

The Holmes Safety Association

BULLETIN

January 1998



INSIDE:

Accident summaries

Breathing easy...

Lowering accident rates



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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. For more information visit the *MSHA Home Page* at www.msha.gov

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: Kudos for this month's super cover photo go to Gala Hoffman of the Public Relations Department, Peabody Group. [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**



MSHA inspector checking the velocity of air flow at underground coal mine.

Multiple actions part of '96 Black Lung Advisory Committee recommendations

Federal effort to end black lung disease takes form of nationwide mine sweep

Federal inspectors from the Labor Department's Mine Safety and Health Administration (MSHA) began visiting the nation's nearly 700 underground coal mines today to kick off the next phase of the agency's effort to eliminate black lung disease from America's mines. The inspectors will provide education and training materials to miners and mine operators concerning the dangers associated with exposure to excessive levels of respirable coal mine dust which causes black lung disease.

This nation-wide coal mine dust sweep will highlight the risk of black lung disease and is part of a multiple initiative which also involves expansion of the MSHA dust sampling program in several states including Kentucky, Virginia, and West Virginia and the commencement of an enhanced special emphasis inspection process for certain underground and surface coal mines.

"Both miners and mine operators clearly need to understand that proper controls in the mining

environment that are consistently applied and maintained is the key to ending black lung disease among miners," said Davitt McAteer, assistant secretary of labor for mine safety and health.

"Most importantly, they have to recognize that we need their help, their awareness, and their concern about black lung disease to accomplish this task."

Proper controls for reducing exposure to coal mine dust are documented in the approved

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MSHA inspectors performing a variety of inspection tasks at underground coal mines and surface areas of underground coal mines.



ventilation plan for each underground coal mine and may include engineering practices such as the appropriate use of ventilation, water sprays, and dust scrubbers, among other actions.

MSHA inspectors will attempt to reach as many miners as possible to discuss hazards associated with



exposure to coal mine dust, to re-emphasize the requirement to check all respirable dust controls at the beginning of each production shift, and to provide them with a packet of information on occupational lung diseases and on their rights and responsibilities under the Federal Mine Safety and Health Act.

The current initiative also involves expansion of a pilot program that increases dust sampling inspections in certain areas of Kentucky and

Pennsylvania, and all of Maryland, Ohio, Virginia, and West Virginia, from an average of one per year at all coal mines to a frequency of four times per year at underground mines and twice per year at all surface mines. In addition, MSHA will now conduct special emphasis inspections on, at least, a monthly basis at mines identified as having problems complying with respirable dust standards. The special emphasis inspections will focus on the maintenance and operation of required dust controls, the adequacy of the operators requirement to conduct an on-shift examination of those controls, and a requirement for operators to collect representative dust samples.

“The special emphasis inspections are important to addressing the problem of black lung disease,” said McAteer. “Time and time again miners told the black lung advisory committee that adequate dust controls are only in place when our inspectors are present. These special emphasis inspections will help insure that required dust controls are in place and functioning properly on a consistent basis. During these inspections, we can note the effective techniques used where we find





compliance with our standards and compile a 'best practices' guide for use by mine operations that seem to have a problem controlling dust. Also, where we find non-compliance, operators should be advised that we will issue citations as required by the Mine Act."

This initiative is part of the efforts begun nearly two years ago to eliminate black lung disease from the mines of this country. In 1995, a Secretary of Labor's Advisory Committee on the Elimination of Pneumoconiosis Among Coal Mine Workers was impaneled to recommend a plan to address the problem. The nine-member advisory committee, which met in coal mining areas around the country during 1996, issued its recommendations in a 116-page report released one year ago. The report addressed the federal program to prevent occupational lung diseases among coal miners and contained recommendations comprised of more than one hundred specific action items directed toward elimination of coal workers' pneumoconiosis, also commonly referred to as black lung.

As suggested by the advisory committee report, in June MSHA



announced a strengthening of existing enforcement procedures to give coal miners better protection against lung diseases. Revised procedures to inspectors included instruction to inspect for compliance with requirements to perform an on-shift examination of respirable dust controls, and to emphasize examination of dust controls on roof bolting machines and of machine-mounted dust collectors on continuous mining machines.

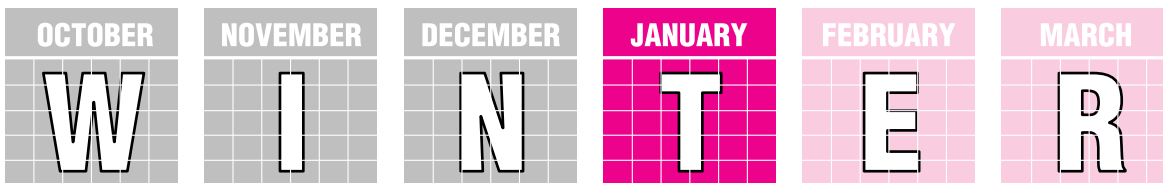
Also, as suggested by the committee report, the agency is working on new regulations to require mine operators to verify the effectiveness of dust control plans, to provide X-ray screening for all coal miners and to establish a separate standard for silica dust. Efforts are also underway to test a new device

which will continuously measure dust levels.

As part of the current black lung initiative, MSHA will also offer local seminars on black lung awareness for miners and mine operators in coal mining regions of the country. The agency will provide more information to miners on the disease during normal training sessions and will require re-training of mine personnel as part of procedures to abate citations issued for repeated non-compliance with requirements for respirable dust standards.

Since 1990, coal mine operators and contractors have reported nearly 3,000 cases of black lung to MSHA.

*Mine Safety and Health Administration—USDOL
Contact: Rodney Brown, phone: (703) 235-1456*



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.

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Pictured left to right is Dean Berry, Morenci Mine Haul Truck Operator; Jodi Black, Senior Safety Coordinator for (OCIP) St. Paul Fire and Marine Insurance Co.; Claude Dew, Vice President for Road Machinery Co.; Bob Torres, Morenci Mine Safety Coordinator; and Butch Cox, Road Machinery Safety and Health Training Manager.



Phelps Dodge, OCIP Contractors working together

This is one of the 320-ton haul trucks working at the Morenci Mine which covers 82 square miles and employs 2,750 workers **not** counting contractors.

At Phelps Dodge, working with contractors is ahead of the curve. In 1991, an OCIP program was initiated at its Morenci Property. We wanted to ensure there were safety standards for contractors working on our property. The first question you are probably asking yourself is "What is an OCIP program?" Well it is an "owner-controlled insurance program" in which the owner of the property maintains the Workers Compensation and general liability insurance for contractors working on the property. "The small contractor may not be able to afford the insurance that Phelps Dodge requires for the contractor to work on-site."

Phelps Dodge pays the premiums, and the contractors deduct an equal

amount from their bids. There are about 120 contracting companies on-site at PDML "By their sheer numbers, they qualify for a premium cut when insured as a group in the OCIP."

"The partnership between Phelps Dodge and the contractors is the most advantageous benefit."

"Phelps Dodge and the contractors are working together now to reduce accidents and cut costs."

When the program first started, the St. Paul Fire and Marine Insurance Company originally hired one safety professional to work with the contractors on Morenci Property and has hired another. In addition, it is presently looking for the third. Presently working on the Morenci Property for St. Paul is Cliff Mull and Jodi Black. Both are Certified Mine Safety Professionals. In fact, they are the only two **Certified Mine Safety Professionals** working directly with

contractors in the world on mine properties. Everyday they must hit the deck "running" in order to cover the vast area of the mine.

Some of their job duties at Morenci are conducting safety audits and providing a wide range of training, including the DuPont STOP Program, drug awareness, OSHA 30-hour classes, MSHA training, fall protection, respiratory protection, accident investigations and more.

At Phelps Dodge, the contractor's safety performance is a definite consideration when contracts for good and services are looked at or renewed.

It is important to remember that contractors who had virtually no safety programs when we started the OCIP are now able to compete in the contractor, pre-qualification process. In addition, the publication of the "Phelps Dodge Contractor Safety Manual" has standardized safety

procedures at PDML. The frequency of contractor accidents has dropped by 75 percent. The number of citations issued to contractors by state and federal inspectors has plummeted. And the Arizona State Mine Inspector's Award for "The Safest Contractor Working On A Mining Property" has been won seven times by contractors at PDML in the last seven years.

As I said, the OCIP was piloted at Morenci in 1991. Last year, it was expanded to include Phelps Dodge branches in New Mexico and El Paso, Texas. In January of this year, it spread to all Arizona sites. And in May, the program was implemented at Phelps Dodge Industries nationwide. Our objective now and always has been to provide a safe and



healthy work environment for employees. Doing so, will help us reach our goal of "Zero" accidents.

*Submitted by H.L. Boling, Director of Safety/Human Resources
Phelps Dodge Morenci Inc.*

Chicago's coal mine exhibit undergoes facelift

Chicago's Museum of Science and Industry, with Chicago-based Marmon Group investing \$1 million, made a much needed renovation to the museum's coal mine exhibit. The exhibit, which was the first to open in the museum, was reopened during a formal reception after its first major refurbishment since the 1970s. The exhibit opened in 1933 and since then more than 25 million people have toured it.

Most of the new equipment was donated by the Marmon Group, and more specifically, National Mine Service, Long-Airdox, Koehler Manufacturing, and Morgantown Machine & Hydraulics. Robert A. Pritzker, president and CEO of the Marmon Group, Inc., presided over a formal reception dedicating the new exhibit. He recalled spending a lot of time in the museum, and particularly the coal mine exhibit, as a child, and now wanted to give the museum something in return for future generations.

