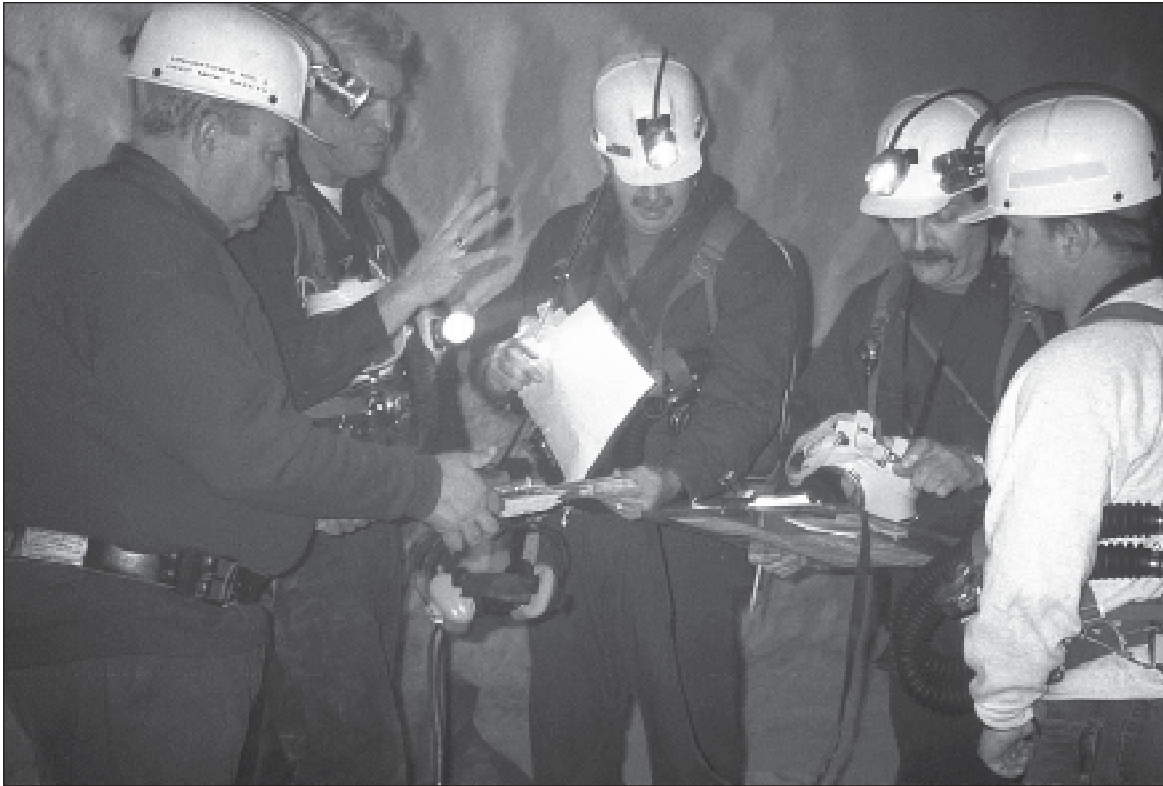




Training future mine emergency responders

Part 2: What topics should be included?

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Since 1991, Pittsburgh Research Center (PRC- formerly part of the Bureau of Mines) researchers have recorded extensive interviews with 30 individuals who are experts in the area of mine emergency response. These individuals, who have an average of 35 years of mining experience and 29 years of mine emergency response experience, related stories and observations from events that they experienced during their combined 850 plus years in mine emergency response. The purpose of this effort was to gather information that could be passed on to both today's and tomorrow's mine emergency responders to train and guide them in handling future events.

This is the second of two articles

which report experts responses to questions about training for future mine emergencies. During the interviews they discussed how training should be conducted, who should be trained, and what topics should be included. This article will cover the third area: Topics that should be included in training for mine emergency response managers.

It is well known that some level of mine emergency response training is required by Federal and most state mine safety regulations. Generally speaking, this mandated training is for front line workers who often will be the first individuals to confront a mine emergency. Underground miners, for example, must receive training in escape procedures, first

aid, and the use of emergency breathing apparatus and available fire fighting equipment. Where mine operators have rescue teams, Federal and some state regulations define minimum training requirements for these teams. However, no regulations are known to exist that require comprehensive training for responding to and managing mine emergencies. Since there are no regulations in this area, the experts were asked what they thought decision-makers need to know to effectively manage a mine emergency. They identified five major subject areas: emergency response planning, mine ventilation, mine gas analysis, fire fighting, and mine rescue.

