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## LESSONS WORTH LEARNING

Jan 1, 2009 12:00 PM, By Merrill Douglas

When Dallas Lipp joined the Montgomery County (Md.) Fire and Rescue Service nearly 30 years ago, he received formal instruction on how to use an axe. No so with the gear that provides the link between the fireground and the world outside. "I got no training on the radio," said Lipp, a lieutenant.

Communications training for firefighters has improved since those early days in Montgomery. But some fire departments still do a better job with axes than with radios, Lipp said. Firefighters often figure out on their own how to communicate, or they imitate what their colleagues are doing. "And not in all cases are those really good practices," Lipp said.

In recent years, some fire departments have complained that when they use digital portable radios on the fireground, noise from hoses, chain saws and other ambient sources distorts the transmissions so badly that people can't make out what's being said. Concern about this problem has kept some departments from replacing legacy analog systems with digital technology. Many fire officials, however, say that background noise may inhibit analog communications as well.

In search of solutions, the International Association of Fire Chiefs (IAFC) formed in 2007 the Digital Problem Working Group, since renamed the Digital Project Working Group. The initiative brought together representatives from fire departments and other public-safety organizations; consulting firms; and companies that make radios, firefighting gear and safety equipment.

Members were invited to participate in two task groups. One performed laboratory tests on digital and analog radios to define the distortion problem and identify potential solutions. The other investigated techniques that firefighters could use to reduce problems with all radios on the fireground.

Last spring, the second task group released the results of its work so far, two lists of best practices for using portable radios at a fire. One list is aimed at fire department leadership and the other at users in the field.

The goal of these recommendations is to improve communications on the fireground as much as possible, given the current technology. Members of the task group felt that existing radios would perform better if firefighters learned to use them correctly, Lipp said.

"Even if there were a magic-bullet technical solution for some of these concerns, if we were able to rapidly identify the solutions and send them all to engineering for design, and send them all to manufacturing for production, it was still going to be years before those solutions would be in the hands of the end users," he said. By using better techniques, firefighters could solve some of the problems right away.

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The best practices for fire department leadership focus on training and equipping personnel, managing communications at a fire, and encouraging vendors to make safety gear and radios function together better. Among the recommendations: "Train all personnel to properly use the assigned radio equipment in conjunction with all components of the protective ensemble." And: "Incident commanders should evaluate background noise in the environment as a safety consideration in task assignments."

The recommendations for personnel in the field focus on hints for reducing background noise and optimizing communications. Some examples: "Speak in a loud, clear and controlled voice to maximize audio intelligibility." And: "When practical, consider using a free hand to muffle a mask-mounted SCBA [self-contained breathing apparatus] low-air alarm when trying to transmit on a radio."

The members generated most of the second task group's recommendations, Lipp said. The group also solicited ideas from the thousands of people on the IAFC's e-mail list, but that request drew only about a dozen replies. "This reinforces the concern that I already have, that as an industry, the fire service is not placing enough emphasis on understanding our communications environment and the tools that we use to communicate," he said.

The IAFC's recommendations are neither new nor ground-breaking, said Leif Anderson, deputy chief of technical services for the Phoenix Fire Department. "To a large extent, I think most people would tell you that in fact they're common sense."

But that doesn't mean most firefighters typically follow best practices. Indeed, the exact opposite seems to be true. "I think you'll find, by and large, there are very few programs or policies and procedures for communications equipment," Anderson said. Too many fire departments fail even to perform preventive maintenance on radios, much less train users to handle them correctly, he said.

And although recommendations on where to place microphones and how to talk into radios might be common sense, firefighters do need such instruction, Anderson said. "I'll bet if you took 10 random firemen and said, 'Show me where the microphone is located on this specific radio,' only two of them would know." The Phoenix Fire Department, which has stuck with analog radios, already covers these topics in its training, he said.

So does the Roseville (Calif.) Fire Department. "We're saying you need to speak slowly; you need to try to stay away from noise sources," said Chris Baker, a fire captain and paramedic there. His department, which is considering a switch to a digital system, also offers instruction on how to talk on the radio while wearing an SCBA. (Turn off the amplifier on the mask's voice port and hold the handheld microphone near the second port, which is not equipped with an amp.)

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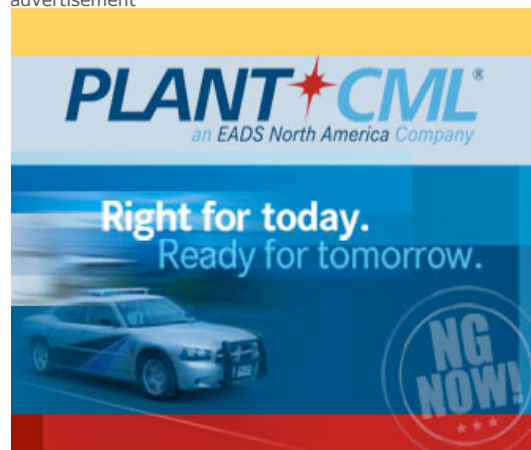
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In addition, firefighters contend with feedback from other radios. "So we have to tell people to tell the other people on their team to turn down their radios while they talk. Or they have to step away," Baker said — but, for safety's sake, not too far away.

