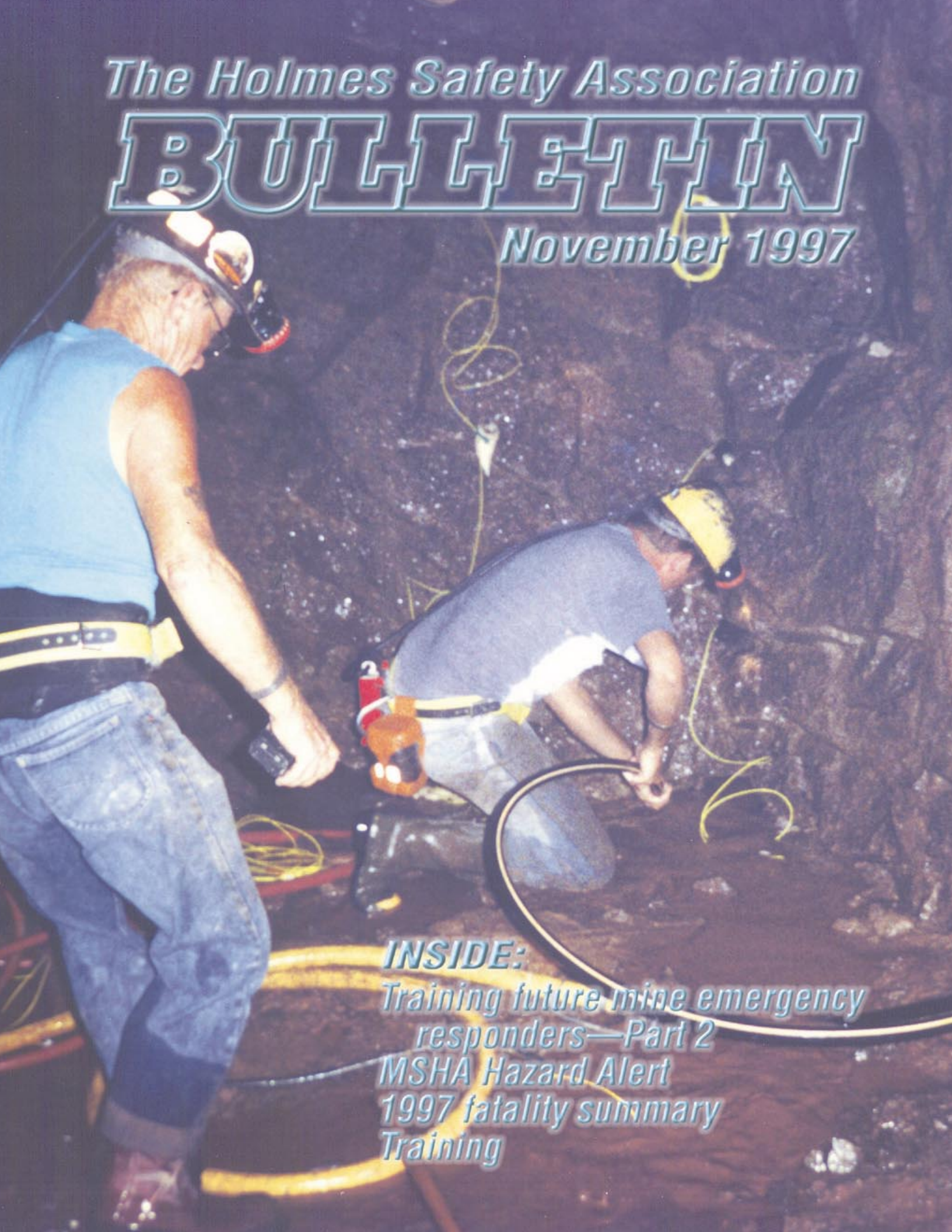

The Holmes Safety Association BULLETIN

November 1997

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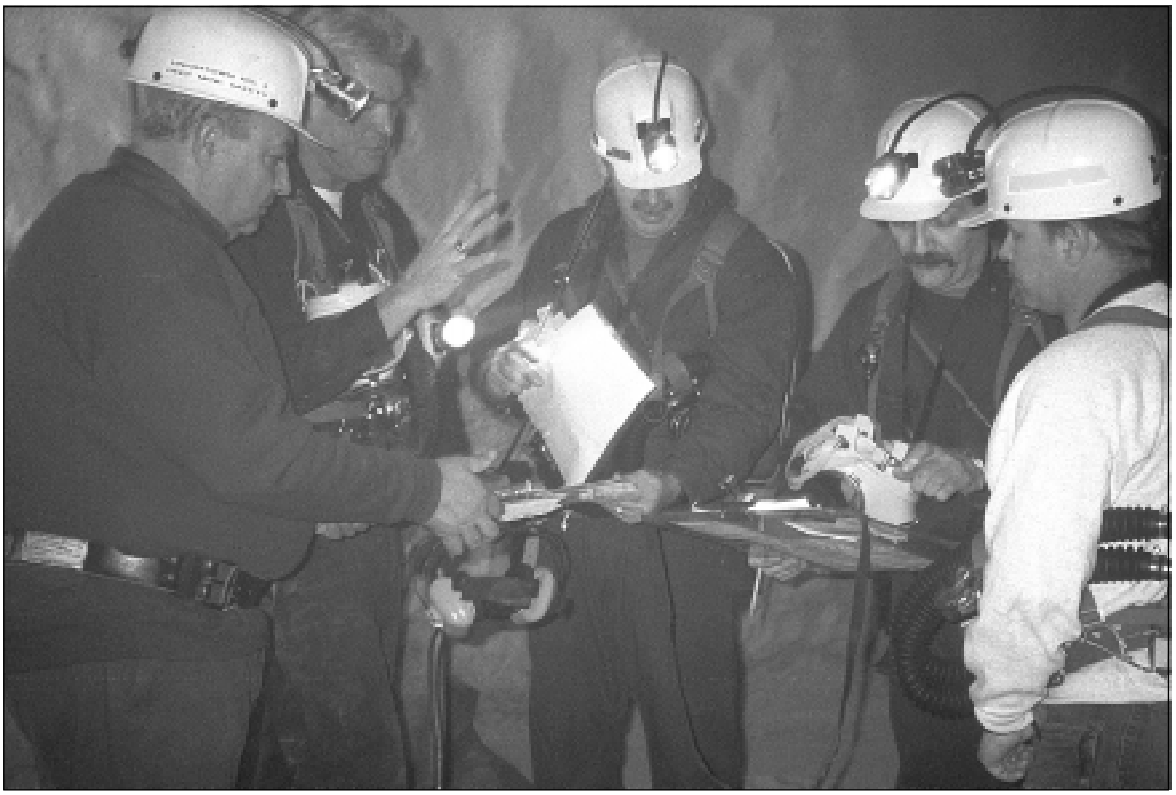
contents:

The ***Holmes Safety Association Bulletin*** contains safety articles on a variety of subjects: fatal accident abstracts, studies, posters, and other health- and safety-related topics. This information is provided free of charge and is designed to assist in presentations to groups of mine and plant workers during on-the-job safety meetings.

PLEASE NOTE: The views and conclusions expressed in ***Bulletin*** articles are those of the authors and should not be interpreted as representing official policy or, in the case of a product, represent endorsement by the Mine Safety and Health Administration.

COVER: Thanks to Terry Jacobs of Gouverneur Talc Co., Inc. (Gouverneur, NY) for this month's cover photo of miners loading a shot to sink a decline in their woolastinite mine—a mineral used in ceramics and as a neutral filler in paints. The miners are, from the left, Kenny Woods and "Doc" Taylor working in Gouverneur Talc's No. 4 mine. [If you have a potential cover photo, please send an 8" x 10" print to the editor, Fred Bigio, MSHA, 4015 Wilson Blvd., Arlington, VA 22203-1954]

KEEP US IN CIRCULATION
PASS US ALONG



Training future mine emergency responders

Part 2: What topics should be included?

By Michael J. Brnich, Jr., Mining engineer; Launa Mallett, Research sociologist; and Charles Vaught, Research sociologist. U.S. Department of Energy, Pittsburgh Research Center, Pittsburgh, PA

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

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:

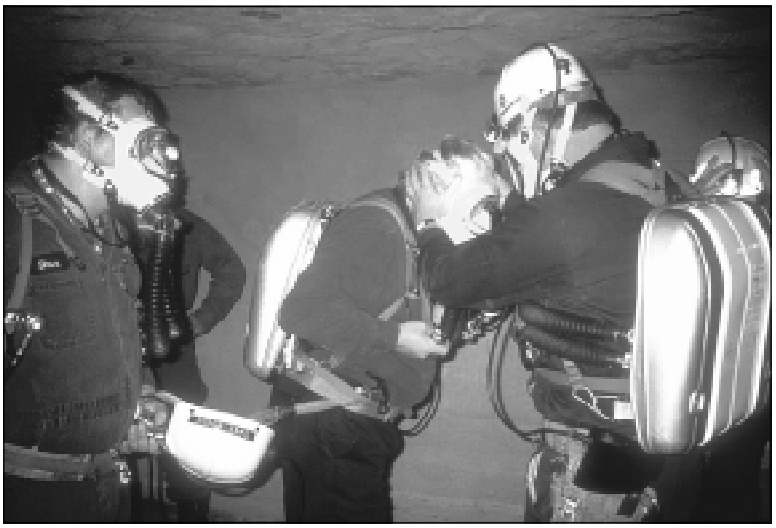
Well, I think one of the most critical things that you encounter when you get to a mine is the ventilation system… at that mine. You know what, what has happened to the ventilation system, and what you need to do… to restore the ventilation, and unfortunately, too many of us just don't know that much 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.*

42 CFR Part 84: It's time to raise your respirator program to the new standard

By Jay G. Mears, Product Line Manager, MSA

It's the dawn of a new era for your air purifying respirator program.

As you're likely aware, the National Institute for Occupational Safety and Health (NIOSH) has updated and modernized the federal regulations that certify non-powered air purifying particulate respirators. These are the most widely used types of respirators, commonly used for protection against hazardous particulates generated during operations such as welding, sanding, grinding and chipping.

This new certification standard is know as Part 84, for the Code of Federal Regulations in which they appear, 42 CFR Part 84. In short, the regulations reclassify filters by specific efficiency ratings and performance characteristics rather than by type of hazard. Beginning July 10, 1998, respirator manufacturers will be able to offer only products approved under the new Part 84 standard.

Although products that met the old standard, 30 CFR Part 11, still provide adequate and approved protection, making the switch requires preparation time. With workplace assessment, worker-needs evaluation, training, possible fit testing and inventory changeover, it's been estimated the transition could take companies three to six months. That's why respiratory protection program managers must act now to begin making the switch to Part 84. Above all, it means you need to be informed.

Answers to frequently asked questions

Following are answers to frequently asked questions about the new standard and how it will impact you. You should become familiar with the level of protection you can expect from the different respirator classes. Also, you should know that new fit testing may be required if the filter change has an impact on the face seals, as with some maintenance-free respirators.

