BULLETIN

April 1993

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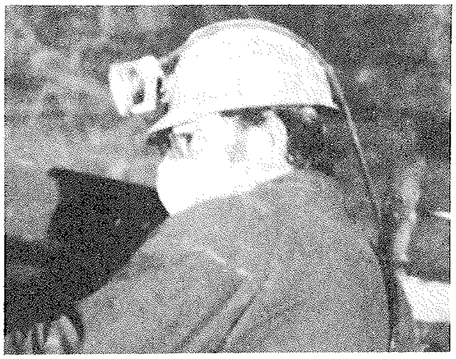

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KEEP US IN CIRCULATION

The Holmes Safety Association Bulletin contains safety articles on a variety of subjects: fatal accident abstracts, studies, posters and other 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.

Welcome new members

NAME	CHAPTER NO.	LOCATION
California Silica Products Co.	10294	San Capistrano, CA
Blue Star Ready Mix	10295	Moorpark, CA
Best Rock Products Corp.	10296	Fillmore, CA
Oro Limited	10297	Ridgecrest, CA
Sloan Canyon	10298	Los Angeles, CA
Aguanga Plant	10299	Riverside, CA
Elsinore Pit & Mill	10300	Lake Elsinore, CA
Rand Mountain Minerals	10301	Johannesburg, CA
Bing Materials	10302	Minden, NV
Joe Demartin	10303	Reno, NV
Echo Bay Alaska, Inc.	10304	Juneau, AK
Southlake Processing	10305	Prestonsburg, KY
Capitol Sand & Gravel Co.	10306	Cross Plains, WI
J & M Trucking, Inc.	10307	Ely, NV
Cooper & Sons, Inc.	10308	Ely, NV
Robinson Mining Ltd. Partner	10309	Ruth, NV
Atlas Gold Bar Mine	10310	Eureka, NV
Rimpull Corp.—Western Division	10311	Flagstaff, AZ
Ampel Corp.	10312	Kutztown, PA
Saline County Road Department	10313	Benton, AR
Duffield Gravel Co.	10314	Russellville, AR
J.A. Riggs Tractor Co.	10315	Morrilton, AR
Hot Springs Street Dept.	10316	Hot Springs, AR
A.P. Green	10317	Little Rock, AR
Midwest Lime	10318	Batesville, AR

NAME	CHAPTER NO.	LOCATION
Unimin Corp.	10319	Festus, MO
Mt. Home Quarry	10320	Mt. Home, AR
Shelby Crushed Stone Products, Inc.	10321	Medina, NY
Carter Sand & Gravel, Inc.	10322	Medina, NY
TCG Materials, Inc.	10323	Delevan, NY
Roaring Run Mine	10324	Apollo, PA
Genoa Sand Pit	10325	Houston, TX
V.C. Reindahl & Son	10326	Oregon, WI
Ensign-Bickford Company	10327	Simsbury, CT
Martins Fork Chapter	10328	Harlan, KY
Mdia	10329	Watervliet, NY
J. Hall Limited	10330	Ravena, NY
Southern Clay Products, Inc.	10331	Gonzales, TX
Clutch Run Mine	10332	Punxsutawney, PA
Tri-State Electric Motors, Inc.	10333	Troy, NY
Dot-Fra	10334	Clifton Park, NY
Mt. Hope Rock Products, Inc.	10335	Wharton, NY
Fisher Industries Plant #18	10336	Corsica, SD
Newbury Sand & Gravel	10337	Mantua, OH
Solon Exc. Sand & Gravel	10338	Mantua, OH
Lakeside Sand & Gravel	10339	Mantua, OH
Lucky Sand & Gravel	10340	Mantua, OH
Beck Sand & Gravel, Inc.	10341	Ravenna, OH
Hilltop Aggregate	10342	Mogadore, OH
Oscar Brugmann Sand & Gravel	10343	Mantua, OH

