

Reply: (RIN 1219-AB44)

Dear Gentlemen,

My name is Patrick A. Gazewood. I am a Nevada underground gold miner, I have been involved in underground mine rescue for thirteen years. I have been involved in many mine rescue responses so I have had an opportunity to have seen first hand what can and will go wrong during an emergency response. I am also a member of the United States Mine Rescue Association a group dedicated to the improvement of mine rescue.

I would like to take the time to comment during your request for information regarding **“Underground Mine Rescue Equipment and Technology.”**

Section D. Rescue Chambers

Question 1: Yes. In certain circumstances such as a cave-in that blocks exiting, gas inundation that doesn't permit escape, the unit could provide protection. I believe that taking the individual out of the equation is best the solution, to get them out of the mine should be the top priority, but when this is not possible lets give them every chance they can get.

Question 2: These units could either be fixed with substantial construction such as gunite or shotcrete with fresh air from the surface, or they could possible be built mobile similar to a fire car that some track mines have, and transported to an area near the work area, for semi permanent installation. These units should be stressed as last resort with escape being the first priority.

Question 3: If possible fresh air or compressed air & water should be provided for as long as possible at least a week.

I would like to encourage MSHA to develop formulas, criteria, and engineering standard for refuge chambers not only for coal but likewise for Metal/Non-Metal mines. Currently in the CFR on refuges there is no specific minimum criterion for size, amount of square footage necessary per individual, Oxygen consumption rates, construction material, or food. Other countries such as Canada or Australia have these as part of their mining regulations. Why is this? It is currently left to the operator to plan all of this from information that has to be compiled from elsewhere why is this?

Let's do it right and develop defined information that these units can be built from and supplied properly without the vague definition currently in the CFR. If we are going to improve mine rescue and also improve the safety of the nations miners let's take the time to gather this information and disseminate it to the industry so that all mine operators are

basing their decisions on good sound engineering and science principles. And not just leave it to chance that the operator has compiled the correct information.

Section E Communications

Question 7: One of the problems in mine rescue can be communicating between other mine rescue team members when linked up on a communication system. Conspic industries has greatly improved this area with a multi team communication system which makes it possible through throat mikes and ear pieces to communicate between the captain, team members & co-captain, and fresh air baseman while all on-line. These systems are a better tool than in years past but do have their limitation.

If an electronic wireless speaker/communication system could be invented that is integrated into the mask of a SCBA system which includes an ear piece in the system that would allow for free communication between members on a team it would greatly improve communication and free up precious response time often spent trying to communicate between members so all individuals are on the same page. It still would require the use of communication lines to be attached to the team, but having a wireless system for team members to utilize when not linked up would be a good step up.

Question 8: A couple of suggestions that can improve current PED systems would be to integrate available technology available in cell phones and pagers. To do this it could be possible to include a vibrating and/or an audible alarm into the systems, therefore it could improve notifying miner during an emergency.

One other technology that could improve evacuation during a mine emergency is based on research done by the Late Ron Conti of NOISH; it could be possible to build a laser escapeway system that could demarcate primary or a secondary escape routes in smoke. Research has shown that certain types of lasers are highly visible in smoke and could be used to mark a route during a fire, making it possible to find your way out easier. Systems can be developed that could be activated by hoist man or communication officer from the surface once an emergency is declared to demarcate escape routes.

Section F Robotics

Question 1: A robot could also be used to transport additional self rescuers, or equipped with bottled oxygen on it. It could also include food, water, first aid supplies. During the 60's robotic sleds developed by the US Military could even fight a fire. In addition a fiber optic communication system could be attached to communicate with trapped miners with a trailing cable back to the surface, or it could be equipped listening devices.