Question 1: Can I continue to use my existing inventory of NIOSH-approved 30 CFR Part 11 particulate filters?
Answer 1: Under 42 CFR Part 84, NIOSH is allowing manufacturers to make and ship 30 CFR Part 11 particulate filters as NIOSH-certified until July 10, 1998. Afterward, respirator manufacturers must offer only the respirators and filters that comply with 42 CFR Part 84. In the meantime, your current 30 CFR Part 11 products still provide adequate and approved protection.

Question 2: How is the new standard different from the old?
Answer 2: Currently, 42 CFR Part 84 outlines testing and certification requirements only for non-powered, air purifying, particulate filter respirators. While the 30 CFR Part 11 classifications were substance-specific (dust/mist and dust/mist/fume/HEPA), the new regulations classify particulate filters by efficiency and performance characteristics against non-oil- and oil-containing hazards.

Question 3: How have standards changed for air purifying, particulate filter respirators?
Answer 3: The 42 CFR Part 84 standard creates three new series of particulate filters designated by NIOSH as N, R and P. All of these filters are tested against the most penetrating size of aerosol (0.3 microns). With all series of filters (N, R and P), consideration must be given to hygiene, damage and breathing resistance. As with 30 CFR Part l l, approvals under 42 CFR Part 84 are obtained for the complete respirator assembly, not just the filters. Additionally, filters in each of the three series (N, R and P) will have three minimum efficiency levels - 95%, 99% and 99.97%. For example:
Filters with the "N95, R95 and P95" designations will be certified as having a minimum efficiency of 95%.
Filters with "N99, R99 and P99" designations will be certified as having a minimum efficiency of 99%.
Filters with "Nl00, R100 and P100" designations will be certified as having a minimum efficiency of 99.97%.

This means that under the new standard you will have a total of nine new particulate filter designations from which to choose.

Question 4: How will I know which filter is right for the protection I need?
Answer 4: NIOSH's nine new designations will help to define and clarify usage parameters. Each of the nine types of filters is designed to coincide with specific requirements

regarding usage, service life and duration. The specifics of these limitations will evolve over time and are clarified in NIOSH's User's Guide. Overall, the N series filter is tested against sodium chloride (NaCl) and is limited to use in atmospheres containing non-oil-based particulates; it can't be used if oil particles are present, such as those generated when cutting oil-covered steel.

N filters have a time-use restriction of eight hours (continuous or intermittent). However, the service time can be extended by performing an evaluation in the specific workplace setting that demonstrates either, (a) that the extended use will not degrade the filter efficiency below the efficiency level specified in the approval, or (b) that the total mass loading of the filter is less than 200 ma.

The R series and P series are tested against dioctyl phylate (DOP) and are intended for filtering any non-oil- or oil-containing particles. R filters also have a time-use restriction of eight hours (continuous or intermittent). However, the service time can be extended using the same methods described above for N series filters.

P filters may be used in either a nonoil- or oil-containing atmosphere, and they do not have any time-use restrictions other than those normally associated with particulate filters. Therefore, by definition, any filters meeting the more stringent P series tests can be used for applications meeting N or R series requirements.

The P series filters are the only series certified for use without any time or use restrictions other that those normally associated with particulate filters. (The P100 is the only filter to be assigned the familiar magenta color.)

In general, the selection of N, R and P series filters depends on the presence or absence of oil particles, as follows:

If no oil particles are present in the work environment, use a filter of any series (i.e., N, R or P series).

If oil particles (e.g., lubricants, cutting fluids, glycerine, etc.) are present, use an R or P series filter. (Note: N series filters cannot be used if oil particles are present.)

If oil particles are present and the filter is to be used for more than one work shift (eight hours), use only a P series filter.

Question 5: Can I still use my current respirator?
Answer 5: The updated standard will not necessarily require you to change the type of respirator or filter you currently are using. Most people will be able to continue using the same types of respirators they currently use. In other words, most filters certified under 42 CFR Part 84 will be "dropin" replacement products for filters certified under 30 CFR Part 11. In many cases, however, the filter media will change. The final determination depends on NIOSH's filter selection criteria and the user's application and exposure(s).

Question 6: Does the new standard mean all users will have to be fit tested?
Answer 6: In most cases, 42 CFR Part 84 will not require a new fit test, because the face piece stays the same and only the replacement cartridge changes. However, many filters certified under the old standard can not meet the requirements of the updated rule. That's because the initial efficiency requirements of particulate filters have increased. Therefore, many of the current "dust/mist" and "dust/mist/fume" filters will have to be redesigned. Ideally, these new filters also will be drop-in replacements for your current respirator filters. Additionally, even though the 99.97% efficiency rating is similar to the former HEPA requirements, replacements in this category still will have to meet the test requirements specified by the N, R or P classes.

In short, if changes in filter media affect the face piece seal—which may occur in filtering face piece respirators—you should check with your respirator manufacturer to determine whether you or personnel in your company need to be fit tested again with the new respirators. Of course, you should fit test all employees at least annually.

Question 7: How can I tell if my respirator and filter meet the new NIOSH standards?
Answer 7: It's important to note that NIOSH grants approvals for the complete respirator assembly, not just the filters. You can be sure your materials are certified according to the requirements of 42 CFR Part 84 by checking the NIOSH approval numbers on the products. Those certified under 42 CFR Part 84 will carry the designation "84A" -for instance, 84A - 0001. Additionally, on all 42 CFR Part 84-compliant products, you will find logos from NIOSH and the Department of Health and Human Services. Finally, certification filter series and efficiency levels (e.g., N95, P100, etc.) will be included on the 42 CFR Part 84 label. Filters marked as P100, for example, meet the requirements of a P series filter and have a 99.97% efficiency. Except for the P100 filter, there are no requirements to color code the various classes of filters. The Pl00 will be color coded magenta, similar to HEPA filters you may be using now, which are approved under 30 CFR Part 11.

Reprinted from the September 1997 issue of Industrial Hygiene News, 8650 Babcock Blvd., Pittsburgh, PA 15237-5010.

For a copy of MSA's "Intelligence Report: Getting Ready for 42 CFR Part 84," contact MSA toll-free at 1/888-867-0602 and request Bulletin No. 1000-30; or contact your nearest authorized MSA distributor. For more information on MSA and its other products, visit MSA on the Internet at www.MSAnet.com.

MSHA Hazard Alert

Miners are being run over by powered haulage and other mobile equipment at metal and nonmetal mines

Since January 1995, 18 miners have been run over and fatally injured by trucks, dozers, front-end loaders, and a drill. Ten of the fatalities involved haulage trucks which ran over miners that were on the ground or in a pick-up truck. In eight other incidents, equipment operators were run over by the same equipment they were operating.

Mine operators and contractors can successfully eliminate these types of accidents at their operation by establishing and enforcing the following basic safety rules:

- Require truck drivers and mobile equipment operators to remain in their units while in designated areas.
- Prohibit foot traffic in haulage areas.
- Develop a communications system to alert equipment operators with restricted visibility to pedestrians and other traffic in the area.
- Provide signs which clearly describe traffic hazards on mine property.
- Establish and enforce procedures for parking and leaving mobile equipment unattended.
- Require all mobile equipment to be blocked against movement prior to repairs.
- Provide hazard training for delivery and customers coming onto mine property.
- Require operators to use seatbelts.
- Require front-end loader operators to visually confirm truck drivers in their cabs before loading.

MSHA reminds coal miners of cold-weather dangers

As winter approaches, the Mine Safety and Health Administration (MSHA) is once again warning coal operators and miners that colder weather creates more hazards in the mines. MSHA's Winter Alert campaign, which runs annually from October through March emphasizes increased vigilance underground during the winter months.

All coal mines contain methane, and when the barometric pressure drops during colder weather, methane can migrate more easily into [be mine atmosphere. increasing the risk of an explosion. Furthermore, dry winter air results in drier conditions underground, and this makes coal dust more likely to get suspended in the mine atmosphere which also can contribute to an explosion.

"Thanks to the cooperative efforts of coal mine operators, miners, and others concerned with mine safety, we have made strides to reduce the risk of explosions, but each year the risks are very real," said J. Davitt McAteer, assistant labor secretary for mine safety and health. "Mining continues to be dangerous and we must be as vigilant today as we have been in the past if we are to deal successfully with these risks."

Historically, some of the nation's worst mining disasters occurred between October and March and since 1900 more than 250 fatal eoal mine explosions have caused the loss of nearly 6,600 lives. In December 1907, an explosion in Monongah, W.Va., killed 362 miners, making it the worst mining accident in U.S. history.

This year's Winter Alert slogan—*0nly you can prevent mine explosions!*— appears on safety signs distributed to all underground coal mines. MSHA also is disseminating Winter Alert calendars that list the dates, locations, and numbers of fatalities of past coal mine explosions.

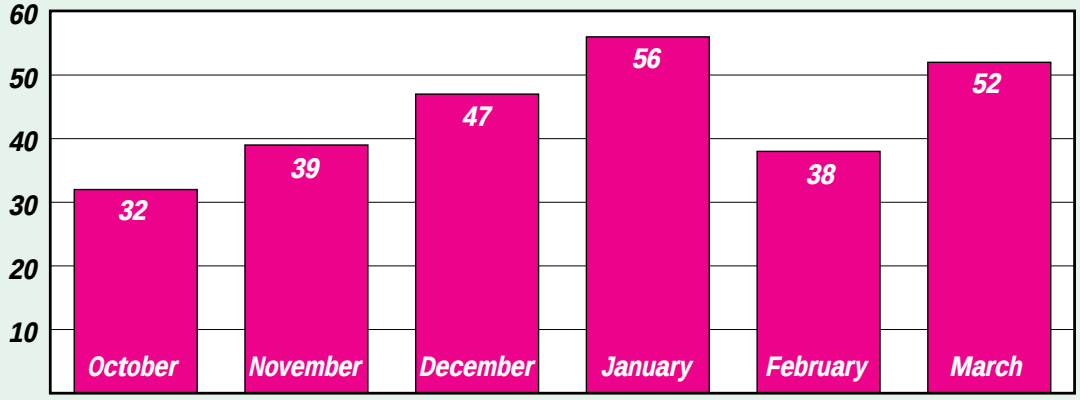
When posted in mine offices, bath houses, underground sections, and other areas where miners work, these signs, and calendars will serve as a constant reminder of the increased dangers thatexist this time of year.

