Fires Mean People Need Fast, Accurate Information

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Abstract: People in fires need fast and accurate information about what is happening where, and what they should do. The challenge to the controls industry is to design and manufacture systems to get information to people that is appropriate and explicit in the instructions given. This paper discusses the merits of an automated system using pre-recorded messages and a manual system that allows emergency personnel to speak to building occupants through a public address system.

Research into the way people respond in fires points out the need to provide them with fast and accurate information, telling them what is happening where and what they should do.

When the fire alarm goes off, it is not reasonable to expect that people will start to evacuate the building right away. In fact, upon hearing a fire alarm, most people tend to ignore it or to look for more information. That information should be provided in a way that will prompt people to react.

What is the nature of the emergency? Where in the building is it? Should I stay where I am or leave? And if I leave, where should I go?

Research has shown that without information to complement the fire alarm signal, people tend to do nothing. Surprise evacuation drills carried out in a subway system in England showed that, when the fire alarm sounded and a simple message was broadcast telling people to leave the system, the vast majority of passengers already waiting on the platforms did nothing. Only those just entering the stations turned around and climbed back to street level.

In high-rise residential buildings, simple fire alarms with no accompanying information tend to cause people to
open hall doors or doors leading to stairwells to look around, or to compare notes with their neighbors, actions that can make the spread of smoke and flames worse. Only a few residents will start to evacuate their apartment building upon hearing the fire alarm if no other information is provided.

So information is needed, and the alternatives appear to be either an automated system that uses prerecorded messages or a manual system that allows emergency personnel to speak to building occupants through a public address system.

An automated system may have limitations in that it might be difficult to provide it with enough messages to cover the whole range of possible situations. The impression, therefore, is that a system that uses "live" messages may be best.

Can automated systems do as well? We don't know, but it would be interesting to test what is available right now, and to go further to see how precise the message can become with different detection systems that can trigger different types of messages directed to specific building occupants. And since it's difficult, even with closed-circuit television, to have eyes everywhere, perhaps automated systems might prove superior in some specific environments.

Systems using prerecorded messages exist. These are systems that might, for example, say that there is a fire on Floor N and that people on Floors M, N and O should go to their designated refuge area which is in Area B.

So far, however, fire researchers at NRC's Institute for Research in Construction have not had a chance to see any automated systems in action, or do any kind of testing of people's reaction to them.

Different studies indicate that if the automated messages are too simple or too general they may not help at all - indeed, they may be counterproductive.

The challenge to the controls industry, knowing what we now do about how people respond to fires, is to design and manufacture systems to get information to people that is appropriate and explicit in the instructions given. People must have confidence in the information provided, so it is essential to ensure that information is precise and accurate.

There are complications for those who would design such systems. What about language? In Canada, English and French might seem obvious, but what about areas - Vancouver, for example - where there is a large Chinese-speaking population? Should the languages there be English and Chinese? How far do
you go in catering to the language mix? The more languages, the longer the message, and we know that long messages can be confusing.

What sort of voice should be used? There is research to suggest that a female voice is best for getting attention initially, and a male voice best for conveying instructions.

If the system is to be used in an apartment building, what about the elderly who might be hard of hearing? Alarm bells tend to ring at a fairly high frequency, where hearing loss is apt to begin. In the United States, legislation now requires the use of flashing strobe lights to supplement the audible alarm. Might that be a part of a system designed for Canadian use? And if people have a hearing impairment, how do you communicate to them the information they need, after you have got their attention with an alarm?

In single-family homes or small residential buildings, people have to learn that smoke alarms need to be tested and cleaned monthly, and, if battery-powered, provided with fresh batteries yearly. Many new homes have several smoke alarms linked together (at least one on each level), but they are often not connected to a central panel that can pinpoint the problem. Many companies market home automation systems that control heating, cooling, lighting, sound systems and the like. But it is not clear that fire safety has been taken into account in all those systems.

Public education must also play a part, of course. When today's adults were children, fire safety instruction most often meant fire drills at school. More specific education about fire safety was simply not taught.

The U.S. National Fire Protection Association has developed the "Learn not to Burn" program for children and it has been tested, found excellent and is widely used. It's time now to do the same evaluation of the programs for adults.

That's why an important project is now under way at IRC, in collaboration with the NFPA, to assess the fire information training material available for working adults.

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