The Holmes Safety Association

BULLETIN

April 1998

INSIDE:

Hearing protectors

Breaking bad habits

Ergonomic seat

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. 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: This is a photo of underground copper operations (taken in the 1970s) from the editor's collection. [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

Tips for fitting hearing protectors

By Elliott H. Berger, Manager Acoustical Engineering, Cabot Safety Corp.

Preliminary considerations

When any type of hearing protector is initially dispensed, the process is best accomplished one-on-one or in small groups with a student/instructor ratio of no more than about 5/1. This is important since the compatibility and fit of protectors must be individually checked on each employee. Also to be considered is that the smaller the group the less likely it is that the trainee(s) will become self-conscious during the fitting process. Plan on allowing about 10 min. for each employee.

HPD training in larger groups is also useful when it occurs in addition to, but not in place of, individual or small-group work. Working with larger classes is a suitable way to provide a review and reminder during the annual educational sessions that are a required part of every hearing conservation program. An excellent discussion of the fitting process may be found in reference 2.

Prior to issuing HPDs the fitter should visually examine the pinna, ear canal, and circumaural regions to identify conditions which might interfere with or be aggravated by the use of the protector in question. In the case of employees who are being refitted and/or retrained in the use of devices they are currently wearing, the condition of the HPDs must be checked as well.[3,4] All resilient parts such as ear-plug flanges and earmuff cushions must be intact and flexible so that a good acoustical seal can be obtained, and the bands on earmuffs and semi-aural devices must provide sufficient force for proper fit.

Initially, hearing protectors are typically dispensed in quiet environments away from the noisy workplace. This is primarily a matter of convenience and logistics which obviously makes it easier for the fitter to communicate with the person being fitted. The disadvantage of this approach is that in low (unobjectionable) noise levels the wearer cannot appreciate the beneficial aspects of the noise reduction provided by the HPDs. It is like trying to evaluate sunglasses by wearing them at night or in a dimly lit store.

When noise is used during the fitting process the wearer can adjust the HPDs for the lowest perceived noise level. Recordings of broadband noise or representative industrial sounds can be presented using a portable cassette player. If a noise source is unavailable, the fitter should follow up with employees within a few days while they are in their work environment to recheck the fit and suitability of the devices that were dispensed.

The occlusion effect

Occluding and sealing the ear with an earmuff or earplug increases the efficiency with which bone-conducted sound is transmitted at the frequencies below 2 kHz. Called the occlusion effect, this causes wearers of HPDs to experience a change in their perceived voice quality and other body-generated sounds/vibrations (breathing, chewing, walking, etc.).[3] Of all the fitting tips that have been devised, listening for the exclusion effect is the most widely applicable, being suitable for use with nearly all types of hearing protectors.

To experience the occlusion effect, plug your ears with your fingers as you read this sentence aloud and note the change in the

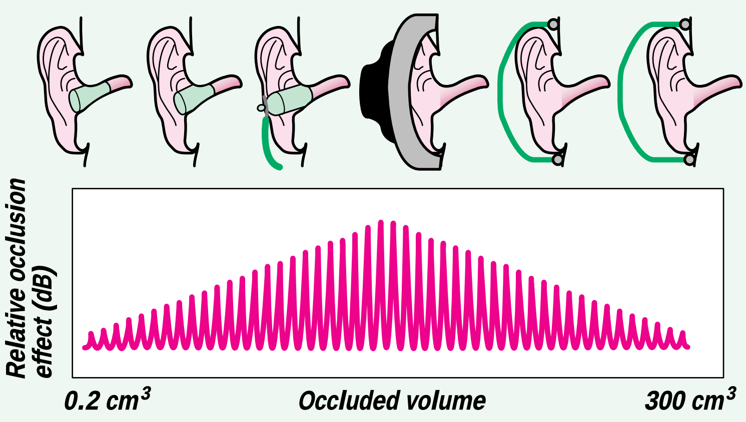


Figure 1.—The occlusion effect and its relationship to the fit and type of hearing protector. The effect is minimized with deeply inserted plugs (left side of graph), increases in magnitude as the plugs are withdrawn, peaks when the canal is capped by a semi-aural device or the pinna is covered by a supra-aural device such as an audiometer earphone (center two drawings), diminishes as the ear is surrounded by an earmuff, and continues to reduce in magnitude as the volume of the earmuff increases (right side of graph).

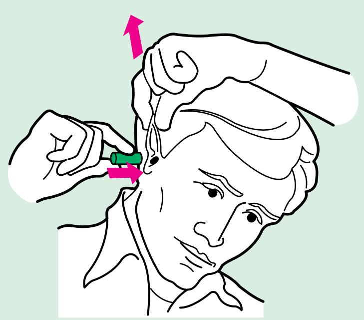


Figure 2.—Pulling the pinna outward and upward while inserting an earplug.

sound of your voice, its added fullness or resonant bassiness. Other adjectives that have been used to describe the changes in voice quality are deeper, hollow, and muffled. The effect is greatest when the ear canal is covered at its entrance. It diminishes as earplugs are inserted more deeply or with the use of earmuffs with large volume earcups (see Figure 1).

The occlusion effect can be used as a fit test for either plugs or muffs by asking the wearer to count loudly from 1 to 5 while listening for the change in voice quality which indicates an acoustical seal and the presence of the effect. With earplugs, an alternative approach is to count aloud with only one ear correctly fitted. The voice should be more strongly heard or felt in the occluded ear.[5] If this does not occur, the plug should be reseated or resized. When the second ear has been fitted correctly, the effect should be the same in both ears, causing the voice to be heard as though it were emanating from the center of the head.

Some listeners are unable to hear differences in the occlusion effect between their two ears, but most can hear a change in the overall sound of their voice when both ears are sealed. An alternative means of generating a "test signal," and one which some find easier to detect, is to hum. It is a good way to create sounds of varying pitch and constant level that can be used when listening for the occlusion effect while adjusting the HPD.

A caveat with respect to the occlusion effect is that although it is a fine way to test the fit of HPDs, its presence is often cited as an objectionable characteristic of wearing hearing protection. As is shown in Figure 1, semi-aural HPDs will create the most noticeable occlusion effect. The amplification can be minimized by wearing either earplugs that are inserted more deeply or earmuffs with larger volume earcups.

Earplug fitting tips

When initially dispensing earplugs the fitter should insert at least one plug into the employee's ear so that they can experience the feel of a properly seated device. This is especially important because of the reluctance most novice users have of placing anything deeply into their ear canals. With one earplug properly inserted, the person then has an example to try to match. Ask the wearer to insert the other plug until both of their ears feel the same and sound equally occluded. Once the two plugs have been properly inserted ask the person to remove them both and then insert them one more time for review and additional practice.

For all types of earplugs, with the possible exception of custom earmolds, insertion is easier and more effective if the outer ear (pinna) is pulled outward and upward as illustrated in Figure 2. Plugs should be inserted into the right ear using the right hand and into the left ear with the left hand. The pinna is pulled with the opposite hand by reaching behind or over the head. This allows the hand inserting the plug to have the best line of approach for proper fitting.

The fitter should determine the best direction in which to pull the pinna to access and enlarge the canal as much as possible. Merely pressing the pinna back along the side of the skull is usually not effective. Demonstrate the correct technique by guiding the user's hand to help pull his or her pinna in the proper manner. All wearers should initially use the pinna-pull technique as they learn how to best fit their earplugs, although with time and experience some may find it no longer necessary.

Employees may also require assistance in finding the best direction in which to "aim" the plugs into their canals. Although this will usually be forward and slightly upward, it can vary substantially for different individuals, in some instances even being directed towards the back of the skull.

Once fitted, the noise reduction of earplugs can be tested subjectively by pressing firmly cupped hands over the ears while listening to a steady noise. With properly fitted plugs the noise levels should seem nearly the same whether or not the ears are covered.

When dispensing earplugs, fitters will soon learn that people are very conscious of the cleanliness of their ear Canals. If cerumen (ear wax) adheres to or coats trial earplugs, wearers may be embarrassed. Assure them that earplugs penetrate more deeply into their ear canals than they can or should normally reach when cleaning their ears. Furthermore, a certain amount of cerumen is necessary to provide a protective barrier for the ear, and it can in fact furnish lubrication to ease and improve the fitting of earplugs.

Foam earplugs. Foam earplugs are prepared for insertion by rolling them into a very thin crease-free cylinder. The cylinder should be as small in diameter as possible, that is, as tightly compressed as can be achieved. Crease-free rolling is accomplished by squeezing lightly as one begins rolling, and then applying progressively greater pressure as the plug becomes more tightly compressed. Be sure to roll the plug into a cylinder rather than other shapes such as a cone or a ball.

After insertion, it may be necessary to hold foam earplugs in place with a fingertip for a few moments until they begin to expand and block the noise. This is not intended to keep them from backing out of the ear canal, since properly inserted foam earplugs do not in fact exhibit such a tendency, but rather is to assure that the plugs do not move and dislodge prior to reexpanding enough to hold in place.

Unlike other types of earplugs, foam earplugs should not be readjusted while in the ear. If the initial fit is unacceptable, they should be removed, rerolled, and reinserted. Furthermore, a large occlusion effect does not usually signify a best fit for foam earplugs since the effect is maximized when they barely enter or cap the canal, rather than when they are well inserted (see Figure 1). In fact the deeper the insertion (which for foam earplugs is usually associated with improved comfort), the better will be the fit and the attenuation, and the less noticeable and annoying will be the occlusion effect.

The simplest, but least accurate method to assess the fit of a foam earplug is to visually (for the fitter) or with the fingertips (for the wearer), check the position of the end of the plug relative to the tragus and concha (see Figure 3). If the outer end of the plug is flush with or slightly inside the tragus, this generally indicates that at least half of the plug is in the canal and the fit is proper. If most of the plug projects beyond the tragus and into the concha, the insertion is probably too shallow. Since tragus-to-ear canal dimensions vary significantly, this check is not a foolproof indicator.

Another test that either the wearer or the fitter can perform is to remove an earplug after it has expanded in the ear for about a minute. If it was well fitted, it should appear free of creases and wrinkles, and the still partially-compressed portion of the plug will indicate that at least one-half of its length had extended beyond the entrance of the ear canal and formed a seal within the canal itself.