The exhibit's exterior resembles a headframe complete with hoist and

cage. Retaining some southern Illinois heritage, it's named Old Ben No. 17.

A large whistle blows to attract people to the exhibit and the crowd waits on flights of stairs that lead to the top of the headframe. While waiting in line, visitors can watch television monitors that show a video clip describing continuous mining and haulage. Before entering the cage, a tour guide dressed in full underground gear including coveralls, hard hat, and steel-toed boots gives an introduction to the audience.

A group of about 15 people enter the cage and take a simulated dark, shaky ride 600 ft. below ground. After arriving at the bottom of the shaft, visitors are given a demonstration of the flame safety lamp and the dangers of methane using a faulty Davy lamp. The museum has made three major changes to the exhibit; a geological description of coal origins, a longwall face, and a modern mine computer room have been added. While walking through a heavily-timbered crosscut of a coal seam that exposes fossils of

swamp plants and animals 40 to 300 million years old, visitors examine how coal was formed geologically.

The largest addition to the exhibit is a room that details longwall mining. The display gives a standing-in-the-tailgate perspective to the visitors. It's equipped with eight shields, tailgate motor assembly, pan line, and a Long-Airdox shearer. As visitors enter the area, the tour guide energizes the face and explains how longwall mining removes almost 100% of the coal compared to about 30% for room-and-pillar mining. The shearer trams back and forth with the cutterhead turning. Simulated sounds give the illusion of the top falling off behind the shields.

On the final leg of the journey, visitors walk through a modern version of an automated safety room where remote control cameras monitor conveyors and sensors report ventilation statistics to a main computer.

Reprinted from the August 1997 issue of Coal Age magazine.

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Peabody Group mines may be "Going for Perfect" now, but a crew in West Virginia has blazed the way. The 31 members of the Roads and Yard Crew of the Big Mountain/Robin Hood Business Unit, Seth, W. Va., were honored in late summer for having attained six years of work without a lost-time accident.



Raising the bar for lower accident rates

Perfection is not too much to ask for when it comes to safety

This year, Peabody employees aren't being asked to do the impossible.

They're just being asked to be perfect.

A new major company-wide safety initiative, *One Future: Going for Perfect*, is asking all employees and business units to do what many of them are already doing, that is, work day-in, day-out —year-in, year-out—with zero lost-time accidents. Is "perfect" too much to ask of all Peabody people? If "perfection" means no lost-time accidents, then many Peabody units are already operating at that level, and have been for some time.

"We have many facilities in this past fiscal year that have achieved that level of performance," said David A. Beerbower, Vice President -

Quality and Safety, Peabody Holding Co., Inc., "that's what we're striving for."

The program in place prior to Going for Perfect had succeeded in lowering accident rates and raising productivity. Every year in this decade, Peabody's overall safety performance has improved, with a 1997 incidence rate 80 percent below that of 1990.

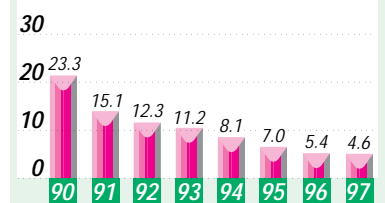
And as the accident incidence rate decreased, productivity increased by almost 170 percent in tons-per-employee-shift for North American mines.

"When you're operating at that level of perfection from a safety standpoint, you're also doing a lot of other things right," said Peter B. Lilly, President of Peabody Holding

Company, Inc.

"To go for perfect you have to pull together as a team," Lilly said, "and this will show in other activities—in production and maintenance, in meeting quality requirements of coal supply agreements, superior equipment availability and utilization, mine planning and engineering, and communications throughout an operation. They help make our mines

Safety incidence rates (U.S. mines)



more competitive.”

Raising the bar

“We felt that as we progressed with our commitment to safety through the existing program, *One Future: Safety Through Teamwork*, we were again ready to raise the bar,” Beerbower said.

“We saw a steady decline in our accident rate,” he said. “Raising the expectation for our people was the next step. Our people have demonstrated the skill and willingness to work together and we can now move up to the next level.”

The improvement in Peabody’s incident rate on an annual basis since 1990 has followed a near-linear path. “There are those who would say that at some point in time a leveling-off should occur,” Beerbower said. “We’re saying that it should not occur until we get to zero.”

“For mines that have had lost-time accidents since the program began: Don’t give up,” Beerbower said. “Once we have an accident, our goal continues to be zero lost-time accidents from there

on. There’s no sense in giving up the struggle.

“What I find repugnant is to say we will accept X number of accidents per year. Our employees deserve better than that, and each one of them should feel that zero is the only acceptable level,” he said.

Despite its Peabody-wide scope, the details of Going for Perfect are being implemented at the business unit level. Peabody laid out the specific expectations, with examples of employees who exemplified the mindset of Going for Perfect, and left it up to the busi-

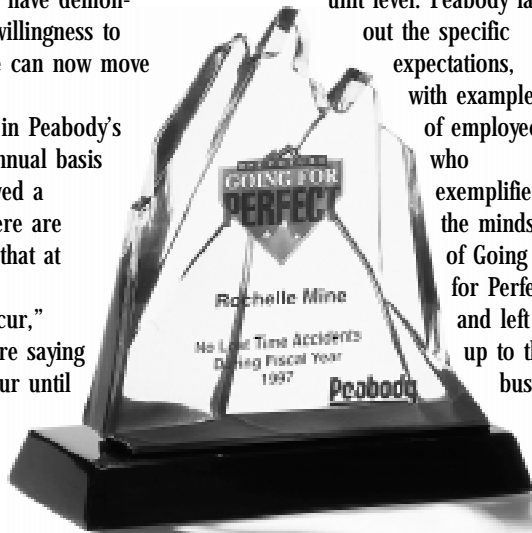
ness units to execute the program in ways suited for their own employees and conditions.

Must come from within

To succeed, the philosophy of Going for Perfect will have to be adopted at the individual level, because that’s where decisions on safe behavior ultimately are made.

“You can’t prescribe an overall company safety program that will get us there,” Lilly said. “It’s up to the business units, teams within the business units, and the individual to come up with innovative, creative ways that address their unique conditions and the personalities of their employees.”

A promotional brochure and video was mailed to each employee at home. “We wanted to celebrate some of the victories that have occurred as a result of working together as teams,” Beerbower said. “We also wanted to excite people, and get people focused on something active and positive, so they could go forward.”



Reprinted from the Peabody Group’s October 1997 issue of *Pulse* magazine.

Trophy awarded to injury-free operations by Peabody Group. Mines well on the way to “Going for Perfect”, if fiscal 1997 results are any indication, are:

- Big Sky Mine
- Caballo Mine
- Harris Preparation Plant
- Lee Ranch Mine
- Patriot Mine
- Randolph Preparation Plant
- Rawhide Mine
- Rochelelle Mine
- Seneca Mine

NMA announces excellence in mining education awards

NMA Chairman Douglas C. Yearley announced that the NMA would recognize the extraordinary efforts of its member companies in fostering education in their local and regional schools by establishing an annual Excellence in Mining Education award.

The first awards will be presented at the annual NMA Mining Convention to companies representing the NMA’s major categories of membership: coal, hardrock, manufacturers and services, and state associations.

“The NMA recognizes the necessity to teach our future citizens

the importance of coal and minerals to society, so that they can make the vital decisions of a democratic country based on knowledge, not biased misinformation,” said Yearley, who is chairman, president, and CEO of Phelps Dodge Corp. In addition, he said the industry, should “foster the overall level of education our children receive, particularly in scientific disciplines.”

Factors that will be considered in judging the nominations will be participation in the NMA Mineral Education for Your Community program, maintaining other adopt-a-

school programs or business/ education partnerships; creation of unique materials demonstrating the production and/or use of minerals, environmental stewardship, etc.; fostering public education through mine tours, visitors’ centers, community days, etc.; encouraging employee volunteerism in the local schools; and sponsoring of educational programs through charitable donations.

Reprinted from the August 1997 issue of *Coal Age* magazine

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Metal/Nonmetal accident summary Fatal powered haulage accident

General information:

A haul truck driver, age 53, was severely injured at approximately 1:52 pm, when the truck he was driving struck the right side berm along the haul road. The victim succumbed to the injuries the following day. The victim had a total of 25 years mining experience—all as a truck driver at this operation.

The operation normally worked one, 9-hour shift, 5 days a week. Maintenance work was conducted on an 8-hour shift on Saturdays.

Limestone was quarried by the multiple bench method and was drilled, blasted, crushed, sized, and stockpiled for sale as construction aggregate. The operation produced about 450,000 tons of crushed limestone per year.

The accident occurred on the main haulage road between the quarry and the crusher dump site. The distance from the dump site to the quarry was about 0.7 of a mile. The roadway at the accident site was 41 feet wide, constructed of crushed, compacted material, and free of holes and obstructions. A berm comprised of large boulders was present on one side of the roadway to prevent vehicles from driving into a wet, marshy area.

The truck involved in the accident was a six-wheel drive, articulated, 40-ton capacity dump truck. The cab of the truck was centered and narrower than the width of the truck. The distance from the right side of the seat to the steel cab support post was 20 inches. The distance from the left side of the seat to the steel cab support post was 24 inches.

The truck was delivered to the quarry and the victim received task training in the operation of the unit the same day by the equipment distributor.