MSHA also is reminding underground coal miners and operators of the following:

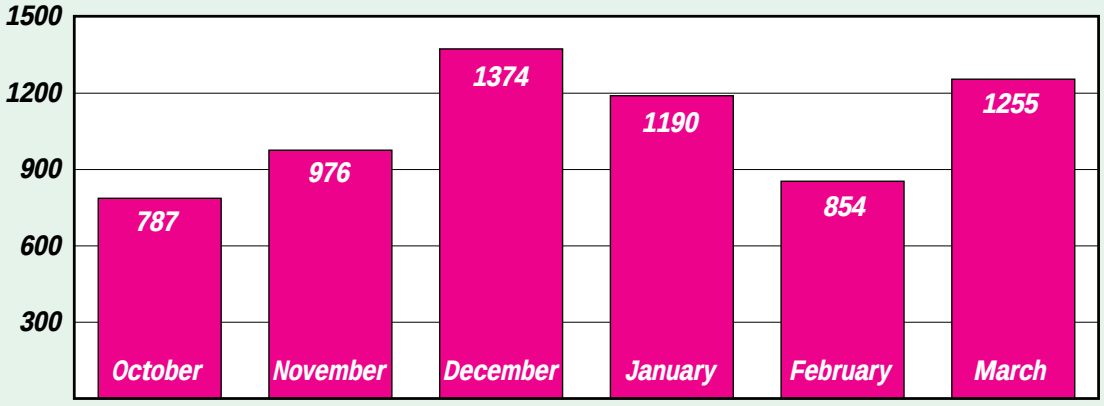
- **Consistently follow the mine-approved ventilation plan.**
- **Conduct thorough pre-shift on-shift and weekly checks for methane and other hazards.**
- **Keep potential ignition sources out of working areas; give special attention to maintenance of bleeder systems in worked-out areas, to ensure that methane from these areas cannot accumulate and become a hazard.**
- **Complete rockdusting in all areas of the mine.**
- **Never smoke or carry smoking materials into an underground mine.**

Reprinted from the Philadelphia office of the U.S. Department of Labor's MSHA bulletin no. III-97-10-14-183-MM— Contact: Amy Louviere at (703) 235-1452.

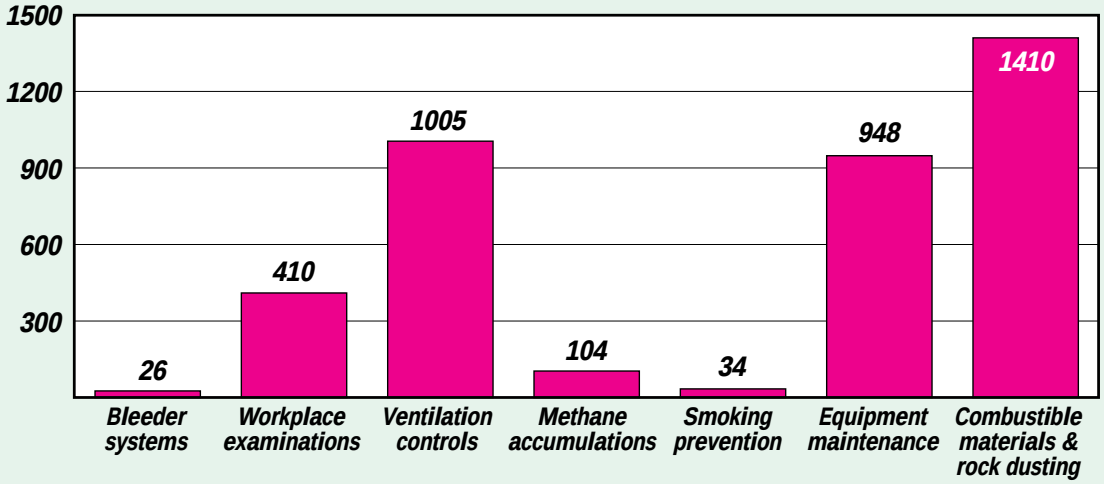
Coal mine explosions since 1900
October through March



Fatalities from coal mine explosions since 1900
October through March



Violations cited during Winter Alert activities
October 1996 through March 1997



10

Safety practices for oxy-fuel cutting and welding

By Dave Bell, Marketing Manager, CONCOA

We learn by experience. Learning safety through personal experience, like a child touching a hot stove, is harmful, wasteful and unwise. Let the experience of others teach you the safe use of cutting and welding equipment.

Safe practices developed from experience in the use of welding and cutting equipment are described in this article. Through research, development and field experience, we have evolved reliable equipment and safe installation, operation and servicing practices.

Accidents occur when equipment is improperly used and maintained. The reasons for safe practices may not always be given. Some are based on common sense, others may require technical volumes to explain. It is wiser to follow the rules.

Failure to observe these safe practices may cause serious injury or death. When safety becomes a habit, the equipment can be used with confidence.

Oxy-fuel welding and cutting safe practices

Oxy-fuel equipment, properly used, can safely weld, heat and cut metals; but carelessness creates such hazards as fire and explosions. The equipment mixes flammable fuel gases and oxygen under pressure to support a flame. Oxygen is not flammable, but it vigorously accelerates combustion of fuel gases and combustible material. Sparks, flying slag, fumes, hot metal as well as heat, are normally under control. The wise operator avoids unnecessary risks by protecting himself and others from accidents as described here and in the referenced sources.

Always follow these rules

Always carefully read the manufacturer's operating instructions prior to using equipment. If you do not have operating instructions, obtain a copy from the manufacturer or the local distributor of the equipment, or obtain a copy of general instructions.

• Always follow the manufacturer's operating instructions at all times. Deviation from these instructions can result in injury.

• Always obtain qualified instructions before attempting to install or use the equipment unless already familiar with the equipment

• Always have equipment periodically inspected and repaired by a qualified repair shop.

• Always inspect the filter in the inlet nipple of oxygen regulators to insure the filter is in place and clean. If the filter is missing, have the regulator inspected and cleaned, and the filter replaced by a qualified repair shop.

• Always keep your oxygen from combustibles. Oxygen cylinders, cylinder valves, couplings, regulators, hoses and apparatus shall be kept free from oil, grease and other flammable or explosive substances. Oxygen cylinders or apparatus shall not be handled with oily hands or gloves.

• Always have at least one special cylinder wrench available for immediate use. Cylinders not having fixed hand wheels shall have keys, handles or nonadjustable wrenches on valve stems while these cylinders are in service so that the gas flow can be turned off quickly in case of an emergency.

• Always close the cylinder valves whenever the equipment is unattended.

• Always drain the regulator. Before a regulator is removed from a cylinder, the cylinder valve shall be closed and the gas released from the regulator.

• Always "crack" the cylinder valve. Before connecting a regulator to a cylinder valve, the valve outlet shall be wiped clean with a clean cloth free of oil and lint, and the valve shall be opened momentarily and closed immediately.

• Always perform these steps after the regulator is attached to oxygen cylinders:

1. Engage the adjusting screw and open the downstream line to drain the regulator of gas.

2. Disengage the adjusting screw and open the cylinder valve slightly so that the regulator cylinder pressure gauge. pointer moves up slowly before opening the valve all the way. 3. Stand to one side of the regulator and not in front of the gauge face when opening the cylinder valve.

• Always leak-test the connections after assembly and before lighting the torch. Flames shall not be used.

• Always purge the hoses individually before lighting the torch for the first time each day. Hoses shall not be purged into confined spaces or near ignition sources. Hoses shall be purged after a cylinder change.

• Always follow the manufacturer's instructions for lighting, adjusting and extinguishing torch flames. A friction lighter, stationary pilot flame or other suitable source of ignition shall be used. Matches, cigarette lighters or welding arcs shall never be used.

• Use pressure reducing regulators only for the gas and pressure for which they are labeled. The regulator inlet connections shall comply with ANSI/CGA Standard V-1, Compressed Gas Cylinder Valve Outlet and Inlet Connections.

• Always inspect connections and union nuts on regulators before use to detect faulty seats which may cause leakage when the regulators are attached to cylinder valves or hoses. Damaged units or connections shall be replaced.

• Always ascertain that gauges used for

oxygen service are marked "USE NO OIL."
• Always drain oxygen regulators of oxygen before they are attached to a cylinder or manifold, or before the cylinder valve is opened. Oxygen cylinder or manifold valves shall always be opened slowly.
• Always have repair maintenance for regulators or parts of regulators (including gauges) performed by qualified technicians.
• Always replace hoses showing leaks, burns, worn places or other defects which may render the hose unfit for service.
• Always close torch valves in confined spaces. Additionally, the fuel gas and oxygen supply to the torch shall be positively shut off at a point outside the confined area whenever the torch is not to be used, such as during lunch or overnight. Unattended torches and hoses shall be removed from the confined space.
• Always ascertain that hoses for oxy-fuel gas service comply with the Rubber Manufacturers Association IP-7 Specification for Rubber Welding Hose and that hoses for oxy-fuel gas service are color-coded according to the authorities having jurisdiction.

Things that you never do

• Never use oxygen as a substitute for compressed air. Oxygen shall not be used in pneumatic tools, in oil preheating burners, to start internal combustion engines, to blow out pipelines, to dust clothing or work, or to create pressure for ventilation or similar applications. Jets of oxygen shall not be permitted to strike any oily surface, greasy clothing, or enter fuel oil or other storage tanks.
• Never interchange oxygen cylinders, equipment, pipelines, or apparatus with any other gas.
• Never use attachments for mixing gases. No device or attachment facilitating or permitting mixtures of air or oxygen with flammable gases prior to consumption, except at a burner or in a torch, shall be allowed unless approved for the purpose.
• Never attempt to repair or substitute parts on equipment, particularly the regulators. Special techniques and tools are needed to safely repair oxy-fuel gas welding and cutting apparatus.
• Never handle, lay or store oxygen regulators or other oxygen equipment on oily or greasy surfaces. The equipment can become contaminated with oil or grease which might result in a fire or explosion.
• Never use acetylene pressure above 15 psi". Acetylene pressure above 15 psig can result in a fire or explosion.
• Never empty the oxygen cylinder below 25 - 50 psi". If the oxygen cylinder is allowed to become completely empty, it will lose its positive pressure and contamination may enter the cylinder and create an unsafe condition.
• Never transfill (refill) empty oxygen or fuel gas cylinder. Return them to the gas supplier for proper filling. Special procedures and techniques are necessary to safely fill cylinders.
• Never change regulators from one gas service to another or replace a pressure gauge with one taken from any other service. Contamination resulting in a fire or explosion can take place by changing pressure gauges or regulators from one service to another.
• Never leave pressure on a regulator when not in use.
• Never open a cylinder valve wide open. An acetylene cylinder valve shall not be opened more than approximately one and one-half turns and preferably no more than three-fourths of a turn, unless otherwise specified by the manufacturer.
• Never exceed the manufacturer's recommendation for withdrawal rate from gas cylinders.
• Never use compressed air from a cylinder without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold, unless the equipment used is designed to withstand full cylinder pressure.
• Never use acetylene at a pressure in excess of 15 psig (103 kPa) or 30 psia (206 kPa). This requirement shall not apply to storage of acetylene dissolved in a suitable solvent in cylinders manufacturer and maintained according to U.S. and state departments of transportation requirements, or to acetylene for chemical use.
• Never stand in front of the outlet when cracking the cylinder valve, stand to one side. Fuel gas cylinder valves shall not be cracked near other welding work or near sparks, flame or other possible sources of ignition.

Conclusion

To paraphrase an old saying, you're never too old to learn new safety tips. If you follow these 'always' and 'never' tips, you will work safer and smarter.

