



**THE HOLMES SAFETY ASSOCIATION**

# **BULLETIN**

**JANUARY 2000**

***Inside:***

***MSHA Directs Mines to Replace or Retrofit  
Self-Rescue Devices***

***Be Safe in Working on Front-End Loaders***

***MSHA Outlines New Program on Voluntary  
Compliance***



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

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

**COVER:** Cover photo provided by the AVMDB video production crew on location at a Nevada gold mine. If you have a potential cover photo, please send an 8" x 10" print to Donald Starr, Holmes Safety Association Bulletin, National Mine Health and Safety Academy, 1301 Airport Road, Beaver, WV 25813-9426.

KEEP US IN CIRCULATION--PASS US ALONG





## ***MSHA Directs Mines to Replace or Retrofit Self-Rescue Devices***

***(Ten Defective Units Found)***

The Mine Safety and Health Administration (MSHA) is requiring that mine operators immediately arrange to replace or retrofit certain self-contained self-rescue breathing units. Ten CSE SR-100 self-rescue units manufactured before June 1994 have been found to have deteriorated breathing hoses, a critical safety defect.

“Every underground coal miner knows that these devices may make the difference between life and death in a mine fire or explosion,” said Davitt McAteer, Assistant Secretary of Labor for Mine Safety and Health. “A unit with a bad hose will not function in an emergency. We have found 10 deteriorated hoses in older units. Operators need to replace these older units as fast as possible.”

Defective units identified by MSHA, the National Institute for Occupational Safety and Health (NIOSH) and CSE Corporation were all manufactured in 1990 through 1993 and had hoses made of natural rubber. Starting on June 7, 1994, CSE used a silicon rubber breathing hose in its SCSRs. No deterioration has been detected in the silicon rubber hoses. More than 400 units have been examined

with manufacture dates from 1990 to 1997.

MSHA inspectors will visit all underground coal mines where CSE SR-100 devices are used to make sure the operators know about the problem and are taking immediate action. Mine operators will need to obtain a purchase order to secure an adequate number of retrofitted or replacement devices. All affected CSE SR-100 devices must be replaced or retrofitted by January 31, 2000.

Mine operators will also need to immediately inform all underground miners about the problem and explain the actions being taken at the mine to make sure miners have adequate SCSR protection in the interim.

“We’re working cooperatively with industry and labor to deal with this problem,” McAteer said.

MSHA advises that mine operators using SR-100 SCSRs dated before June 1994 should make sure miners have as many additional devices available to them as soon as possible. Mine operators should give special attention to ensuring that miners who have to travel throughout the mine have SCSRs not in the affected group.

An MSHA coordinator will collect and share information about which mines need replacement SCSRs and where extra units are available.

MSHA will allow co-mingling of different manufacturers’ SCSR models if miners are trained to use all the different devices deployed at their mine.

“We are in the midst of the Winter Alert season when, historically, mine fires and explosions have been more numerous,” McAteer said. “Every miner needs to know that the SCSR unit at hand will provide protection in an emergency. The mining community needs to take quick action to replace self-rescuers that might be defective.”

MSHA began its investigation into the CSE units after a miner opened a unit during a recent fire and found holes in the breathing hose.

Federal mining regulations require that all underground coal miners be supplied with a breathing device that will provide at least one hour of oxygen in a mine emergency such as a fire or explosion.

***Article taken from a Mine Safety and Health Administration News Release, V-60, Dec. 22, 1999.***

JANUARY 2000

## *Be Safe in Working on Front-End Loaders*

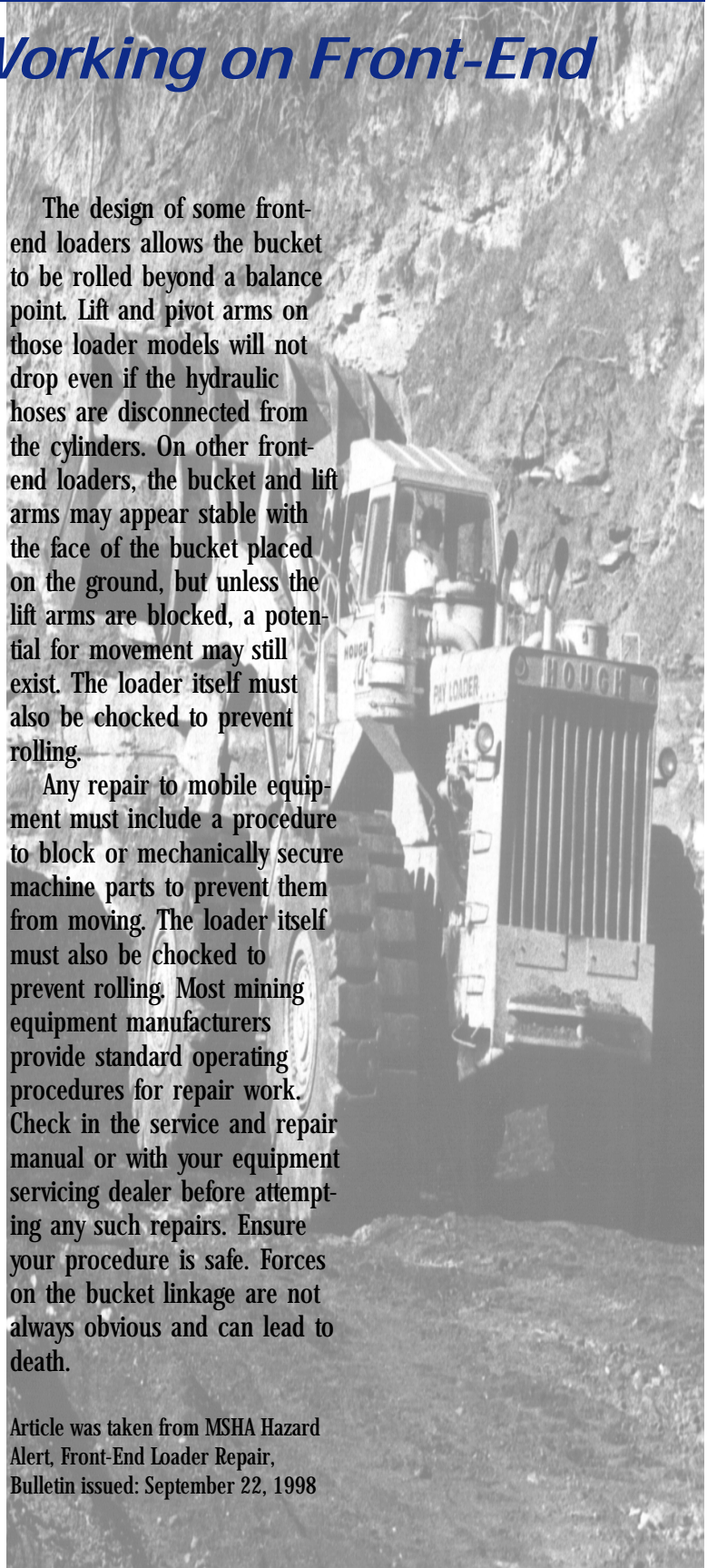
Front-end loader lift and pivot arms must be blocked so they cannot move while mechanics are working on them. In separate accidents, two mechanics, working between the bucket lift arms and the loader frames, died while repairing the hydraulic systems. Hydraulic pressure was released and the lift and pivot arms moved downward, crushing the mechanics between the lift arms and the loader frames. Both mechanics worked for contractors. One victim had 12 years of experience as a heavy equipment mechanic. The other had worked 31 years in the industry.