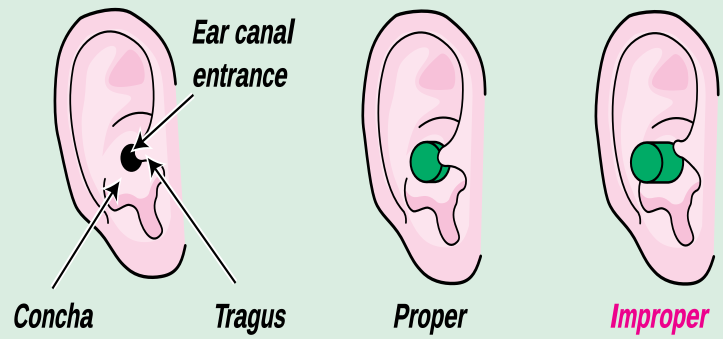


Figure 3.—Key features of the external ear (pinna and ear canal) along with demonstration of a proper and improper fit of a foam earplug.

A comprehensive guide to all aspects of foam earplug utilization, as well as a Roll Model training aid, are available from Cabot Safety Corporation.[6]

Premolded earplugs: When initially inserting premolded earplugs the fitter should be able to easily detect gross errors in sizing. Ear gauges are available from some manufacturers of premolded earplugs to aid in this process. Plugs that are much too small will tend to slide into the canal without any resistance, their depth of insertion being limited only by the fitter's finger and not the plug itself. Overly large plugs either will not enter the canal at all or will not penetrate far enough to allow contact of their largest (outermost) flanges with the concha (see Figure 3). With certain premolded multiple-flanged earplugs, however, it is unnecessary for the outermost flange(s) to seal the ear to obtain a proper insertion and fit for those with small to extra-small ear canals.

A plug that is well seated and appears to make contact with the interior wall of the canal without appreciably stretching the tissues is a good size to begin wearing.[7] When a canal falls between two sizes the larger size plug is not necessarily the best one to choose. Even though it may provide more attenuation, if the plug is not worn or not used correctly due to discomfort, the resultant effective protection may be less than would have been achieved had the smaller more comfortable size been selected.

Experience suggests that in about 2 to 10% of the population different sizes of premolded earplugs will be required for the left and right ears. As a general rule, the more sizes in which a particular plug is manufactured, the greater will be the likelihood of this occurring.

A properly inserted premolded earplug will generally create a plugged or blocked-up feeling due to the requisite airtight seal. When a seal is present, resistance should be felt if an attempt is made to withdraw the plug from the canal, much like pulling a rubber stopper from a glass bottle. The seal can be further tested by gently pumping the plug in and out of the ear canal. When a proper

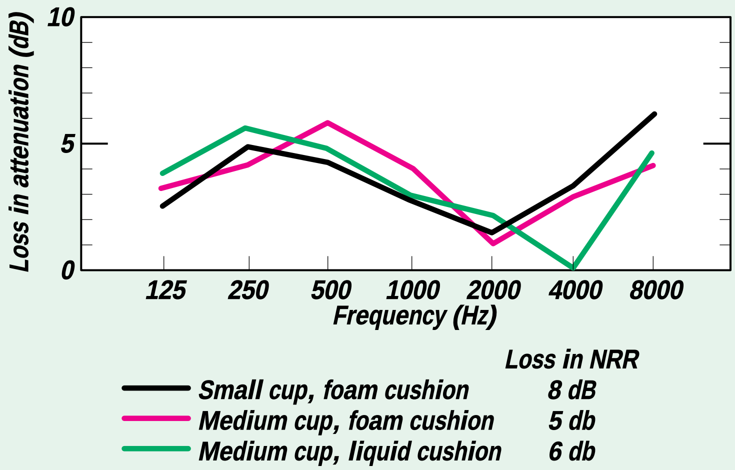


Figure 4.—Effects of correctly sized and fitted eyeglasses on the attenuation of three different earmuffs.[8] 10-subject data re ANSI S3.19-1974

acoustic/pneumatic seal is present, the pumping motion will cause pressure changes in the ear which the wearer should be able to detect.

Because of the pneumatic seal created by properly inserted premolded earplugs, suction is created if they are rapidly removed. This can be uncomfortable, painful, and/or potentially harmful to the ear. Teach wearers to remove plugs slowly, or even to use a slight twisting or rocking motion to gradually break the seals as the plugs are withdrawn .

Custom molded earplugs: One of the most important steps in making a custom earmold impression is the use of a cotton or foam block or eardam inside the canal. Use of eardams prevents the impression material from being forced too deeply into the canal where it could contact the eardrum or be difficult to remove.

Of equal and perhaps greater importance, an eardam helps to ensure that a better fitting impression is obtained. If the dam is absent, the impression material is permitted to flow along the canal without ever properly filling it. However, when the dam is present the flow of the impression material is locked, which forces it radially outwards to better fill the canal, thereby providing a tighter fit and a more effective seal.

Earmuff fitting tips

Contrary to popular belief, earmuffs are not one-size-fits-all devices. The head-band may not extend or collapse enough to fit all head sizes, and cup openings may not properly accommodate the largest ears. The contours in the circumaural areas of the wearer's head may be so irregular that the cushions cannot properly seal against them. Like an earplug, an earmuff must be individually dispensed and checked for fit to acquaint wearers with its features and make sure it is compatible with their anatomy.

Place the muff on the wearer's head and be sure the cups fully enclose, and are centered about the pinnae without resting on them. Adjust the headband so that it sits comfortably on the head and the cushions feel to the wearer as though they exert evenly distributed pressure around the ears. Instruct users about the importance of achieving the best possible seal between the earmuff cushions and the side of the head. Caps and other head-worn gear must not interfere with this seal, and excess hair should be pulled back and out from beneath the cushions.

Eyeglass temples should fit close to the side of the head and be as thin as practical in order to reduce their effect on the ability of cushions to seal around the ear. The loss in attenuation that temples create, with cushions in good condition, is normally 3 to 7 dB. The effect varies widely among earmuffs and also depends upon the fit and style of the eyeglasses. Representative data are plotted in Figure 4.

Wearing eyeglasses in combination with earmuffs may be uncomfortable for some wearers since earmuff cushions press the eyeglass temples against the skull. The pressure can be relieved by fitting foam pads over the temple pieces, but the increase in comfort may be at the expense of attenuation as has been demonstrated for one commercially available pad product.[8] Also, pads do nothing to reduce acoustic leaks caused by overlength temples which break the cushion-to-skull seal behind the ear. However, temple pads should still be considered for use, since the improved comfort they can provide may be crucial in motivating certain employees to wear their HPDs.

Earmuff protection can be roughly checked by asking wearers to listen with earmuffs on while in the noisy environment in which they work. They should be able to detect a considerable difference in the overall apparent noise level if they lift both earmuff cups, or between their two ears if they lift only one cup. If not, the earmuffs were either grossly misfitted, are in very poor condition, or the noise in which the persons work is predominated by the lower frequency sounds for which earmuffs generally give less protection. Most listeners will not be able to detect small to modest degrees of misfit with this test since earmuffs will usually provide enough noise reduction, even when moderately misfitted, to be clearly distinguishable from the no-attenuation (i.e., the lifted-cup) condition.

Final comments

Years of hearing conservation experience have shown that hearing protectors are often misused, and that in general their real-world performance falls far short of the protection that properly-worn and maintained HPDs can provide. To improve the situation, employers must develop effective group and individual training sessions in which employees are provided clear and accurate guidance in the fitting and use of their HPDs. The tips described herein will be useful in that regard; training and motivational concepts have been elaborated elsewhere. [1,3,5,7,9]

Remember, it takes time to get used to wearing protectors, both how they feel and how they sound. A break-in period is advisable for new wearers, especially in the case of earplugs. It may take a week or two for some persons to fully adapt to the feeling of wearing hearing protectors and to begin to recognize and appreciate the auditory as well as the non-auditory benefits that their use provides.

Fitting hearing protectors is largely a common-sense affair. With time, commitment, and the experience gained from careful observation, nearly all ears can be successfully fitted and real world problems overcome.

1. Berger, E.H.—The EARLogs, complete series available upon request from Cabot Safety Corporation.

*2. Royster, L.H. and Royster, J.D. (1985). "Hearing Protection Devices," in **Hearing Conservation in Industry**, edited by A.S. Feldman and C.T. Grimes, Williams and Wilkins, Baltimore, MD, 103-150.*

*3. Berger, E.H. (1986). Shearing Protection Devices," in Noise and **Hearing Conservation Manual, 4th edition** edited by E.H. Berger, W.D. Ward, J. C. Morrill, and L.H. Royster, Am. Ind. Hyg. Assoc., Akron, OH 31 9-381.*

4. Gasaway, D.C. (1984). "'Sabotage' Can Wreck Hearing Conservation Programs," Natl. Sat. News 129(5), 56-63.

5. Ohlin, D. (1975). "Personal Hearing Protective Devices Fitting, Care, and Use," U.S. Army Environmental Hygiene Agency, Report No. AD-A021408, Aberdeen Proving Ground, MD.

6. E-A-R® Fit Kits, which include a manual and Roll Model training aid, are available from Cabot Safety Corp. at 8001 Woodland Dr., Indianapolis, IN 46278.

*7. Guild, E. (1966). "Personal Protection," in **Industrial Noise Manual Second Edition**, Am. Ind. Hyg. Assoc. 84-109.*

8. Berger, E.H. (1988). Unpublished research notes on measurements taken at E•A•RCAL™ Laboratory.

*9. Royster, L.H. and Royster, J.D. (1988). "Education and Motivation," in **Noise and Hearing Conservation Manual 4th edition**, edited by E.H. Berger, W.D. Ward, J.C. Morrill, and L.H. Royster, Am. Ind. Hyg. Assoc. Akron, OH 383-418.*

URL http://www.cabotsafety.com/tech/earlog/earlog l9.html [accessed 2/18/98]

January 25, 1909; Washington No. 5 Mine; Franklin, Md.: 5 killed

(From "The Annual Report" of the Mine Inspector for Allegany and Garrett Counties, Md., 5/1/1908-5/1/1909)

The most distressing mine accident of the year, or I may say, in the history of mining in the George's Creek Valley, occurred at the Washington Mine No. 5 near Franklin. Here on Monday morning, January 25, five men were killed; two outright, two dying within 10 hours after the accident, and another on the day following the accident. Nine others were more or less seriously injured. A laborer, aged 18 years, single, and a blacksmith, aged 46, married, were killed outright. A carpenter aged 22 years, single, and a mine laborer. aged 26 years, single, sustained injuries from which they died shortly after the accident. A weighmaster, 23 years-old, married, died from injuries received two days later.

The accident occurred on the plane, early in the morning. It was the first trip run. The men were riding up the plane to their work, as had been the custom for them to do. The incline-plane is very steep and about 2,200 feet long, which no doubt caused many to ignore the danger and ride up.

In the middle of the incline-plane there is a double track where the loaded car descending passes the empty car going up. At this point an automatic switch is used, so constructed that the loaded car, going down, passes through and leaves the latches in proper position for the empty car, ascending on the following trip, to pass on the opposite side. The accident happened on the first trip on Monday morning, which accounts for so many men being on the car. No cars had been run on the plane since Saturday evening.