For additional information, contact Controls Corporation of America (CONCOA), 1501 Harpers Rd., Virginia Beach, VA 23454, 800/225-0473 in USA, 757/422-8330, www.concoa.com

***REFERENCE SOURCES**:*
For more information, refer to the following standards or the latest revisions and comply as applicable:
*1. ANSI Standard Z49.1, **Safety In Welding and Cutting**, American Welding Soc., RO. Box 351040, Miami, FL*
*2. ANSI Standard Z87.1, **Practice for Occupational and Educational Eye and Face Protection**, American National Standards Institute, 1430 Broadway, New York, NY 10018*
*3. American Welding Society Bulletin F4.1-80, **Recommended Safe Practices for Welding and Cutting Containers and Piping That Have Held Hazardous Substances** (See ref. 1 for address.)*
*4. NFPA Standard 51, **Oxygen- Fuel Gas Systems for Welding and Cutting**, National Fire Protection Assoc., Batterymarch Park, Quincy, MA 02269*
*5. NFPA Standard 51B, **Cutting and Welding Processes**, (See ref. 4 for address.)*
*6. CGA Pamphlet P-1, **Safe Handling of Compressed Gas in Containers**, Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA*
*7. OSHA Standard 29 CFR, Part 1910, Subpart Q, **Welding, Cutting and Brazing**, U.S. Government Printing Office, Washington, DC 20402*

About the author:
Dave Bell is industrial products marketing manager at CONCOA, a world-wide manufacturer of gas flow control equipment.

Increased inspections as metal/ nonmetal fatalities continue to rise

Even after MSHA's unprecedented "mine sweep" to try and increase safety awareness in the metal/ nonmetal sector of the mining industry, fatalities in that sector continue to rise.

As of Oct. 2, that total fatality count stands at 54 for 1997. One fatality occurred during the mine sweep and three occurred this week, after the sweep was completed.

On Sept. 15, MSHA dispatched its entire force of inspectors to the nation's 11,000 non-coal mines to review safety measures with miners and to look for hazardous conditions.

MSHA is beginning the next phase of the accident reduction efforts by focusing inspection personnel on several key states in which mining fatalities are most frequently occurring this year. Agency personnel will be shifted from other areas of the nation to focus on mining sites in California and Texas, both of which have six fatal accidents; and Florida and Nevada, which both have five fatalities.

Davitt McAteer, assistant secretary of labor for MSHA, said that inspectors "reached a great majority of industry miners, supervisors, and mine managers and made them aware that these accidents are preventable. However, I am quite disheartened that three fatalities occurred just after our mine sweep ended. We are definitely not where we want to be."

"While we still do not know precisely the reason fatal accidents continue to occur at such an increased pace this year, we will continue to focus our resources on finding a solution and bringing a halt to this disturbing trend," added McAteer. "We are going to keep trying various methods of assistance and enforcement until we hit the right button."

As for the cause of the recent increase in mining deaths, McAteer related that investigators are looking at such possibilities as excessive work hours of employees due to downsizing at some operations, newly hired employees who are not properly trained in certain duties, contractor employees who are unfamiliar with the dangers of the mining environment, and a lack of awareness by supervisors of their responsibilities under the Federal Mine Safety and Health Act. According to MSHA's preliminary investigation, one of the miners killed on the job this week had worked 12-hour shifts for 15 consecutive days before his fatal accident.

McAteer added, "we are now entering a stepped up inspection mode that will send more inspectors to certain mine sites to conduct inspections for longer periods of time and allow for observance of specific work practices.

"During the September sweep, inspectors were told to emphasize communication and education with regard to causes of fatal accidents and ways to prevent these accidents from occurring," McAteer explained. "During this phase, we will look for any and all violations of mine safety regulations at these mine sites and will cite those violations."

Also, as part of this phase of accident reduction, the six MSHA district offices will develop and implement a tailored program of mine inspection for the mines and miners in those areas. Attention will be focused on tasks and circumstances which have involved fatal accidents and will ensure that mine operators are devoting appropriate resources to miner safety.

Start making plans!

1998 Joint Mine Safety and Health Conference

This conference will be held at the Medallion Hotel on the north side of Dallas in Farmers Branch, Texas February 18-20. Make plans to attend now. Information and registration forms will be in the mail soon.

1998 Arkansas Mine Safety/Health Conf.

This conference will be held at the Lake Hamilton Resort Inn in Hot Springs, Arkansas on March 3-4, 1998. Start now and make plans to attend. Information and registration forms will be in the mail soon.

*Reprinted from the Fall 1997 issue of the Ark. Dept. of Labor's **MSHA News.***

Adding fork lift attachment may have contributed to fatality

Alterations of haulage equipment and a failure to examine the equipment before it was used led to the powered haulage accident that killed John E. Meyer April 26 at Kilauea Crushers in Wickenburg, Ariz., according to MSHA's final report on the accident.

Meyer, an equipment operator and welder, was moving a welding machine using a front-end loader that had been adapted to function as a forklift. The loader was being used to carry the welding machine up a 19% grade when one of the wheels struck the ground.

The loader stopped and began to descend backward. The engine either stalled or was turned off, and engine coolant on the ground indicated that the loader may have overheated. A warning notice indicated the service brake would not function when the engine was not running.

MSHA concluded that Meyer left the loader as it was moving backward. Meyer's death was a result of blunt injuries. Other factors in the accident included a failure to inspect the loader and altering the equipment in a manner that made it difficult to reach the parking brake.

The park brake lever was difficult to reach because the operating controls for the Balderson Quick Coupler, which had been installed by the previous owner, were located between the loader operator's seat and the lever. To apply the lever, operators would have to stand up, reach over the Balderson controls and then down to the park brake lever, which was under the instrument panel.

The Balderson Quick Coupler installed on the loader allowed for the removal of the bucket so the loader could be used as forklift or crane. The loader was equipped with the forklift attachment at the time of the accident.

MSHA said the loader was equipped with a roll-overprotective structure and a seatbelt, but the seatbelt was found to be defective. The defective seat belt did not contribute to the accident, said the report, but MSHA did issue a separate citation for it.

MSHA noted that engine coolant was on the roadway at the location where the loader had stopped before it ran backwards. There were no external leaks in the hydraulic system.

Aside from the seatbelt violation, MSHA issued two citations. The first, a violation of §50.10, which requires mine operators to report a fatality immediately. The accident happened at I p.m. April 26 and was not reported until 7:25 a.m. April 28.

MSHA also issued a citation for an alleged violation of §56.14100 (a), which requires that equipment is inspected before use. MSHA stated the loader was not inspected before the accident.

Reprinted from the October 3, 1997 issue of Mine Safety and Health News. Copyright 1997 by Legal Publication Services.

Hazard alert—Hydraulic problems

By Don Huntley, Pete Kerfoot, and Don Conrad

Two mining accidents occurred recently in central Pennsylvania due to hydraulic problems on equipment. The first happened because a roofbolter had excessive pressure in the circuit that controlled the stabilizer jack. The excessive pressure caused the front of the bolter to be lifted off of the mine floor. When the jack was retracted, the machine fell rapidly and the canopy on the bolter struck the operator on the head. The second occurred when a scoop operator unintentionally pressurized the scoop bucket against the mine floor. This caused the scoop body to raise pinching the operators head between the frame of the scoop and the mine roof. The control of the scoop steering was very sloppy and required excessive movement allowing the operators hand to inadvertently activate the bucket down pressure. Both occurrences resulted in severe injuries to the equipment operators. Remember hydraulic systems can deteriorate over time. Weekly examinations of equipment should include all machine functions not just permissibility, and equipment operators' complaints of malfunction should be investigated thoroughly. Controls that do not function as designed, components of a machine that move, with extreme speed, erratically or even extreme slow movement can present a hazard to the equipment operator. Let's all give some special attention to the hydraulic systems of our equipment in future weekly examinations.

Reprinted from Holmes Safety Association's Pennsylvania State Council's News Letter, Vol. 2, No. 2, 30 June 1997.

Barricading makes a comeback?

By Michael J. Brnich, Jr., Mining Engineer, (412) 892-6840 (tzb9@cdc.gov) and Charles Vaught, Ph.D., Research Sociologist, (412) 892-6830 (cav9@cdc.gov).

Underground coal miners have always faced the risk of having to escape a mine fire or explosion. Before self-rescue devices, they would often barricade rather than risk escaping bare-faced through a toxic atmosphere. Barricades were often crudely constructed of brattice curtain, timbers, nails, and whatever other materials the miners could find. However, barricaded miners were often found dead because their chamber became oxygen-deficient, carbon monoxide leaked in, or they tore down the barricade too soon upon hearing a rescue team approach. Even after filter self-rescuer devices were introduced, miners were taught barricading techniques. Following advances in sophisticated seismic sensing equipment in the 1970's, a signaling protocol was developed for locating barricaded miners.

The barricading ideology began to change in the early 1980's with the introduction of self-contained self-rescuers (SCSR's) that provided miners with enough oxygen to reach the first split of fresh air. Although MSHA still mandates instruction in barricading, greater emphasis is now placed on teaching miners to use SCSR's proficiently and to be knowledgeable about their escape routes. Only recently has at least one mine operator begun to revisit barricading as an alternative to escape.

Since early 1996, this U.S. coal mine has been mining super longwall panels up to 1,000 feet wide and nearly 19,000 feet long. What is unique about this mine is the pitch of the coal seam. Starting with the setup entries at the back end of the panels and proceeding outby for about 9,000 feet, the coalbed dips downward on a 7% to 10% pitch. Once mining has reached midpanel, the coal begins pitching upward on about the same percent grade (i.e., the coal forms a basin at midpanel). As a result, miners working on the longwall must escape uphill for about 1.75 miles before reaching the mains. From there, they continue uphill on grades of up to 11% to reach the portal. Escaping this mine on foot would require significant time, energy, and oxygen.

As a result, mine personnel constructed barricade chambers in crosscuts in the mains and between the longwall panels. The chambers have large concrete bulkheads on each end that are fitted with an airlock. Boreholes from the surface provide fresh air and water. The chamber in the mains is fitted with a lined shaft that permits lowering an escape capsule from the surface. The mine stores additional SCSR's in the chambers, along with first aid and other supplies.

NIOSH researchers worked with mine personnel to develop a simulated decision-making exercise to teach workers about barricading. The goals were to (1) introduce the barricade chambers to the miners, (2) inform the work force about procedures in place for its mine rescue team to support an evacuation, and (3) provide an opportunity to explore other escape strategies for super longwall panels.

We administered the exercise to 172 individuals at the mine. After each class, we asked the miners to complete a questionnaire. According to the results, 99% said that the situation described in the training exercise could happen in real life and 96% indicated that the exercise helped them remember something important regarding escape from a mine fire. Finally, although only 57% of the trainees had seen the barricade chambers, over 86% said that they would use one in an emergency. In summary, the exercise heightened awareness of the mine's barricade chambers and showed workers that there are situations where barricading should be considered as an option.