In both fatalities, the mechanics needed to work on the main hydraulic valves located on the frame of the loader. To make room, the lift arms were raised and the cutting edge of the bucket was tilted forward, near perpendicular to the ground, in the full dump position. The lift arms were not blocked. Working between the lift arms and the frame, the mechanics disconnected the hydraulic hoses from the main valves. The hydraulic pressure trapped in the lift cylinders was released and the bucket rotated to the “at rest” or “return to dig” position, the lift arms crushing the mechanics.

The design of some front-end loaders allows the bucket to be rolled beyond a balance point. Lift and pivot arms on those loader models will not drop even if the hydraulic hoses are disconnected from the cylinders. On other front-end loaders, the bucket and lift arms may appear stable with the face of the bucket placed on the ground, but unless the lift arms are blocked, a potential for movement may still exist. The loader itself must also be chocked to prevent rolling.

Any repair to mobile equipment must include a procedure to block or mechanically secure machine parts to prevent them from moving. The loader itself must also be chocked to prevent rolling. Most mining equipment manufacturers provide standard operating procedures for repair work. Check in the service and repair manual or with your equipment servicing dealer before attempting any such repairs. Ensure your procedure is safe. Forces on the bucket linkage are not always obvious and can lead to death.

Article was taken from MSHA Hazard Alert, Front-End Loader Repair, Bulletin issued: September 22, 1998



## *MSHA, West Virginia Jointly Tackle Stockpile Problem*

The U.S. Department of Labor's Mine Safety and Health Administration (MSHA) and the State of West Virginia are working together to address the high incidence of fatalities at mine stockpiles by proposing enhanced protective features on certain mobile equipment.

The proposal calls for all mobile equipment that is manually operated on surge piles to have fully enclosed cabs equipped with high-strength windows. The strength of the glass would help protect equipment operators in the event of a stockpile collapse.

"Stockpile accidents tend to occur at mines in just a handful of states," said J. Davitt McAteer, Assistant Labor Secretary for Mine Safety and Health. "We are pleased that West Virginia is taking the lead to address this very serious safety problem."

Since 1980, 18 coal miners have lost their lives in accidents involving collapsed surge piles. Eight of those deaths occurred at West Virginia coal mines.

A number of hazardous conditions could contribute to a

surge pile collapse. When coal is drawn from the bottom of an overlying stockpile, a visible cone generally forms above the conveyer device, or feeder. The size of the cone will vary according to the size and density of coal, height of the pile, moisture content, etc. Occasionally, a cone does not form properly, leaving a void space below. The weight and vibrations from the equipment can cause that void to collapse.

West Virginia's Office of Miners' Health, Safety and Training initially approached its Federal counterpart for technical assistance last August. MSHA had located a glass manufacturer that produces high-strength glass and launched a series of tests to verify the product's strength.

In addition to installing glass capable of withstanding a pressure of at least 20 pounds per square inch with a safety factor of two, West Virginia will propose that the cabs of surge pile equipment be equipped with two self-contained self-rescuers, a backup communication system, a remote control device capable of stopping the flow of coal from the feeder, and a means of providing

emergency lighting to the mobile equipment operator.

"These additional safeguards will protect the miner while he waits to be rescued in the event of a collapse," said Ron Harris, Director of West Virginia's Office of Miners' Health, Safety and Training. "They are just part of the solution, however. We must keep working to find ways to prevent these collapses from happening in the first place."

*Article taken from MSHA News Release No. 99-1222, dated December 22, 1999*



## MSHA Outlines New Program on Voluntary Compliance

MSHA has a new Voluntary Compliance Assistance Partnership (V/CAP) Program intended to ensure repaired and rebuilt equipment continues to meet MSHA safety standards.

The program is for manufacturers, repair/rebuild facilities, mine operations, and miners' representatives, and will provide participating facilities with training, auditing, and technical assistance.

As part of the program, MSHA's Quality Assurance Division at the Approval Certification Center will offer one- or two-day training seminars for facilities that frequently repair or rebuild MSHA-approved equipment. Training will cover creation of audit checklists and the steps needed to conduct audits each year covering ten percent of repaired or rebuilt equipment. "These steps are necessary to verify compliance with critical characteristics on MSHA-approved products," the agency said in *Program*

### *Information Bulletin No. P99-17.*

The Quality Assurance Division will run yearly, onsite product audits for participating facilities and will give technical assistance to participating facilities during the repairing and rebuilding process.

MSHA said participating facilities may advertise their participation in the V/CAP program, giving mine operators increased confidence that the equipment received from participating facilities for use in underground mines will continue to meet the MSHA approval requirements.

MSHA said the program will improve safety by:

- Assisting manufacturers, mine operators, and other facilities that repair or rebuild approved products to MSHA-approved condition.

- Ensuring that personnel who repair and rebuild approved equipment are correctly trained and that they have access to nonproprietary information that they need to restore equipment to MSHA-approved condition.

- Identifying for mine operators, equipment manufacturers, miners' representatives and MSHA enforcement personnel, those repair facilities that are in the V/CAP Program.

MSHA will make the list of participating facilities available on its Internet homepage.

The program does not affect

the responsibility mine operators have to ensure the equipment they use is properly maintained or used in MSHA-approved condition.

The program bulletin said that under the program MSHA will not:

- Guarantee equipment that is repaired or rebuilt by facilities participating in the program will be free of violations.

- Exempt equipment repaired or rebuilt by participating facilities from additional MSHA inspection.

- Grant approval for any repaired or rebuilt equipment submitted to the Quality Assurance Division.

*To participate in the program, contact John Petrus, Chief, Compliance Audit Branch, Approval and Certification Center, at 304/547-2049.*

*Article taken from the Mine Regulation Reporter, Vol 12, Number 21, dated October 18, 1999.*

## Crews at IMC Kalium Mines Use Behavior-Based Safety to Improve Performance

by Stan Hodson & SHE Pacific Contact Person

This article reports the ways that personnel at the IMC Kalium Carlsbad Potash Company are adapting behavior-based safety to prevent injuries at their site. IMC currently employs over 600 people in their surface and underground operations in Carlsbad, New Mexico, USA. The plant currently produces over one million tons annually of fertilizer and industrial potash products.