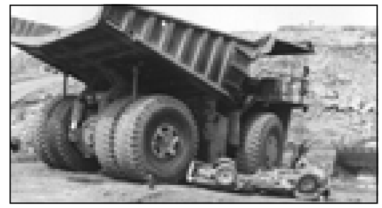
For some reason not clear, the first trip on Monday, with 15 men, some on the inside of the car, and others standing on the front and rear bumpers, ran in on the wrong track and collided with the loaded car descending, killing 5 and injuring 9, as stated before. Of the 15 on the car only one escaped being injured, and strange to say, this man was riding on the front of the car going up the incline.

On being notified I went to the scene of the accident and made a thorough investigation. I examined the switch carefully and found it in good working condition, in fact, not the least impaired. The only logical conclusion as to the cause of this frightful accident is that the latches were changed some time between the time of the last run on Saturday and the ill-fated one on Monday morning, which dealt death and injury to so many.

*Reprinted from **Historical Documentation of Major Coal Mine Disasters in the United States Not Classified as Gas or Dust: 1846-1962**, U.S. Bureau of Mines, Bulletin No. 616.*

Breaking bad habits

Far right: A careless mistake—parking below the line of visibility—led to this accident in which a miner lost his life.



A rock is riding on the conveyor belt and shouldn't be there. Instead of stopping the belt and retrieving it, a quarry employee reaches in to get it before it gets to the pulley.

As the plant superintendent, what do you do? Historically, if nothing went wrong, you turned away, shook your head and said nothing. At Rogers Group, Inc., however, the same event might trigger a whole series of events including dialogue with the employee, possible disciplinary action and incorporation of the incident into a safety training meeting.

Being proactive on safety is getting results. The company safety program, which incorporates near-miss accidents, has helped Rogers Group enjoy 12- to 15-percent reductions in its accident frequency rate for each of the last four years.

"Up until recently people hadn't realized that managing safety is part of business, like managing costs, production, maintenance etc.," says Mark DeArmond, area manager and former regional safety manager. "Just like any successful business is going to participate in strategic planning, safety can do the same thing. That's caused us to turn the corner."

Recording unsafe acts and unsafe conditions

"Historically, safety people dealt with the end result of an accident, whether it was lost-time, a hospitalization, a death or a first-aid injury. We only dealt with that because that's what the government told us to deal with," says DeArmond. "The proactive portion of a safety program deals with the sequence of events leading up to the accident."

According to DeArmond, once an accident occurs, it's up to fate as to the outcome. "If you and I should walk across the sidewalk and trip and fall on the curb, we cannot predict if we're going to get up and brush ourselves off and look around to see if anybody saw us or if we're going in an ambulance to be treated for a broken leg."

While no one can control the consequences of an accident, we can control the "sequence of events" leading up to an accident. The key, DeArmond says, is differentiating between unsafe conditions and unsafe acts.

"There's a difference," says DeArmond. "The unsafe conditions are what traditional safety people look at, for example, guards over pinch points, wearing hard hats and safety glasses, backup alarms, handrails and those kind of things. in fact, when an OSHA or MSHA inspector shows up, that's what they look for."

While unsafe conditions have been the traditional focus of safety programs, they are responsible for only 5 percent of accidents. The other 95 percent of accidents are caused by unsafe acts, DeArmond says. "If we spend all of our effort and time dealing with the so-called unsafe conditions, we've only made a 5 percent improvement in the safety numbers."

It was by reducing the number of unsafe acts that Rogers Group was able to achieve such significant reductions in its frequency rate.

Changing mindsets

To truly improve safety, DeArmond says that companies have to believe that they can go accident free. Once they adopt that culture and philosophy, proactive approaches can be successful. Until then, there's not much luck.

"The biggest commitment is getting senior management to buy off on this concept," says DeArmond. "They have to commit to changing old habits. If they're willing to honestly and sincerely support that, then that's the first step toward turning the culture."

Rogers is not only taking a tough stance on safety, it's also backing it up with time and money. The proactive safety approach is tied to an incentive plan. A portion of the incentive is based on the supervisor's involvement with the proactive safety plan.

Monthly, supervisors record a total of 10 observations on the safety acts of employees, both good and bad. The acts are recorded in a Habits/Observation Log and are used as the basis for generating ideas for safety meetings. DeArmond notes, however, that the incentive is not based solely on the supervisor's participation in the safety program.

"It's not a standalone," he says. "The concept is trying to marry safety and production. You can't have one without the other. You have to make the two work together, hand in hand."

Improving training

While filling out the log does increase a supervisor's paperwork duties and operational responsibilities, it pays off in other ways.

One benefit of having supervisors filling out the observation log and performing the training is that it keeps employees on their toes.

"Just like if you and I were driving down the highway; if we know there's a trooper running radar, we slow down. Once we pass him, we're going to resume our regular speed," says DeArmond. "Likewise with unsafe acts, when MSHA inspectors or safety people come around, most of our employees don't have an accident."

DeArmond says that by having local supervisors monitor the safety behavior of employees, the company has been able to graduate to the next level of safety.

"If our employees are in the habit of not locking a conveyor belt to work on it, that's an unsafe act and that's a habit we need to change," says DeArmond. "Observing this is not necessarily negative discipline, but it is feedback and corrective action."

The feedback can be whatever the circumstances dictate, ranging from a gentle reminder to termination in some cases.

A commitment to safety can sometimes require tough choices, DeArmond notes. When longtime employees are unwilling or unable to perform their jobs in a safe manner, the company may need to take them out of leadership roles or ease them into early retirement.

"By the same token, when employees do recognize the merits of safety and do buy into this concept, we also want to recognize those behaviors that are going beyond the norm and give them an attaboy to recognize that and be a positive culture," says DeArmond. "The industry is such that there are going to be some negative disciplines handed out, but we look for the opportunity to do the positives."

Measuring the results

Rogers Group measures the success of its proactive safety program using its frequency rate. Two types of accidents are factored into the frequency rate: any personal injury that requires treatment other than on-site first aid and any preventable property damage.

The company has used its frequency rate as a measure of its success for the last several years. During the last several years, the company's frequency rate has dropped at least 12 percent per year. According to DeArmond, Rogers' aggressive safety program has been implemented during those four years, with concentrated efforts during the last two years.

While Rogers is investing far more time and effort into safety than required by government regulations, the results are paying off in a safer work environment.

By Therese Dunphy

Reprinted from the Web version of the June 1996 ***Aggregates Manager.***

Supervisors plan and emcee safety training

Quarry superintendents play a pivotal role in Rogers Group, Inc.'s safety training.

Not only do they record activities in the Habits/Observation Logs (see Breaking Bad Habits), they also provide the day-to-day safety leadership and organize the safety refresher training.

The superintendent emcees their own refresher training. They have to determine which subject their employees need to hear about and they have to help find the speakers.

"Employees see their boss-who assigns them production duties and responsibilities-also talking about safety," says Mark DeArmond, area manager, Western Kentucky. "When the safety office conducted the refresher training, the quarry superintendent was like the employees. Accountability suffered. Once the safety meeting was over, it was business as usual."

Now, the safety office serves as a resource for the meetings, but the location supervisor has the ultimate responsibility.

Typically, the training is handled as an annual eight-hour refresher course, although supervisors have the option of holding monthly meetings.

The supervisor chooses the format that works best for his personnel and plant situation.

"It would be difficult and it would be wrong to dictate how to do such and such," says DeArmond. "Our operations are diversified, our locations are different and the workforce is different. To say, 'Here's how to do it' is really not fair. We say, 'Here's what you need to accomplish. Whatever it takes to get you there."

According to DeArmond, the flexible format allows the plant supervisor to personalize the program to his location's needs and the company provides the resources to follow through.

McAteer asks resources to combat fatalities, black lung

Reversing a rise in mine fatalities at metal and nonmetal operations and reducing coal miners' respirable dust exposure that can cause black lung are among key commitments for MSHA in the coming fiscal year, according to Davitt McAteer, assistant secretary of labor for mine safety and health.

McAteer testified before the U.S. House of Representatives Subcommittee on Labor-HHS-Education Appropriations on February 26 concerning the agency's Fiscal Year (FY) 1999 appropriation request. MSHA's appropriation request for FY 1999 includes $211.1 million and 2,243 employees (full-time equivalents, or FTE), an increase of $7.8 million and 57 employees (FTE) over FY 1998. MSHA staffing has declined annually since FY 1993, when agency appropriations included 2,571 FTE.

"The Federal mine safety and health program clearly works," McAteer said. "The number of fatal accidents in the mining industry has fallen from 382 in 1969 to a record low in 1996 of 86. In 1997, coal mining deaths fell to an all-time low of 30.

"Unfortunately, 1997 saw an alarming increase in the number of fatal accidents at metal and nonmetal mines. Preliminary data indicate there were 60 deaths at these mines, the highest total in a decade. Rising production of stone, sand, and gravel; an influx of newer and less trained workers; longer work hours to meet production demands; and increased reliance on contractors unfamiliar with mine dangers are among reasons suggested for the increase in fatalities.

"Throughout 1997, MSHA took steps to address fatalities in metal and nonmetal mining. In addition, we conducted an unprecedented sweep of more than 9,000 metal and nonmetal mines in which MSHA personnel talked with more than 100,000 miners and supervisors about the fatalities and how to avoid similar accidents. Our efforts have not yet succeeded; in 1998 we are resolved to find the right mix of actions to drive down the number of fatalities," McAteer said.

In FY 1999, MSHA proposes to place a safety and health specialist in each metal and nonmetal district to target root causes of accidents and injuries and to focus on high-risk mining jobs, locations, and types of operations, McAteer said. MSHA's request for FY 1999 includes $1.2 million and 16 FTE for this and other initiatives designed to target specific mine hazards.

McAteer also stated his belief that a current appropriation "rider" prohibiting MSHA from enforcing training requirements at more than 10,000 nonmetal mines has contributed to the increase in fatal accidents.

"Just three weeks ago, a fatality claimed the life of a 23 year old sand and gravel miner," McAteer said "MSHA found this young worker had not been trained. More than 60 percent of the victims at metal and nonmetal mines, many of them young workers with limited experience, had received inadequate training. Now is the time to ensure that all miners receive the training they need to recognize and avoid safety and health hazards. It is senseless and shameful to allow workers to die owing to a lack of proper training."

MSHA's appropriations request also proposes 40 additional FTE and $2.7 million to expand Federal coal mine respirable dust sampling in the effort to prevent black lung.

"While improvements have been made in the health area, miners remain at risk of developing occupational lung disease," McAteer said. "Today, some 55 thousand former miners are receiving compensation for black lung at a total annual cost of over $1.1 billion."

