

SHOULD THE INDUSTRY RETHINK SAFETY AND RESPONSE STANDARDS AND PROCEDURES?

Mine fire, rescue and response expert Carl Baisden calls for an immediate safety summit

BY LEE BUCHSBAUM



Calling most mine rescue teams under-prepared, Carl Baisden, director of mine training at Southern West Virginia Community and Technical College, focuses on ultra-realistic training while calling for a nationwide safety summit.

In terms of fatalities, 2010 was one of the more deadly years for America's coal mining industry in the past 20 years. A total of 48 coal miners perished on the job last year. West Virginia suffered the greatest loss of life with 35 coal mining fatalities. The mine explosion at Massey Energy's Upper Big Branch mine (UBB) in southern West Virginia alone took the lives of 29 miners in one fell swoop. Since that tragic event occurred, all safety officials have redirected their attention toward ensuring that nothing like that ever happens again.

Are these underground coal mining disasters inevitable? Mayhem is never too far away when mines are allowed to push the envelope. While the Mine Safety and Health Administration's (MSHA) investigation continues, intrigue and anger swirl around what happened at UBB that fateful April day. As the industry begins another "potential ignition season," the question remains: How pre-

pared are U.S. coal operators now to address the inevitable once again?

Blessed with some of the nation's best remaining, albeit some of the most challenging coal reserves, West Virginia will continue to be the nation's largest underground producer. With a renewed focus on safety and disaster response, Southern West Virginia Community and Technical College's Mine Training Academy in Logan has seen a rapid increase in demand for its renowned ultra-realistic training exercises.

Carl Baisden, director, mine training and energy technologies for the Mine Training Academy, is a nationally certified fire and explosive investigator and chief of West Virginia Mine Rescue Task Force I. On April 5, 2010, when the UBB disaster occurred, Task Force I was alerted to respond to the incident by the director of the WV Office of Miner's Health Safety and Training. In the eight months since the explosion, the academy has conducted

training and disaster simulations for almost 40 teams from all over the nation including rescue teams of the top five coal companies in the United States.

With more than 35 years of mining experience, which includes advanced fire and rescue training, Baisden is gearing up for what looks like a very busy year. "The companies want the training to be as tough and complex as possible because if they can handle the training we give them here, they are confident they can handle whatever they may encounter in an underground situation," Baisden said.

Simulators at the academy are designed to duplicate situations that rescuers may really encounter. "We have collapse simulation and some of the latest fire props where we can create several million Btu's of heat and flame training. We can also create negative visibility so thick it can be sliced out of the wall. We work very hard to get teams conditioned to work in zero visibility because that is one of the most severe conditions they encounter. They need to be able to competently function in it," said Baisden.

Nationwide, few institutions are training under these kinds of severe conditions, but many institutions are paying attention. "We have a working dialogue with many schools as we attempt to develop a semi-standardized type of training. Since last April, we have had several institutions visit our facility and view our instructors in action," Baisden said. It appears that many of these facilities are not attempting to recreate the wheel because of a recognized need to immediately provide advanced standardized training.

Real World Training vs. Field Competitions

One of the largest issues facing mine rescuers is that their field-based training, conducted generally above ground in con-

tests, has largely proven inadequate. "The competition field is but one avenue for building camaraderie," Baisden said. "While it does allow teams to interact, communicate and learn to know each other, in the real world, real incident teams are frequently overwhelmed. Most teams need more actual conditioning for low visibility or no visibility, for actually working with heavy loads like an unconscious miner, which they, presently, rarely do. They need to learn how to work as a team in a debris-filled area where they learn how to maneuver and manipulate a stretcher with a 180- to 200-lb miner on it. All the while navigating in a way to protect the patient and keep the team intact as a unit."

Baisden feels that given the disasters of the last few years, mine rescuers should consider a team element response kit composed of equipment needed to transport an injured miner out of either low, medium or high coal seams. "A majority of teams have not trained extensively on their knees or in the low seams like we have in the majority of West Virginia mining operations," Baisden said.