As more mines consider super longwall panels, escape will become an important concern. Operators will need to address whether it is feasible for their miners to traverse long distances in an evacuation. If not, other options may need to be considered.

*Reprinted from the July 1997 issue of NIOSH's **Mining Health and Safety UPDATE**. U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health—Vol. 2, No. 1.*

Missing the point

A worker in Australia suffered serious injuries after he fell nearly 60 feet through a skylight onto a concrete floor. He broke both his arms and seven ribs, fractured his shoulder, and punctured a lung. His spleen and kidney had to be removed. The worker was wearing a safety harness. It was connected to three lanyards joined end-to-end for a combined length of about 58 feet.

*Reprinted from the May-June 1997 issue of Western Australia's **MINESAFE**.*

1997 fatality summary

This article updates the status of fatalities occurring in both coal and metal/nonmetal mines from January through September of 1997. Based on preliminary accident reports, as of September 30, 1997, 78 fatalities have occurred at coal and metal/nonmetal mining operations. During this period, 24 fatalities occurred at coal operations and 54 fatalities occurred at metal/nonmetal operations. Powered haulage fatalities, in both coal and metal/nonmetal were the most frequent accident classification, causing 38% of the fatal injuries; machinery fatalities accounted for 16% of the fatalities and fall of roof, rib or back caused 11% of the fatalities.

Coal Mining

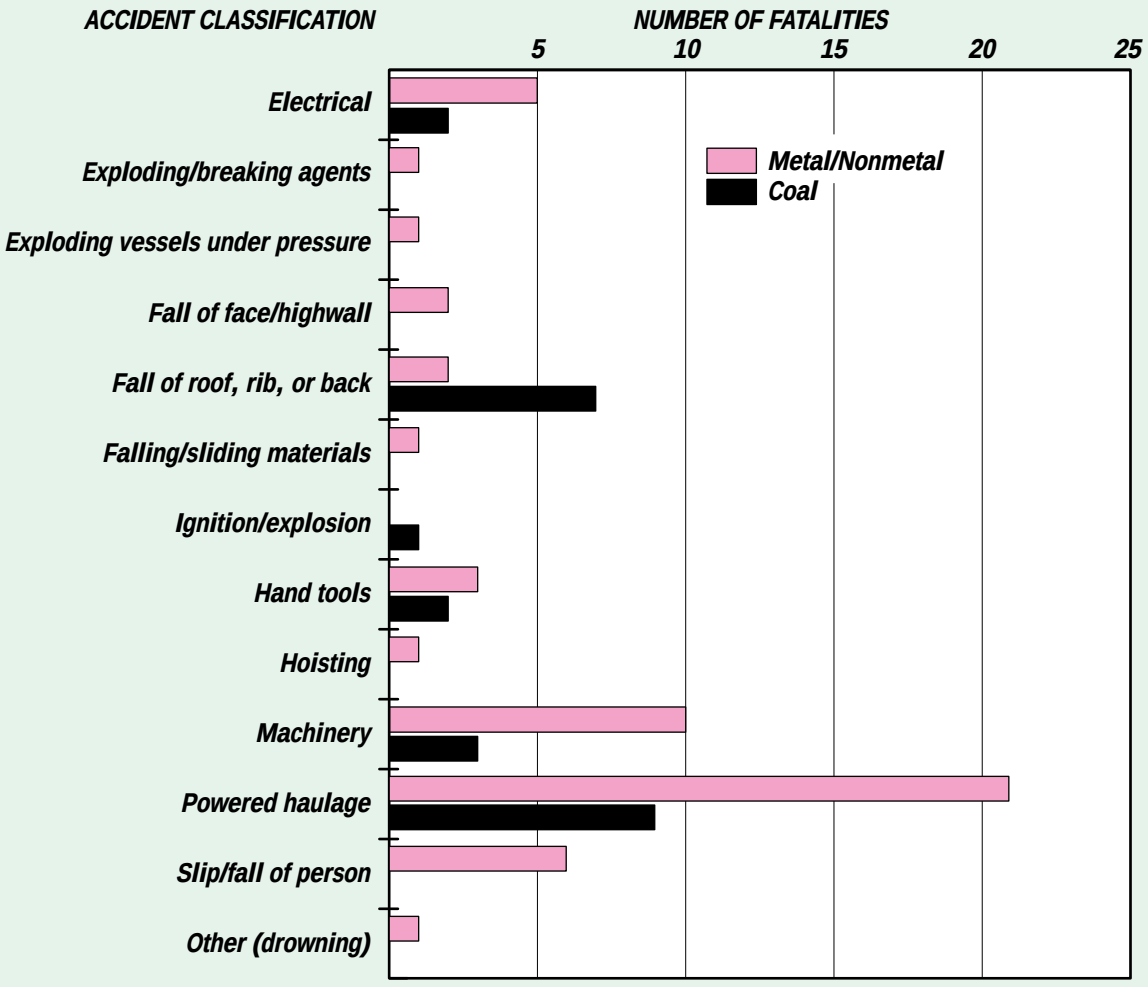
Nine of the fatalities were classified as powered haulage, 7 were classifeid as fall of roof/rib/back and 3 were classifed as machinery. Of the 24 fatalities, 7 occurred in W.Va., 4 in Pa., and 3 in Ky. Fifteen fatalities occurred underground and 9 on the surface.

Metal/Nonmetal Mining

Twenty-one of the fatalities were classified as powered haulage, 10 were classified as machinery, 6 were classified as slip/fall of person and 5 were classified as electrical. Sixteen fatalities occurred at limestone operations, 11 occurred at sand and gravel operations, and 8 occurred at gold operations. Six fatalities each occurred in Calif. and Tex. and 5 fatalities each occurred in Fla. and Nev. Forty-five of the fatalities occurred at surface operations, the remaining 9 fatalities at underground facilities.

Submitted by: John V. Forte, National Mine Health and Safety Academy

FATALITY SUMMARY, January–September 1997
Based on preliminary accident reports as of September 30, 1997



Miner's tag saves lives underground

In an underground mining emergency such as a rock [or roof] fall, tracing miners trapped underground has, in the past, been achieved by counting those who emerge from the pit and subtracting them from the number of workers who went underground at the start of the shift. The obvious inadequacies of this method, highlighted by the coming and going of workers and supervisors underground, have led to the design of the first comprehensive tracking system for miners underground.

The Miners' Tracking Tag, less than 40 millimeters long, fits inside the casing of the battery pack of each miner's cap-lamp. Powered by the cap-lamp battery, the tag transmits its unique code, corresponding to a miner's lamp number and name, by radio at half second intervals to receivers attached to the backs of mine headings at strategic points. The receivers register the individual tag codes whenever a miner (or machine) is within range. This information is stored in the controller along with details such as the date and time it was recorded and the location of the reader itself. The data is then transmitted to the mine computer via controllers and processed, giving immediate reports of the location or identity of miners in particular areas. The features of this system become essential during blasting, as the tags are a much more effective mechanism for locating miners than a simple roll-call.

One feature of the tag is that it can operate on a charged battery for a period of more than 10 years. The tags themselves are tiny, with dimensions of 26mm x 38mm, (about 11/16" x 1") with a range underground along line of sight of about 90 meters (275'). The receivers are encased in a tough polycarbonate casing designed for maximum resistance to knocks, seeping water and extremes of temperature.

The product is a major breakthrough that will contribute significantly to the safety of thousands of miners.

For more information, contact Chris Stubley on Tel: (08) 9222 3531.

*Reprinted from the June 1997 issue of **MINESAFE** published by The Mining Operations Division, 6th Floor, Mineral House, Department of Minerals and Energy, Western Australia, 100 Plain Street, EAST PERTH WA 6004*
Editor: Catherine Stedman, Tel: (08) 9317 3485

Bloodborne pathogens

How to protect yourself

It is important to understand what the hazards of bloodborne pathogens are and what preventative measures you can take to protect yourself from exposure. The three main areas of protection include Attitude, Personal Protective Equipment and Housekeeping.

Attitude

Your attitude is a vital part of protecting yourself. The right attitude means taking universal precautions. This means that you treat all human blood and body fluids as infectious. When coming upon an accident scene, many different fluids may be present. Some may not be infectious and some may not even have come from the victim, as in the case of an industrial or auto accident. By treating all fluids as infectious, you prevent possible infection through unnecessary contact or inappropriate actions.

Personal protective equipment

Personal protective equipment includes clothing and equipment, worn by an employee during activities which may result in exposure to bloodborne pathogens. Personal protective equipment always starts with gloves, but may also include gowns, face shields, eye protection and pocket masks.

1. Single shield and eye protection. These items prevent blood from entering the mucous membranes through the eyes, nose or mouth.

2. Pocket mask. A pocket mask refers to any one of many types of devices used while performing CPR or mouth-to-mouth resuscitation. When equipped with a one-way valve, this device prevents the victim's blood or blood-tainted fluids from entering the rescuer's mouth and nose.

Housekeeping

Housekeeping refers to methods for cleaning and decontaminating infected surfaces and the disposal of blood and body fluids. All decontamination must include the use of an appropriate disinfecting solution such as one part bleach to ten parts water.

Presented by G.E. Miera, NM State Mine Inspector, Bureau of Mine Inspection, P.O. Box W105, Socorro, NM 87501 Telephone: (505) 535-5460, FAX (505) 835-5430

Seven miners die in September mining-related accidents

Even as MSHA inspectors conducted an unprecedented "sweep" of metal and nonmetal mines, six non-coal miners and one surface coal miner died in September accidents.

Year-to-date (Oct. 3) preliminary figures show that 54 metal/nonmetal miners and 24 coal miners have died in mining-related accidents.

A contract driller working at a quarry in Dixon, Ill., was killed in a machinery accident on Sept. 3. The victim had nine years' experience and had been drilling a hole about 4 feet from the edge of a 92-foot highwall. He was in the process of adding drill steel when the drill hammer feed chain broke and he fell over the edge. The MSHA report noted that a lanyard was found on the drill and a safety belt was located in the drill truck about 40-feet away.

On Sept. 8, a 48-year-old laborer was killed in a machinery accident at a quarry in Nolan, Texas. He was performing maintenance at the cement plant and standing on top of a bridge crane (which was used to feed raw material to the cement plant) with one foot on the hoist drum and the other on the clam shell closure line drum. Due to miscommunication with the hoist operator, the hoist drum moved and he fell between the two drums and was crushed.

A 57 year-old contract truck driver was killed on Sept. 16 in a haulage accident at a gold mine in Silver Peak, Nev. He was hauling water to a leach pond with a tractor trailer water truck. He stepped out of the cab and was run over by the rear wheels.

A 56 year-old superintendent at a sand and gravel operation in Friars Point, Miss., was killed in a slip/fall accident on Sept. 28. He was last seen working on the dredge at 4 p.m. that day, and was reported missing at 5:20 p.m. His body was found about 15 miles downstream. MSHA said he had worked 12-hour shifts for 15 consecutive days before his fatal accident.