On November 20, 1996, a Federally-appointed advisory committee—composed of members from industry, labor, and academia—issued a report containing recommendations for more than 100 specific action items affecting every aspect of the Federal respirable dust program.

"A major component of the Federal program to protect miners from hazards of exposure to respirable coal mine dust and silica is bimonthly sampling by mine operators of occupations with a high risk of overexposure," McAteer said. "However, operator samples may not always be representative of the everyday work environment.

"In FY 1999, MSHA will increase monitoring inspections at mines that have difficulty maintaining consistent compliance with dust standards or that submit samples that appear to be unrepresentative of the mine environment," McAteer said.

MSHA's appropriations request for FY 1999 also includes $791,000 and 1 FTE to support strategic management of the agency and information technology needs.

In fiscal year 1999, McAteer said MSHA plans to:

- Expand the use of electronic systems for mine operators to file required reports with MSHA;
- Develop a more comprehensive database of miner illnesses using data from the current grace period in which mine operators may report of occupational illness cases without risk of penalty;

- Make agency information more readily available to the public through the Internet;
- Develop and implement cost accounting systems to measure program performance as required under the Government Performance and Results Act (GPRA).

In line with GPRA, McAteer said, MSHA has established seven performance goals that link directly to reducing injuries, illnesses, and fatalities in the mining industry:

1. Reduce the industry nonfatal-days-lost incidence rate to below the average number recorded for the previous five years for all mines;
2. Reduce the number of fatalities to below the average number recorded for the previous five years in the top three categories of accidents (haulage, roof fall, and machinery);
3. Increase the percentage of personal exposures in compliance with the permissible level for noise in metal/nonmetal mines by 2 percent;
4. Increase the percentage of personal exposures for the highest risk occupations in metal/nonmetal mines that are in compliance with the permissible exposure level for silica by 2 percent;
5. Increase the percent of samples in compliance with the respirable coal mine dust standard as measured by MSHA sampling policy by 2 percent;
6. Increase the percentage of mines in compliance with new health standards for diesel particulates by 2 percent;
7. Reduce the abatement time for silica overexposure by 2 percent in the metal/nonmetal mines.

MSHA will continue working with all sectors of the mining community to prevent mine accidents including roof collapses, mine fires, and explosions, McAteer emphasized.

"The mining environment is ever-changing and fraught with danger. We can never relax our vigilance," McAteer said.

McAteer's complete statement to the House Subcommittee on Labor-HHS-Education Appropriations, as well as appropriations requests for Department of Labor agencies including MSHA, may be found on the Department of Labor's Web site at **www.dol.gov** under "What's New," "DOL Budget Appropriations Site."

MSHA News Release No. 98-0304
Mine Safety and Health Administration
Contact: Katharine Snyder, Phone: (703) 235-1452
Wednesday, March 4,1998

November 3, 1922; Eddy Creek Colliery; Olyphant, Pa.: 6 killed

(From a transcript taken from the "Scranton Times" edition of Saturday, Nov. 4, 1922, courtesy of the Scranton Public Library, Scranton, Pa.)

A terrific explosion yesterday afternoon in the Bird's Eye slope of the Olyphant mine at Throop brought death to 5 men and serious injuries to three others.

Those injured by the explosion are in the Mid-Valley Hospital, Olyphant, and reports from that institution this afternoon indicated that two were in a critical condition and may not recover. One is believed to have been internally hurt.

The accident happened while the 8 men were driving a tunnel in the slope, under the direction of a mine contractor. They had entered the mine at 3 and were to work until 11 pm. Three were working their first day in the mine in many months.

The exact cause of the explosion has not yet been determined, but one of the 3 injured men in the hospital gave a statement of what the men were doing at the time the blast came. He had just poured powder in the 5 holes that had been drilled in the solid rock at the face of the tunnel and started away with a box of powder under his arm. The other men were standing directly in front of the face of the tunnel, one of the men now dead stepped up to connect the electrical attachment that is used in setting off the explosives that tear through the solid rock.

He states that this man seemed to have only reached the point where the connection was to have been made when there was a big flash and the explosion. A large piece of flying debris struck him in the leg and he fell and started to crawl along in the mine to give the alarm. He had gone about 15 yards when he met another employee who ran out and called help. On the surface calls were sent for ambulances and physicians and within a short time there was considerable excitement in the neighborhood.

The explosion was of such great force that it blew the heads from two of the victims and otherwise mangled their forms. A third man had both legs blown off.

Note: Apparently one of the injured men died, since State and Federal records indicate that six men were killed.

Reprinted from ***Historical Documentation of Major Coal Mine Disasters in the United States Not Classified as Gas or Dust: 1846-1962****, U.S. Bureau of Mines, Bulletin No. 616.*

Ergonomic seat with viscoelastic foam reduces shock on underground mobile equipment

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Operators of underground mobile equipment, particularly shuttle cars, are often exposed to significant levels of whole-body vibration (WBV) and shock. The Human Factors group at the NIOSH–Pittsburgh Research Center has investigated the use of viscoelastic foam to reduce shock for the equipment operator and improve seats on mine shuttle cars. In-mine data were recorded on a JOY 21 SC shuttle car for the original seat and an ergonomic version with viscoelastic foam. A review of the data shows improved isolation across the driver/seat pad interface. For the full-load case, the ergonomic seat decreased transmissibility and isolated the shuttle car operator down to 15 Hz. Additional testing of the foam materials with the development and use of a lumped-parameter analytical model showed different composites of the foam materials can reduce the isolation frequency to below 5 Hz. This paper describes the underground mine trials and the testing done to evaluate properties of the viscoelastic foams. The paper also discusses the development of an analytical model using the data from underground trials and the foam testing.

Introduction

Studies sponsored by the U. S. Bureau of Mines (USBM) have reported that as many as one-third of the equipment operators in underground coal mines may be exposed to adverse levels of whole-body vibration (WBV) (Remington et al., 1984). Shuttle cars are identified as a primary source of this adverse exposure. The operator experiences WBV and shock when the shuttle car travels over rough mine floor marked by bumps, ruts, and potholes. In low-coal mines (< 1.25 m or 50 in), restricted space makes seat suspension systems difficult to use in isolating operators from WBV and shock. Miners log 25 million hours of work annually in these mines.

Interviews with underground mobile equipment operators revealed complaints mostly about shocks or jolts they received when operating shuttle cars. Hence, the feedback from equipment operators made the case for research to reduce shock. Specifically, this research focuses on a more ergonomically designed seat and on identifying how well various types and thicknesses of viscoelastic foams reduce the shock experienced by shuttle car operators.

Underground mine trials

Researchers at the Pittsburgh Research Center (PRC) modified the original seat in a JOY 21SC shuttle car used at an eastern Kentucky mine. The coal seam at this mine is 0.889 m (35 in) thick with an operating height of approximately 1.09 m (43 in). Owing to the low mining height, operators must adopt a reclining posture to operate the shuttle car. From observing and talking with the shuttle car operators, it became obvious that the original seat provided little adjustability or lower back support. Modifications to the original seat resulted in a more ergonomically designed version with an easily adjustable lumbar support, fore-aft seat pan movement, and viscoelastic foam padding. The padding included six layers, each .013 m (5 in) in thickness, of the following order from top to bottom: EXTRA-SOFT, PUDGEE, BLUE, YELLOW, SOFT, and GREEN. The BLUE, YELLOW, and GREEN layers are CONFOR medium-density, open-celled polyurethane foams from E-A-R Specialty Composites Corp., Newark, DE. The remaining materials are manufactured by Dynamic Systems, Inc., Leicester, NC. EXTRA-SOFT and SOFT are SUN-MATE polyurethane foams with organic composition of more than 50% plant derivatives. SUN-MATE PUDGEE is unique among the materials as a viscoelastic gel-foam with a soft dough-like consistency. Data were recorded for a typical shock with the shuttle car operating empty and with a full load. In terms of transmissibility across the driver/seat pad interface, the ergonomic design shows considerably improved isolation for the full load case. Below 15 Hz, transmission increases across the seat due to the improvement in isolation frequency. The design objective was to lower the isolation frequency and improve the damping characteristics of the seat so an increase in transmissi-bility is minimized.

Although the seating foam composite above provided substantially improved isolation for the shuttle car operator, PRC researchers were interested in further reducing the isolation frequency. Consequently, additional testing of the viscoelastic foams was arranged with a company specializing in noise and vibration engineering, Roush Anatrol.

Material property evaluation

Using the forced oscillation technique, investigators at Roush Anatrol evaluated the six foams above plus SUN-MATE MED-SOFT. This method was used to quantify the influence of static preload, dynamic strain amplitude, and temperature on the modulus of elasticity and damping properties of the foams. Test temperatures were selected from actual readings and knowledge of the mine environment. The chamber temperature was held constant at these temperatures for testing at pre-strain levels of 0%, 10%, and 45%.

Analytical model

The isolation system provided by the foam was analyzed dynamically using a lumped-parameter, analytical model. The dynamic interaction of the vehicle, isolation system, and driver was simulated with the model using a seven degree of freedom spring-mass-damper system. Six material layers with variable material thickness were included in the model.

The ergonomic seat was chosen as the baseline seat in the model because of its known material configuration and properties.

A shock input, taken from in-mine data recordings, was applied analytically to the system to determine the driver's response for each material configuration. Responses were generated at the driver/seat interface (seat accelerometer location) and at the driver's torso. The responses were then compared to the experimentally measured, modified seat response and to the analytically predicted driver response. An analytical transfer function between the input force and the torso was also generated to show the isolation frequency and the amplification at resonance. Accordingly, investigators optimized the seat material configuration using an iterative process.

Analytical model results

For isolating the shuttle car operator, EXTRA-SOFT, SOFT, and PUDGEE foams exhibited characteristics that make them the best of the materials evaluated. At 4.4° C (40° F) and 21.1° C (70° F), the SOFT and EXTRA-SOFT have lower modulus of elasticity values than the YELLOW with EXTRA-SOFT the lowest. The SOFT and EXTRA-SOFT are relatively stable with temperature and have similar damping properties. Across the temperature range tested, PUDGEE shows less than an order of magnitude change in modulus of elasticity. Across the frequency span and temperature range, the dampmg properties of PUDGEE are also fairly uniform. Moreover, PUDGEE has the lowest modulus of elasticity values of the seven foams tested. PUDGEE'S higher damping than the EXTRA-SOFT could, however, restrict its ability to expand from a compressed state during a jolt or shock.

The EXTRA-SOFT and PUDGEE composite was evaluated as Case #2. This provided the maximum depth of a low modulus foam as well as one that maintains its stiffness and damping properties over the expected operating temperature range. The isolation characteristics of the seat are improved to approximately 4 Hz. A small amplification in the 3 Hz region appears due to the lowering of the driver/seat resonance.