As the industry continues to pursue and mine deeper and more challenging reserves, rescuers will have to adjust their training as well. "We have to adapt. Mines with multiple sections create a complex ventilation problem for mine rescue teams and, additionally in many coalfields today, there are several mines simultaneously mining multiple seams from one portal," said Baisden.

Following the disaster and tragedy at UBB, the academy is now training under more complex simulations and computer generated movements where teams can visualize, through computer based training, actual fire and smoke movement underground. "We have worked closely with state and federal emergency responders to help teach teams how they can change ventilation to sustain life in front of them and how they can strategically work different issues simultaneously," Baisden said. "This advances their multi-tasking skill sets."

Bringing Emergency Medical Help to the Injured and the Rescuers

Given the constraints of time in an ever-changing coal mine, "where we don't know what's out there, the sooner we can expedite and return a miner to the surface in stable condition the faster we can mitigate the incident," Baisden said. Baisden helped coordinate the creation of a for-

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ward, underground emergency-medical area underground (See *Coal Age*, April 2010, p. 48). This had never been done before. “It just so happened that we had certified medics that were additionally experienced and certified miners who were available at the incident,” Baisden said. “These guys were already on the scene. Advanced equipment was readily available and we had discussed this previously with both MSHA and the State of West Virginia.”

Though the team did not deploy, “our goal would have been to bring advanced life support to injured miners that were several miles underground and up to several hours transport time to the surface. Having the potential to deploy an advanced medical area at a fresh air base in the future would have to be determined on a situation by situation basis as to how long the teams will be underground and how many victims are potentially involved. But we could possibly change the outcome of future events by having certified and trained paramedics that would support mine rescue teams in an extended operation, if the need was there. These special teams would additionally receive additional training and could possibly assist with other duties at the fresh air base as needed,” Baisden said.

Rescuers themselves also need to be medically monitored as they traverse through various danger zones in order to bring their brothers out. During the response to UBB, experts realized that teams were being adversely affected by carbon monoxide (CO) as well. “When we would take a break, the rescue teams would basically line up on the rib like they would on a production unit. While at rest, many rescuers complained about the onset of headaches. Normally, that might be from dehydration, going without food, and being in a very stressful environment,” Baisden said.

As they returned to the surface, rescuers were met by medical rehab units where a new non-evasive medical device was used that gave instant CO and oxygen readings from each individual team member. “As far as we know, this was the first time this had been performed. These quick tests immediately gave us the data to accurately know that we were absorbing CO from areas that we thought were potentially clear. The body acts as a sponge absorbing what the respiratory system takes in. Through this new technology, we were able to monitor all indi-

viduals on a case by case basis,” Baisden said.

Taking Advantage of Emerging Communications Technologies

Collectively, mine rescue responders also have to reconsider their communications systems to take better advantage of cutting-edge technology. “This is particularly true when we are under apparatus or when we are in an area where there are multiple victims. We could additionally have a high noise level that could hinder clear and concise communication to the surface command post. At the academy, we are testing several types of systems now,” Baisden said.

Another rethink that needs to take place concerns the types of equipment needed in underground emergencies that are still considered impermissible such as hand-held thermal image cameras. “When they are normally used, they are in a fire situation in a free flame state,” Baisden said. “They have proven very effective underground. Under the right circumstance I know lives could be saved by utilizing them,” Baisden said.

Other rescue tools also available that rescue teams might want to be trained with include low pressure airbags which can lift hundreds of tons at a time. Longwall operations have learned to use airbags to move shields and other heavy equipment. The academy’s Task Force I is one of the few teams in the nation that trains regularly to make this type of equipment and technology available to any mine rescue team that requests it. “We would like to see rescuers certified with this type of rescue equipment in the event of future need,” Baisden said.

Rescuing Miners from an Emergency Refuge Chamber

Following the disaster at Sago and the mandates about new rescue chambers, miners by and large are still very skeptical about the chambers’ abilities to sustain life in many emergency situations. The amount of training miners are receiving in regard to refuge chambers is making them more comfortable. “Their level of confidence in them remains to be seen,” Baisden said. As an industry, we are approaching the moment when miners will chamber in place and rescue teams will have to be ready with additional training to properly handle those situations. There continues to be a lack of real world testing and available data that will better

predict as to how these chambers will react to the real world conditions in an underground event.