A 35 year-old service technician was killed in a machinery accident on Sept. 29 at a surface mine operation in Fort Meyers, Fla. He was in the process of removing a tire from a truck with a hydraulic boom mounted on the truck. The tire came off the boom hook and fell on him. He had 17 years' experience.

A 44 yaer-old equipment operator was killed in a haulage accident on Sept. 30 at a sand & gravel operation in Salado, Texas. He was removing overburden and drove an empty Caterpillar scraper into stockpile, made a left turn off the stockpile and the scraper rolled over.

A 48 year-old truck driver was killed in a haulage accident on Sept. 19 in Lovely, Ky. The victim was driving a 170-ton truck from the pit to the raw coal dump. While driving down an incline near the dump site, the truck began to accelerate and went through the coal dump, through the guardrails, and dropped 55 feet onto the raw coal crusher and the conveyor belt structure. The victim was ejected from the truck before it came to rest.

OCTOBER **W** NOVEMBER **I** DECEMBER **N** JANUARY **T** FEBRUARY **E** MARCH **R**

ALERT reminder: ● *Always maintain adequate mine ventilation and make frequent checks for methane and proper airflow.* ● *Know your mine's ventilation plan and escapeways. Properly maintain methane detection devices. Communicate changing mine conditions to one another during each shift and to the oncoming shift.* ● *Control coal dust with frequent applications of rock dust.* ● *Make frequent visual and sound checks of mine roof during each shift. NEVER travel under unsupported roof.*

Confined space entry a System Safety approach

By Chuck Miller, ONRSA System Safety Specialist

There is an all-too-well-documented potential for fatal consequences when workers enter confined spaces. A System Safety perspective can help to address the challenges of safe confined space entry work (CSE). System Safety, after all, is simply applying technical and managerial skills to the systematic and forward looking identification and control of hazards throughout the life cycle of a project, program or activity. The key thrust is prevention of accidents through effective risk management.

Confined space entry activity can be considered a project involving a specific set of risk factors. Each situation must be evaluated on a case-by-case basis. Certainly the traditional approach to CSE safety attempts to address all known hazards. Where there have been problems, the critical gap has often been lack of adherence to proper procedures for the situation. There may not have been adequate training for the workers entering a tank or vault, or some risk factor may have been overlooked. System Safety can address both these aspects. Rather than adapting an existing entry procedure to the new situation, a complete and systematic assessment process should be performed to avoid errors of omission during project planning.

System Safety techniques commonly draw on the combined knowledge of a multi-talented group of experts, using a structured brainstorming technique as a guide. HAZOP is one such method. Extensive process studies are carried out by repeatedly testing the applicability of a series of seven guide words (no/not, more, less, as well as, part of, other than, reverse) to all relevant process parameters. The entire flowsheet is examined in an incremental, sub-section approach. A rigorous process examination, assisted by this universal checklist, will maximize the team's hazard identification success. This same type of teamwork should be employed in defining the risk factors and designing appropriate controls for each CSE target.

Particularly important in this effort is a "clean slate" approach to risk identification. Similar situations will provide a wealth of information, but the unique factors —ones that may prove the most hazardous— could easily be overlooked. Categorizing a vessel based on the material it processes is very likely an oversimplification, and extrapolating information gathered from similar cases may mean the right "what if" questions never get asked.

A technique known as Change Analysis, which compares and contrasts two similar events or situations, would be beneficial here. It would allow the team to pinpoint the differences between the two CSE situations in question. Perhaps a subtle change in work environment generated by the different locations of two CSE spaces would result in significant risk factors. Attention to detail is crucial in CSE safety. Concentration levels, operating and maintenance history for each space need to be considered. Once again, to cover all the potential risk factors, it's critical to obtain input from all those with relevant knowledge or hands-on experience in the CSE scenario in question.

A wide range of equipment is available for CSE work. Instruments detect oxygen levels, combustible and toxic gases. Respirators filter out harmful agents, or exclude them by supplying their own atmosphere. Special clothing provides a barrier against contact with noxious materials. Communication systems provide an added layer of safety, essential where line of sight feedback is not possible. Some models even detect lack of motion by the CSE worker and alert the attendant. Rescue equipment covers a broad range of CSE configurations. Ventilation and purging options are numerous. With all these resources at hand, there should be no reason to experience a CSE injury or fatality. Proper application of the available knowledge can prevent them. The key is to ensure that all the essential information comes forward at the beginning, when the equipment or procedures are being designed. Systematic teamwork is the answer.

Reprinted from Ontario [Canada's] Natural Resource Safety Association's July/August 1997 issue of ***Health & Safety RESOURCE.***

Readers: Please work extra SAFELY during the Winter Alert!

Training
Highlighted "versus degraded" technique

Kathleen M Kowalski, Ph.D., Research Psychologist, NIOSH

What do fighter pilots and miners have in common? They are learning to recognize hazards using the "degraded" technique developed by the U.S. military. Traditionally, fighter pilots learned to recognize targets by studying photos taken under the best of conditions (a "highlighted" training approach). However, research showed that the pilots did better when trained with less than ideal ("degraded") pictures of the targets. "Degraded" refers to pictures where cloud cover, rain, poor weather conditions, natural barriers, buildings, or other obstructions partially hide the object—conditions that pilots would likely encounter in real life.

This approach can also be used for mine hazard recognition training. One example used a "highlighted" photo of a miner's foot positioned within a trailing cable loop on a mine floor. The photo showed the potential dangers of tripping or being caught by a retracting cable. The second photo showed a "degraded" version of the scene. The cable loop hazard is obvious. However, other more subtle dangers are present, including working without safety gloves and glasses.

Other examples include working in a confined area between rib and equipment, and placing tools on machinery (especially if the machinery is powered up or moving). One advantage of the degraded approach is that it encourages group discussions about workplace hazards.

To compare the effectiveness of "highlighted" versus "degraded" hazard recognition training, we developed experimental and control training modules. These modules were used alternately during Part 48 training and followed with the same individual test of hazard recognition. Miners trained with the "degraded" training module scored significantly higher on the test than those trained in the more traditional "highlighted" manner. We conducted two further field studies in underground coal mines in the South and Midwest involving more than 2,600 miners. Both sites experienced more than a 25% drop in incident rates, which management and researchers attributed in part to the "degraded" hazard recognition program. However, in field studies such as this, one cannot rule out the possibility that factors other than the change of training method contributed to this reduction.

We are currently working with the Illinois Department of Natural Resources and Illinois Eastern Community College to develop a "degraded" hazard recognition training package for the mining industry. The package, including a video, slides, overheads, and an instructor's manual, will be available from MSHA's National Mine Health and Safety Academy, Beckley, WV (304-256-3257) by fall of 1997.

Kathleen M Kowalski, Ph.D., Research Psychologist, (412) 892-4021 (kek2@cdc.gov).

*Reprinted from the July 1997 issue of NIOSH's **Mining Health and Safety UPDATE**. U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health—Vol. 2, No. 1.*

MSHA Hazard Alert—Falls from trucks
Five deaths and 396 serious injuries

Since January of 1992, five truck drivers have been fatally injured when they fell from trucks. Fall protection was not provided in three of the fatalities and in the other two fatalities, fall protection was available but not used.

Additionally, 396 truck drivers have been seriously injured during the same time period. These injuries are occurring as the drivers conduct various activities on and around trucks used in mining. Climbing on top of and getting off the trucks account for the biggest percentage of the accidents. Other activities which accounted for the most accidents:

Checking the load distribution on the truck. Securing tarps on loaded trucks. Opening and closing hatches on tanker trucks. Performing one of the required preshift safety checks. Getting in or out of the vehicle cab.

To help prevent these type of accidents, operators should:

Provide load-out facilities equipped with fall protection. Require that fall protection be used at all load-out facilities. Provide fall protection for truckers when tarping trucks. Train all truck drivers in the proper methods of getting on and off the trucks. Require preshift inspections be conducted in a safe manner.

20

Pennsylvania team takes first place in mine rescue contest

Consol Pennsylvania Coal Company's Bailey Team of Graysville, Pa., won first place yesterday in the mine rescue competition at the 1997 National Mine Rescue, First Aid, EMT and Bench Contest which was held Sept. 16-18 at the Kentucky Fair and Exposition Center in Louisville, Ky. Island Creek Coal Company's B-Team of Oakwood, Va., and Kerr-McGee Coal Corporation's Galatia Mine Rescue Team of Harrisburg, Ill., were the second- and third-place winners in the mine rescue portion of the contest, sponsored by the Department of Labor's Mine Safety and Health Administration.

Mine rescue contests are designed to sharpen skills and test the knowledge of miners who may one day be called upon to respond to a real mine emergency. The contest requires teams of six members each to solve a hypothetical rescue problem while being timed and observed by judges according to precise rules. The simulated problem involved trapped miners who had to be located and rescued. State and federal mine safety experts evaluated each team as they worked through their rescue problem in a simulated mine environment. Teams were rated on adherence to safety procedures and how quickly they completed their task.

"Competition of this kind calls attention to the need for the highest standards in mine safety," said J. Davitt McAteer, assistant labor secretary for mine safety and health. "These rigorous exercises help mine rescue teams be ready for tomorrow's emergency by preparing today. Naturally, we hope their skills will never be needed."

The **Energy West Mining Company Silver Team** of Huntington, Utah, took first place in the First Aid portion of the competition. In the first aid contest, participants must demonstrate the correct method of caring for an injured miner. Teams are judged on proper application of skills according to the fundamentals of first aid. In the first aid event, second and third place went to **Eastern Associated Coal Corporation's Federal No. 2 Team** of Fairview, W.Va., and Jim **Walter Resources, Inc.'s JWR #1 Team** of Brookwood, Ala.

Eastern Associated Coal Corporation's Coal River Team of Seth, W.Va., took first place in the combination mine rescue/first aid competition, in which scores for both events are combined. **Eastern Associated Coal Corporation's Harris Team,** of Twilight, W.Va., and **Energy West Mining Company's Silver Team** of Huntington, Utah, took second and third place in the combined mine rescue/first aid competition.

Top honors in the Emergency Medical Technician (EMT) portion of the event went to **Premier Elkhorn Coal Company's Team No. 1,** of Myra, Ky. In the EMT contest, a primary and secondary EMT tackle real-life scenarios. EMTs are certified and provide an unbroken chain of medical care until the patient arrives at the hospital. Second and third place in the EMT contest went to **Kerr-McGee Coal Corporation's Galatia Mine Rescue Team** of Harrisburg, Ill, and Lodestar Energy, Inc.'s A Team of Clay, Ky.

Roger Carpenter of **Eastern Associated Coal Corporation's Federal No. 2 Team,** Fairview, W.Va, took first place in the bench competition. Benchmen are charged with maintaining the rescue equipment. In the bench competition, participants must thoroughly inspect breathing devices that have been purposely tampered with, and they must correct those defects as quickly as possible. Second and third place winners in the bench competition were Todd Watson of Lodestar Energy, Inc.'s West Kentucky Team, Clay, Ky., and **James Schuessler of Cyprus Emerald Resources Corp.'s Cyprus Emerald White Team,** Waynesburg, Pa.