Roof Evaluation—Accident Prevention

REAP—a program developed to promote health and safety awareness in mining

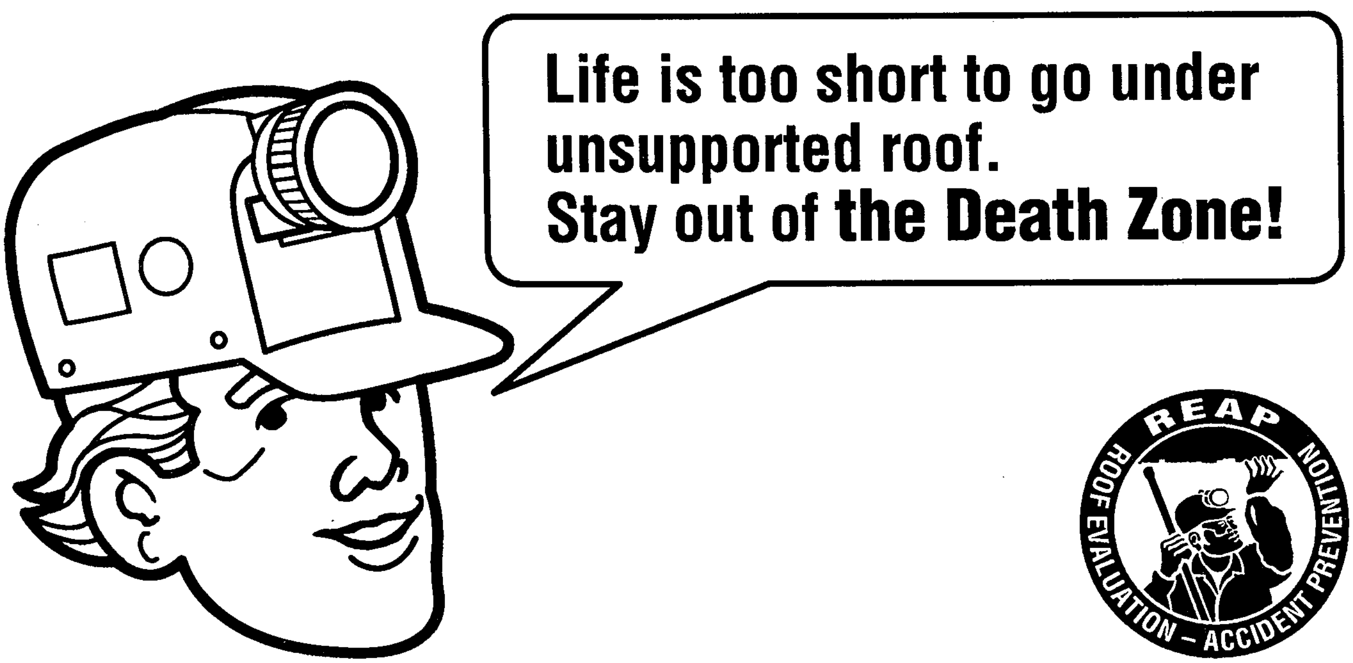
REAP Poster Program

The Mine Safety and Health Administration (MSHA) is reviving the monthly REAP poster program. MSHA believes this program was especially effective in keeping the mining public's eye focused on the dangers of working under unsupported roof.

The poster program will be resurrected with the districts and the divisions of safety and health each being responsible for designing one poster each on an annual basis. Over the past few years, MSHA has solicited, received, and used ideas for posters and slogans from miners. We wish to begin this practice again in the near future and will acknowledge the person or persons responsible on the poster when it is used.

The posters should be designed to illustrate to miners the conditions and/or practices that have caused roof or rib falls. However, if you do not have an accident scene, design a poster that will make miners aware of roof or rib conditions thereby promoting the prevention of accidents.

Posters should be submitted to: Tony Turyn, 4015 Wilson Boulevard, Arlington, VA 22203-1984. If you have any questions concerning the REAP program or the poster program please contact Tony at (703) 235-1170.