Five inches of EXTRA-SOFT constituted Case #6. For a low-coal application, this design represents nearly the maximum amount of seat padding that might be used. The design also employs the best single material m terms of low modulus of elasticity, low and consistent damping, and low temperature sensitivity. This foam configuration provides analytical isolation frequency of 5 Hz.

Conclusions

The shuttle car seat design that shows the best isolation properties corresponds to foam configurations of Case #2 or #6. Either of these selections maximizes the isolation performance of the seat in the limited space available. The analytical model provides a usable tool to design and optimize shock and vibration isolation systems for use on a variety of seating configurations in underground mines. It will greatly aid investigators at the NIOSH - PRC in providing mining companies and manufacturers with guidelines for the construction of ergonomically designed seats to reduce the shock exposure of underground mobile equipment operators.

Acknowledgments:
The authors thank J. R. Bartels, J. P. DuCarme, R. L. Unger, and R. S. Fowkes for their contributions in the design and construction of the ergonomic seat.

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Coal accident summary

Fatal powered haulage accident

General information

The operation is an underground coal mine in Utah.

The mine has three drifts into the Tank coal seam, which has a variable thickness of 4 to 9 feet. The mine has one active development and one active retreat pillar working sections, both of which use remote-controlled Joy 14CM15 continuous mining machines, Joy shuttle cars, Lee Norse TD-142 single-boom roof bolting machines, and belt haulage. A Fletcher DDR-13-B-CW double-boom roof bolting machine is used to install supplemental supports.

The mine employs 44 underground miners and 27 surface employees, and has a daily production of about 982 tons of coal. The mine works two 9-hour production shifts and one 9-hour overlapping maintenance shift each day, 7 days per week. The mine liberates negligible amounts of methane.

In the area of the accident, main entries had been previously developed and room and pillar retreat mining methods were being utilized. The immediate roof consisted of a 3-foot layer of sandstone with clay-filled joints overlain by a 1-inch layer of coal. The main roof consisted of a massive layer of sandstone. The average mining height was 7 feet and the average mining width was 19 feet.

Description of accident

On Sunday, August 24, 1997, at about 3:00 pm, the afternoon shift crew under the supervision of the acting section foreman entered the mine and traveled to the north bleeder retreat pillar active working section. The crew arrived on the section about 3:30 pm and went to the kitchen while the section foreman examined the pillar line. There were seven miners on the crew and five of the seven miners were part time employees with limited mining experience. The off-standard shuttle car operator had about one year of total mining experience. The crew then received work assignments and performed normal duties as they completed the number 5 and 6 cuts and started the number 7 cut on the number 5 pillar.

At about 5:45 pm, the section foreman told the continuous miner operator (who was also a certified mine foreman) that he was leaving the section to check on another problem. The continuous miner operator was operating the continuous mining machine with a remote control unit. At about 6:23 pm, the men working on the section observed indications of the roof working, saw timbers breaking and/or felt an air blast and heard a roof fall. The number 11 off-standard shuttle car had just been fully loaded. About two feet of rock fell on the continuous mining machine beginning at the cab and extending inby. The victim, a continuous mining machine helper (with 23 days of total mining experience), the continuous miner operator, and the shuttle car (operated by the victim's brother) started moving rapidly outby from the caving pillar split. The continuous miner operator stated that the victim slipped/tripped and fell in front of the shuttle car. The continuous miner operator yelled at the shuttle car operator to stop.

There was excessive rib sloughage on the left corner of the number 6 pillar and there were excessive accumulations of loose coal on the floor of the entry between the number 5 and 6 pillar blocks where the accident occurred.

The victim was crushed in an approximate 6-inch opening between the cable reel compartment and the mine floor. The continuous miner operator, a certified EMT, checked for vital signs but could find none. The continuous miner operator told the shuttle car operator to slowly move the shuttle car in an unsuccessful attempt to free the victim. The continuous miner operator then utilized the hydraulic jack mounted on the shuttle car to lift the car high enough to free The victim.

Two crew members were sent to phone outside for an ambulance and the victim was placed on a stretcher and transported to the surface. The county ambulance crew transported the victim to the hospital where he was pronounced dead by the attending physician.

Conclusion

The number 6 pillar had not been split in accordance with the approved roof control plan. The pillar cut sequence contributed to a premature cave initiation. Loose coal in the roadway leading into the number cut in the number 5 pillar presented a slipping/tripping hazard. The installation of a spill board on the conveyor and the position of the seat in the operator's compartment of the shuttle car resulted in a zero visibility condition concerning the location of the continuous mining machine operator and helper. As the cave extended onto the top of the continuous mining machine, the victim started running outby past the shuttle car, slipped/tripped on loose coal, fell under the moving shuttle car, and was crushed between the cable reel compartment of the shuttle car and the mine floor.

Summarized (3/12/98) by the editor, Fred Bigio, from an MSHA Accident Investigation Report dated August 24, 1997.

Abnormal weather conditions compel mine operators to step up vigilance

Unusual weather conditions throughout the U.S. have prompted a call for increased vigilance in the nation's mines. According to the Mine Safety and Health Administration (MSHA), unseasonably mild weather and torrential rains brought on by El Niño may have a direct impact on the mining industry.

The early arrival of Spring in some parts of the country may induce stone and sand and gravel operations to accelerate production, particularly at operations normally shut down during the winter months. Furthermore, flooding brought on by heavy rains may require emergency production of aggregates to replace washed-out roads, or to produce paving or construction materials. Last year, many aggregates operations, particularly in the West, experienced an increased demand for their products for building and road repair in the wake of weather-related damage. It was also the worst year for metal and nonmetal fatalities since 1987.

"I am urging all mine operators to increase their vigilance for potential safety hazards," said J. Davitt McAteer, assistant labor secretary for mine safety and health. "While accelerated production can raise employee income and improve economic conditions in the local community, mine operators need to guard against longer hours that may lead to employee fatigue, reduced attention spans, lost-time or disabling injuries, and possibly even death."

MSHA is encouraging mine operators to consider all factors involved in the mining cycle when dealing with weather-related problems. To provide such guidance, the Agency has released a *Hazard Alert Bulletin* that identifies potential hazards and offers suggestions on how to control them:

• Severe weather conditions can generate lightning, not only presenting the danger of lightning strikes in open areas of surface mines but also increasing the hazard of unplanned detonation of explosives. Mine operators should track the approach of thunder and lightning storms and should refrain from loading blast holes if a storm is expected to move into the area. If a storm does approach a surface mining area, the site should be cleared until the danger has passed.

• Highwalls and stockpiles (material dug and piled for future use) that become saturated with water may become unstable. Freezing and thawing can further destabilize the highwall slope, creating a hazard for equipment operators working on top of the pile or persons working near the base.

• Heavy rains can raise water in impoundments, placing additional pressure on these structures. Highwalls, stockpiles, and impoundments should be carefully and more frequently inspected to ensure their stability against collapse and the potential development of cracks.

• Slips and falls have historically been the third leading cause of fatal accidents at mine sites. Rainfall can make floors, mine equipment, and roadways slippery and potentially hazardous. Everyone should exercise additional caution as they move around mine sites, both on foot and on equipment.

• To ensure adequate driving visibility in bad weather, windshield wipers should be kept in good condition.

Reprinted from a U.S. Department of Labor News Release, USDL: 98-40 dated Tuesday, March 10, 1998, Office of Public Affairs, Atlanta, Georgia. For further information contact: Amy Louviere at 703-235-1452.

Metal/Nonmetal accident summary

Fatal Fall of Material Accident

General information

A 77-year-old retired company president was fatally injured when an unsecured concrete and steel barrier fell on top of him from the rear framework of a portable crusher. The victim had retired but continued to work periodically at the mine and was directing the relocation of the portable crusher at the time of the accident. The victim had a total of 36 years of mining experience since starting the company with his brothers in 1961.

The portable plant was owned and operated by the victim and his brothers and normally operated one, 8-hour shift a day, 5 days a week, and employed several people.

Description of the accident

The front-end loader operators arrived at the work site at about 6:45 am, on the day of the accident. The victim arrived at about 7:30 am, his regular starting time, and instructed the front-end loader operators that the crusher would be relocated. They proceeded to dig out the crusher's rear tandem wheels, and connect a chain from the Komatsu front-end loader to the draw bar on the front of the crusher.

The two front-end loaders in use at the time of the accident were a Komatsu model WA450, and a Caterpillar model 966D.

The portable crusher involved in the accident was a 1970 Cedarapids jaw crusher. The crusher was mounted on a framework of 15" I-beams, with semi-truck trailer wheels. The rear of the crusher would normally be pushed against an excavated earthen embankment to allow the front-end loaders to dump directly into the crusher's feed hopper. A large concrete and steel barrier was placed on the framework at the rear of the crusher to partially support the embankment and to prevent sand and gravel from accumulating around the crusher's wheels.

The barrier measured 20' x 4' x 3" thick, and weighed about 4,000 lbs. It was constructed of 16, 3" x 7" interlocking steel strips, forming a waffle like structure which was filled with concrete. A steel lifting lug was permanently attached to the top center of the barrier and was used to lift the barrier into position using a chain attached to the bucket of a front-end loader.

When located on the crusher, the bottom of the barrier was about 39" above the ground, and rested atop two 15" I-beams which were part of the crusher's framework. The top of the barrier leaned slightly against two, vertical, 6" I-beams. It was normal practice not to secure the barrier in any manner.

When the crusher was moved to a new location, the operating procedure was to pull it away from the embankment far enough for a front-end loader to knock the barrier off the supporting I-beams and let it fall to the ground. The lifting lug on the top of the barrier was used only to place the barrier back in position once the crusher had been moved to a new location. On the day of the accident, the crusher had been pulled about 41 feet away from the embankment, up a 6.5° grade.

At about 10:15 am, while one front-end loader operator was using the front-end loader to pull the crusher away from the embankment, a fuel truck arrived and stopped on the access ramp located in front and to the left of the crusher. The victim had the men halt their activities so the front-end loaders could be fueled.

The other front-end loader operator pulled the Caterpillar loader in front of the fuel truck. He was fueling the loader when he saw the victim walking towards the rear of the crusher with a shovel in hand. Moments later, he heard a noise towards the rear of the crusher. He looked over and saw the victim on the ground with the steel and concrete barrier on top of him. At the same time, the other front-end loader operator who was standing on the fuel tank of the Komatsu loader located in front of the crusher, caught a glimpse of the falling barrier. He called out to the victim, but received no response.