Section H Developing New Mine Rescue Equipment

Question 1: The challenges that are associated with developing new equipment are the same challenges that are associated to all industries. Come up with an idea, spend money to develop it, and then cross your fingers and hope someone buys it. One of the problems in developing items for mine rescue is that the mining industry has become very safe, and the number of mines producing have been reduced, and mine emergencies can be far and few in between. So the demands for specialized mine rescue equipment are greatly reduced, it's simply supply & demand economics. Most of the technology associated with mine rescue work were developed for other industries and adopted by the mining industry, and without some type of incentive it will probably always be that way.

Question 4: Streamlined; yes. I would like to suggest an area to develop that would be of benefit to all mining operations, I understand that it is not the role of the Fed. Gov. to endorse any product over another. But one of the problems in the mine rescue industry is knowing what types of rescue equipment are available in the industry currently, what would be of benefit is a database of rescue device & products available that are approved by MSHA or recently have been approved for rescue work. This could be posted on MSHA's site. That way it would be possible for a mine operator to know what is available and if they choose, seek out these items. It would provide a centralized location and be a resource such as the current MSHA library available to the entire industry for review.

Question 5: Any barrier reduction or incentives that MSHA can provide to the mine rescue industry to make it easier would be beneficial, this could be developed through grants, loans, matching funding for R&D, etc.

Section I Mine Rescue Teams

Question 1: Most mine rescue teams have similar equipment, but there is equipment that is needed that has not been developed yet that would be of benefit to all the industry. May I make a few suggestions of equipment that would be of benefit to the success and safety of a rescue team? Some of this technology exists or has been tested in the past, or needs to be developed or refined for rescue work. I believe that with all of America's technological expertise these items can be developed and implemented.

1. Total Team Communication systems, where all team members can talk/listen with each other without being attached to a life-line. Current technology doesn't make it possible for all members to hear or communicate with one another without being attached to a life line. I know the importance of utilizing a life-line and it is a necessary component of a team's gear. But unless a team is traveling in smoke and attached to the system there is no other way to communicate with one another except up-close and personal or through hand signals or trying to shout over ventilation systems. An electronic portable system that can be utilized in

close proximity of other team members would eliminate communication delays during exploration, rescue, and mine recovery situations.

2. Develop corner roller or pulley devices that allow easier movement of communication cables that are drug by teams during exploration phases of an incident. Currently there is nothing out there in the industry that makes this possible. Teams have to drag up to 1000 ft of communication cable around, over, and through all kinds of obstacles. Any device that could potentially eliminate head aches of this situation type would greatly improve response time.
3. Wheeled rescue stokes carriers, currently many teams utilize stokes carries to ease the strain of team members of having to manually carrying all their rescue gear which may be up to 200lbs of gear. But there is no standardization of these types. They are usually built by the team, adapted from military surplus or adapted from a deer carrier. Any off-road all-terrain stokes device capable of handling the demands of mine rescue would be of benefit to all the industry.
4. Team member bio-monitoring devices, much research has been done by NOISH (Specifically by Patrick Heniz and Floyd Varley) to understand the dangers of working in high heat environments that are common to mine rescue work, rescue men have died in the past because of this every present threat. Recommendations have been made on ways to better maintain the health and wellness of rescue team members, so that rescuer do not fall victims to the stress of the environment during rescue work. Developing rescue heat environment standards, bio-monitoring devices and proper management of this ever present danger can make rescue work safer. Confine space rescue work is the most dangerous of all types of rescue work. A mine is a confined space on a massive scale. Any thing that can be done to improve the danger that is inherent with this type of rescue work is a good thing.
5. Inflatable temporary bulk heads, and air locks, are items that are highly specialized and not utilized very often in mine rescue but are a necessary item when fresh air bases are constructed or refuge chambers are entered or foam generators are being utilized to extinguish a fire. Being able to control the environment is critical to a safe mine rescue response. Currently there is only one maker in the industry that builds inflatable air locks and that is RocVent industries. In the past ABC Ventilation Product use to make this type of device but because they are needed rarely demand is not enough to justify production. It might be worth looking at to see if MSHA along with much of their other specialty rescue equipment could keep items like this on hand. So that they can be transported to a rescue with the rest of their response equipment when called upon.