The truck sustained minor

damage in the accident. When the truck was tested and driven during the accident investigation, there were no mechanical defects which would affect its safe operation.

On the day of the accident the weather was clear and dry.

Description of accident:

At about 6:15 am the day of the accident, the victim arrived at the mine. He went to the mine office for a cup of coffee, spoke briefly with the foreman, and then proceeded to the shop where the employees assembled before starting work. After a pre-shift inspection of his truck, he began his normal duties of hauling shot rock from the quarry to the primary crusher.

Work proceeded without incident until 1:50 pm, when the crusher operator asked the haul truck drivers to dump slower because of the larger rock size. There was no indication that the victim had any problems, or that anything was wrong. After radio communication with the scale operator, the victim drove away from the crusher empty and proceeded toward the quarry.

About 0.1 of a mile from the crusher, the victim lost control of his truck at a gradual curve in the haulage road. The truck struck the boulders which provided a berm on the right side of the roadway. It remained in contact with the berm for about 88 feet, at which time it articulated and came to rest across the roadway.

Another truck driver was returning from the quarry with a load of shot rock a few minutes later and saw the truck across the haul road. He radioed the scale operator at the scale and reported the accident. He then climbed to the operator's cab and found the victim slumped over the right side of the instrument panel

with the seat belt still holding him in his seat. The arm rests on both sides of the seat were bent out approximately at 45-degree angles. The other truck driver yelled at the victim and, after receiving no response, returned to his truck and radioed the scale operator to request an ambulance.

The foreman heard the conversation between the other truck driver and the scale operator and asked the scale operator to notify the shop mechanic who was trained in basic life support. The shop mechanic arrived at the scene a short time later and attended to the victim.

The county ambulance service arrived and transported the victim to the hospital, where he was placed on life support systems. He died the following day. The cause of death was reported as injuries to the head, creating massive brain trauma.

Conclusion:

There were no eyewitnesses to the accident. It is speculated that the victim failed to steer his truck through a gradual curve in the haulage road, struck the berm, and traveled along the berm for about 88 feet. Black tire marks and scrapes on the boulders indicated the truck bounced back and forth against them as it traveled out of control. The victim received his injuries as he was thrown about in the cab of the truck. The lap-type seat belt which the victim was wearing did not adequately restrain him.

Recommendation:

It is possible that a harness-type restraint system may have prevented or reduced the severity of the injuries sustained in the accident.

Summarized (11/25/97) by MSHA's Joseph Hoffman from an Accident Investigation Report dated June 6, 1997.

Breathing easy

Respiratory protection equipment can help workers guard against the effects of fugitive dust.

By Patrick Hernan

A good respiratory-protection program in a pit and quarry environment is not always an easy thing to define. No two mining sites are the same, and stone and sand producers often have a different product mix with a different set of risk factors.

Risk “depends on exposure levels and concentrations,” says Michael Fuchs, product manager for Uvex, a leading safety-equipment manufacturer based in Providence, R.I.

Fuchs and other experts say exposure to airborne particles can lead to diseases such as asthma, lung cancer and silicosis. An effective prevention program must include engineering controls, the proper breathing equipment, workplace vigilance and employee training.

“You just can’t tell someone to put on a respirator and go at it,” Fuchs says.

Silicosis, which is receiving increased attention from the National Institute for Occupational Safety and Health and the International Agency for Research on Cancer, is an important concern of sand and gravel producers.

The disease comes in three nonreversible forms and is caused by prolonged exposure to crystalline silica dust.

Chronic silicosis usually occurs after 10 or more years of exposure at relatively low concentrations. Accelerated silicosis results from high concentrations and develops five to 10 years after the first exposure.

Acute silicosis may develop within weeks of exposure to the highest silica-dust concentrations. About 250 construction-related employees die from silicosis each year. The highest concentrations of airborne silica may occur where abrasive blasting, crushing or concrete and masonry sawing take place.

“Damage is done [to] the lung, depending on the particulate,” Fuchs says.

Even though the pit and quarry industry has taken a proactive approach toward silicosis prevention, it is essential for producers to educate themselves and employees on workplace dangers.

A preventable condition

One of the odd things about silicosis, say the experts, is that it continues to occur despite the fact it is preventable. Purchasing the proper respiratory equipment—from half-masks to full-masks in their various forms—not only aids in prevention, it satisfies federal work-place safety regulations.

Fuchs says producers should ask important questions: Does the job-site equipment match employees’ needs? Have workers been adequately trained in the use of respirators? Are maintenance procedures being followed?

And producers should not limit themselves solely to silicosis prevention. Fuchs says producers should not forget about “nuisance dust,” which frequently circulates indoors and carries its own set of health risks.



Nuisance dust, Fuchs says, often causes problems in the upper-respiratory system.

Since that system is in a “constant cleaning mode,” Fuchs says, hints that something may be wrong in the work environment include coughing and sneezing by employees.

Multiple exposures to nuisance dust, paint sprays and other potentially harmful products often present at job sites create risks to workers, Fuchs says.

To minimize exposure, keep workers safe and avoid trouble from regulatory agencies, producers should do a careful analysis of the challenges they have to overcome and purchase respiratory equipment that will do the job.

“There are many manufacturers that provide the complete array of products—from disposable to self-contained units,” Fuchs says.

Reprinted from the July 1997 issue of Quarry Safety.

Coal accident summary

Fatal fall of rib accident

General information:

The mine is opened by two shafts, one slope, and one drift into the Pittsburgh coal seam which averages 84 inches in thickness. The mine employs 211 persons underground and three persons on the surface. The mine produces coal three shifts per day, 6 days per week. Maintenance and support work are performed on the seventh day on all three shifts.

One longwall section and two continuous-mining machine sections produce an average of 7,500 raw tons daily. Coal is transported from the face areas to the section loading point by a chain conveyor on the longwall section and by shuttle cars on the continuous-mining sections. Coal is then discharged onto a series of belt conveyors and transported to a surface preparation plant.

Description of accident:

The victim, a belt repairman, along with another belt repairman and the beltman, received their work assignments on the surface from the belt support foreman. They were to travel to the assigned area of the mine and continue setup of the belt transfer point under the direct supervision of the maintenance foreman. At about 12:05 am, the crew of workers entered the mine and traveled to their assigned work area.

After arriving at the work area, the victim began welding on the left side of the belt transfer frame under the supervision of the maintenance foreman. The beltman and the other belt repairman were burning holes for bolts on the right side of the transfer frame and cutting sections of roof bolts to be welded onto the transfer frame. After a period of time, the men switched sides with the victim and the maintenance foreman welding on the right side and the beltman and the other belt repairman cutting on the left

side. At about 5:00 am, the four men decided to take a break for food.

About 5:25 am, the victim and the maintenance foreman returned to the belt transfer area and resumed working. The victim got the torch and knelt down to start cutting roof bolts on the left side of the belt transfer. As the maintenance foreman turned to get more roof bolts, he heard the victim light the torch. The maintenance foreman began to walk away when he heard a loud noise. He looked back, but could not see the victim. The maintenance foreman yelled for the victim and ran back to the belt transfer point where he saw that a large piece of material had fallen from the rib area. He could only see the left hip of the victim protruding from under the fallen material. The maintenance foreman called for help. The roof bolter was working on an overcast one crosscut in by the belt transfer area when he heard a loud noise and then the maintenance foreman yelling for help.

The roof bolter ran to the belt transfer area and told the maintenance foreman to get help.

The maintenance foreman returned to the accident site along with the continuous-miner operator, another roof bolter and the construction foreman. The fallen rib material had broken into two pieces when it landed. Using a block and tackle and a chain hoist anchored to the mine roof, the miners lifted the material off of the victim. Due to the severity of the injuries, first-aid was not attempted. The victim was placed on a stretcher and transported out of the mine.

They arrived on the surface with the victim at 6:45 am where he was pronounced dead by the coroner. The cause of death was listed as multiple blunt force trauma.

Other factors involved:

The original height of the coal seam in the belt transfer area measured 96 inches, including a nine-inch rock binder approximately 5 feet above the mine floor. An additional 36-42 inches of rock and wild coal was mined to provide the necessary height for construction of the belt transfer area. The total height of the belt transfer area varied from approximately 132-138 inches.

The material that fell from the left rib consisted of rock binder: coal and rock intermixed with wild coals. The material measured 10 feet in length, 2 feet thick, and 30-42 inches in width.

A preshift examination of the belt transfer area was conducted by the section foreman, for the midnight shift, between 9:00 and 10:00 pm. An onshift examination of the belt transfer area was conducted by the construction foreman at about 1:40 am the next morning. Miners and foremen were working in the belt transfer area during the entire midnight shift.

There were no hazards observed during the shift or examinations prior to the accident. Co-workers and foremen indicated that there were no visible signs of roof/rib abnormalities or deterioration in the area that fell.

Conclusion:

The accident occurred when a large piece of material dislodged without warning from the left coal rib in the 2 West belt transfer area. The material struck the victim from behind, resulting in his death from multiple blunt force trauma.

A contributory factor to the accident may have been the mining height created by the removal of about 36-42 inches of additional material above the coal seam.

Summarized (11/25/97) by MSHA's Joseph Hoffman from an Accident Investigation Report dated July 1, 1997.