Both men immediately rushed to his aid and found the victim on the ground at the rear of the crusher, with his left shoulder and back pinned under the top left side of the barrier. One loader operator checked for vital signs and found none. The other immediately called the company shop using a 2-way radio in the Komatsu loader. The company coordinator received the call and immediately called 911. Neither loader operator attempted to lift the barrier off of the victim.

Emergency responders arrived at the scene at about 10:32 am. They checked the victim for vital signs and, finding none, secured the area until the local medical examiner arrived. The medical examiner pronounced the victim dead at the scene, and the barrier was lifted to remove the victim's body.

Conclusion

The primary cause of the accident was failure to secure the barrier to prevent it from creating a falling hazard to persons walking near it. A contributing factor was the 6 percent incline that the portable crusher was sitting on, which shifted the barrier's center of gravity making it more unstable.

Summarized (3/12/98) by the editor, Fred Bigio, from an MSHA Accident Investigation Report dated October 7, 1997.

Break in chain results in death of electrician

When the link chain of a cumalong broke, it pinned a miner between an underground mine's circular cross brace and a belt conveyor drive roller causing his death, MSHA concluded.

The victim, a resident of Jefferson County, Ala., was killed May 29, 1997, when he tried to secure a Harrington 1-1/2 ton cumalong on the mine's boom section and conveyor drive.

The victim was standing be-tween—and underneath—the boom section and the conveyor drive trying to pull the boom section forward to mount it into its secured brackets. The boom, which previously had been attached to the conveyor drive unit, had to be lowered so the conveyor belt could clear the mine roof. To lower the boom, its mounting brackets had to be relocated in front of the boom and in a lower position on the conveyor drive.

His co-workers—an electrician, a laborer; and a bridgeman—relocated the brackets by attaching the first Harrington 1-1/2 ton cumalong to a roof bolt in the mine roof and around the second circular cross brace from the discharge roller on the boom section.

Also, to prevent back and forth movement of the boom, the cumalong's lower hook and chain were used as a sling around the cross brace. A safety chain also was placed around the same brace and attached around another circular cross brace between the two conveyor drive rollers.

After the brackets were relocated, the trio of workers loosened the safety chain as they tried unsuccess-fully to raise the boom so it could be placed into the brackets.

The victim intervened and tried to place the second cumalong on the boom section when the chain of the initially installed cumalong broke causing the boom section to rotate toward the conveyor drive. He was caught between the two.

Immediate attempts to free the victim were unsuccessful. However, once freed, he was given CPR by the emergency medical technician onsite but no vital signs were found. After repeated CPR attempts he was pronounced dead at 3:35 p.m.

MSHA attributes his death to an unsecured blocking of the boom prior to his going beneath the boom section.

MSHA concluded the failure to carefully plan and develop the conveyor drive installation location and not using a sling or any other device with an appropriate weight with the cumalong also contributed to the accident.

The mine also was cited because the belt conveyor drive unit was not securely blocked in position prior to work being done beneath the boom section and conveyor drive unit

The fatality report was issued through MSHA District 11, Michael Lawless, 135 Gemini Circle, Suite 213, Birmingham, Ala. 35209-5842.

Reprinted from the January 12, 1998 edition of Mine Regulation Reporter.

April 30, 1914; No. 2 mine; Cumberland, Wyo.; 5 killed

(From "The Rock Springs Miner," Rock Springs, Wyo.)

Two men were killed, a third fatally injured, 7 seriously injured, and 20 are slightly injured as the result of the breaking of a coupling in No. 2 mine, Cumberland, on Wednesday, April 30.

A train of 10 mine cars was coming up the slope of the mine with 62 men aboard when the coupling between the third and fourth cars broke and 7 cars rolled rapidly down the slope.

Many of the miners, realizing that death would result if they were carried to the bottom of the slope, threw themselves from the cars and escaped.

Before the cars had proceeded 200' their velocity was so great that they jumped the rails and crashed into the walls of the slope. Two men were instantly killed.

Eight others were crushed or maimed and several of them will be permanently crippled. The less seriously hurt of the injured were in cars whose momentum was checked by the cars which jumped the rails.

The car was equipped with a "safety rope" but this broke when the breaking of the coupling brought a great strain upon it.

The aforementioned report indicated 3 killed rather than 5. Since Bureau of Mines Bulletin 509 records 5 men killed, undoubtedly 2 of the injured died later.

Reprinted from ***Historical Documentation of Major Coal Mine Disasters in the United States Not Classified as Gas or Dust: 1846-19****62, U.S. bureau of Mines, Bulletin No. 616.*

More mine operators using internet to comply with MSHA reporting requirements

Hundreds of mine operators nationwide have taken advantage of the new electronic filing process for reporting required information to the Labor Department's Mine Safety and Health Administration (MSHA).

Two months ago, MSHA announced that the agency had set up a new service which gives mine operators and independent contractors the option to electronically file employment and coal production information with MSHA over the World Wide Web. Federal mining regulations require mine operators and their contractors to submit specific information to MSHA on a quarterly basis, using designated forms provided by the agency.

As of January, the MSHA form 7000-2, may be completed and submitted electronically to MSHA directly over the internet using MSHA's homepage at http://www.msha.gov under "Forms." Computer users may also access the proper forms through the Department of Labor's homepage at http://www.dol.gov under "elaws." Users are prompted to follow instructions provided on the screen.

"We are quite pleased with the response so far from mine operators," said Davitt McAteer, assistant secretary of labor for mine safety and health. "However, we want to see many more mine operators take advantage of the system. Electronic filing is efficient and it removes much of the red tape in complying with our rules."

Since the service was launched earlier this year, nearly 300 mine operators have taken advantage of the system to report required information on employment and production at their mine sites. The system guides mine operators and contractors through the reporting process, taking into consideration the type of mining operation reporting. The system allows users to print a copy of the completed form for company files. This copy will document compliance on the part of participating mine operators with MSHA reporting requirements. Companies filing elec-!tronically will also receive electronic mail (e-mail) confirmation that the required information has been received by MSHA.

Currently, the system is designed for initial filings of required information only. Amended filings that correct information previously filed must continue to be mailed to OIEI, PO Box 25367, Denver, Colo., or telefaxed to (888) 231-5515. As in the past, initial filings may also be filed through the mail or by telefax.

Use of electronic filing is part of the Labor Department's E-laws project which provides employment laws assistance for workers and small businesses.

MSHA will continue development of electronic filing systems and will develop a similar system for submission of the Mine Accident, Injury, and Illness Report (MSHA Form 7000- 1) later this year. In addition, a system for electronic submission of training plans is also under development. MSHA welcomes any comments or suggestions to enhance these systems as they are being developed. For further information on electronic filing of required MSHA data, contact Jay Mattos at MSHA in Arlington, Va., on 703-235-8378 or through e-mail to jmattos@msha.gov.

Reprinted from a Mine Safety and Health Administration press release.
Contact: Rodney Brown (703) 235-1452

Rock burst at Hecla: A personal experience

By Jerry Dolph, former hard rock miner and present day author

Hecla Mining's "Lucky Friday Mine," located beneath the town of Mullan, Idaho, has been shaken since the 1960s by many deep underground rock bursts. Among the many rock bursts to hit the mine, some registered magnitudes on the order of 3.5 and better on the Richter scale.

On a Friday in 1969, the mine did not live up to its name and a 3.5 burst hit when all of the stopes on a level approached an upper level at the same elevation. After that, a stair-step pattern was used to give the mine's levels more of an "arch."

This article is an account of one of the more ferocious bursts to hit the miners of the Lucky Friday. I say "miners" instead of "mine" because I was there and it was a very personal experience for me.

I had been working at the Lucky Friday for six years. During that time, I had heard and felt thousands of air blasts. In fact, in the early spring of 1986, the mine was experiencing as many as 1,000 air blasts an hour, of different intensities, of course. Most of them sounded like popcorn popping. There were also a few bumps and occasionally a real boomer.

That day did not seem any different from all the rest. I came to work, went into the dry (locker room) and changed into my mine diggers. After picking up my rack of re-sharpened drill bits and the rest of my gear, I walked over to the Silver Shaft.

The Silver Shaft was sunk in the 1980s. It is circular, concrete lined and more than 6200 feet deep.

The Silver shaft is where I first saw John that morning. We worked on the mine's 5000-foot level, only in different slopes. John and I had been friends for many years and liked to bet against each other on things such as when the first snowfall of the year would occur. Or we would wager on when someone would take down the two enormous (715- and 610-feet) Bunker Hill smoke stacks at nearby Kellogg. We only bet for soda pop though, so neither of us was getting rich (incidentally, the two smoke stacks remain standing at the time of this writing).

At the appointed time, the hoistman lowered the skip into place and we got in. After a six or seven minute ride down the shaft at 800 feet/min., we arrived at the 5,000-foot level.

Once there, we paired off with our own partners and walked to our slopes. My stope was 900 feet away from the shaft and about 130 feet above the track level. That is to say, once we walked to the bottom of our timbered raise, we then climbed 130 feet through a 5-foot diameter, wood-lined manway before reaching the working level of our stope.

View looking down a manway after a burst crushed it. The normal condition of the manway would be a four foot square smooth sided opening. Photo courtesy of ASARCO taken in the Galena Mine in the Silver Valley.

Everything had gone as usual that morning. It was the typical hot, wet, dirty, or "oily day," conditions you would expect if you were fighting a jackleg drilling machine a mile deep in the earth, at nearly 100˚F and 100% humidity.

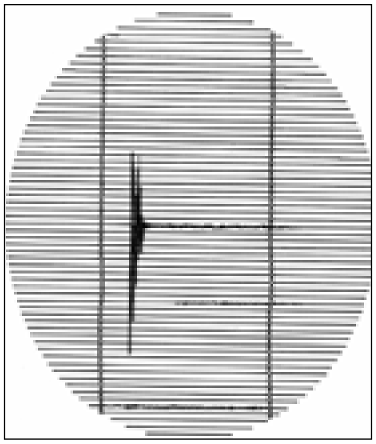
The stope I worked in was very active—as far as ground movement. So we had been installing extra thick timber to support the ground. We also bolted heavy chain link fencing into the walls using 6- to 8-foot long rock bolts.

My partner, Ron, and I worked until lunch and decided to eat out in the raise (central part of the stope), near the manway and under the timber. The ventilation was better and the air was cooler.

We were sitting on the raise's board floor facing each other when it hit.

From out of nowhere there was a tremendous, bone-jarring explosion. I looked up and saw a 30-in. thick cap (tree-like timber) about 6-feet above my head suddenly sag down and splinter near its center. The solid

Near right: seismometer reading of a small burst registering 73 mm of mercury pressure—taken Sept. 20, 1987 at the Lucky Friday mine. The mine experienced literally thousands of such "hits" each day. The author's friend and coworker, John Pelon, died in a burst such as this. Far right: photo of a crushed cap and top of a protruding manway ladder—the result of a side squeeze. The photo was taken in the author's stope in the Lucky Friday mine.



granite walls (one of which I was leaning up against) that Ron and I had bolted up so carefully with chain link fencing, began violently jerking and rolling in and out like a flag billowing in a stiff wind.