Holmes Safety Association Monthly safety topic

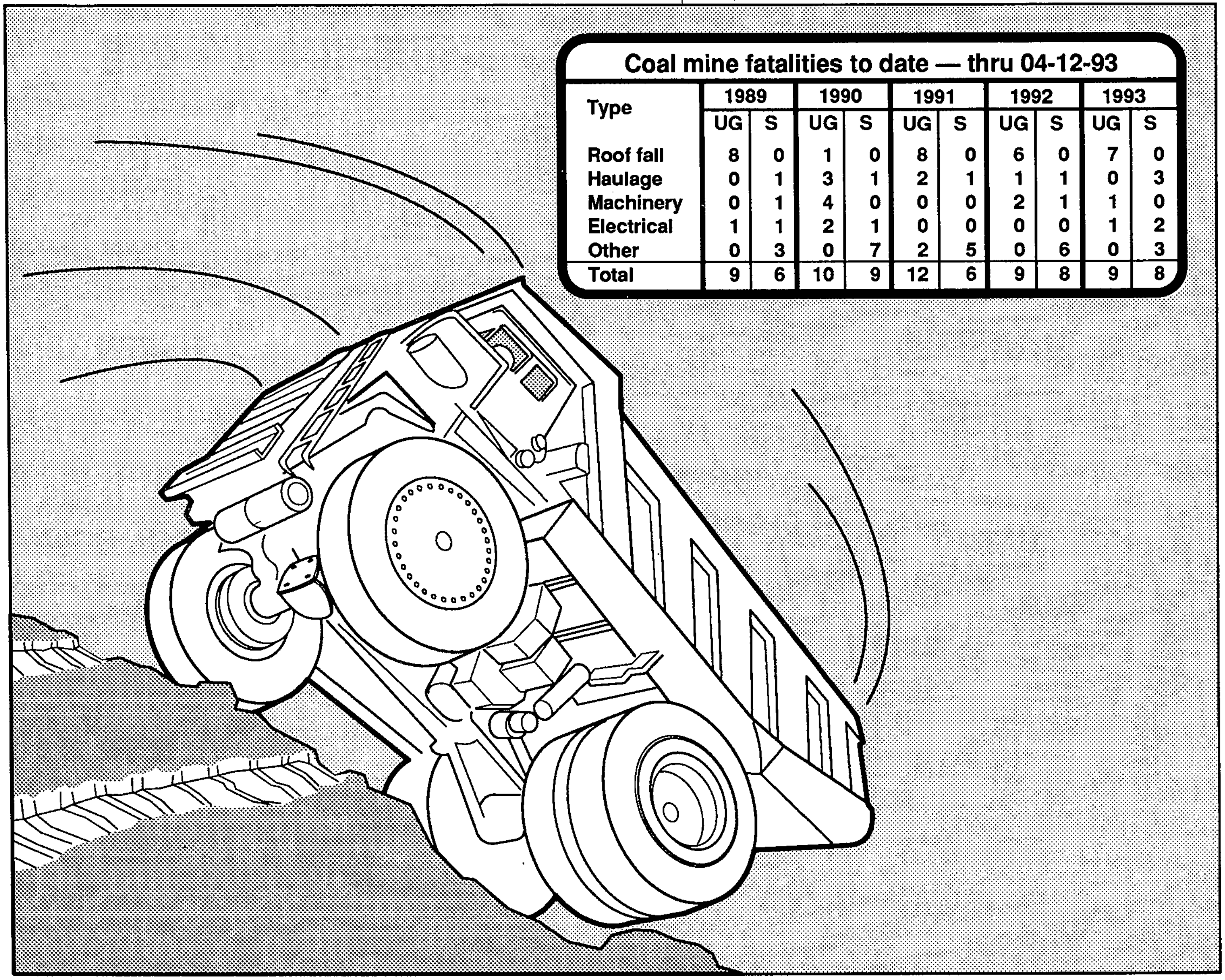
Fatal powered haulage accident

GENERAL INFORMATION: A 41-year-old crew leader, with 25 years of mining experience, was fatally injured when the haul truck he was a passenger in stalled, lost its brakes, and went over a berm and fell 50 feet, pinning the victim inside the cab.

The mine is operating one continuous miner section which works two shifts per day, six days per week. The mine employs 44 with 29 classified as underground and 15 surface and produces an average of 1,250 tons per day.

DESCRIPTION OF ACCIDENT: The afternoon shift preparation plant employees began work at 6:00 p.m. The plant foreman on day shift gave the crew their work assignments. Two mobile equipment operators were instructed to drive the refuse trucks. Three trucks were being used to haul refuse; two gob trucks and one slurry truck. Two of the drivers alternated driving the slurry truck. Work progressed without incident for approximately four hours. At about 10:30 p.m. one of the drivers parked the gob truck at the preparation plant and drove the slurry truck up the haul road to the refuse area. While dumping the slurry, he backed the truck too far and became stuck. One of the other drivers arrived at the refuse area in his gob truck, dumped the load and gave the other driver a ride down to the preparation plant. The victim instructed two of the drivers to get a chain and pull the slurry truck out. The slurry truck was pulled free and, a problem with the drive train was noted. The driver and the victim started down the haul road in the empty gob truck while the other driver dumped the loaded truck. The driver stated that he had difficulty steering the truck to the right. While negotiating the curve, the driver's side front wheel was off the road and into the berm. The driver stated that the truck's engine died and he depressed the clutch pedal and tried to restart the engine. The engine started but one tire on the left rear side was locked and sliding which repeatedly killed the engine. He stated that as the truck continued down the haul road, he tried unsuccessfully to steer onto an old refuse road on the right side of the haul road. The truck could not be controlled and picked up speed as it approached a steep left-hand curve. The truck could not make the curve, went over the berm, and became airborne about 50 feet before impacting the ground on its front end and flipping straight over onto its top. The security guard heard the impact and then a call for help. The guard notified other mine personnel of the accident and called for an ambulance.