6. Suction Rescue device, this item is more of a device that would be of benefit to a surface fire brigade than an underground rescue team. But under the right condition could work underground with a portable suction unit. This device is a wand with an attached hose connection; often it has an air lance wand that is used in conjunction and adaptable to large suction trucks. It is commonly utilized by city sewer & water companies to drain & clean out piping and containment basins. Many large mines utilize these units in their mills for cleaning sumps, tanks, etc. While we are talking about mine rescue lets talk about how important this could be to a mine in general specifically on a surface rescue. It can be utilized to quickly remove dirt and transported safely away. It can clear debris in a trench collapse rescue; also it could be utilized in confine space rescue in bins that have material engulfment accidents. In the past there have been fatalities in the mining industry because of engulfment and entrapment. These units reduce the amount of hand digging and bucket brigades necessary in this type of rescue. There are currently some fire departments that are using this device. Use of this type of device is greatly reducing the time involved in an entrapment situation.

Section J Government Role

Question 1: There are several products currently used abroad in the world that could not only improve mine rescue but likewise the safety of our miners. They are in need of approval to become MSHA endorsed. Mine arc system build portable self contained refuge chambers that can be build in many different sizes these units are now in use in the Australian mining industry the company's website is:

<http://www.minearc.com.au/>

To my understanding these units are even used by The US Government on the Nevada Test Site. On the test site, tunnel work takes place there. These units used are there because they are not governed by MSHA on that site but fall under OSHA standards. If this type of refuge is good enough to be used in an OSHA setting why not utilize it for use in the mining industry? These units have yet to be approved by MSHA for use in mining in the United States.

Another product out there that could be of benefit to mine rescue & fire brigades is the fire fighting product produced by Extreme Technologies Corp 2947 Scott Circle E, Jacksonville, Fl 32223 Ph. 904-334-4407 The company has an incredible fire fighting products that are a step up from trip AAA foam. Below is a hyperlink to the company website and video demonstrations link.

<http://www.extremetechnologiescorp.com/>

http://extremetechnologiescorp.com/Video/video_files.htm

Application of this product to fight different types of fires with quick and dramatic results would be good for all of the mining industry whether in an open or underground settings. This is another product that would be good for MSHA approval.

Question 6: I would like to make some suggestion that could improve the capabilities and effectiveness of mine rescue teams, and also improve safety in the mining industry.

1. Any mine that currently has a mine rescue team will be the first to tell you that it costs a lot of money to successfully run a team. And because of that cost the decision in much of the industry is to secure mutual aid contracts with larger mines that can afford to have teams. Many smaller operators may not have the people to run an effective team or have the funds to do so. I would like to suggest that MSHA be willing to secure grant money, matching fund money or some type of tax credit that could assist these small operations & mid size operations to provide for mine rescue equipment. I would like to further suggest. The US Military uses Biomarine SCBA devices for use as part of Biological Warfare training, and also in the event it is needed during war. These are the exact same units as the mining industry uses. As The US Government upgrades and trades these units off for newer model, it could be possible to secure the units and or refurbish them, and donate them to mine rescue teams at free or reduced rates.
2. I would like to suggest that a mine rescue training facility be constructed out west similar to the Beckley, West Virginia facility at the MSHA Academy That way more mining companies in the Western United States could have the same level of training offered as those teams closer to the MSHA Academy
3. I would like to suggest that MSHA Develop an Incident Command training program for the Metal/NonMetal mining industry similar to the one currently in use in the Coal industry as taught by MSHA.
4. The roles of most mine rescue teams in the industry are changing. 20 years ago underground mine rescue consisted of going in rescuing miners and recovering mines. And that traditional role will not change, but today's mine rescuer can wear many hats and MSHA has not traditional kept up with the industry, and that is why we are discussing this today. Those same mine rescue teams are functioning as Fire Brigades, Site Hazmat Teams, EMT's, Rope Rescue, and it is not uncommon for that mine rescuer to wear all of those hats. Many mining companies have gone