It was amazing how quickly things happened. The wood floor I was sitting on jumped up and down and threw me around as if I were riding a bucking bronco.

The stope was instantly engulfed in a dust cloud so thick that it was impossible to see and nearly impossible to breathe. The dust was so thick that it was almost like trying to breathe water. I choked and gasped for air, pulled my sweat-soaked T-shirt up over my mouth and nose and breathed through that. It was frightfully dark.

After the terrible roar of exploding rock, breaking timber, and violent shaking subsided, my first thought was, where the hell is Ron? We had been facing each other, our boots had been only a few feet apart, when the rock burst hit. The dust was so thick that even though my lamp was on—I could not see him or anything else. Only absolute darkness.

All was quiet except for the slight shuddering groans the timber made as it took on more weight and the faint clicking of rocks falling somewhere. I could hear the raspy rattle the chain link fencing made as it moved and stretched. The walls continued to move and were still giving way. Then I remembered the broken timber above my head.

I sat there in the darkness, breathing through my T-shirt for what seemed like an awfully long time. Finally, I was able to see a faint light from my powerful cap lamp, which was only a few inches above my nose. Until then, I thought my light had been broken in the melee. The dust was so thick that its particles hung in the air like a wall in front of my light.

As time passed, the air cleared a little and I finally spotted another dull light. It was Ron's. It turned out that we had been sitting and staring at each other through the entire event and did not know it.

Before the blast hit, our stope was in good shape. As the dust cleared, though, we saw that most of our timber had been twisted and was broken. The heavy wooden cap above my head was badly splintered and looked like it had taken just about all of the weight it could bear. It bowed in an unnatural arc.

Much of the solid granite walls had caved in as well, pushing the chain link fencing out into the stope. The fencing had held though, and looked like large bags of broken rock that were hanging on the walls. The rock bolts still had the fencing pinned in place on the walls.

Ron and I stared at each other, in a state of shock. Then I asked, "You all right?" He replied, "Yeah… man, that was a bad one, wasn't it?" "You got that right," I said.

Our signal light began to flash (the motorman flashed us from the level below by pulling on a "bell cord"), so I walked over and picked up the telephone receiver. We used battery-powered telephones in the raise. Before I could even get the receiver to my ear, I could hear the motorman's voice coming up the timber slide, screaming, "Come down, John's Dead."

Ron and I climbed down the broken and twisted ladders in our partially crushed manway. We hurried after the motorman to John's stope. It was only 300 feet away and next to ours.

After reaching the bottom of John's manway, we began climbing. It was only about 40 feet to where he and his partner had been working that morning. After topping the last ladder, I stood up on his work floor. Looking up, I saw John hanging upside down over the timber. His legs were broken off and he had been pinned mid-thigh by two large chunks of high-grade ore. His body was limp and lifeless.

Along with three other guys, I hurried to his aid in an attempt to somehow revive him. We tried mouth to mouth resuscitation, but he was in an awkward position. When it was my turn, I had to steady myself by placing a hand on his chest. As I did, I noticed that his chest felt like a bag full of broken wood.

John died that day, and I suspect that only by the grace of the Good Lord am I able to tell about one of the big ones.

*Jerry Dolph worked for 16 years as a miner, and lives and writes in Post Falls, Idaho. He has authored numerous articles for the International **California Mining Journal, Rock and Gem, Mining Engineering**, and other magazines and newspapers. He also wrote the gritty, often humorous, **Fire in the Hole**—a view of the industry through the eyes of the miners themselves.*

*Originally published in **Mining Engineering.***

One woman's career in mining

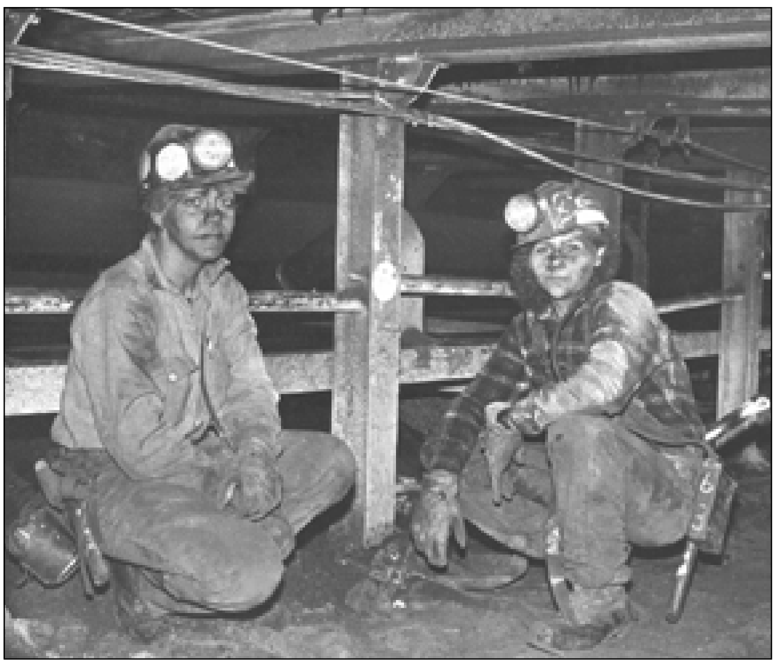
By Cheryl McGill

Some people seem to have known what they wanted to be when they grew up since the age of five. As for myself, nothing could have been further from the truth. Coming from a traditional family setting (mother, father, and one brother) and living in a small town, a career as a teacher, nurse, or a housewife would have been the expected plan. Becoming a coal miner was beyond my wildest dreams.

For some, the pursuit of a non-traditional occupation stems from a desire to "change the world," to be a pioneer, or just to be different. For me, the sole motivating factor was money.

Since the dominant industry in the area where I lived was the coal industry, and the best-paying jobs were coal-mining jobs, the choice was obvious to me. In the early 1970s, news stories of women going to work in the mines were beginning to flash on the 6 o'clock news. With the knowledge of the lifestyle a job in mining could provide for me and my son, and too much pride to ask for help from my family, I set out to become a coal miner.

After applying for employment with a number of coal companies, I finally got a call for an interview. This interview turned out to be the single most important event in what has become a very rewarding career.



Cheryl, belt examiner, and Lauralee Cyr, belt cleaner, collaborating on next job

I was asked questions like "Kid, have you ever even been in a mine? Do you want to stand bent over and shovel coal till your back breaks for the rest of your life?" At my honest reply of, "No Sir," his gruff tone began to change.

From the start, hostility and resentment toward my new job became all too apparent. Although many miners were less than accepting, similar attitudes from friends and family took me by surprise. As a counter to all of this hostility, I had the largest paycheck I'd ever seen, and the determination to make this work. Thus began my uncharted path of education, work, and trial and error. Through the suggestion and examples of a select few individuals, for and with whom I worked, I began to realize the difference between a "job" and a "career." Today I hope to pass on the same type of encouragement to others who come after me.

In my case, becoming a mine inspector seemed a natural progression from the experience gained through working in the mine. My job responsi-

Cheryl and Pyro manager discuss procedures prior to leading tour group

Charging bore holes in the coal face of a deep mine in Western Kentucky, owned and operated by Pyro Mining Co.

bilities and titles in the mine had ranged from general inside laborer to safety manager, with my main interest in the area of health and safety. Mine Safety and Health Administration (MSHA) inspectors are deeply committed to improving the health and safety conditions under which miners make their living. In most cases this commitment is born from the inspectors' first-hand personal knowledge of the hazards of the occupation, enhanced by the training that all new federal inspectors receive.

I applied for an inspector position in 1987 after some encouragement from a friend who was an inspector. The federal hiring register was open for the first time in several years. What did I have to lose? Never expecting to hear anything in response to my application, I found it was serious decision time when I did receive an offer.

With any job change there are uncertainties and anxieties—coming to work for MSHA was no different. By this time my mining background and educational level were comparable to my male counterparts, which allowed for my progression through the ranks from trainee to journeyman inspector within the same time frame as the male inspectors. Recently, I was promoted to the job of health and safety specialist at MSHA headquarters.

What is it like to be a female mine inspector?

A typical day for me as a mine inspector would begin early, usually 6:00 am at the field office, gathering inspection equipment then traveling to a mine. One difference for me as a woman is that it's helpful to know what kind of facilities, if any, are available at a mine I am going to inspect. Male mine inspectors can don their uniform and safety equipment in an all-male miners' bath house or even the parking lot. Pre-planning could save me a lot of embarrassment or discomfort while at the mine.

In my experience as an MSHA inspector, I have always been relatively well received initially by both mine management and miners. That is, until the novelty wears off or some enforcement action becomes necessary. At that time their perspective changes to "this woman who doesn't know what she is talking about." Fortunately, the negative reactions don't last long, especially when you do your job consistently.

Another of the more easily resolved problems of a female mine inspector is the different physical capabilities of men and women.

Physical strength, or the lack of it, seems to be the first in a long list of "can't do" items that a woman is presented with in a nontraditional occupation. Compensation for physical weakness can easily be accomplished with the creative use of tools, levers, and equipment.

A more subtle but just as common

obstacle comes in the form of attitudes and opinions of more traditional and less flexible coworkers. There is no simple, quick-fix way to tear down these barriers. They must be dealt with on an individual, case-by-case basis. Unfortunately, this often takes more than just being good at what you do.

For many women, experience can be another barrier. Women's entry into the mining industry is a relatively recent occurrence. Just the lack of years of experience moves you to the back of the line. This necessitates finding ways of catching up and becoming an equally productive member of the work force. As with any break from tradition, there has to be a starting point. Most women who have chosen a nontraditional career deeply desire to rise or fall on their own strengths and abilities. The stigma that results from the perception that women receive special treatment in the workplace of today hinders women's ability to reach their full potential. It takes incredible personal strength to move forward in the face of such antagonism. Sometimes you feel so worn down that you reach the point where you want to say "Why bother?" and quietly fall back into the socially accepted ranks.

It's time for a new chapter in the book. The rules are in place establishing a woman's right to equal treatment in the workplace. It's time to start filling in the blank spaces. Laws and regulations alone can't do the job. Networking, support systems, and good solid work are among the best tools that we as women can use to benefit ourselves, each other, and make valuable contributions in the workplace today.

