire in the May/June issue was most interesting.

One item escaped the investigators. In later years, I reviewed the pictures; they clearly showed the telltale globs where acoustical tile was glued up to the ceiling. The photo on page 77 of the *NFPA Journal* shows the globs clearly.

In the late 1940s, after deadly fires had occurred in a soldiers' hostel in Newfoundland and in Mercy Hospital in Iowa, fire officials realized that there was a new problem. In April 1949, a disastrous fire at the St. Anthony Hospital in Effingham, Illinois, killed 74 occupants, principally infants in the nursery and nuns and nurses who would not leave them. In the July 1949 *NFPA Quarterly*, Jim McElroy reported on that fire and set forth the hazard of combustible tile, and in the October 1949 issue, Bob Moulton wrote an article summarizing the hazard.

I can personally attest that the industry vigorously fought any attempts at regulation.... It had developed a U.S. Department of Commerce-approved "industry standard" fire test, which amounted to a fire in a thimbleful of alcohol. A light flame-retardant coating enabled the board to pass this "test."

A change in the industry's attitude came about, not from reasoned explanations by fire protection experts, but as a result of a lawsuit. The management of the St. Anthony Hospital obtained a sealed settlement against the manufacturer of the combustible fiberboard.

The manufacturers appraised the potential for similar massive liability judgments or settlements and directed their officials to cooperate in developing standards as a matter of self-protection. Thereafter, the industry's opposition changed to cooperation in the development of fire standards.

In 1961, a fire in Hartford Hospital in Hartford, Connecticut, killed 16 patients. The corridor ceilings were of combustible acoustical tile glued to a gypsum board ceiling. The hazard had been recognized, and the tiles had been painted with a flame-retardant coating. The fire, which developed in a soiled-linen chute, rolled out and attacked the ceiling, [then] roared down the corridor. When samples of the tile were tested, they showed a reduced flame spread insufficient to give as intense a fire as was experienced. [When] an entire 25-foot section was removed and sent to Underwriters Laboratories, however, the flame spread was very high. The difference was found to be due to the adhesive that attached the tile.

The Clark County Fire Department's report on the 1980 MGM Grand Hotel fire in Las Vegas noted that 12 tons of adhesive had been used to adhere the tiles to the casino's ceiling. The flammable adhesive added a large fuel load to the fire.

A very serious hazard is often created when a building is remodeled. The code requires the installation of a new ceiling that meets flame-spread requirements. No code that I am aware of requires the removal of the old ceiling. The new "fire-rated" ceiling is installed below the old ceiling, leaving the dangerous combustible ceiling above it. Fire will burst down out of that void.

Two fire fighters died in Michigan, Wyoming, when such a fire burst out of the ceiling. Even then, the city did not amend the code. Recently, 16 people died in a fire at the John Sevier Nursing Home in Johnson City, Tennessee. The fire involved combustible tile that was left in place when a new grid ceiling was suspended below it.

In 1982, two Boulder, Colorado, fire fighters died in a training fire in a building lined with combustible fiberboard. An article noted that "the building was toured by many people prior to the drills, and no one noted any problem with the interior finish of low-density fiberboard."

The hazard is still imperfectly understood, particularly by some fire suppression forces. At times, it is regarded as a fire prevention problem, particularly where there is an "iron curtain" between fire prevention and suppression forces.

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