to the higher levels of training to provide greater safety response to their miners. I have personally worn all those hats during my 13 years of being involved in underground mine rescue. Currently surface response teams must seek their training from fire academies, or departments, seek their rope training from high angle rope rescue schools or seek hazmat training from their state. I would therefore like to suggest that MSHA take a comprehensive look at all mine rescue whether it is underground or surface rescue and improve the curriculum to cover these subjects. I would like to suggest that a surface Mine Rescue training program be developed similar to the Underground module book, with all aspects of rescue work one might encounter on the surface. The book should include firefighting, extrication, rope rescue, first aid, and hazmat training. That way a national standard can be developed that all the mining industry could be benefited by. I would like to suggest other improvements that could be added to the underground training modules. A training program on hazmat response and a training program with rope rescue in an underground setting. One team that I was involved with during my mine rescue career has responded to 3 different rescue/recover incidents that required the use of rope rescue. I received this training after a miner was killed in our open pit when a haul truck went over a highwall. The company took a comprehensive look at the site and decided to train the team in this aspect of rope rescue work. At that site our team covered the open pit, mill, and underground facilities. Even though we never had to use this training on our own site in an emergency setting we were called on to utilize this expertise on three other occasions because our team was the only team in Southern Nevada with this skill. We responded to The Baxter Mine accident in Southern California when a surface drill operator had a bench collapsed under him and end up in underground workings. We had to utilize every bit of our underground training in addition to our rope rescue to support and stabilize the site before completing a successful rope rescue recovery. We likewise were involved in two responses that involved old abandoned mines, one of those incident is now part of the video presentation portion of the current stay out stay alive program for kids, that illustrates the dangers of abandon mines. The last involved a little girl that was playing with her brother around an abandoned mine shaft when here parents were working an off-road rally race. Several years ago there were approximately 700 mine rescue teams in the nation. Today there are around 200 teams. These teams are being called on to do roles that are up and above the tradition roles of mine rescue. Teams are now being called on to do more abandoned search and rescue missions and it is because underground teams have the knowledge of these types of rescue that we are being called. It would be good for MSHA to take a comprehensive look at abandoned mine lands and help to abate some of these locations. Rather than wash their hands of the site once mining has ceased. I realize this is a symptom of a bigger problem, but discussing

mine rescue team roles and how it can be impacted by abandoned mine rescue might be a good subject for future mine rescue training manuals.

5. Last but not least, I would propose that a yearly mine rescue symposium be developed where MSHA, and the miner rescue portion of the mining industry, and rescue industry vendors get together and discuss, develop, plan, and implement improvements in surface and underground mine rescue. It is possible to make major strides and develop long term strategies that can and will improve safety and response time in the mine rescue.

In conclusion, in order that improvements in mine rescue become lasting I would encourage MSHA to look outside the box, and not just let the suggests that are being proposed by the industry be so much water under the bridge and become a thing of naught. The opportunity to improve mine rescue is something that has been talked about in years past whenever mine rescue teams get together and is more importantly needed presently. Let's just not talk the talk, let's walk the walk. Our Current mine rescue training curriculum was developed twenty years ago, and needs to be updated, but more importantly improvements in all aspects of mine rescue need to be looked at. Let's not just isolate all of the improvements to the coal industry only, those of use that work in the hard rock industry and are involved in mine rescue would like to see the improves in mine rescue, and improvements to refuges be for the good of the entire industry. Too often in the past all the improvements in the industry and more particularly to the 30 CFR's have been for the benefit of the coal industry only. Turning a deaf ear to those of us that work in the Metal/NonMetal industry is like treating our industry like a bunch of bastard step children. To do so is not only a disservice to the coal industry, but is likewise a discourtesy to the entire mining industry, so let's not drop the ball do it for the good of all of the nations miners.

Thank you for your time.

Sincerely,

Pat Gazewood