The driver stated that after the truck landed, he exited the truck uninjured on the lower side (passenger side), and climbed the gob pile at the rear end of the truck. The truck cab was on its top and



Coal mine fatalities to date — thru 04-12-93

Type	1989		1990		1991		1992		1993	
	UG	S	UG	S	UG	S	UG	S	UG	S
Roof fall	8	0	1	0	8	0	6	0	7	0
Haulage	0	1	3	1	2	1	1	1	0	3
Machinery	0	1	4	0	0	0	2	1	1	0
Electrical	1	1	2	1	0	0	0	0	1	2
Other	0	3	0	7	2	5	0	6	0	3
Total	9	6	10	9	12	6	9	8	9	8

heavily damaged. The victim was in the cab and both doors were jammed shut. A call was made from the scene summoning the rescue squad. The rescue squad removed the victim from the truck and transported him to the hospital where he was pronounced dead.

CONCLUSION: The accident and resulting fatality occurred when the driver lost control of the Mack truck while descending the haul road from the refuse fill area. The driver stated that the truck engine stalled and the service brakes (foot-brakes) would not stop the truck. Inspection of the truck revealed that the brakes had the following deficiencies. Brake pads on three out of the four rear tandem wheels had been installed in the wrong positions on the brake shoes. The rear tandem wheel that had the brake pads installed correctly had a broken axle seal and the brake pads and drum were covered with grease. The front brakes were adjusted in a manner that allowed little or no contact between the brake pads and the drums.

Preventing silicosis and deaths in rock drillers

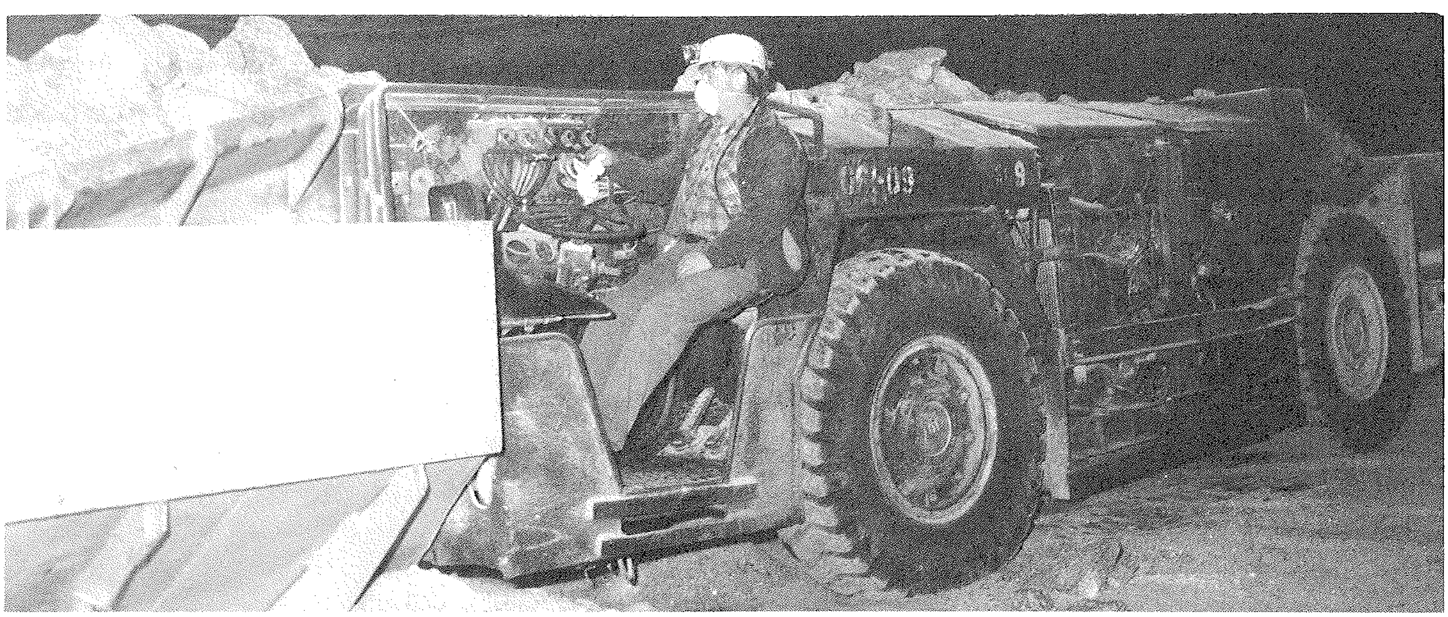
The National Institute for Occupational Safety and Health (NIOSH) requests assistance in preventing silicosis and deaths in workers exposed to respirable crystalline silica. The need is urgent to inform surface coal mine and other rock drillers, driller helpers, employers of drillers, and drill rig manufacturers about the respiratory hazards associated with drilling operations. Your assistance in this effort will help prevent silicosis-related death and disease, a national goal for health promotion and disease prevention stated in *Healthy People 2000* [DS 1990].