IMC Kalium engages in two methods of mining, continuous mining using machines, and conventional drill and blast. The conventional blasting techniques dislodge the ore from faces that are from 7- to 12-foot high. In continuous mining a machine cuts the ore from a face that is 4- to 7-feet high. The combined IMC Kalium underground operations produce 22,000 tons of ore daily: 14,000 tons by continuous mining and 8,000 tons by conventional mining. Underground there are seven production areas on three mining levels. A 20-mile distance separates the farthest extremes of the mine. Over 200 people work underground in job

specialties related to production, maintenance, and power.

Site managers were committed to making long-term gains. Therefore, they chose to implement behavior-based safety process because it is a process rather than a program. Furthermore, the behavior-based approach let them adapt it to their site and at the same time develop in company personnel skill and techniques for the future.

### *How does Behavior-Based Safety work?*

This approach is focused on task-related behaviors. Behaviors, observable actions, are the proper upstream focus for safety for two reasons:

1. At-risk task-related behaviors are the final common pathway for almost all incidents.
2. Most at-risk behaviors common at a site are supported somehow by the culture and systems of the site.

**Critical behaviors.** The committee of non-salaried and salaried employees reviewed 143 incident reports for the years of 1995 - 1997. They identified 171 behaviors that

were implicated in those incidents and they organized those behaviors into 28 categories. The categories include eyes-on-path, fall protection, personal protective equipment (PPE), and tool use. This cluster of at-risk behaviors served as the final common pathway in the most serious and/or most numerous incidents at the site. The committee produced operational definitions for each identified safe and at-risk behavior, and logged them on a data sheet. The following are two examples of critical behaviors:

- Under the category Tool Selection and Use: When making repairs, is the coworker using a belt cutter to cut the 42-inch wide conveyor belt?

- Under category Pre-Job Inspection: Did the coworker fill out the shift/daily hazards inspection checklist and ensure exhaust fan function?

The completed data sheet is used to train site personnel as observers who then gather data on workgroup performance of the identified behaviors.

**Data.** Most of the critical at-risk behaviors typically have to do with shortcuts, temporary conveniences, or with systems issues that prevent safe behavior. The trained observers use the data sheet developed by their peers to measure the rate at which the workgroups

*(Continued on next page)*

perform the identified critical behaviors either safely or in an at-risk manner. The operational definitions guide the observers as they sample or measure performance.

The categories of the data sheet also have examples to help calibrate the observers. This calibration produces several important benefits. It ensures that the data is objective and accurate. Fluency in the data sheet also means that workers from different trades can observe each other because they have a new common vocabulary for safety. Finally, the categories of the data sheet give everyone (observers and observees) a shorthand way of referring to critical safety behaviors. The trained observers become very familiar with the data sheet. This is important because behavior happens fast and the observers need to have their eyes on the action, not on their paperwork.

#### *Barriers to continuous improvement*

Using the comments and observation data, site personnel can target areas for improvement. For instance, the data may show that eyes-on-path is running high (95% safe), and that pre-job inspection is improving (up from 74% safe to 87% safe), but that tool and equipment use is consistently low (67% safe), and so is fall-protection use (65% safe). Therefore, site personnel flag

those items as indicating performance areas where an 'accident' is just 'waiting to happen.' The written comments of the observers can go a long way toward showing the number and kinds of remedy needed.

#### *Outcomes*

The IMC Kalium behavior-based process is successful because at all levels it engages site personnel in the safety process, and it provides objective data for identifying remedies. The composition of the steering committee reflects the site as a whole. The ongoing two-way feedback offers numerous opportunities for communication about safety. And the operational definitions ensure that the accumulating data is objective.

*Stan Hodson is Managing Editor and Trainer with Behavioral Science Technology, Inc.®/BST®, an industrial safety consulting firm headquartered in Qjaj, California, USA.*

*This 800-word version is derived from Draft-7 as approved by IMC Kalium Safety Manager Bill Holder on 31 August 1998.*





## Out West . . .

### ***Ninth Annual International Mine Safety & Health Conference***

The Arizona State Mine Inspector's 9th Annual International Health and Safety Conference and Exposition was held in Flagstaff at the Radisson Woodlands Hotel, October 5-7, 1999. This year's conference focused on the aggregate industry and the influence of part 46. One highlight for the properties involved with part 46 was a workshop that provided a pre-approved MSHA training plan according to part 46 guidelines in hardcopy and electronic form.

In all, there were over 170 attendees who were pleased with the blend of informational and motivational speakers. Bruce Dial from the MSHA Academy in Beckley, West Virginia, demonstrated their latest interactive training CD. Rod Breland and Patrick Hurley from MSHA in Denver, presented MSHA updates. Other topics included crane safety, dust control, and hopper and conveyor safety. Also presented

were the new hearing loss and noise regulations, as well as OSHA jurisdiction on hot and batch plants. At the closing banquet on Thursday evening the 1999 Safety Awards were presented to several outstanding units without lost-time accidents. After this year's success, the Arizona State Mine Inspector's office will return to Flagstaff for the 10th Annual Health and Safety Conference and Exposition on October 3-5, 2000.

*Article from the publication, Miner Details, Arizona State Mine Inspector's Office, dated January 2000*

### ***Final Rule Issued for Employee Training at Rock Products Mines***

At the end of September 1999, MSHA issued the final rule 30 CFR Part 46 for the training and retraining of miners engaged in shell dredging or employed at sand, gravel, surface stone, surface clay, colloidal phosphate, or surface limestone mines. Final rule effective date is October 2, 2000.

The Education and Training Division of the Arizona State Mine Inspector has developed training outlines to assist mine operators in achieving compliance to the new rule. Please contact Larry Nelson, Operations Manager, Arizona State Mine Inspector, at 602/542-5971 or e-mail education@mi.state.az.us for further information.

*Article from the publication, Miner Details, Arizona State Mine Inspector's Office, dated January 2000*

### ***Cyprus Miami Receives Reclamation Award***

Congratulations to Cyprus Miami on receiving the 1999 Recognition Award for Mined Land Reclamation. The award, acknowledging long-standing dedication and excellence in mined land reclamation, was presented at the Arizona State Mine Inspector's 9th Annual Recognition Awards Dinner. Accepting the award for Cyprus were Robert Ressler, Manager, Environmental Affairs and Land, and Gary Jones, Civil Engineer. Cyprus Miami is one of the pioneers in using Holistic Range Management techniques for reclamation. These techniques include using cattle to provide surface roughening,

*(Continued on next page)*

organic matter, incorporation of organic matter into a plant growth medium, and seed incorporation and mixing of cover material into the side slopes and tops of mill tailings to enhance vegetation establishment. Anyone driving through the town of Miami can see the results of the cattle in the grass covered tailings slopes and the reduction of blowing dust. Keep up the good work!