Magnetic sensors offer some distinct advantages in harsh mining environments

By Tim Thomas

The annual production and distribution of coal, ash, and coal by-products represents staggering material handling challenges particularly considering the dusty, abrasive nature of the products. Conventional belt conveyors commonly handle the coal moved in mining, transport loading and off-loading, stockpiling, and consumption operations.

Coal handling systems must efficiently and accurately move mountains of material, day after day. Multiple conveying systems must be synchronized for elevating, blending, or diverting. In some cases, conveyor transport speed must be monitored and precisely adjusted on the fly.

An overlooked conveyor that takes on more product than it can off-load may break or spill over, thereby jamming equipment and creating a domino effect of damage. Undetected and unchecked belt slip could lead to loss of operating efficiency, dangerous overheating, and serious complications in upstream and downstream processes.

Successful coal conveying is based on accurate information gathered constantly from multiple points. This data feeds electronic motion control circuitry that adjusts motor speeds and related equipment, and takes corrective action should a process go out of balance.

For example, in some operations a conveyor speed differential of a few percent between synchronized processes cannot be tolerated. Automated monitoring and control systems for integrated conveyors must be accurate, properly aligned, and capable of constant, unattended operation at a range of outdoor temperatures on dusty, vibrating equipment.



The speed of machinery often is controlled by electronic adjustable speed drives, rather than by belts, pulleys, or speed reducers. This allows for precise control using electronic signals, but requires accurate, dependable motion sensing devices suited to industrial operating conditions. A properly-designed motion control system serves both predictive and preventive functions, making appropriate adjustments, activating alarms, and preventing material handling breakdown.

Motion control functions

There are three primary control functions related to motion in coal handling systems. Properly implemented, these functions protect conveyors and associated equipment from overloading, jamming, drive breakage, or inaccurate operation. The simplest motion control function detects go/no-go conditions. For zero speed detection, the sensor must respond to motion or lack of motion.

Another control function, monitoring a critical shaft, senses over-speed, under-speed, stopping, starting, and forward or reverse rotation. These conditions are detected by a signal generating device that typically incorporates adjustable set-point relays (action or alarm levels) to control one or more conveyors.

A fully featured motion switch determines whether the material handling system is operating precisely as intended, not just whether it's "On" or "Off." It can detect belt slippage, jamming, conveyor overload, very small rotational speed variations, and can provide switch closures to make appropriate responses.

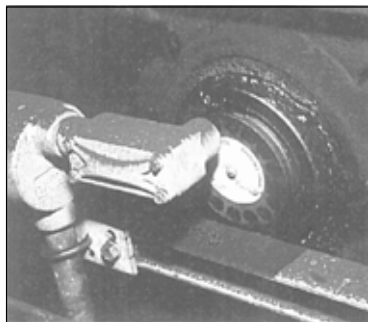
Zero speed and motion switch control signals can be applied in relay-based motor control systems, and also can conform to conventional programmable logic controllers (PLC) standards, including the appropriate range of voltage, pulse width, and amplitude. The typical PLC requires a control signal amplitude of 6 to 24

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Grease and coal dust do not affect the accuracy of this magnetic sensor. The sensing assembly contains an electronic circuit that converts inductive sensor output to the electronic signals for transmission to the plant's process control room.

volts dc (V-dc), with signal pulse width adjustment between 0.1 and 100 milliseconds (ms) to accommodate the PLC scan rate in various application settings.

Finally, motion control systems serve several control functions, including simple detection, display, and transmission of operating speed, as well as feedback control functions. Unlike the motion switch, which provides relay contact closures at selected setpoints, the tachometer system generates an analog voltage or current output signal based on one or more selected shaft speeds. This signal (typically 4/20 milliamps or 0-10 V-dc) is linear, and proportional to the speed of the monitored shaft.



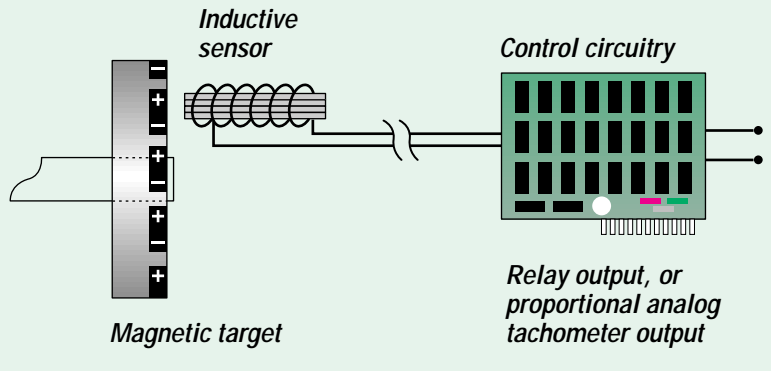
The tachometer signal can be sent simultaneously to a digital display, PLC, chart recorder, loop controller, drive speed controller, or other control or monitoring devices.

A tachometer feedback system can generate control signals that are proportional to over speed or under-speed conditions to precisely adjust conveyor speed or control other coal handling functions. As belt wear or other load factors cause the conveyor speed to lag, power to the conveyor drive motor is adjusted by the tachometer feedback control function to maintain precise operating speed.

Motion sensor options

Industrial sensors used to detect and measure rotary motion include photoelectric devices, mechanical switched, proximity switched, and magnetic switched. These motion

Figure 1.—The Altra•Gap magnetic motion sensor uses a rotating magnet target, inductive sensor, and electronic circuit to monitor shaft motion and create either switch closure or proportional analog signals.



sensors vary in their gap requirements, ability to tolerate rugged conditions including shock, vibration, electrical noise, or misalignment, as well as vulnerability to contamination.

One motion detection device is the Altra•gap magnetic sensor developed by Process Control Systems, Inc., of Minneapolis, Minn. This sensing method consists of a magnetic target that is positioned opposite an inductive sensor (See Figure 1). Associated electronic circuitry measures sensor

10,000 feet. As Figure 2 shows, the Altra•gap switch operates with a magnet-to-sensor gap of up to 7/8 inches, and across a radial alignment range of more than 180°.

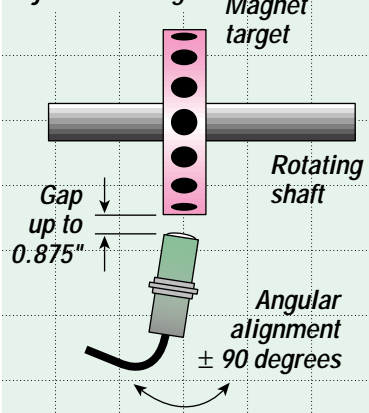
Other motion sensors may be more gap-sensitive. For example, in the case of proximity switches, many require a gap accuracy of +0.30 inches with little or no tolerance for azimuth variations. If such a switch is disturbed during operation or maintenance, recalibration may be necessary.

By contrast, the Altra•gap magnetic motion sensor is capable of error-free operation across an alignment range of approximately 180°. The spacing and alignment tolerances of this sensor are due in large part to its associated proprietary electronic circuitry.

Magnet discs for motion sensing commonly are fastened to the driven rather than driving elements in a material handling system. Monitoring the driven shaft ensures that the sensor will detect changes in speed or direction resulting from drive slippage or failure, rather than simply reading the unaffected performance of the driving component. Magnetic discs can be mounted to shaft ends for this purpose or split collar magnet wraps may be used where shaft ends are not accessible.

A properly-designed motion control switch will be fail-safe. An alarm condition should result if the control

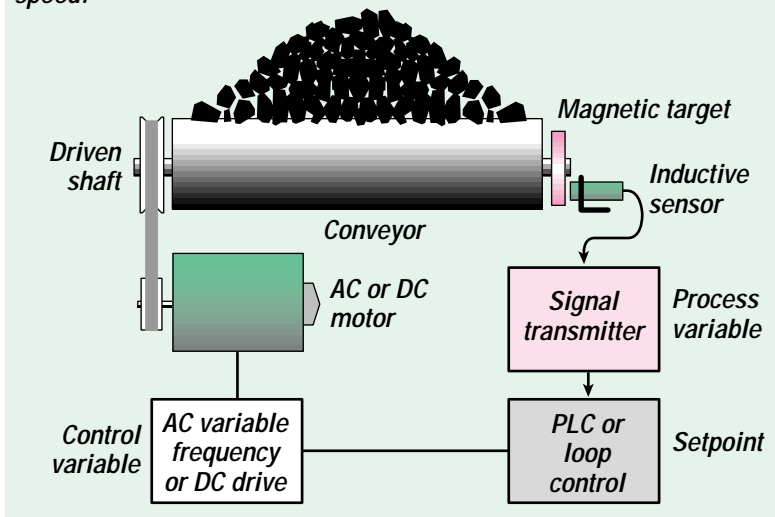
Figure 2.—Magnetic motion sensors operate well over a wide adjustment range.



output that results from magnet motion and generates control signals.

The Altra•gap sensor and its related electronics can be mounted together in a small, self contained enclosure, or the sensor can be separated from the electronics by up to

Figure 3.—Tachometer motion sensing detects conveyor speed and continually adjusts power input to maintain constant drive motor speed.



signal is lost as a result of any switch malfunction, preventing the control from failing in the safe position.

Magnetic sensors can be configured for tachometer feedback applications (See Figure 3). The output from the sensor's signal amplifier provides a PLC with shaft speed information, and determines the power to be supplied to the drive motor to maintain the desired speed.