The national mine rescue, first aid, EMT, and bench contest for the coal mining community is held in odd-numbered years.

Mine rescue training began in the United States in 1910, the year the U.S. Bureau of Mines was created. Joseph A. Holmes, the bureau's first director, sought a training vehicle that would provide the mining industry with a cadre of mine rescue specialists who would be prepared to respond to mine disasters. The training efforts evolved into local and regional competitions and, a year later, a national contest. President William Howard Taft was present at the first national competition.

United States Department of Labor, Office of Information, Philadelphia, Pa. 19104
Mine Safety and Health Administration: III-97-09-19-163-PA/VA/WVA
Contact: Amy Louviere or Kathy Snyder, Phone: (703) 235-1452.

Research Center developing computer-driven emergency response materials

Overview of the Mine Emergency Response Internet Training Simulation (MERITS)

Another advantage of the computerized format of MERITS is the ability to track each stage of the resolution of the emergency. As a result, it will be possible to provide better and more detailed feedback on the user's performance. The software will monitor the speed and appropriateness of the actions, allowing for a thorough debriefing at the end of the exercise on all actions taken.

MERITS will be an interactive multimedia computer simulation, delivered via the Internet, of an underground coal mine that is undergoing some type of emergency. It will simulate both underground and surface events at the mine site, and provide a means for the users (command center personnel trainees) to be informed of those events and to make decisions to attempt to resolve the emergency. These decisions, in turn, will affect the progress of the simulated emergency.

Some of the underground events which will be simulated include the spread of the fire and smoke under the influence of the mine's ventilation system, the actions of the miners attempting to escape the mine, the rescue teams attempting to locate the miners, and unexpected events such as roof falls. The underground simulation will be based primarily on many Bureau of Mines research studies concerning mine ventilation simulation, SCSR training and field audits, oxygen cost studies, miner demographics, and analyses of miners' behaviors during past emergencies.

Surface events will include interactions with unofficial visitors (for example, victims' families), the media, medical services, labor, government officials, and weather events (such as flooding that interferes with the flow of supplies to the mine), debriefing of rescue teams, and traffic problems.

The simulation of the underground and surface events will be performed by the host computer. Relevant information concerning those events will be passed to the local PC and communicated to the trainees. At times, the host PC may need to trigger certain events on the local PC. For example, digital sound recordings will likely be used to simulate ringing phones and interaction with the media and families of victims. Corporate personnel, political figures, and others may "visit" the command center (via a digital video recording appearing on the screen), demanding that certain courses of action be taken. This will be accomplished by "playing" audio and video files that reside on a CD on the local PC that has been supplied in advance. As another example, updated mine maps produced by the "rescue teams" will be displayed to the trainees for viewing. The local PC will also provide an interface through which the trainees may direct certain courses of action to be taken. At times, a secondary event may arise that prevents the trainees from addressing other issues until that situation is resolved. For example, the unexpected arrival of a distraught family member at the command center (depicted via digital video) may interrupt the trainees from addressing a problem at hand until the family member can be calmed down and moved to an appropriate facility away from the command center. Should required resources (food, medical supplies, etc.) be exhausted or delayed during the course of the simulation, or other unanticipated developments occur, it will be the responsibility of the trainees to address these issues while still attending to other ongoing events. These "interruptions" can provide a greater sense of realism to the trainees by exposing them to the stresses that can be involved in an actual emergency.

The simulation will operate on a set of "rules" which determine its possible behaviors. The rules will cover classes of information necessary to create a realistic simulation. These classes of information may include human factors (physiology, psychology, level of training), mine design (mine location, ventilation systems), internal and external resources (firefighting capabilities, rescue team availability, supplies), political considerations (relations with federal, state and local authorities, media impact, relations with victims families) and economics (costs associated with rescue efforts).

Delivery of MERITS

It is anticipated that the host PC will be a dual-processor Pentium running the Windows-NT operating system. This host would be maintained by a mining organization at a central location (although mines with appropriate facilities will be able to maintain both a host and local PC at

their site). This host would provide security to "lock out" unauthorized users, so that only one site at a time can access MERITS.

Although MERITS will be capable of generating a random emergency situation on its own, a scripting feature will be provided that allows the host organization to specify parameters about the emergency. This will allow for controlled experiments where the host organization knows in advance the type of emergency scenario that will be generated.

Software to interface with the MERITS program will be installed on the local PC prior to starting the simulation. Certain information must be supplied to this interface program by the trainees before the simulation is initiated. For example, a mine map (either supplied to the trainees on CD or downloaded off of the Internet) will need to be supplied. Also, details concerning the mine's formal emergency response plan, including responsible personnel, availability of equipment, medical and food supplies, and facilities for housing, food, briefings, etc. will be required. Because the simulation itself is performed on the host PC, mines that do not have high speed PCs will be able to access and use MERITS. Another advantage of using the host to perform the simulation is that a central trainer can be responsible for developing the simulation exercises. These exercises can be updated periodically to provide new and varied training experiences.

Hardware/software reqmts. for the host PC:

- Dual-processor Pentium PC equipped with at least 32 MB RAM, 2 gigabyte or greater hard disk, and access to the Internet.
- Windows NT operating system and the MERITS simulation software.

Hardware/software reqmts. for a local PC:

- 486 or better PC equipped with 16 MB RAM, Sound Blaster compatible sound card and speakers.
- CD-ROM drive, 4x speed or greater, 1 GB or greater hard disk, a Super VGA monitor, a mouse, access to the Internet, and a printer.
- The Windows 95 or Windows NT operating system, a Java-enabled Web browser, and the local MERITS program and data files (distributed to the trainees in advance on CD).

Exact requirements may change as the project develops. Hardware needed to run the simulation will be restricted to that which will be available to most schools, training centers, and corporations and to many individuals by the time the simulation is ready for distribution.

Reprinted from the May 1997 issue of ***The Guardian****—Volume XXVIII Issue II—a publication of the United States Mine Rescue Association, P.O. Box 1010, Uniontown, PA 15401.*

The golden sands of Nome

When destitute miners on the beach at Nome realized that the ruby colored sand at their feet was laced with gold, they must have thought that they had died and gone to heaven. The beach strike was a poor man's paradise where digging the gold was said to be easier than stealing it. The work required only a shovel, a bucket or can, and a crude, easily built rocker. Efficient use of the rocker required two or more people, with one filling the hopper, another pouring water over the sand and another rocking the cradle. The shallow diggings on the beach were open to everyone; beach land could not be staked by any individual. If you left your diggings another prospector could move in. Poet Sam Dunham wrote in 1900, "For many miles along the beach, double ranks of men were rocking, almost shoulder to shoulder, while their partners stripped the pay streak and supplied the rockers with water and pay dirt." At the height of the summer mining season, nearly 2000 men, women and children were rocking on the beach. It is estimated that the "beachcombers" mined as much as $2 million in gold from the sand. By fall of 1899, Nome, easily reached by ship, had become a booming city of about 5,000. Among the variety of businesses were at least 20 drinking establishments, 16 lawyers, 11 physicians, 12 general merchandise stores, 4 real estate offices, 4 drug stores, 3 watchmakers, 3 fruit and cigar stores, 5 laundries, 4 bath houses, 2 paper hangers, 2 hospitals and one "massage artiste."

Mining the Nome beach (from the Web site of the Alaska State Library—44-113)

Back to basics for a healthy spine

Low back pain eventually strikes 8 out of 10 adults, so chances are it has laid you low or affected someone you know. Back pain used to dictate days or even weeks of bed rest, but no longer. For most patients, doctors now advise cautiously continuing normal activities.

Most episodes of low back pain pass quickly. Call your doctor if severe symptoms last longer than a couple of days or hamper your daily activities. Seek help immediately if back pain affects bowel or bladder control, if your groin or rectum gets numb, or if your legs feel weak.

The good news: You can prevent back pain from occurring or recurring by staying fit and by following "be-kind-to-your-back" rules. You can also strengthen at-risk muscles by exercising.

Stand tall

Good posture is one of the best ways to prevent low back pain. Remember your gym teacher's instructions? Assume your full height, hold your head up and pull your tummy in. Avoid sticking out your buttocks or arching your back.

Don't stand tall in high-heeled shoes, though. These can punish your back by pushing you into poor posture. Instead, choose comfortable, low-heeled shoes or flats.

Lift and carry properly

When lifting anything, always bend your knees so you hoist the load with your sturdy thigh muscles, not your vulnerable back. For support and balance, keep your feet apart and lined up under your shoulders. Don't twist, bend forward or reach while lifting. Carry heavy objects close to your body.

Take care of your back at work

If you have to sit at work all day, take regular breaks to give stiff muscles a welcome stretch. Your work surface should be at a comfortable height, and your chair should support your lower back. For additional support, place a pillow or rolled-up towel at the small of your back. Rest your feet flat on the floor or on a footrest. If you must stand for prolonged periods, try placing one foot on a low stool.

Try sleeping on your side

Experts advise sleeping on your side with your knees drawn up or with a pillow between them. If you sleep on your back, place pillows under your neck and knees.

Stomach sleeping can stress a weak back. If you're a confirmed stomach sleeper, put a pillow under your abdomen to help protect your back.

Exercise wisely

Avoid exercises that strain your lower back, such as double leg lifts with straight legs, classic sit-ups, hip twists, toe touches and backward arches.

Regular aerobic exercise strengthens your back—and the rest of your body. Try brisk walking, swimming, stationary biking or cross-country skiing. In addition, add a few exercises to your routine that specifically target back, abdominal and leg muscles. The exercises described below can improve the muscle strength and flexibility you need to maintain good posture.

Reprinted from the Fall 1997 issue of Georgetown University Medical Center's ***Healthy Decisions****.*

The GU Center is located at 3800 Reservoir Road, N.W., Washington, DC 20007 Telephone: 202-784-4234.

Two exercises for a healthy back

The pelvic tilt, the most commonly recommended back exercise, strengthens abdominal muscles and stretches the muscles of the lower back. The knee raise stretches your lower back and the hamstring muscles of your thighs.

Begin both exercises by lying on your back on the floor, with your knees bent and your feet flat.