*Article from the publication, Miner Details, Arizona State Mine Inspector's Office, dated January 2000*

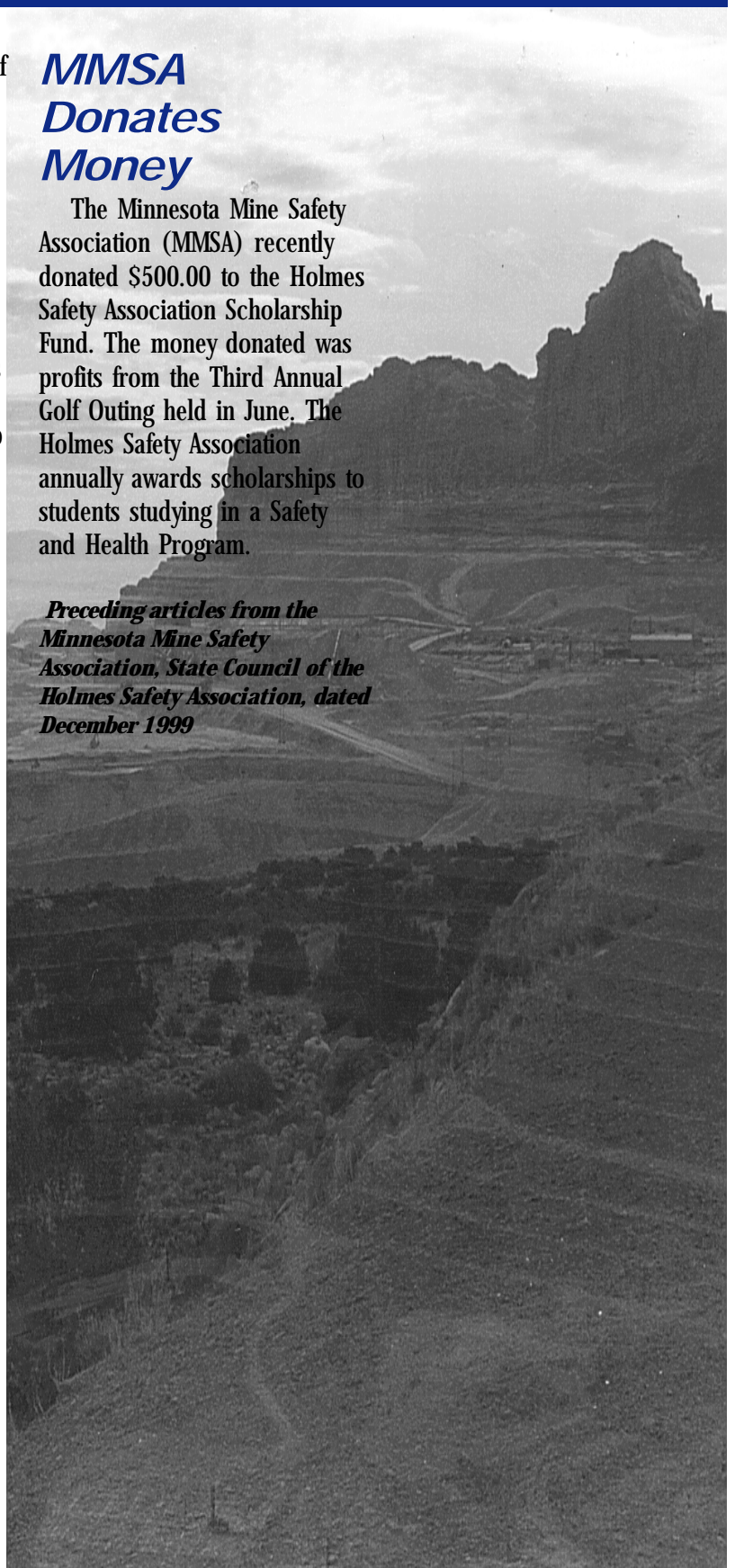
### **Minnesota Mine Safety Association Scheduling Meetings on Part 46**

The Minnesota Mine Safety Association has scheduled informational meetings on part 46 throughout Minnesota. We are pleased to inform you that personnel from the MSHA district office out of Duluth will be the presenters. The schedules and locations for the upcoming meetings are as follows: February 8, 2000, in Duluth; February 10, 2000, in Rosemont; and February 17, 2000, in Mahanomen. The Association will be mailing out a flyer within a few weeks with additional information.

### **MMSA Donates Money**

The Minnesota Mine Safety Association (MMSA) recently donated \$500.00 to the Holmes Safety Association Scholarship Fund. The money donated was profits from the Third Annual Golf Outing held in June. The Holmes Safety Association annually awards scholarships to students studying in a Safety and Health Program.

*Preceding articles from the Minnesota Mine Safety Association, State Council of the Holmes Safety Association, dated December 1999*



## *Overloading/Load Bias?*



*Excessive overloading and/or load bias beyond design parameters may lead to the likely failure of critical components and instability which may seriously jeopardize safety.*

It will also reduce the expected life of truck components such as engines, transmissions, tires, bodies, suspension cylinders, hydraulics, hoist cylinders, steering systems, final drives and wheel bearings, and can result in spillage and deterioration of haulroads.

***This safety note from the Department of Minerals and Energy, Western Australia, Mining Operations Division, MineSafe Magazine, Vol. 10, No. 2, dated August 1999.***



## *How Well Do You Know Your 30 CFR:*

### *Match the Jingle to the Reg.*

- A. Don't be known as one who bought it.  
Give yourself a safety audit.**
- B. Life is precious; make it last.  
Remember this each round you blast!**
- C. When prepared, you've got it made.  
It's up to you, know first aid.**
- D. Face shield, goggles, glasses; keep a good  
selection. Always wear your eye protection!**
- E. Don't do this in excess.  
Always follow code.  
Circuits will be dangerous when you overload.**
- F. Harness, belts and lanyards, make the best selection.  
Check it over daily, use your fall protection.**
- G. Watch your speed of travel, seat belt, berms and brake.  
Work at proper grade and load, your safety is at stake.**
- H. When you take precautions, no problem will erupt.  
Sound the proper warnings when you start equipment up.**

**CHECK YOUR ANSWERS ON PAGE 20**

*Match the Jingle to the Reg.*

1. *56/57.14200*
2. *56/57. 9000 series*
3. *56/57.15004*
4. *56/57.12001*
5. *56/57.18010*
6. *56/57.6300*
7. *56/57.18002*
8. *56/57.15005*

**This jingle quiz was provided by Joel T. Tankersley, Inspector with the Green River Field Office, Rocky Mountain District, Green River, WY.**

**Wellness**



**Heart Disease: The Number 1 Killer**

**High blood pressure, high blood cholesterol, and cigarette smoking** have long been recognized as major risk factors for coronary heart disease. More recently, physical inactivity, known to contribute to heart disease and stroke, has been elevated to the status of a “primary risk factor.” Remember: the likelihood of developing heart problems increases with the number of risk factors you have. A person with any two risk factors can have four times the risk of someone without any; three risk factors can indicate eight times the risk.