According to Process Control Specialist Mike Lund, of Powder River Power, a Gillette, Wyo., material handling system supplier, two important motion sensing applications in local open pit coal mining are in crushers and sampling systems. Debris, such as broken scraper teeth or metal parts, can plug a crusher causing substantial damage if the system is not immediately stopped. In the case of coal samplers, a constant material flow is important and can be confirmed with conveyor motion sensors.

Another coal industry material handling specialist, Application Engineer Fred Schuele of Control and Drive Systems, Inc., Olathe, Kan., has found magnetic sensors superior to proximity switches in several applications. These include monitoring coal conveyors for belt slippage, measuring heat exchanger wheel speed, and verifying water pump

operation. "Magnetic sensors can tolerate rugged environments and give more accurate results than other sensing methods," he said.

"Proximity switches need to be carefully adjusted and they can be blocked by dust or even snow and ice," Schuele said. "We have found that magnetic motion sensors can sense through material buildup and have much greater adjustment latitude. We find that conveyor motion control is more dependable and trouble-free with magnetic sensors."

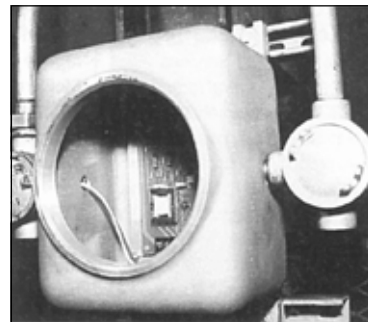
Conveyor monitoring in surface mining applications generally is limited go/no-go sensing, according to Electrical Supervisor Jed Jensen of Powder River Coal Co.'s Rawhide mine located in northeast Wyoming. This mine uses mechanical brush sensors in some cases, and magnetic sensors in others.

"Some of our conveyors run at very low speed too slow for accurate, dependable sensing with a mechanical sensor," Jensen said. "In such cases we use a magnetic sensor with a high density field—accomplished by using 10 to 15 magnets on the magnet disk. This gives us sufficient switch accuracy even at very low shaft revolution rates, and ensures dependable automated process management. For example, a

crusher or feeder will not start unless signals show that the downstream belt is running "

Senior Engineer Bruce Maki of Northern States Power's High Bridge power plant in St. Paul, Minn., said that magnetic switches are used on several fixed speed conveyors to meet fire protection code recommendations. These sensors are set to stop conveyors should speed drop to less than 80% of their nominal rate.

High Bridge also uses a magnetic sensor to drive a tachometer circuit on a variable speed feeder measuring relative speed between fixed speed 800-ton per hour conveyors and halting operation under out of tolerance conditions. This under-speed monitoring arrangement guards against the effects of belt slip.



Magnetic motion detection target/sensor units can be separated from associated electronics by up to 10,000 feet. This explosion-proof housing contains electronics for a motion control pair located on an upper floor in the power plant.

The optimum motion control design for coal conveying uses modular, turnkey motion sensing components that can be assembled and interconnected for virtually any application without a great deal of custom engineering. A well-designed system is fail-safe constantly alert, resistant to difficult environmental conditions, able to integrate complex multiple functions, and able to take instant action. Effective motion sensing and control protects capital equipment, prevents coal waste, saves energy costs, and helps coal handlers maintain efficient operations.

Reprinted from the August 1997 issue of *Coal Age* magazine.

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Lack of lifejacket, handrails were contributing factors in drowning

A lack of handrails, lack of a lifejacket and lack of safe access between two waterbound vessels caused the drowning accident that killed a 30-year-old deck hand Sept. 30, 1996 at a sand dredging operation in Waggaman, La.

The victim's crew worked on a floating sand dredge, 135 feet by 32 feet. Sand was dredged from the Mississippi River using a suction dredge and pumped through a floating pipeline on pontoons to holding sand pits on both banks of the river.

The dredge on which the men worked was equipped with 41 inch-high handrails along the outside from the stern for a distance of about 61 feet along the port and starboard sides of the dredge. The remaining 74 feet of eight-foot wide walkway along the ladder section was not

equipped with handrails.

The victim's crew agreed to stagger their lunch break starting at about 11 am to work through lunch so they could leave at 2 pm. The breaks were taken on a tugboat adjacent to their work area. Once they returned from lunch at about 1 pm, the victim began helping with the coiling of the removed wire rope cable on the starboard side within the handrail section of the dredge. He was reportedly not wearing a life jacket.

At about 1:45 pm, the captain noticed that the victim was missing. During a search, a worker found the victim's hardhat floating in the river between the dredge and the bow of the tugboat. The Captain contacted the company owners, local police and the U.S. Coast Guard. A dive team found the victim's body the next day.

MSHA issued a citation for violating the requirement that an operator notify MSHA immediately in case of a fatal accident. MSHA became aware of the accident during an inspection at a nearby operation on May 9, 1997.

MSHA also issued a citation for violating the requirement that requires life jackets to be worn when there is danger of falling into the water. A citation was issued for violating the requirement that scaffolds and working platforms be kept in good condition. The citation noted that the barge did not provide handrails. MSHA also issued a citation violating the requirement that safe means of access be provided.

Reprinted from the October 17, 1997 edition of Mine Safety and Health News.

Faulty wiring caused electrocution

A 42-year-old mechanic was electrocuted when he touched a metal wand of a high pressure washer that was energized with 277 volts AC.

An MSHA investigation concluded the accident was caused by an incorrectly wired power cable and an infrequently checked grounding conductor after repairs were made to a Silverjet high pressure washer.

The July 12 accident occurred in Pendleton County, Ky., when the victim came into contact with the wand of the high pressure washer after he repaired it.

The Hubbell twist lock plug, which connects the washer to the disconnect, was improperly wired at the washer control box. The 480 volt, 3 phase plug, was wired with a

power wire connected to the grounding wire. That connection put about 277 volts onto the washer frame and its metal attachments.

An older Silverjet high pressure washer in the wash bay area had components that were interchangeable with the washer involved in the accident. Neither of the pressure washers was working prior to the day of the accident.

Also, the continuity of the grounding conductor was not checked after repairs were made, MSHA electrical inspector Clarence Holiway reported.

After the accident, MSHA issued citations on the Silverjet high pressure washer and modified a 103-K order on July 14. The change

allowed the mine to remove the high pressure washer for rewiring and repair.

It also allowed the mine to rewire primary power supply which is 480 volts, 3 phase. MSHA ended the order on July 29 at which time the washer was rewired and properly grounded.

The victim had nine years and three months' experience as a journeyman electrician. He had been a mine mechanic for three months before the accident. Records indicated he received an annual refresher training course in February in accordance with 30 CFR, Part 48.

The report is available on MSHA's home page: www.msha.gov.

Reprinted from the October 20, 1997 edition of Mine Regulation Reporter.

Failure to follow roof control plan led to death of one and injury to another miner

Failure to observe an approved roof control plan resulted in a roof fall that killed one miner and severely injured a second at a mine in Tazewell, Va.

The accident happened May 15 when mine foreman and mine machine operator were preparing to move the mine machine out of a completed cut by removing the cable when the roof fell. The mine machine operator was killed and the foreman suffered a fractured pelvis and crushed leg. The roof fall was 50 by

50 by 8 feet.

MSHA found that mine management had failed to follow the approved roof control plan, that pillar and barrier cut depths were excessive in both length and width in five locations, that faulty pillar recover methods and removal of more coal than had been planned for allowed lateral and abutment pressures from the gob to overcome the mine roof at the location of the continuous mine machine while mining was being conducted. None of

these hazardous conditions was reported at the preshift inspection. A roof control training session was provided prior to the resumption of mining.

Coal from the mine is transported to the processing plant a half-mile away at Middle Creek, via contracted trucks headquartered two miles away.

*Reprinted from the November 28, 1997 edition of **Mine Safety and Health News.***

Failure to trim unstable stockpile led to truck driver's death

Failure to properly trim an unstable stockpile or to ensure that persons were not exposed near the base of a stockpile was the contributing cause of the death of a truck driver who was redelivering crushed limestone to the mine. The accident happened

Aug. 18 at a quarry in Cook County, Ill.

A contract driver, was returning material to the mine because of a canceled delivery. He had backed his truck near a 75-foot stockpile and was disengaging the spreader chains

on his tailgate when the stockpile sloughed and buried him in limestone. Death was by asphyxiation.

*Reprinted from the November 28, 1997 edition of the **Mine Safety and Health News.***

Failure to properly unload pipe from truck was leading factor in driver's death

Failure to properly unload a truck of high density polyethylene pipe was the leading factor in the crushing death of a 45-year-old truck driver. The accident happened Aug. 6 at the Toddville plant a kaolin milling operation in Wilkinson County, Ga.

The victim was assisting a piping service, which had been contracted to do general maintenance work at the

plant. The pipe was used to transport kaolin slurry from the mill to the processing plant. Each pipe was 50-feet long, 18 inches in diameter and weighed 1,200 pounds. There were 27 pipes stacked on the truck in pyramid fashion, staked into place and tied down with ropes.

The accident happened when the victim was cutting the last of the

ropes lose, using a knife taped to the end of a long pole. The employees had no experience with unloading the pipes and did not understand how to use a forklift. The plan was to cut the pipe lose and let it fall free to the ground. The pipe broke lose sooner than anticipated, crushing the driver.

*Reprinted from the November 28, 1997 issue of **Mine Safety and Health News.***

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Mines and contractors working together towards a common goal

Upper photo, left to right: Dan Bleak, Phelps-Dodge contract administrator; Bill Bowen, president of Bowen Machine & Fabricating Co.; Joe Baca, Bowen safety director; and Jodi Bowen Mauldin, CEO of Bowen Machine & Fabricating Co.