“We need to know what their survivability is in relationship to the proximity of a thermal event or an explosion of some type. We need to know how they are affected by radiant heat. Most chambers are rated for a max operating temperature of an ambient 75°. We would know as fire encroaches upon a chamber, that there is going to be some kind of reaction. We need to know what our time limits are. If you have an open flame, then consideration of the atmosphere is a given. If miners go to the refuge chambers, they have only a calculated amount of hours before that moving flame catches up to them. No matter what the situation, they and we are on a clock. With their lives on the line, we have to be able to get in there as quickly as safely possible, with whatever tools we need. That’s not happening now,” said Baisden.

Communication is also lacking. “We need to be given an actual idea of what the conditions inside a chamber are like so that we can prepare teams and address certain time frames. The men on the surface have a critical job of ensuring the safety of everyone, the whole overall operation. And what they value more than anything is accurate factual information as to what is happening underground. Gas samples, the trending method that we use prevalently now as to what is going on, what we are getting on local detector readings, what we are actually visually seeing. They have no data to give them any indication as to what takes place in a chamber on certain cycles, every six hours, every 10 hours. And we don’t know what the psychological effect will be for miners that have been in a chamber. How will they react after being shut up for so long when help does finally arrive? Mine rescue teams need some type of psychological training to teach them about what they might encounter. To date, we do not understand or have data regarding what happens to personnel in a refuge chamber for several days,” said Baisden.

Rescue teams would also operate more efficiently by using mass casualty training, such as a combat soldier does. If the miners evacuate to a refuge area, it would be logical for them to wait there for assistance. It’s there that rescue teams would possibly encounter miners with multiple injuries. Mine rescue needs to consider a

higher standard of medical training to handle burns and respiratory issues, as well as traumatic injuries.

Smoke is also a key concern. An actual coal seam fire, though rare, does happen. But the real threat underground is not from the fire itself but from the smoke. Just like on the surface, smoke is what usually causes fatalities. Very few fire deaths are caused by the actual fire itself.

Calling for a Safety Summit

As the entire industry continues to learn from past events, Baisden believes MSHA and the state need to re-evaluate the size of rescue teams and the specific tasks of team members. Historically, team members have had segmented tasks. Each position on the team had a duty they fulfilled. "With the advent of the new rescue procedures, we are heading into situations where we'll have to break down those barriers and cross train members in regard to the evolving communications tracking and refuge chamber technology.

"We should reconsider the required skill sets that teams currently train for. We need to raise that bar just like in medical training. Why would you want a minimum level of first aid when you could have an advanced level? Especially in situations where you are in a remote area and help is hours away. We should reconsider the equipment teams use. For that matter, we should re-evaluate what goes into a first aid box which is presently standardized from law of many years ago," said Baisden.

The state and federal government have recently required emergency responders to take NIMS training, which is a standardized interoperability program for allowing a diverse group of emergency responders to function together at an incident. It is a common language that is very useful in creating a unified command. "We need to retreat from multiple command posts and immediately determine who is in charge so we can expedite the operational procedures. It might assist mine rescue teams to additionally understand that this training and process is becoming a national standard for emergency responders," said Baisden.

Following the variety of incidents over the last five years, "we've not really had the opportunity to put together a rescue consortium. It really needs to be a concerted effort, by all the powers that be: MSHA, every state mining agency, every educational institution and every mining

company inclusive where all of our experiences could be reviewed and utilized to advance our purpose. We must begin to consider or create a consortium of technology, procedures and policies so that we are all on the same sheet of paper where we can expedite safety and rescue and utilize all of the tools that are available for the rescue world today," Baisden said.

"We owe it to the miners who go underground everyday to be prepared in

every way to respond to their needs and be there at a moment's notice, if needed. Most people do not understand why mine rescue does what they do, but the brotherhood works and trains so that others may live," said Baisden.

Buchsbaum is a Denver-based freelance writer and photographer specializing in industrial subjects. He can be reached through his Web site at www.lmbphotography.com or by phone at 303-746-8172.

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