**High Blood Pressure**

When the heart beats, it forces blood into the arteries,

which act like a network of pipes to carry oxygen and food throughout the body. Blood pressure is the force exerted against the artery walls as blood moves through them. Think how a hose nozzle works: when open, it takes little pressure to force water through the hose; when closed, pressure in the hose increases.

Blood pressure is measured using a “blood pressure cuff,” or sphygmomanometer. Two readings are taken: the higher (systolic) measures the maximum pressure on the arteries caused by the heart’s contraction; the lower (diastolic) represents the pressure between beats. A reading of 120/80 (millimeters of mercury) is considered “normal.” Although acceptable levels may vary somewhat, systolic readings above 140 and/or diastolic readings above 90 typically indicate high blood pressure, or hypertension.

High blood pressure adds to the workload of your heart and arteries. It can eventually damage arteries in various parts of the body, possibly leading to stroke, kidney failure, and blindness. It also increases the risk of heart disease and heart attack by contributing to the buildup of fatty deposits in the arteries.

According to the American Heart Association (AHA), “individuals with uncontrolled high blood pressure are three

times as likely to develop coronary heart disease, six times as likely to develop congestive heart failure, and seven times as likely to have a stroke as individuals with controlled high blood pressure.”

About 30 percent of American adults have high blood pressure, which is about one-third more common among blacks than among whites. Approximately half of all heart attack victims and two-thirds of all stroke victims have high blood pressure. Although the cause of most cases is unknown, persons more likely to develop hypertension include:

- Older adults
- Overweight persons
- Alcohol abusers
- Oral contraceptives users (Women)
- Individuals who are sensitive to sodium (salt)
- Members of families with a history of hypertension
- Physically inactive persons

Unfortunately, an estimated 35 percent of Americans with hypertension don’t even know it. This is why high blood pressure is often described as “the silent killer.” (American Heart Association, 1996)

**High Blood Cholesterol**

Cholesterol, a fat-like substance transported in the blood, is one of the major components of plaque that



forms on artery walls. Although your body needs cholesterol to function normally, high levels in the blood have been shown to contribute to atherosclerosis, heart attack, and stroke. Therefore, many experts believe that cholesterol levels should be maintained below 200 milligrams per deciliter (mg/dl) of blood.

Studies show that the risk of heart attack for persons with blood cholesterol levels at 240 mg/dl is about twice that at 200 mg/dl; it increases to at least four times as high at 300 mg/dl. Even moderately elevated blood cholesterol levels increase the risk of heart disease. ***Unfortunately, more than half of all adults have total blood cholesterol readings above recommended levels, and about one in four has a level considered "high" (i.e., 240 mg/dl or above).***

There are several types of cholesterol. The two most important are LDL (Low Density Lipoprotein) and HDL (High Density Lipoprotein) cholesterol. LDL cholesterol can be thought of as "lethal" or "bad" since elevated levels contribute to the build-up of plaque on artery walls. On the other hand, HDL cholesterol is "helpful" or "good," since it helps to prevent plaque by removing cholesterol from the bloodstream. The ratio of total cholesterol to HDL cholesterol should be less than 5.0.

For example, if total cholesterol is 200 mg/dl, HDL cholesterol should not be less than 40 mg/dl ( $200/40 = 5.0$ ).

The most important factor affecting cholesterol levels is diet. Large amounts of cholesterol are found in egg yolks, red meats, organ meats, dairy products (whole milk and cheeses), butter, and shellfish. Foods high in **saturated** (hydrogenated) fats also tend to raise the level of cholesterol in the blood. Conversely, **unsaturated fats** (such as canola, olive, peanut, sunflower, and corn oils) tend to lower cholesterol levels. Other possible contributing factors include obesity, genetic disorders, thyroid problems, diabetes, and diseases of the liver and kidney.

### **Smoking**

Most people are aware of the relationship between smoking and lung disease. However, according to the AHA, smoking also doubles the risk of heart attack and increases the risk of sudden cardiac death two to four times. Smoking contributes to high blood pressure by constricting blood vessels and increasing the heart rate. Carbon monoxide in cigarette smoke also reduces the oxygen-carrying capacity of the blood, adding an additional burden on the heart. Smoking acts to lower HDL cholesterol levels and appears to promote the formation of plaque on artery walls.

According to the American Heart Association (1996), current estimates for the United States are that 27.5 percent of the American population 25 years of age and older smoked in 1990. Among men, about 28 percent smoked; among women, the percentage was about 23. Fortunately, the proportion of the adult population that is aware that smoking is one of the major risk factors for heart disease has increased dramatically over the last 15 years. As a result, smoking has declined by 40% since 1965. However, recent data show that the downward trend may have leveled off.

Smoking may pose a particular problem for miners because of their increased risk for silicosis and pneumoconiosis by working in the mining industry. The additional cardiovascular stress may trigger heart disease that might not otherwise have existed. However, research shows that people who stop smoking decrease their risk of heart attack by 50 percent after two years. After 10 years, a former pack-a-day smoker has about the same risk as someone who never smoked a single cigarette.

### **Physical Inactivity**

Studies indicate that inactive people have a higher risk of heart attack and a lower chance of post-heart attack

*(Continued on next page)*

survival. A sedentary lifestyle contributes to total blood cholesterol and excess weight. Moreover, a regular program of exercise has been shown to increase HDL cholesterol levels in the blood while decreasing LDL levels.

In 1990, a National Health Interview Survey indicated that 41 percent of adults 18-64 years of age “exercised regularly.” However, only about 5 percent of the respondents were aware how often and how long exercise must be performed to promote cardiovascular fitness. In another survey conducted by the Centers for Disease Control, roughly 60 percent of adults reported that they maintained a “sedentary lifestyle,” defined as fewer than three 20-minute sessions of leisure-time physical activity per week. Almost 30 percent did not engage in **any** physical activities (other than regular job duties) during the previous month.

Studies have shown that physical activity and work capacity seem to be related to heart disease and insurance claims for heart injury. **Unfortunately, typical job activities performed by mine inspectors do not provide adequate levels of activity to promote fitness.**

*Other Factors Related to Coronary Heart Disease*

In addition to the primary risk factors, other traits have

been statistically linked to coronary heart disease. Some of these secondary risk factors are controllable through lifestyle changes; others are not. Persons with one or more of the following characteristics should pay even closer attention to their health risk profile:

- **Excess Weight.** Being overweight puts a strain on your heart and may lead to other cardiac risk conditions such as high blood pressure, high blood cholesterol, and adult diabetes.

- **Diabetes.** One form of diabetes (inability to regulate blood sugar) develops most often in overweight adults. It produces abnormalities in lipoproteins that may accelerate atherosclerosis, and may raise the risk for heart attack in other ways not well understood.