Left to right: Rawlings Lemon, Bowen site superintendent; Jim Johnson, Phelps Dodge Morenci manager of materials management; Cathi Kelchner, Bowen site safety administrator; Jodi Black, C.M.S.P., St. Paul Insurance OCIP, program safety administrator; and Ron Lee, Bowen site supervisor

Contractors working on mine sites continue to excel and experience continuous safety improvement. Bowen Industrial Contractors are a shining example of that improvement. Bowen's total commitment to safe construction is highly visible. It starts with the CEO, Jodi Bowen-Mauldin; president, Bill Bowen; Site Superintendent, Rawlings Lemon; Safety Director, Joe Baca; Site Safety Administrator, Cathi Kelchner and filters down through the ranks, always keeping the communication channels open. In addition, they work very closely with the mine contract administrators to ensure that they are abreast of what's happening at the mine so that work activities of both groups will continue to flow safely and productively. A sincere congratulations to Bowen Construction's Management Team, their Safety Team and their employees for a commitment to helping provide a safe work environment for all concerned. Also, a sincere thank you to contract administrator, Dan Bleak, for his attention to detail and positive attitude toward ensuring safe construction is practiced at Morenci, to Jim Johnson, who supervises most of the contract administrators and to St. Paul Insurance OCIP program safety people, Cliff Mull, C.M.S.P.; and Jodi Black, C.M.S.P., who oversee and work with Morenci's contractors in a team effort.

Safety innovations

Bowen Industrial Contractors has built a reputation as one of the leaders in industrial construction safety. Some of Bowen's safety achievements include winning the Arizona State Mine Inspector award for safety in 1989, the Safety Improvement award in 1992, Safe Construction award in 1993, and the

Safe Construction and Safe Production award in 1994. Maintaining this level of excellence has required a commitment from Bowen's top management which embraces safety as a proactive culture. Since 1992, Bowen Industrial Contractor's employment has grown from 500 to 960 employees across the United States. During this period, Bowen has reduced their insurance modifier from 1.7% to 0.63% and have set new records in safe construction



behavioral based safety awareness program.

(B) **Safety Vest Program**—One member of each crew is awarded an orange vest and assumes responsibility for the overall safety of that crew.



employee hours. In an effort to increase safety standards throughout the heavy industrial construction field, the following are examples of the safety programs Bowen Industrial Contractors has successfully implemented over the past few years. (A) **Dupont's Safety Training Observation Program (STOP)**—A

This employee has the authority to correct and document unsafe actions or conditions.

(C) **Job Safety Analysis Report**—This report points out safety issues specifically, thereby ensuring safety as a top priority in job planning. Utilization of these reports has been enhanced by authorizing the field representative to send a copy of each

to incorporate for review. This requirement is done prior to job start-up thereby documenting safety concerns pertaining particularly to that job.

(D) **Critical Time Line Charts**—Used to track all time and materials resulting in a more organized and safer work environment.

(E) **Safety Committees**—An existing program which was complimented by the STOP program. Personnel from different trades conduct weekly site safety audits.

Meetings with safety representatives and administration are held to discuss problems and solutions.

(F) **Tracking System**—The Bowen Safety Team compiled a tracking system to point out specific areas of concern in an effort to prevent reoccurrences.

Having these programs operating at Bowen Industrial Contractors solidifies the company's commitment to safety while empowering the employees to reach a "zero accident" goal.

Bowen's goal does not differ from the Morenci mines. In fact, our direction and goal is to continue to work together with the contractors and St. Paul OCIP program, setting the standards for mining safety in the world by helping to provide and ensure the safest possible work environment for the employees, both now and in the future.

*By H.L. Boling, C.M.S.P.
Phelps Dodge Corporation, Assistant
Director of Human Resources/Safety &
Health*

Results of the Southern Mine Rescue Association 26th annual contest

A mine rescue, benchmens, and first aid contest was held at Equestrian Center located on the West edge of Houston, Texas, May 16-17, 1997. The contest consisted of a Field problem, First Aid contest, Benchmens' contest, 25-question written test, 10-question written gas test, and 20 question written Benchmens' test.

The mock mine was located in an oil shale formation with over and underlying sandstone. The mine had been classed gassy when recent gas tests indicated methane concentrations above the 0.25% limit.

Twelve teams participated in the contest trying to solve the problem—based, in part, on an actual event. Two youngsters, ages 10 and 12, had entered the mine through a decline when they found the shaft gate open and unguarded. They proceeded down the decline to the bottom. They then entered a drift where 10 by 10 square set timbers had been used to support the roof and walls. Their flash light went out, leaving them in the dark. They had matches and a lighter and they lit a piece of old

timber so they could see their way out. In the process the fire spread to the square set timbers. The 10 year-old boy took off running towards the decline and the 12 year-old went through an air lock next to the main fan towards the #1 shaft. The 12 year-old was burned on his hands and arms when he tried to put out the fire.

During the mine exploration the [rescue] team found a flash light, matches, and a butane lighter along the no. 2 X-cut drift, only 1 team checked the flash light to see if it would work (the 50 point dock took them out of 1st place).

On entering the shaft station he found the mine foreman and the hoist operator installing a permissible phone system at the #1 shaft. At about that time, the main fan went down which was good as the fan was feeding the fire. It was later determined the fan had been shut off by the mine owner who had arrived at the mine and noted smoke coming out the decline. On checking, the mine foreman found the mine outside of the air lock full of smoke.

They decided to see if they could find the 10 year-old and take him out of the mine. Then the hoist operator could start the #1 shaft hoist and hoist them out of the mine.

The hoist operator left the fresh air and went to find the 10 year-old. He died in the mine from CO exposure. The 10 year old made it out of the mine just as the mine rescue team arrived at the portal. After an exchange of information the team went under ground. They located the mine foreman and 12 year-old. Before a rescue effort could be implemented the fire had to be sealed (with a regulator) at two locations.

The plan was to move the two trapped individuals into the air lock and reverse the fan, clear the mine air, and walk the 12 year-old and the foreman out of the mine. However, none of the teams followed this plan.

A number of ideas were used including the removal of the foreman first and the 12 year-old second. This was not without a problem as the 12 year-old didn't want to stay in the mine alone. The teams then tied him

to the stretcher and then came back for him later. The winning team had 45 discounts and the 12th place team had 178.

The Field Competition winners were:

First place was won by the General Chemical Co. Black Team of Green River, Wyo., John E Sylics, Team Captain. Second place was won by Morton Salt Co. of Grand Saline, Tex., Randy Rogers, Team Captain. Third place was won by the Dravo Lime Co., Raider Team, of Maysville, Ky. Gary Lewis, Team captain. In fourth place was the Morton Salt Blue, of Weeks Island, La, Henry Charpentier, Team Captain. Fifth place was won by the Westinghouse WIPP Blue Team from Carlsbad, N.Mex., Gary Kessler, Team Captain. A flash light lying in the middle of a drift in the gassy mine was turned on and kept this team out of first place.

The trophies were handed out at the banquet by Rod Breland, head of the National Mine Rescue Program on the Arlington staff.

The first aid contest was written/coordinated by Jim Murray from the

University of Texas, with the assistance of the Missouri Three man teams. The winners were:

First place was Dravo Lime Co., Raider Team. Made up of Gary Lewis, Ken Heater and Mark Buckley. Second place was won by the Westinghouse WIPP Team of Gary Costlier, Mitch Carter, and Tony Oilstone. Third place was won by Morton Salt Co., Weeks Island Mine Blue Team of, Henry Carpenter, Phillip Hamilton, and Gerald Outre. Fourth Place was won by Morton Salt, Grand Saline Team of Randy Rogers, Doug Lovest, and John Teague. Fifth Place was won by the Avery Island, La., Cargil Salt Team #1 of Gil Elrod, Butch Boveremp, and Tony Ramero.

The Benchmans' contest was conducted by the National Mine Service Co. and was won by, Joe Baca of the Westinghouse WIPP Blue Team. Second place went to Ren Ramer of the Dravo Lime Co. Raiders Team. Third Place was won by Mike Nigh of The United Salt's Hockey, Tex. mine. Fourth place was won by Stoney Hoard, of Morton Salt's Weeks Island Mine.

John Rainey, from National Mine

Service Co., Indiana Pa., and Richard Tubbs from the Birmingham, Ala. office headed up the team of Benchmen Judges and handed out trophies at the banquet.

The success of the contest is due to the hard work of the following: the Missouri Dept. of Labor's Steve Dunn, Phil Blair, and Denny Mathes; the Arizona State Mine Inspectors Office's Dave Hamm; the University of Texas' Jim Murray; Westinghouse WIPP site's Buddy Webb for the use of the computerized test correcting machine and National Mine Service Co.'s John Rainey and Richard Tubbs for assisting the Southern Mine Rescue Association and MSHA.

The South Central District thanks: Mr. Chris Duploy, Mine Supt., from the Hockey, Tex. Mine; the United Salt Co. employees; and the Southern Mine Rescue Assoc. for their assistance in this program.

Submitted by Doyle D. Fink, District Manager, South Central District and Whitey Jacobson, Safety Specialist, Dallas, Texas

MSHA notifies coal miners of defect in self-rescuers

A manufacturers design flaw of an underground mining respirator has prompted a recall of some 7,000 Portal Pack SCSRs currently in use.