November 9, 1909; Auchincloss Colliery; Nanticoke, Pa.: 9 killed

(From Reports of the Inspectors of Coal Mines of the Anthracite Coal Regions of Pennsylvania 1909, p. 536)

On November 9, 1909, at 2:50 pm, an explosion of gas occurred in No. 2 shaft, Auchincloss Colliery, at Nanticoke, fatally burning one man and setting fire to the timber and coal at the face of chamber known as No. 40, which produced smoke and gas that suffocated eight other workmen, and slightly burning another.

The section of the mine in which the explosion occurred is known as No. 1 counter off No. 1 slope, Ross seam, and is ventilated by a separate and distinct split of air independent from all other parts of the mine and in which about 50 men are employed, but as is the custom a number of them emerged from the mine earlier in the day, among them being miner No. 40, in whose place the explosion is supposed to have occurred and for whom the injured was laboring. Miner No. 40 testified at the inquest, held for the purpose of inquiring into the cause of the accident, that on entering his chamber on the morning of the explosion and on leaving it at 12:20 pm, he made an examination of his place and found it free from gas and in good condition. He also testified that he worked in this particular place, chamber No. 40, for one year and during that time he recalls only one occasion on which he found an accumulation of explosive gas. Therefore, the cause of the accumulation of gas between 12:20, the time miner No. 40 left his chamber, and 2:50, the time of the explosion, can only be conjectured.

Chamber No. 40 is driven at about a five per cent dip off No. 1 counter and is about 400 feet long, and at the face is a very abrupt upthrow or anticline, in consequence of which the coal was in a laminated condition and fell away from the working face, allowing the occluded gases to escape.

Three theories were advanced as to the cause of the explosion, all of which were plausible.

The theory accepted by the coroner's jury as having caused the explosion, was that the seam of coal at the face of chamber No. 40, having suddenly changed from a light dip to a pitch that is almost perpendicular and being of a laminated nature, a pocket of gas was liberated and filled the workings with fire damp at the point where the men were at work, which was ignited in some unknown manner, possibly by coming in contact with one of the workmen's lamps, or by one of the men striking a light.

The most unfortunate incident in connection with this disaster, was the failure to escape of the 6 men who were suffocated. They were working fully a 1,000 feet from where the fire occurred and were warned to leave the mine as there was something wrong. This was evident by the filling of the vvorkings with smoke and afterdamp, but after they had examined the air current in the workings and expressed the opinion that the trouble that existed in the portion of the mine from where the smoke was coming was but slight and would not endanger their lives, they decided to remain. They had sufficient time to reach a place of safety, had they heeded the wise warning of one of their number. They remained, however, and the workings filled vvith smoke and afterdamp to such an extent that escape was then impossible, the rescuing party being unable to reach them before the deadly vapors overpowered them.

Reprinted from ***Historical Documentation of Major Coal Mine Disasters in the United States Not Classified as Gas or Dust: 1846-1962****, U.S. Bureau of Mines, Bulletin No. 616.*

Abandoned mines claim more lives

On Dec. 14, a boy and girl, ages eight and seven, slipped into an icy water-filled pit and drowned. A third youngster, the girl's brother, managed to escape. The Colorado deaths occurred at an old gravel company site where no mining had been done since the 1980s.

State and federal regulators from around the nation continue to remind the public not to trespass on mine sites, including dangerous old mines.

In an exclusive survey, *Mine Regulation Reporter* reported last year that more than 30 deaths had been confirmed nationwide at old mine and quarry land.

MSHA expands SCSR audits

Glitches were found in some self-contained self-rescuers (SCSRs) at a mine in West Virginia, so MSHA is pulling out all the stops to ensure the fire- and explosion-proof devices are safe and working properly.

MSHA recently sent out a bulletin saying it has expanded its audits of SCSRs with "special emphasis inspections" planned for Ocenco Inc.-developed SCSRs.

MSHA found several Ocenco SCSRs at the West Virginia mine to be faulty and some failed tests under a National Institute for Occupational Safety and Health (NIOSH) audit. NIOSH and MSHA must approve all SCSRs.

The inspections will visually check SCSRs for damage, improper maintenance and approval expiration, MSHA chief Davitt McAteer said.

Federal law mandates mine operators periodically inspect the SCSRs, which give miners an hour's supply of oxygen, because the SCSRs can provide diminished protection if they are outdated, mishandled or improperly maintained, McAteer said.

McAteer added mine operators must be careful in buying second-hand SCSRs without adequately knowing whether the devices were properly maintained. "Improper maintenance may not always be visible to the potential buyer," he said.

SCSRs should be replaced as soon as possible, however, the devices still will provide substantial protection even if outdated.

In addition, MSHA said in the coming weeks, it plans to work closely with mine operators to ensure outdated SCSRs are replaced.

For more information, call Wayne Veneman at 703-235-1452.

Blood pressure shifts may link snoring and stroke

By Sally Squires

Severe snoring appears to increase the risk of stroke by briefly reducing blood flow to the brain, report scientists from Case Western Reserve University in Cleveland and the University Hospital in Freiburg, Germany.

Previous studies have shown that the risk of stroke rises by as much as 40 percent in people who have sleep apnea, which temporarily causes breathing to stop during sleep and is often linked with heavy snoring. This is the first study, however, to find a direct link between severe snoring and a drop of blood flow to the brain, which could help explain the increased risk of stroke.

The study included 11 men and one woman, average age 54 years, who were heavy snorers but had no evidence of heart disease. Five participants had high blood pressure, which was controlled by medication.

Researcher Nikolau Netzger and his colleagues in Freiburg measured blood flow to the brain during sleep. They found that severe snoring, known as hypopnea, caused blood flow in the middle cerebral artery of the brain to drop by as much as 76 percent. Sleep apnea, a condition during which people briefly stop breathing and often snore heavily, also caused blood flow in the middle cerebral artery to decrease by 80 percent. But a far less severe form of sleep apnea, which did not involve snoring, dropped brain blood flow by only 14 percent.

The sharp decrease in blood flow seen during severe snoring could help set the stage for a stroke in several ways, said Netzger, whose study was published in the Jan. 9 issue of the journal Stroke. The sharp drop in blood flow that occurs in severe snoring is followed by a surge in blood flow as the body suddenly wakes and struggles for air. The blood pressure increases enormously and the heart rate rises enormously, he said. "This strains the system with extremes," he said, and could lead to a stroke.

At the same time, Netzger said, most people who snore need not worry about an increased stroke risk. "About 50 percent of the male population and about 50 percent of women at menopause and older snore," said Netzger, who is a visiting professor of pulmonary medicine at Case Western Reserve. "They should not be frightened."

But heavy snoring that leaves people gasping for breath in the middle of the night and very sleepy during the day is a condition that people "should bring to the attention of their physician," Netzger said.

Reprinted from the January 13, 1998 edition of the Washington Post Health magazine.

Far left: The Holmes Safety Association recognized Solon Sand and Gravel owner Howard Sargent, who, in 40 years of service, has never suffered an injury which kept him from work. From left are HSA national representative Jim Meyer, Rick Atkinson of Solon Sand and Gravel Co., Sargent and Don Benadum, former HSA president.

Other photos are of the various vendor and informational booths and the final banquet.

Mining seminar held at Aurora Woodlands

Local sand and gravel miners gathered Wednesday at Aurora Woodlands in Aurora, Ohio for an annual seminar addressing the industry's impact on the environment and the importance of worker safety.

About 140 attended the fourth annual seminar sponsored by the National Organization of Mine Owners and Mine Workers (among the attendees were 28 vendors plus speakers).

The organization has witnessed a steady decline in the number of on-the-job accidents since the seminars were initiated, according to Jeremy Samson of Lucky Sand and Gravel Co. in Aurora.

In addition, miners have grown to more deeply appreciate the importance of their industry in the community and its impact on the physical environment.

"We are here to learn how mines of the future will have to be in order to utilize some of our most important natural resources without disturbing the surrounding neighborhoods," Samson said.

Reprinted from the January 15, 1998 edition of the Aurora Record Courier.

THE LAST WORD…

"Life is like riding a bicycle. You don't fall off unless you plan to stop pedaling."—Claude Pepper

"May all your troubles last as long as your New Year's resolutions."—Joey Adams

"You may have to fight a battle more than once to win it."—Margaret Thatcher

"The word impossible is not in my dictionary."—Napoleon Bonaparte

"Champions keep playing until they get it right."—Billie Jean King

"It's a funny thing about life. If you refuse to accept anything but the best, you very often get it."—W. Somerset Maugham

"Courage is very important. Like a muscle, it is strengthened by use."—Ruth Gordon

"When one door is shut, another opens."—Miguel De Cervantes

"Miracles happen to those who believe in them."—Bernard Berenson

"If you think you can, you can. And if you think you can't, you're right."—Mary Kay Ash

"Lots of folks confuse bad management with destiny."—Kin Hubbard

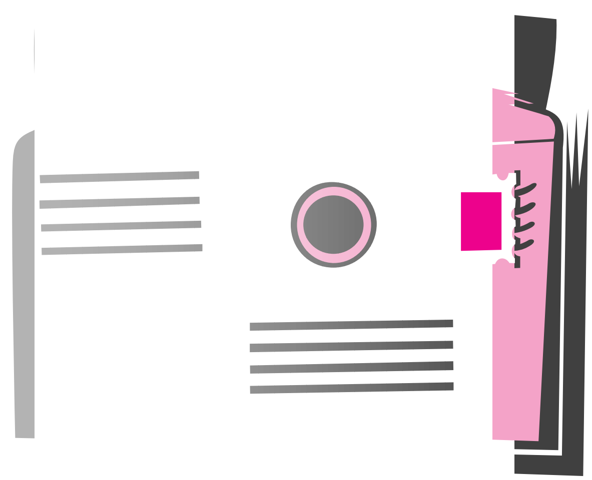
NOTICE: We welcome any materials that you submit to the Holmes Safety Association Bulletin. For more information visit the MSHA Home Page at www.msha.gov. We **DESPERATELY** need color photographs suitable for use on the front cover of the ***Bulletin.*** We cannot guarantee that they will be published, 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.

Please phone us at (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:

- *Mar. 31-Apr. 2, W. Pennsylvania Safety Council 73rd Annual Safety Conf./Exhibit, Pittsburgh Expo Mart, Monroeville, PA*
- *Apr. 1-3, Virginia Mining Assoc. Annual Meeting, Holiday Inn, Norton, VA*
- *Apr. 15-18, 101st Natl. Western Mining Conf./ Exhibit, Broadmoor Resort, Colorado Springs, CO*
- *Jun. 9-11, Longwall USA ’98, Lawrence Convention Center, Pittsburgh, PA*
- *Jun. 21-24, 1998 Natl. Jt. Meeting—HSA/ NASMIA/MIIA, Tampa Hyatt, Tampa, FL*