- **Age.** Atherosclerosis often worsens progressively over time, leading to increased heart disease in older persons.

- **Race.** African Americans have a greater risk of heart disease than white Americans, in large part due to higher average blood pressure levels.

- **Hormonal Factors.** Men have more heart attacks than women and have them earlier in life, but women narrow the gap after menopause.

- **Family History of Early Heart Attack.** There is a significant genetic component to

heart disease. Someone with family members (parents, siblings, cousins, aunts, uncles, grandparents) who have had a heart attack should strongly consider avoiding all other controllable risk factors.

- **Alcohol.** Excess consumption of alcohol promotes weight gain, increases blood pressure, raises blood fat levels, and produces heartbeat irregularities. (However, some researchers have suggested that moderate intakes of alcohol may reduce heart attacks.)

- **Stresses of Modern Society.** Personal and professional stress may provoke other risk factors and lead to excessive smoking, drinking, and eating. Some personality types may be at increased risk for heart disease.■

# Avoiding Frostbite

When the mercury dips below freezing, you'll want to take these steps to protect yourself and your family from frostbite, the damage to skin tissue that is caused by prolonged exposure to cold. Fingertips, earlobes, noses, and toes are most at risk.

The best way to prevent frostbite is to keep vulnerable body parts covered and to dress in layers. Layering maximizes the amount of insulation and warmth provided by clothing by trapping more air inside. It is also easier to regulate body temperature by adding or subtracting clothing.

The first layer, the one closest to the skin, should be made of a nonabsorbent, loosely woven material that will draw perspiration away from the skin. Polypropylene is a good choice. Avoid cotton materials as they will absorb moisture and feel cold and clammy.

The second layer should be lightweight and breathable, made from materials such as wool or fleece. This layer will trap warm air between the first and third layers and move moisture away from skin.

Outer layers, the ones facing the elements, should be breathable and water resistant. Nylon and polyester are good choices. Also look for coats

with zippers and vents which can help regulate body temperature.

Add a good hat and scarf and wear mittens rather than gloves for maximum warmth and protection. (Mittens trap more air than gloves.) On especially cold days, layer lightweight gloves under waterproof mittens for extra warmth.



## *Remember:*

**No matter how well you are dressed, it is best to limit the time spent outdoors in freezing temperatures.**



## *"I yelled; then I ran like hell" - The Milford Mine Disaster February 5, 1924*

*by Steve Hoyle, Bulletin Staff Writer*

### *Milford and Its People*

The Cuyuna Range - rolling country with low hills of sand and gravel and many lakes. The lowland between the lakes is swampy with muskeg and standing water. Muskeg is a practically treeless area supporting a dense growth of grasses. The surface of the soil, which is usually wet and soft when not frozen, is covered with a layer of partly decayed grass and grass roots. Three miles north of Crosby, Minnesota, near Foley Lake, is the Milford Mine, an underground operation with a single shaft.

In a year, the Milford Mine produced more than 103 thousand tons of manganese-rich ore used to make high-quality steel. It was a new property as development work started in 1918, with the mine open for business five years later. The miners who worked at Milford were from Minnesota and Michigan, and from foreign countries such as Finland, Germany, Austria, Yugoslavia, Scotland, and Canada. They lived in the nearby towns of Crosby, Ironton, Brainerd, Cuyuna, Manganese, Wolford, Trommals, Aitkin, Klondike

Station and Milford.

### *Working at Milford*

There were two levels connected to the mine's single shaft. One level was a depth of 135 feet and the other was 200 feet below the surface. The workings extended south and east from the shaft beneath Foley Lake. The highest working place, at the west end of the ore body, was at the 125-foot level. The lowest working sub-level was at 165 feet, on the east end of the property. There was water in the Milford mine. According to a report prepared by the State of Minnesota, about "500 gallons per minute... practically all coming from the lower level. Some of the rooms made a little water, just dripping from the back, but this was to be expected in a region having so much ground water."

Underground, the miners extracted ore by slicing off the top of the ore body and caving the surface as quickly as possible. "When a room [was] finished," a Bureau of Mines report said, "the sides were boarded up, the timbers shot down, and the room allowed to fill with sand and gravel. In

some cases, the room did not immediately cave but usually did so after a few days. A State report said, "blasting the timber from mined-out sections...kept the back close to [the] ore," which "made it safe for miners to slice out the ore on the next level below." The report continued, "it was by this method that the Milford Mine was laid out and such small mining work as had been done was carried out."

### *The Disaster*

On February 5, there were 48 men inside the mine at 3:35 p.m. With no warning, a sudden inrush of air blew their hats from their heads and put out their mining lights. The air was warm; something not typical of the mine's usual cool temperatures. The men were concerned, but several retrieved their hats, relighted their lamps, and went back to work. There was another rush of air, followed, one man recalled, by "...a roaring sound like a battery of flivvers." A flivver was an old, cheap, automobile. Others testified to investigators that they heard a "strange booming noise." One miner

knew there was a problem when he saw mud rising in his working place. The only man on the bottom level of the mine who escaped realized he was in danger when the electricity went out. Another survivor felt a “terrific wind.” It was “very...odd,” he said, “for a mine that was so quiet and cool all the time. There wasn’t supposed to be no wind.”

There was another gust of air and an inrush of mud. The lights went out in the mine, and the wind kept blowing out the miners’ lights. In the darkness, the miners yelled frantically to their buddies to get out, and started to scramble for safety.

One miner remembered his “super human strength” as he fled. “Boy did I go,” he said later. Down the drifts and up the ladders they went from one level to another as the mine filled rapidly with water and gelatinous mud.

They reached the shaft bottom but could not stop to rest. Now they had 135 feet more to climb to get to the surface. They climbed as fast as they could as mud and water filled the shaft.

Seven managed to escape up the ladder to safety, but 41 others were caught in the mud and drowned. None of the survivors were injured, except for a few who were bleeding from the mouth and ears from being caught in the mine air as it compressed.

People rushed to the mine

shaft but, “...up came the slimy ooze, licking the sides of the shaft until within a few feet of the surface. It sloshed...and gurgled and then retreated,” until it was about 20 feet below the shaft collar. It was clear to the people gathered at the mine that there would be no more survivors.

Arriving the next day at Milford, W.H. Carrick, from the Bureau of Mines office at Duluth, recalled, “there was a little whirlpool showing in the spot where the water entered the mine, and a pool of water and muskeg stood over the opening. Between this pool and the lake the surface was intact but showed a depression that indicated the material beneath had been washed out and allowed the surface to subside. There was also about a four foot depression on the lake as shown by the subsidence of the ice in the center of the lake.”

### *Recovery*

Area mining companies at once responded with men and assistance. George H. Crosby, the mine owner, boarded a Soo Line train at Duluth and sped to the scene. On the train was a flat car loaded with pumps and equipment.