On Nov. 13, MSHA and the National Institute for Occupational Safety and Health notified all users of the defective self-contained self-rescuer (SCSR) device.

MSHA and NIOSH recommend that mines which have the machine-mounted Portal-Pack SCSRs remove them from service as soon as they can be replaced by any other approved SCSRs.

The SCSR, manufactured by **Mine Safety Appliances Co.**, was labeled as "unusable unless certain specific

procedures are followed" prior to using the device. The company hopes to replace the device by early 1998.

The wearer must exhale into the breathing tube three times, according to the manufacturer, MSHA, and NIOSH. This action would clear any particles in the breathing tube.

MSHA reports that fragments of the chemical that produce oxygen were found in the breathing tube of some units and would be undetected by the user.

If inhaled, these particles could cause a person to choke while donning the device. The SCSR user might discard the device as a result rather

than use it when it is most needed.

Federal mining regulations require all underground coal miners to be equipped with a breathing device that will provide the user with at least an hour of oxygen during a mine emergency.

In the event of a fire or an explosion, the underground mining environment may become contaminated with toxic gases and fumes from which the SCSRs are designed to protect.

For information, call MSHA public affairs at 703-235-1452.

Reprinted from the November 17, 1997 edition of Mine Regulation Reporter.

Cal Quarryman's safety newsletter

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Managers sometimes try to motivate their employees with posters containing inspirational sayings. A while back I saw this one on a hospital wall: "You cannot discover new oceans unless you have the courage to lose sight of the shore." As a safety professional, I could not help thinking that experienced sailors never leave the shore without life jackets, lifeboats, radios, compasses, and knowledge of the most recent weather reports. Too much fearlessness in the face of danger can lead to what the Greeks called hubris—the belief that you can get away with anything. The sinking of the *Titanic* is perhaps the most famous example of how hubris leads to tragedy: "unsinkable" ships don't require many lifeboats.

But as the saying on the hospital wall suggests, our culture tends to value risk taking more than safety. In the United States, our frontier heritage glorifies the can-do spirit and rugged individualism of our ancestors, people who abandoned everything familiar for the opportunity to make something of themselves in the new world. In telling stories of the pioneers, we often miss the important point that the hardships they endured taught the survivors how to manage risks: *Hire a good guide (e.g. Squanto, Sacagawea, Daniel Boone). Wear high boots in snake country. Don't carry more than you really need. Keep your powder dry. Get an early start, because you have to get through the mountains before the snow falls.* Today the best of the pioneers' hardearned knowledge is preserved and passed on by the **Boy Scouts**, whose motto describes the essence of wilderness risk management: "Be Prepared."

Adopting scouting's preparedness ethic in today's global economy is a

daunting challenge. Having the will to take competitive risks in making business decisions is both necessary and desirable, but sacrificing safety to meet production goals is not. Getting into a "capture the flag" mentality to achieve short term success leads invariably to disastrous, long term losses. **Safe production** needs to become a corporate value shared by everyone in the organization. The prevailing belief must shift from, "If I followed all the safety rules, I'd never get any work done," to "If it's not safe, don't do it."

Organizations seeking to develop **safe production** as a corporate value must confront the reality that individual experience does not match group risk. If you believe, based on

likely than the potential punishment of being struck by it. Recently, truck drivers at two different mines bet that they could beat trains to crossings, only they lost their bets and were killed. At the site of one of the collisions, the crossing was well marked and the train's whistle was blowing as the haul truck driver attempted to cross the tracks. At the other site, the highway truck collided with the train when the driver attempted to cross the tracks to get to the scale house after picking up a load of stone at a stockpile.

Why the two drivers chose to try to cross the tracks will never be known. But merely blaming the accidents on **human error**, sighing, and moving on to the next problem



Detonation of a large quarry shot about a half-second after the shot was fired.

past experience, that taking a risk is far more likely to lead to a reward than to an accident, chances are pretty good that you will take the risk. For example, have you ever decided to outrun a train at a railroad crossing just after the crossing lights started flashing? If so, you were betting that you could get across safely before the train could get there, and that the reward of not having to wait for the train was more

does nothing to prevent future train crossing accidents. An important principle of safety is that it is easier to modify things than people. Could a haul road be built to bypass railroad crossings? Could a scale house be placed in a location where trucks would not have to cross the tracks to reach it? Could material be moved another way, such as with conveyors?

If the production system makes it more convenient for employees to

Numbered granite blocks being outfitted with a sling prior to movement to a transportation area.



take risks than to work safely, then employees will take risks. In such a situation, it is not enough for managers to say they are committed to safety. They must demonstrate their commitment by backing their words with actions to change the system. Managers will know they have succeeded when choosing to work safely is not considered unusual behavior, but rather, the natural way to do a job. **But establishing a system of safe production in a get-it-done culture is not easy.** Consider the following account.

At a lime plant in the Midwest,

contract truckers driving over-the-road tank trucks hauled bulk lime and roofing granules from the plant to customers in a three state area. After getting the trucks weighed empty, then loading the trucks, and finally getting weighed full, drivers brought their trucks to a truck wash area behind the mill. A platform about twelve feet in height was located above the wash area and could be reached by using an attached stair.

Access from the platform to the tanker trailers parked below was provided by a moveable walkway 58 inches long, equipped with a step to

accommodate the different trailer heights. Drivers used the platform and walkway for access to close hatches before washing the trailers. A wire rope static line installed on a steel support extended about 40 feet and was attached to a 30-inch length of chain that connected it to the steel handrail support at the end of the moveable walkway. (The chain had apparently been added because the line had been pulled loose by a truck that had bumped into the walkway.) A safety belt with a six-foot lanyard was attached to the static line, but it was hard to reach and use from the walkway because the section of chain prevented it from sliding the last 30 inches. Because of the long reach required, fastening the safety belt to the line before stepping onto the top of a trailer was very difficult. In addition, the static line was not high enough to position a tank truck directly underneath it.

Not surprisingly, truck drivers rarely, if ever, used the safety belt and line. Supervisors from both the lime plant and the trucking company observed drivers opening and closing hatches without using the restraint system, but failed to take corrective action. Then, last April, an unrestrained driver fell from the top of his trailer at the truck wash area. He landed on his head after falling a distance of more than 11 feet, and died from the resulting injuries. After an investigation, MSHA concluded that the cause of the accident was the failure of management to enforce the use of the safety belt and line restraint system. To correct the problem, improved restraint systems were installed in all areas where access to the hatches was required, and only plant employees wearing full body harnesses were authorized to step, tied off, from the platforms to the trailer tops. For additional protection, an automatic truck wash was built, and a requirement that drivers stay in their trucks while on company property was established

and enforced.

"If it's not safe, don't do it." Endorsing that motto is easy after an accident, but not always so easy to live by when you are trying to do your job. Some time ago, a safety trainer photographed a maintenance mechanic's rear end. The mechanic was on his hands and knees next to the back tire of a haul truck, with his head under the partially raised bed frame. The truck had been raised from the rear with a loader bucket, upon which it precariously rested. When workers attending a safety class were shown this scene, their universal reaction was, "What an idiot."

But that is not the whole story. When the maintenance mechanic saw the slide, he said to the trainer: "I didn't have a jack. How else was I supposed to fix that axle? We used to have a jack good for raising 30 tons, but someone broke it trying to lift a 50 ton truck."

Unsafe acts do not occur in isolation. To successfully build a culture that fosters **safe production**, you need to move away from focusing on the individual ("**blaming the victim**") and start focusing on the **process that promotes** and sustains unsafe acts. For example, General Motors plants had 33 fatal fall of person accidents between 1974 and 1992, with 12 of them occurring between 1989 and 1992. When considered individually, the fatalities seemed to be classic instances of **human error**. Typically, employees failed to use provided fall protection

equipment. But when management and labor representatives decided to work together on analyzing the process that contributed to falls, they found that in many cases work could be redesigned to eliminate employee exposures to high places. Work redesign, combined with effective restraint systems and training in how to use them became the ingredients of a comprehensive fall prevention program. Since the program's implementation late in 1992, there has not been a single fall fatality at a General Motors plant.

Similar strides at considering safety as part of a process have been taken at Ford Motor Company, which has developed this description of the movement from *an individual focus to a process focus*. Employees are the problem *to* the process is the problem. Doing my job to helping get things done. Understanding my job *to* understanding how my job fits into the total process. Measuring individuals *to* measuring the process. Can always find a safer employee *to* can always improve the process. Motivate people to remove barriers. Controlling employees *to* developing people. Don't trust anyone *to* we are all in this together. Who made the error? *to* What allowed the unsafe act to happen? Correcting behaviors *to* reducing hazards. Bottom-line driven *to* safe work environment. The emphasis at Ford is placed on **how and what** rather than who. In other words, the best way to change people's behavior is to change the system. Of course, you still have to do

your part. Because of the nature of mining, all hazards can never be completely designed out of the system. You need to make sensible choices. Think of that the next time you see a train approaching a crossing, or you have to work at a place where there is

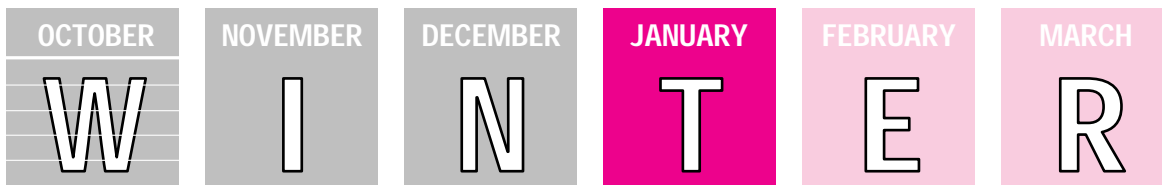


Gardner-Denver track drill with dust collector at drill collar.

a danger of falling.