How easy is it to remember to hold your mic just so, shield it from the noise of hoses and chain saws and speak calmly and loudly in the middle of a burning building? "It's not easy at all," Baker said.

Besides contending with background noise, firefighters dressed in bulky turnout gear, lugging equipment or ripping down sheet rock have to contend with their own heavy breathing. "They'll try to enunciate slowly and loudly, but they'll have to repeat several times because they can't be understood. They'll have to ask for transmissions to be repeated, because they can't hear very well," he said.

It's not easy for firefighters to change their habits, agreed Chief Michael Dilley of the Urbana (Ill.) Fire Department. "It takes constant reinforcement," he said.

Urbana and other municipal fire departments in Champaign County switched to a digital radio system in late 2007. Background noise already posed a small problem on the old analog system, and the digital system makes things slightly worse because it's more sensitive to all sounds. "We haven't had huge problems with it," he said. "But we also instituted the [IAFC's] radio best practices, which helps."

Most firefighters are extremely well-trained in their daily activities, but it does take a little extra thought to use the radio properly in a tough environment, said Dirk Young, manager of national public-safety markets for Tyco Electronics Wireless Systems (formerly M/A-COM). "One of the best ways to reinforce that, and to help them keep a cool head during that process, is additional and continual training," he said.

Young was one of the industry representatives who helped to draw up the IAFC's best-practice recommendations. One topic that the task group did not discuss at length, but which the manufacturers hope to take on in the future, is how to make radio systems and safety gear such as SCBAs work together more effectively.

"We have to get the human interface to these devices addressed as well," said Baker, who has been looking for safety masks with built-in radio microphones and ear pieces but hasn't found any that meet his department's needs. "That's one of the reasons I'm so encouraged by the work of the IAFC committee," he said. "We can come up with true standards that manufacturers can build equipment to that will work for us."

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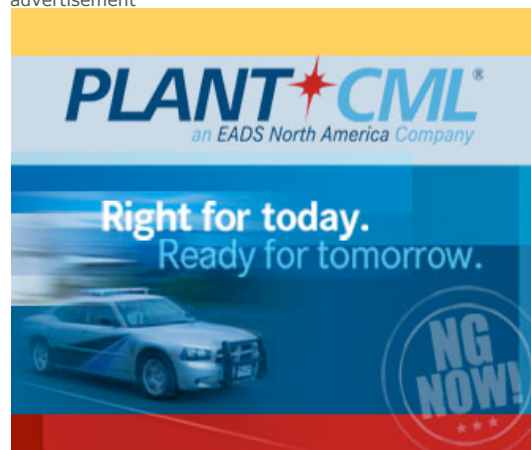
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In designing equipment, it's important to treat a firefighter and all his tools as a single unit to make sure all the technology works cohesively, Young said

Jackie Wasni, Motorola's vice president of sales for the mid-Atlantic region, who also served on the task group, declined to speculate on how manufacturers will better integrate communications and safety gear. She pointed to the fact that the document containing the best-practice recommendations is an interim report. "The working group has not really completed the objective, which is finding solutions," she said.

"I think all manufacturers are looking to see what type of technological solutions can assist here," Wasni said. "And there are things that we are working on, such as noise-suppression software, new speaker mic design, those types of things."

For now, though, the IAFC's recommended practices can help improve the situation on the fireground, Wasni said. "When you do those things, you really positively impact communications, whether it's a digital signal or an analog signal."

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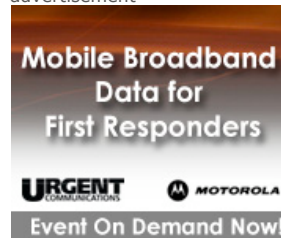
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## IAFC BEST PRACTICES TASK GROUP RECOMMENDATIONS FOR FIELD USERS

1. When practical, use the radio for the initial distress call before manually activating the PASS [personal alert safety system] in a mayday situation. PASS devices create a great deal of background noise very close to the radio microphone, so transmitting on the radio before activating a PASS optimizes the probability that a voice message can be transmitted successfully.
2. Ensure the microphone is placed 1 to 2 inches from the mouth or SCBA [self-contained breathing apparatus] voice port with the microphone positioned directly in front of the audio source.
3. Speak in a loud, clear and controlled voice to maximize audio intelligibility.
4. Shield the microphone from noise sources to improve the intelligibility of the audio in high-noise environments.
5. When practical, consider using a free hand to muffle a mask-mounted SCBA low-air alarm when trying to transmit on a radio.
6. Consider the location of radios and microphones in relation to PASS devices and other noise-generating user equipment.

Source: IAFC

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