Recovery was a three-step process. First, Foley Lake had to be pumped. Then, the removal of mud and muskeg from the lake and nearby area, “...and the cleaning out of the channel from the lake to the

sink hole where water entered the mine.” Underground recovery work was the last part of the operation. It would take nine months until the last body was found and removed from the mine.

Working in cold temperatures of 10 to 20 degrees below zero, the pump crews set up their equipment at Foley Lake. The cold “was rather hard on the men,” Carrick wrote, “but greatly assisted [recovery because] heavy machinery could be moved around at will over the surface and lake.” The area near “...the pump was frozen to a depth of about two feet and had to be blasted out for a radius of 30 feet, the chunks being removed to the side by teams of horses.” A layer of clay also had to be shot and cleared before a “sand sucker” pump could be set up. By February 20, it was ready to go.

“From this time until June 5, the sand sucker was in steady operation removing mud from the lake, but concentrating its efforts towards cleaning out the channel from the lake to the sink over the mine workings.” Other pumps worked inside to remove water and muskeg from the mine workings.

The recovery crews fought power outages and bad weather (the water level rose every time it rained) as they struggled to de-water the mine. “The

*(Continued on next page)*

vegetation brought in by the water,” Carrick said, consisted of “roots, rushes and grass... very difficult to handle.” If a pump clogged, the crew had to dismantle and clean it, then reassemble it before work could resume.

The timber headframe caught fire twice. “Either fire, if it had gotten out of control, would have put an end to recovery operations, since the motor that operated...the pump was installed at the collar of the shaft. Fortunately, both fires were...discovered and extinguished...” quickly.

Inside, bulkheads held back the water and mud in the mine. Mud and materials were loaded into mine cars and hoisted to the surface. The bodies of more and more victims were discovered as the work continued, and the remains of the last victim were recovered on November 4.

**Investigation**

A special commission appointed by the State of Minnesota investigated the disaster at Milford. They found that a worked-out room at the east end of the property (south end of the ore body) had “caved through the surface and in so doing had trapped a narrow gut of mud which has a direct connection with the pond, some 300 or 400 feet distant, and that the mine had filled through this opening.” The committee report refuted a charge that had been made that

the company had been mining under the lake to an adjoining property. The commission believed that the company had followed accepted mining practices and had taken no shortcuts that might affect safety. They said, “the rooms were brought down as quickly as possible,” and that the company was “constantly alive to the necessity of making all of the working places as safe as possible.”

Milford reopened and mining resumed after the disaster. A few years later, however, reduced demand for steel caused by the Great Depression forced the operation to close in 1932.

**For further reading:**

**Carrick, W.H. Letter to George M. Rice, February 16, 1924, regarding recovery efforts at Milford.**

**Carrick, W.H. “Preliminary Report of the Milford Mine Flood at Crosby, Minnesota” received at Bureau of Mines, Pittsburgh, February 11, 1924.**

**Carrick W.H. Letter to D.J. Parker, March 26, 1924, regarding movement of rescue car to Milford.**

**Carrick, W.H. “Milford Mine Flood on February 5, 1924, at Crosby, Minnesota.”**

**Carrick, W.H. “Names of Men, Where Found and Condition Found In.” Appendix to report “Milford Mine Flood on February 5, 1924, at Crosby, Minnesota.”**

**“A Gruesome Story of Tragedy - Account of Cuyuna Range’s Greatest Disaster.” Brainerd Dispatch. <http://www.brainerddispatch.com/stories>**

- Answers to the 30 CFR Jingles:*
- A. 56/57.18002
  - B. 56/57.6300
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  - D. 56/57.15004
  - E. 56/57.12001
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  - H. 56/57.14200

## *First Trip on the "Chippy" Hoist Cage*

*by Russ Newell, writer*

I hired on at the old Morning Mine at Mullan, Idaho, on October 26, 1937. I took my first ride down the shaft in that mine the next morning at 7:00 a.m., after a train ride of nearly two miles on the man train from the mine portal to the top station where all the work was started for the day.

I was scheduled to work on the 3,800-foot level, which at that time was the bottom working level. An offset shaft was under construction which was to sink to the 4,000-foot level, and was later sunk to the 5,200-foot level in the years to come.

It was the custom to try to get a new "hand" to make his first trip down on the "Chippy" hoist cage - a single drum Nordberg hoist that was equipped with a water rheostat with a soda solution; it took 200 or more feet of almost free fall before enough resistance would build up to bring the fall under control. Believe me, it was an event I'll never forget, for one had the feeling that the floor of the cage had been suddenly pulled from under one's feet. In later years, I learned to operate this hoist and learned that it was a good, safe hoist for travel in the mine shaft.

The hoist was equipped with a flat cable, sewn together at the "rope house" by the cable crew - it consisted of 14 strands of 3/8-inch cable sewn with what looked much like bailing wire into a strong mesh of steel that wound flat on the hoist reel. The reel was probably about 15 feet high and just wide enough for the flat cable to wind nicely on itself. There were level indicators on a large oval to keep the operator informed as to the location of the cage in the shaft, and we used white paint on the cable as warning marks and red paint as spot marks to bring the cage to floor level of the stations as it stopped.

This was a very busy hoist for it was in constant use lowering and raising men to various levels and lowering timber and equipment to all of the then-working areas of the mine, so the operator had but few idle moments.

The flat cable worked very well and posed no "wrapping problems" that are sometimes present where a large round cable is used on a wider drum equipped hoist. In the early spring of 1937, the cable broke on this hoist and 10 men fell to their deaths to the bottom of the shaft - this accident created

a new and more alert inspection of the cable's condition, and from that date on, those flat cables were removed, cleaned, and examined on a regular basis for wear and frayed wires. By using this safety procedure, there was never another broken cable on the hoists of the Morning Mine.

The main hoist, a double drum Nordberg, also used flat cable on the reels. These reels were about 20 feet in diameter and the flat cable was sewn using 14 strands of 5/8-inch cable and was handled in the same manner as the "Chippy" hoist cable. This hoist lifted ore and waste rock from the working levels of the mine as well as lowering and raising of the men at the beginning and end of the working day. This was a very smooth operating hoist and an easy one to run in spite of the two reels that the operator had to keep track of, where each skip (for ore) or cage (for men) was at any given time in the shaft.

The Morning Mine ceased operations in November of 1953. The mine reopened again some two years later for a short time and, after closure in 1957, was allowed to flood with water and with it came the end of the use of flat cable in the Coeur d'Alene mining district.