Until next time, yours in safety,
Cal Quarryman

Reprinted from the November 1997 issue of Cal Quarryman's newsletter from Minnesota Mine Safety Association A State Council of the Holmes Safety Association. Any comments or items of interest from the mining/construction materials community for the next issue of this newsletter will be appreciated. Contact Al Simonson of MMSA at (507)-625 9084. Or P.O. Box 2073, North Mankato, MN 56003.



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.

Do it yourself... When you know what you're doing

Fall/Winter are great times to fix up the house, and the handyperson—Mr. Fixit, Harry/Harriet Homeowner, Handy Andy/Ann, Tim Allen—is an American ideal. The person who can fix anything from a faucet to a chimney is revered by those of us who barely know an awl from a chisel. Reverence is fine. The trouble comes when the rookies and the wannabees start behaving like professionals.

Experts advise against tackling projects involving wiring, plumbing or heating, even when you have had some training in those areas.

They are complicated and dangerous jobs, and a miscue could lead to disaster.

However, there are many jobs the average do-it-yourselfer can tackle around the house as long as he or she uses good judgment and proven safety practices.

goggles, dust masks, gloves, hearing protectors, head protection, and heavy soled shoes.

Goggles with impact-resistant frames should be worn for work that could produce flying particles or splattered liquids. Do not rely on regular reading glasses for protection. Wear goggles with a sturdy head strap and many ventilation holes on the sides, which make the goggles more comfortable in warm weather and prevent fogging.

Dust Masks are used to filter common dusts, such as fiberglass insulation particles and sanding dust. Some toxic materials, such as lead paint and asbestos, require special respirator masks with cartridge-type filters.

Gloves (ordinary rubber) protect the hands from skin damage when using paints or strong solvents. Leather or cloth gloves will provide protection for other types of work.

Hearing Protectors should be worn around prolonged exposure to loud noises produced by equipment such as drills and power saws.

Head Protection should be worn in close quarters and low ceiling areas, especially with nails sticking down. Use an old bike helmet or buy a hard hat.

On the job

Think small. Don't overdo it by taking on more challenge than you can handle. Allow enough time to do the job without hurrying or cutting corners. Avoid fatigue by alternating heavy and light work and taking frequent breaks. Always plan the job before starting. Look for potential hazards. Get all the needed tools on hand before starting. Don't improvise on the tools needed. When carrying tools or supplies, make sure the route is clear and pets are out of the

way. Clutch a heavy load to your body and lift straight up. Let your legs do the work, not your back. Know your limits and when to ask for help. Keep your work area clean of debris. Never saw into walls without knowing the exact layout of electrical wires, plumbing, gas pipes, asbestos insulation, and studs. As an aid, use a stud sensor and run a shower to listen for running water in pipes in the wall.

Know and use equipment properly

- Take time to review all operating instructions for your equipment. Understand the equipment before you begin to use it.
- When renting a new piece of machinery, have the dealer explain its operations to you.
- Do not remove the guard, shield, or safety mechanism that came with the equipment.
- When you are teamed with another person on a machine, stay alert, and communicate with each other clearly.
- Keep equipment in good working condition.
- If the tool requires two hands, hold on with both hands.
- If a wood saw does not cut well with little pressure, it probably needs sharpening.
- If a power tool sparks, stalls or overheats, do not use it. It should be repaired professionally.
- Use the proper ladder for the job and keep it in good repair. Place the ladder on a firm, level, nonslip surface and keep your body within the side rails.

Reprinted from the September 1997 issue of the U.S. Department of Labor's *Safety and Health Bulletin No. 97-12*. A publication of the Office of the Assistant Secretary, Washington, D.C. 20210



Dress like a professional

The minimum safety equipment for all do-it-yourself projects includes

New techniques make heart surgery less traumatic for patients

Nobody wants to have heart surgery, but 1.5 million Americans will need it this year. Open heart surgery, sometimes called bypass surgery, is the most common major operation in the United States.

Exciting advances in heart surgery at Georgetown University Medical Center are allowing patients to recover within days. "We can help patients heal faster, better, safer, and less expensively," says James Cox, MD, surgical director of the Georgetown Cardiovascular Institute.

Usually surgeons get to the heart by making a foot-long incision in the chest, sawing the breastbone in half, and prying open the rib cage. Also, for many patients, a vein is taken from the leg just before surgery to use as the "bypass." After surgery, patients go through 8 to 10 weeks of painful and often complicated recovery from the surgery primarily

because of the opening of the chest and leg. New procedures at Georgetown are changing the way heart surgery is performed.

- **Closed Chest Bypass.** Using a device called a Heartport, Cox is performing heart surgery without opening the chest. "I hope to substantially change the trauma associated with heart surgery," says Cox. Using the Heartport allows Cox and his team to improve the precision, safety, and effectiveness of heart surgery, without cracking the chest.

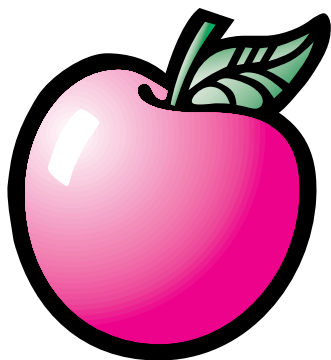
- **The Maze Procedure.** Invented and developed by Cox, the "maze" procedure is a unique surgical solution for people with a rapid, uneven heart beat, called atrial fibrillation. It is one of the most common heart conditions and can lead to heart attack or stroke.

- **Easier Vein Removal.**

Through the use of an endoscope (a long surgical tube with a camera at the tip), surgeons at Georgetown make only three tiny incisions in the leg to get the vein for use during heart bypass surgery. This speeds up recovery time and lowers the cost for patients.

As an academic medical center, Georgetown is not only performing the newest surgical techniques, but our researchers are also developing them. In fact, under a grant from the American Heart Association, Georgetown researchers are developing ways to eliminate the need for bypass surgery for certain patients through the use of lasers.

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



Apples: A+ in Nutrition

Apples are low-calorie, non-fat and a significant source of fiber. All 20 varieties including Empire, Idared and Northern Spy contain no cholesterol or sodium. Scientists at Oxford University's Imperial Cancer Research Fund found that people who eat fresh fruit daily

'98 underground mine rescue contests

Regional contests	Date	Location
Southwestern	April 2-3, '98	Carlsbad, NM
Southern	May 1-2, '98	New Iberia, LA
Kansas Shoot Out	May 20-21, '98	Hutchinson, KS
Coeur d'Alene	May 16-17, '98	Osborn, ID
Northern Regional	June 15-16, '98	Batavia, NY
Wyo. Mutual Aid Association	June 5-6, '98	Rock Spring, WY
UMR Rolla MO	October ??, '98	mine rescue contest
Fresnillo, Mexico	February 9-10, '98	Fresnillo, Mexico

Whitey Jacobson, December 3, 1997

had 24 percent fewer heart attacks, 32 percent fewer strokes and 21 percent fewer deaths from all causes compared with those who did not. To learn more about how to incorporate apples into a daily diet (and a handy list of varieties,

looks and tastes) send a stamped, self-addressed business-size envelope to "Apples: Well on Your Way to 'Five a Day' for Better Health," U.S. Apple Association, P.O. Box 1137, McLean, VA 22101-1137.

THE LAST WORD...

None are so fond of secrets as those who do not mean to keep them.—Charles Caleb Colton

I don't want to be a genius—I have enough problems just trying to be a man.—Albert Camus

You cannot do a kindness too soon, for you never know how soon it will be too late.—Ralph Waldo Emerson

He will always be a slave who does not know how to live upon a little.—Horace

The use of money is all the advantage there is in having it.—Benjamin Franklin

God heals and the doctor takes the fee.—Benjamin Franklin

The only profession that labors incessantly to destroy the reason for its own existence.—James Bryce

Of every ten persons who talk about you, nine will say something bad, and the tenth will say something good in a bad way.—Antoine Rivarol

It is a good thing to learn caution from the misfortunes of others.—Publilius Syrus

Old minds are like old horses; you must exercise them if you wish to keep them in working order.—John Quincy Adams

NOTICE: We welcome any materials that you submit to the Holmes Safety Association Bulletin. For more information visit the MSHA Home Page at www.msha.gov. 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 1998 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 any 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 (703-235-1400).



Holmes Safety Association Officers and Executive Committee 1996-1997

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Secretary-Treasurer	Robert Glatter	Federal	VA

<i>Name</i>	<i>Representing</i>	<i>State</i>	<i>Name</i>	<i>Representing</i>	<i>State</i>	<i>Name</i>	<i>Representing</i>	<i>State</i>
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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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Mark your calendar

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Upcoming events:

- ***Feb. 18-20, South Cent. Dist. M. Mine Safety/Health Conf., Dallas Medallion, Dallas, TX***
- ***Feb. 26, Joint Health and Safety Conference, the Inn at Reading Wyoming PA***
- ***Feb. 26, Minnesota Mine Safety Assoc. Conference, St. Paul, MN***
- ***Jun. 9-11, Longwall USA '98, Lawrence Convention Center, Pittsburgh, PA***