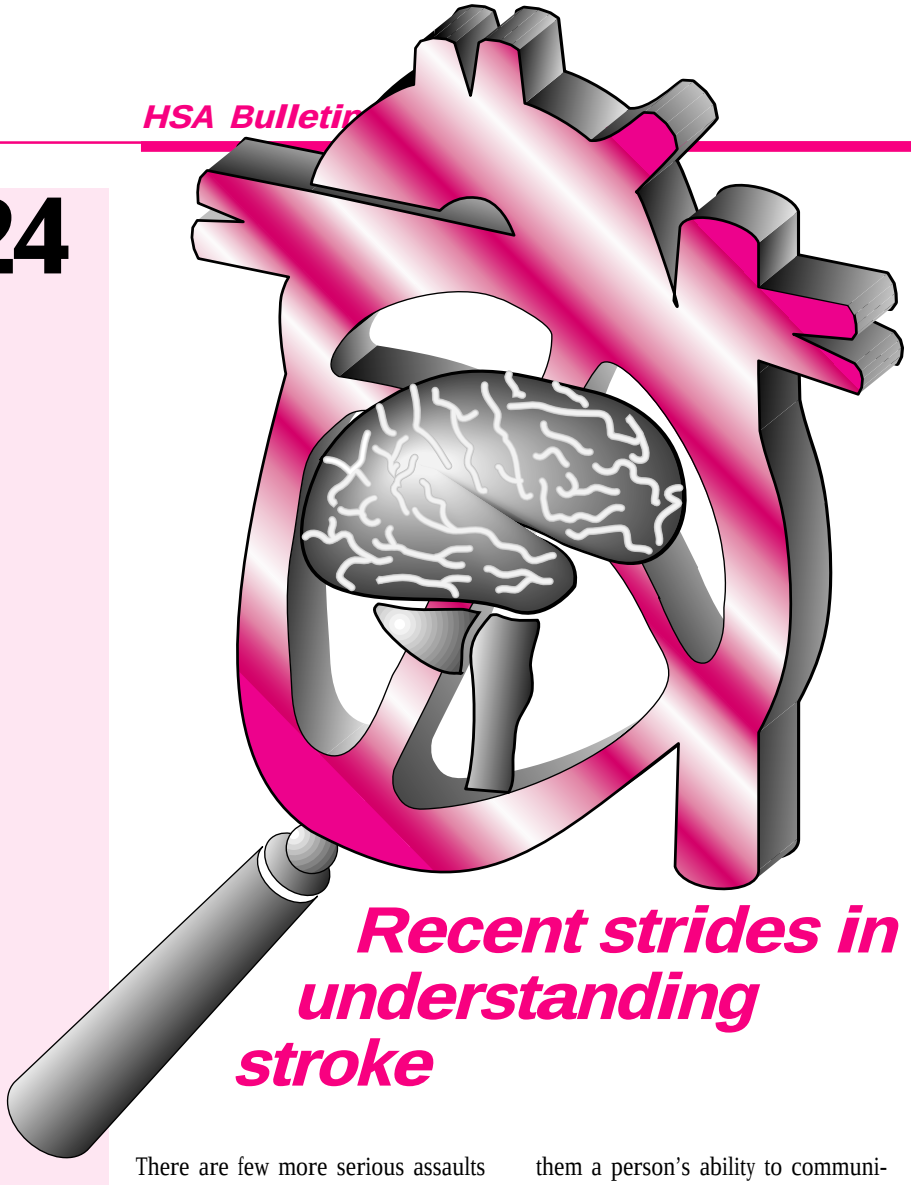
Pelvic tilt

- As you exhale, press the small of your back to the floor.
- Hold this position for 5 seconds.
- Relax and repeat, building up to 10 times daily.
- You don't need a floor to perform the pelvic tilt! Try performing the tilting motion while sitting, standing or on your hands and knees.

Knee raise

- Pressing the small of your back to the floor, pull one knee to your chest with your hands.
- Hold for 5 seconds, then slowly lower your leg.
- Repeat 10 to 20 times daily with each knee.
- Vary by raising both knees to your chest.

If your back muscles feel tight at first, try doing these exercises after taking a warm bath or shower.



Recent strides in understanding stroke

There are few more serious assaults the brain can suffer than a stroke. Many people know that these "brain attacks" are often a result of uncontrolled high blood pressure. Most also know about stroke's devastating aftereffects: death or loss of function. Fewer people know exactly what happens during a stroke.

Up until about a decade ago, health care professionals also had a relatively low awareness of the process of stroke. It was certainly known that one of the two types of stroke, ischemic* stroke, occurs when a clot lodges in one of the cerebral arteries, which are the blood vessels that feed the brain with oxygen- and nutrient-rich blood. As a result, the flow of blood in the brain becomes completely occluded. The brain cells downstream of the blockage, starved for oxygen and nutrients, wither and die, taking with them a person's ability to communicate, walk, coordinate, or reason. In the other type of stroke, hemorrhagic stroke, one of the cerebral arteries weakens and breaks, causing bleeding into the brain, and the death of the tissue around it

On the frontiers of stroke therapy

For a long time, physicians regarded stroke with an air of resignation. The condition was often unpredictable and largely untreatable. The damage left in its wake was usually irreversible. Fortunately, though, such a scenario usually stimulates a lot of research, and what investigators have found out about ischemic stroke is changing the way it is treated.

The first thing they've found is that they can actually unplug the blood vessel that has become occluded during ischemic stroke. Thrombolytic, or clotbusting, drugs which were originally (and are still) used to treat heart attacks,† actually break up the clot. This minimizes the time that brain tissue is deprived of oxygen, thus preventing cell death. Clotbusters must be given within three hours of the onset of the stroke, so it is essential to know the warning signs of stroke and get to

WARNING SIGNS OF STROKE

Now that new treatments are available that must be administered within hours of the stroke, it is essential to get to the hospital without delay. You should become familiar with these hallmark signs of stroke.

- **Sudden weakness or numbness of the face, arm, or leg on one side of the body**
- **Sudden dimness or loss of vision, particularly in one eye**
- **Loss of speech or trouble talking or understanding speech**
- **Sudden, severe headache with no apparent cause**
- **Unexplained dizziness, unsteadiness, or sudden falls, especially with any of the above symptoms**

the hospital immediately if you or a loved one experience them. There, the doctors must first determine that the stroke is not a hemorrhagic one, since clotbusters, which thin the blood, can worsen those.

Newspaper reports from patients who have received the clot-busters successfully sound nothing short of miraculous. Some who have suffered massive strokes walk away from the hospital days later feeling fine or with minimal loss of function, for example, a little weakness in a limb. Unfortunately these success stories don't occur nearly as frequently as we'd like, and clot-busters do have a downside: they themselves can cause bleeding in the brain, or hemorrhagic stroke. It is one of the side effects of which every patient is advised before receiving thrombolytic drugs.

Researchers have also found out that a stroke is actually a long chain of events in which the clot is only the first link. Indeed, much of the damage caused by stroke occurs hours, even days, after the initial incident. The trauma of the clot sets off a chemical cascade. If it proceeds unchecked, the resulting deficits can be extensive and profound. But researchers are finding out that by intervening at different levels of the sequence, they might be able to prevent some of the damage that occurs at later stages, thus preserving vital functions.

Researchers are vigorously investigating a whole new group of medications. Called neuroprotective agents, they intercede at different steps of this spiral of damage, protecting the cells from onslaught. In clinical trials, about a third of the patients who receive neuroprotective agents leave the hospital with a higher level of function than those who don't. Some of these agents could be available as early as 1998.

Now that the face of stroke treatments has changed, there is a massive movement to educate the public about the signs of stroke. Take a minute to read over the box below. Now, whether you recover from a stroke or not may only be a matter of time.

** Ischemia is a state of oxygen deprivation that may lead to tissue death.*

† A heart attack is caused by a clot lodging in one of the arteries of the heart, causing ischemia and tissue death. Thus ischemic stroke and heart attack are caused by the same process.

Reprinted from the Summer 1997 edition of Hoechst Marion Roussel's ***CardiSense—Vol. VII, No. 4.***

Helpful hints for healthier lives

Good health news, useful ideas and beneficial products you can use.

• Brisk walks increase your energy level, reduce stress and promote optimism. They also rev up your metabolism and can help you maintain or lose weight.

• Washing your hands keeps you healthy. Children who washed their hands four or more times during the school day had 24% fewer sick days because of colds and flu and 50% fewer sick days because of stomach troubles.

• Eating more fruits and vegetables can lower your blood pressure. In one study, adults with hypertension who ate a low-fat diet and 9 or 10 servings of fruits and vegetables every day for two weeks had significant reductions in blood pressure.

• Reducing your stress can lower your risk of heart disease. People with reduced blood flow to the heart had a three times higher risk of heart attack or death if they had a high stress level, one study found.

• Drinking plenty of water every day may reduce your risk of colon cancer. Women who drank more than five glasses a day had half the risk of the cancer as those who drank fewer than two glasses, according to one study. All those in the study had a family history of the disease.

Sources: California State University at Long Beach, American Heart Association, Duke University, "University of California, Berkeley—Wellness Letter" "Prevention," Fred Hutchinson Cancer Research Center

Reprinted from the summer 1997 issue of the George Washington University Health Plan's ***Vital Signs.***

THE LAST WORD…

Overlook a great deal.
Improve a little.—Pope John XXIII

He who labors diligently need never despair; for all things are accomplished by diligence and labor.—Menander of Athens

Angels can fly because they take themselves lightly.

Great dancers are not great because of their technique; they are great because of their passion.—Martha Graham

The secret of getting ahead is getting started. The secret of getting started is breaking your complex overwhelming tasks into small manageable tasks, and then starting on the first one.—Mark Twain

Things work out best for those who make the best of the way things work out.

THE PATIENCE PRAYER
God grant me patience
…and I want it right now!

Nothing makes a person more productive than the last minute.

NOTICE: We welcome any materials that you submit to the Holmes Safety Association Bulletin. We **DESPERATELY** need color photographs suitable for use on the front cover of the ***Bulletin.*** We cannot guarantee that they will be published, but if they are, we will list the contributor(s). Please let us know what you would like to see more of, or less of, in the Bulletin.

REMINDER: The District Council Safety Competition for 1997 is underway—please remember that if you are participating this year, you need to mail your quarterly report to:

Mine Safety & Health Administration
Educational Policy and Development
Holmes Safety Association Bulletin
P.O. Box 4187
Falls Church, Virginia 22044-0187

Please address all editorial comments to the editor, Fred Bigio, at the above address or at: MSHA—US DOL, 5th floor—EPD #535A, 4015 Wilson Blvd., Arlington, VA 22203-1984. Phone us at (we love to hear from you): (703) 235-1400

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*We are short of articles on metal/quarry safety and welcome **any** materials that you submit to the Holmes Safety Association Bulletin. We **DESPERATELY NEED** color photographs (8" x 10" glossy prints are preferred however, color negatives are acceptable—we will make the enlargements) for our covers. We **ALSO NEED** color or black and white photographs of general mining operations—underground or surface. We cannot guarantee that they will be published. If they are, we will credit the contributor(s) within the magazine. All submissions will be returned unless indicated.*

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Upcoming events:

- *Nov. 30-Dec. 3, 33rd Annual Int'l Cement Seminar, Century Plaza Hotel, Los Angeles, CA*
- *Dec. 1-5, 103rd Northwest Mining Assoc. Annual Conv./Expo, Spokane, WA*
- *Dec. 10, Safety Seminar for Underground Stone Mines, Holiday Inn–Airport, Evansville, IN*
- *Dec. 14-16, Louisville Construction/Mining Expo, Kentucky Fair/Expo Ctr., Louisville, KY*
- *Feb. 18-20, '98, S. Cent. Dist. Jt. Mine Safety/ Health Conf., Dallas Medallion, Dallas, TX*