*This article was submitted by James D. Zingler and was written by Russ Newell of Mullan, Idaho, who is deceased.*



*What's happening at the ...*

*National Mine Health and Safety Academy*

*Conferences/Seminars and Workshops:*

**Mine Construction, Maintenance, and Repairs Safety Workshop, May 31 - June 1, 2000**

**Technical coordinator: John Tyler or Bruce E. Dial**

**Mine Rescue Team Training Informational Seminar, May 23-24, 2000**

**Technical coordinator: David Friley**

**Roof Control Seminar, May 23-24, 2000**

**Technical coordinator: Joseph P. Fama**

**Surface Haulage Safety Seminar, August 22-24, 2000**

**Technical coordinator: John Tyler or Bruce E. Dial**

**Tram/National Mine Instructors Seminar, October 10-12, 2000**

**Technical coordinator: Jimmy L. Shumate or Sharon T. Casto**

**If you need more information about contents of a seminar/workshop, contact the technical coordinator at 304/ 256-3100 or Jan Keaton at 304/256-3234.**





## *Mining Our History* *An Overview of Disaster* *Anniversaries*

*by Melody Bragg, Bulletin Staff Writer*

### 116 Years Ago *Ignition/Explosion of Gas* *Crested Butte Mine* *Crested Butte, CO*

**January 24, 1884**

At about 8:00 a.m., a violent explosion traversed this mine, originating in Room 18. The explosion was carried by dust, and many of the men working underground were caught in the flame and force. Of the men in the mine, 59 were killed and 112 escaped.

### 107 Years Ago *Explosives* *Como Mine* *King CO*

**January 10, 1893**

Twenty-four men lost their lives when a frightful explosion occurred at this mine. The accident was caused by a "windy shot." Explosion of the dust set free and circulated blackdamp, and the almost instant death of the men followed.

### 91 Years Ago *Mine Fire* *Zeigler Mine* *Zeigler, IL*

**January 10, 1909**

A fire on November 8, 1908, was caused by crossed electric wires and when attempts to fight it were unsuccessful, the mine shafts were sealed. Thirty-one men were killed during the time the fire was fought. On January 9, 1909, the seals were removed and the fan started. A crew of men entered the mine to restore ventilation and clean up the mine. At 12:15 a.m. on January 10, a gas that filled the upper end of West C south entries was carried over the region where the fire had previously raged, and an explosion occurred which killed 26 men and again wrecked the mine. Forty hours later black smoke issued from the airshaft and immediately both shafts were sealed.

### 89 Years Ago *Explosives* *Keating Gold Mine* *Radersburg, MI*

**January 18, 1911**

Six men died of asphyxiation as a result of the detonation underground of approximately 600 pounds of 40-percent dynamite. The exact cause of the detonation was undetermined.

### 86 Years Ago *Ignition/Explosion of Gas* *Rock Castle Mine* *Rock Castle, AL*

**January 10, 1914**

At 8:43 a.m., an explosion in the 17th right entry caused the death of 12 with burns and suffocation. The fireboss had reported gas in 3 room that morning but had not examined 1 rooms in which gas had been found previously and had been cleared the day before. Miners were allowed to work in their rooms inby the rooms where the gas was standing. The explosion was spread by the fine dust but stopped at a wet section of the entry, as no great violence was developed. About 75 men in other parts of the mine were not affected.

JANUARY 2000



## *Announcing the Joseph A. Holmes Safety Association Scholarship Program*

### **PURPOSE**

The Joseph A. Holmes Safety Association endeavors to promote health and safety within the mining industry. We believe that providing financial aid to students in the pursuit of education related to mining safety will result in safer mines and healthier environments within the mining industry. To that end, we have instituted this Scholarship for Mining Committee.

### **SCOPE**

This scholarship program shall be open to persons currently employed or who are pursuing careers in the mining industry, safety and health fields. Scholarship awards are available in the following categories:

1. *High school graduates (or "graduating seniors")*
2. *Undergraduate students currently enrolled in a college or university*
3. *Graduates of a college or university*

### **APPLICATION REQUIREMENTS:**

#### **EACH APPLICANT MUST SATISFY EACH OF THE FOLLOWING CRITERIA:**

1. Must have been accepted by or currently enrolled at an accredited college or university in a degree program in mine safety, occupational or industrial health and safety, industrial hygiene, safety management, or other related safety programs.
2. Must have taken ACT or SAT examinations if you have been out of high school for less than 5 years. (Scores must be provided by the high school guidance counselor, principal, or college registrar).
3. Must complete the Financial Disclosure Information section to verify financial status and expenses of all persons living in the applicant's household.
4. Must provide a transcript of grades for the last 3 years of completed education (i.e., high school or college level).
5. Must submit a 100-200 word essay on "why I want to study for a degree or pursue a career in the mine safety field."
6. Must complete the survey of Extracurricular Activities.
7. Must submit two to three letters of recommendation (one academic, one personal and one from the mining community, if able).

8. Must complete the application and submit it to the ***Joseph A. Holmes Scholarship Program, c/o Secretary/Treasurer, P.O. Box 4187, Falls Church, VA 22044.***

***Applications must be submitted*** to Scholarship for Mining Program no later than March 2, 2000. The committee Chairperson shall convene the committee not later than 30 days prior to the date of the annual meeting of the National Holmes Safety Association each year for the purpose of selecting the successful applicant(s). All applicants will receive consideration without regard to race, color, sex, age, national origin, religion, or disability.

***To receive an application for the Holmes Safety Association Scholarship Program, please apply to Joseph A. Holmes Scholarship Program, c/o Secretary/Treasurer, P.O. Box 4187, Falls Church, VA 22044.***



## *Words to think about...*

Drop the last year into the silent limbo of the past. Let it go, for it was imperfect, and thank God that it can go.  
***Brooks Atkinson***

Year's end is neither an end nor a beginning but a going on, with all the wisdom that experience can instill in us.  
***Hal Borland***

Time has no divisions to mark its passage. There is never a thunderstorm or blare of trumpets to announce the beginnings of a new month or year. Even when a new century begins, it is only we mortals who ring bells and fire off pistols.  
***Thomas Mann***

**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](http://www.msha.gov). If you have any color and black/white photographs that you feel are suitable for use on the front cover of the Bulletin, please submit them to the editor. 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***.

***For address changes and new subscription requests, contact:***

**Bob Rhea**  
**Holmes Safety Association Bulletin Mailing List**  
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***Please address any comments to:***

**Donald Starr**  
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**Please call us at 304/256-3283 or**  
**Fax us at 304/256-3524**

**REMINDER:** The District Council Safety Competition for 2000 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**

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<i>Name</i>	<i>Representing</i>	<i>State</i>	<i>Name</i>	<i>Representing</i>	<i>State</i>	<i>Name</i>	<i>Representing</i>	<i>State</i>
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- National Stone Association 16th Annual Convention, Jan 28-31, 2000, New Orleans, LA
- SME Annual Meeting and Exhibit, Feb. 28-Mar. 1, 2000, Salt Lake City, UT
- 31st Annual Institute on Mining Health, Safety and Research, Aug. 28-30, 2000, Blacksburg, VA
- Nevada Mining Association, Sept. (TBA) 2000, Lake Tahoe, NV (TBA)
- MINE Expo 2000, Oct. 9-12, 2000, Las Vegas, NV