Nine individuals suggested that

4



responders be educated in overall emergency response planning. These experts believed this topic area should include training in the development of an emergency response plan followed by training of personnel in the implementation of the plan. Stressing the importance of training in mine emergency response planning, one veteran remarked:

They (mine management) should understand the requirement for preplanning. And they planned production ahead of time. They should plan for an emergency ahead of time. Because if that emergency occurs, all the planning in the world for your production, it doesn't mean anything... If you don't plan for the emergency, and the emergency occurs, you are not going to be able to handle it.

In another section of the interviews, experts were asked about issues that should be passed on to future responders. It is interesting to note that mine emergency veterans stressed the significance of preparedness with respect to:

1. Having a well designed emergency response plan and
2. Practicing for emergencies during that discussion as well.

Seven response experts stressed that responders should be given extensive training in mine ventilation and five suggested training in mine gases. Many of these 12 individuals felt that most responders do not fully understand ventilation systems and mine gases well enough to make good decisions about how to proceed. As one veteran noted:

Well, I think one of the most critical things that you encounter when you get to a mine is the ventilation system... at that mine. You know what, what has happened to the ventilation system, and what you need to do... to restore the ventilation, and unfortunately, too many of us just don't know that much about ventilation, and I think that's one of the critical areas, whether it be an explosion, or a mine fire, or either one. That's one of the most critical areas to me, and... we aren't that proficient in

mine ventilation.

Another expert stressed the importance of emergency response personnel being well versed in ventilation:

...you've got to take care of your ventilation. ...if you're putting a lot of air in the mines, and it's going over a fire, you're not doing anything. You'll never get it out, but you've got to... You may stop it (air) over here, but you may build up gas, or make it a more dangerous situation over [there].

Finally, one veteran emphasized how knowledge of mine ventilation and mine gases can enhance the decision making process:

Training them, where we have people who can look at a mine map, understand ventilation, understand how air [behaves], (and) what the involvement of ventilation with the incident is. Who understands what mine gases mean. Who will be able to put things together, and to make decisions that might alleviate this situation.



Veterans generally felt that future responders, especially the decision makers in the command center, should be trained in, or at least have a strong understanding of, fire fighting and/or mine rescue procedures. As suggested by several experts, all too often responders do not know how to properly attack a mine fire. Delay in figuring out how to handle a mine fire can result in the loss of valuable time, and potentially the loss of the mine. As one veteran reflected:

Fire fighting... how to fight a fire. A lot of people don't know how the hell to fight the fire, particularly with the air, fighting a fire direct, and getting to it right away. ...You just can't stand around and wait till we call somebody... to say "We got a fire. What do you want us to do?" ...you got to get in and fight the damn thing. And you can't wait. Once you wait, particularly in the Pittsburgh seam, you're a dead man. You're not going to have a mine.

Similarly, some response experts believe that decision makers should be familiar with mine rescue procedures. Especially with emergencies at larger operations, individuals from regional company offices are often called in to help manage the event. Knowledge of mine rescue procedures can enhance the decision

making process. As one veteran suggested, training of higher level decision makers in mine rescue procedures is important:

Well, I don't think that the operating supervision from the, shall we say... the non-production departments are aware of what the mine rescue personnel have to do, and what types of situations that they get into. I think if they had a session on mine rescue, [for the] department heads... so [they] can have a better understanding of the terminology, and the equipment that was being used, why it was being used, (and) how long it could be used.

Conclusions

Five major topics that should be included in training for emergency response decision-makers were identified by experts. Nine veterans suggested that future responders be trained in mine emergency response planning. Emphasized in their discussions was the view that not only should responders be trained in planning, but also in testing and revising of plans. Twelve experts talked about the importance of training emergency responders in mine ventilation and mine gases. All twelve veterans underscored the role that a thorough understanding of ventilation and mine gases plays in deciding how to handle most major

underground emergencies. Finally, 13 interviewees believed that response personnel need extensive training in mine fire fighting and mine rescue. Overall, devoting resources to training for a potential emergency was encouraged by all of these experienced responders.

Suggested reading

The topic of mine emergency response preparedness is complicated. While there are many facets of the emergency preparedness puzzle that must be considered, this series of articles has touched on only several small pieces. To obtain information on other areas of emergency response planning, the authors suggest the following sources:

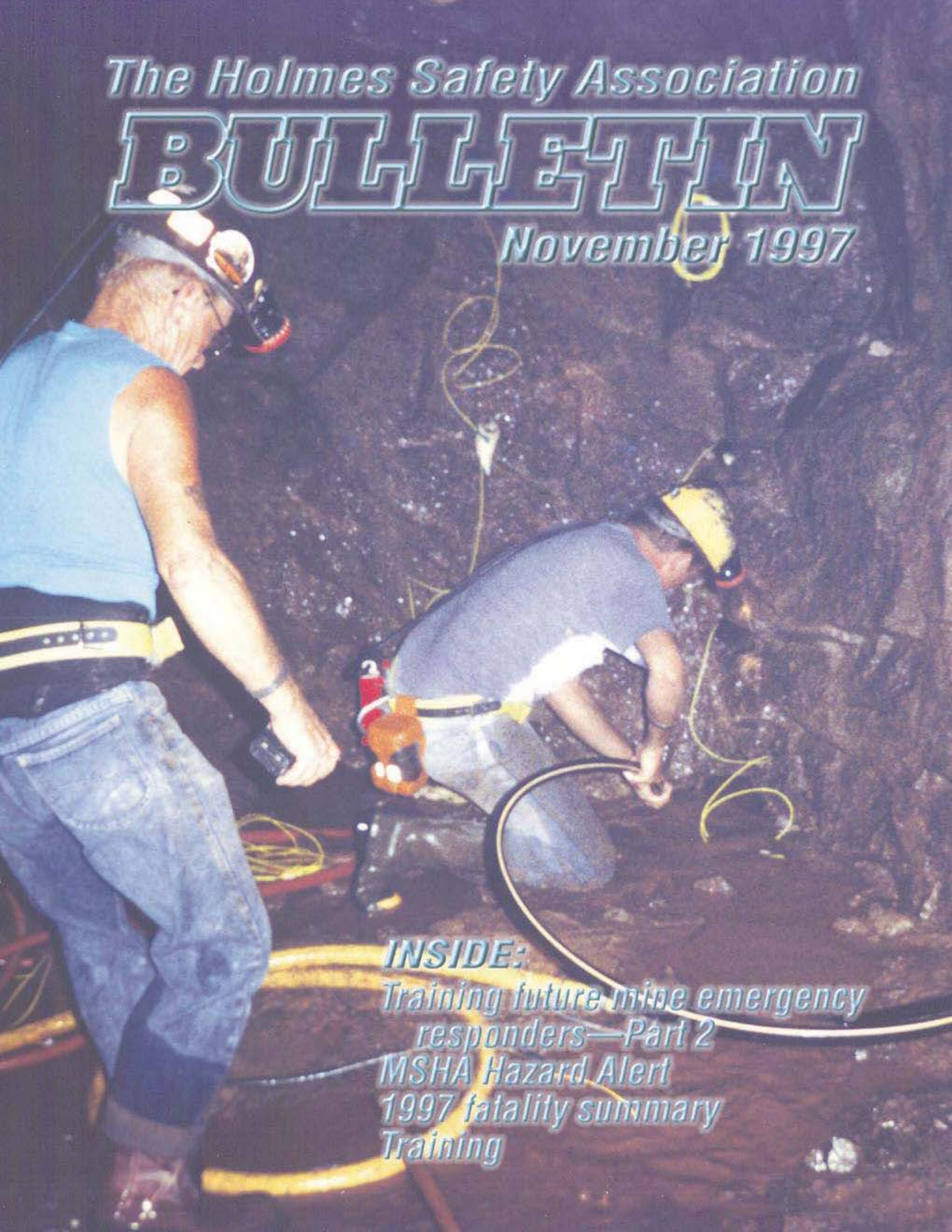
Auf der Heide, Erik, **Disaster Response: Principles of Preparation and Coordination**. C. V. Mosby Co., Baltimore, MD, 1989, 363 pp.

Mallett, Launa, Michael J. Brnich, Jr., and Charles Vaught. "Emergency Response Planning for Small Mines; Who Needs It?". **Improving Safety at Small Underground Mines**, Bureau of Mines Special Publication 18-94, 1994, pp. 11-13.

Brnich, Michael J. Jr., Launa Mallett, and Charles Vaught. "Emergency Response Planning." **Holmes Safety Association Bulletin**, November 1994, pp. 11-13.

REFERENCES:

Vaught, Charles, and D. G. Wooten. "Responding to an Underground Mine Fire: A Case Study." **Paper in Proceedings of the Twenty-Third Annual Institute on Mining Health, Safety, and Research** (Blacksburg, VA, Aug. 24-26, 1992). Department of Mining and Mineral Engineering, Virginia Polytech. Institute and State University, Blacksburg, VA, 1992, pp. 197-208.

A photograph of two miners in a dark, rocky tunnel. The miner on the left is standing, wearing a blue tank top, jeans, and a headlamp. The miner on the right is crouching, wearing a grey shirt and a yellow headlamp. They are surrounded by yellow cables and equipment.

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INSIDE:

*Training future mine emergency
responders—Part 2*

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Training