This article describes 23 cases of silicosis from exposure to crystalline silica during rock drilling. Of the 23 workers reported, 2 workers have already died from the disease, and the remaining 21 may die eventually from silicosis or its complications.

NIOSH requests that editors of trade journals, safety and health officials, labor unions, and employers bring the recommendations in this article to the attention of all workers who are at risk. NIOSH also requests that manufacturers of drill rigs and other rock drilling equipment become familiar with and implement the source control measures recommended in this article.

Background

Silicosis has been recognized in rock drillers employed in caisson construction [Ng et al. 1987], metal mining [Ezenwa 1982], slate quarries [Sacharov et al. 1971], tunnel construction [Burns et al. 1962; Bavley 1950; Cherniack 1989], highway and dam construction [Burns et al. 1962], and rock quarries [Ahlman et al. 1975; Guenel et al. 1989]. Although rock drillers in underground coal mines (roof bolters, for example) have developed silicosis [Tomb et al. 1986], those in surface coal mines have not historically been considered at significant risk [Fairman et al. 1977]. However, recent studies suggest that surface coal mine drilling presents a serious respi-



ratory hazard to drillers and driller helpers. Furthermore, most of the recent case reports on silicosis in rock drillers involve surface coal mine drillers.

Surface mining process

An early step in the surface or strip mining process is the removal of topsoil and other overburden materials, including sandstones, shales, limestones, and unconsolidated soils. Removal of these materials may require drilling holes into the rock formation to accept explosive charges for blasting. After blasting, the debris is cleared with earth-moving equipment such as dragline cranes, end loaders, or power shovels.

Silica exposure during surface mine drilling

When the drilled rock has significant crystalline silica content, the drill operators and helpers may be exposed to large amounts of respirable crystalline silica. Such exposure places these workers at high risk of developing silicosis. Rock drillers operate large, mobile rotary rigs that drill holes in the rock. Compressed air is often used to keep the drill hole clear and to cool bit cutting points and bearings. This process frequently generates large clouds of dust containing crystalline silica.

Operators of earth-moving equipment may also be exposed to silica when removing overburden materials.

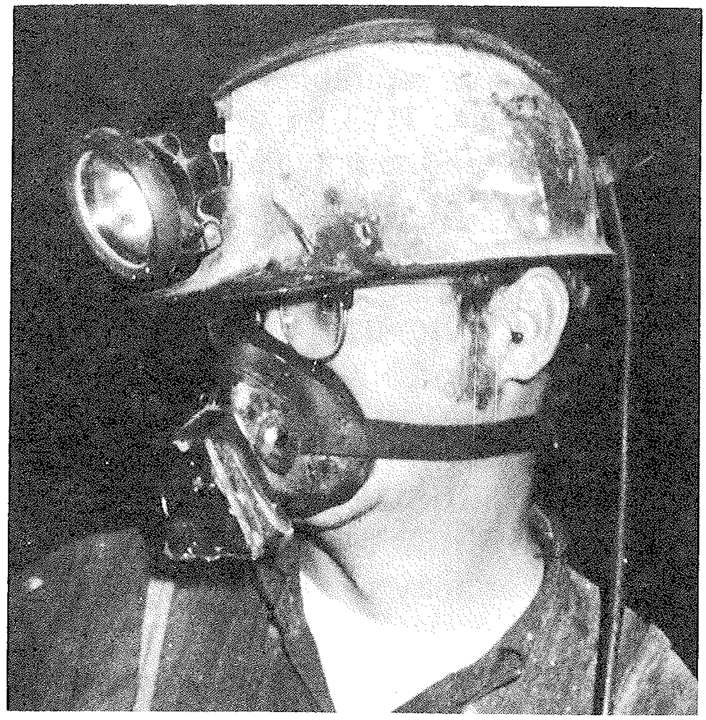
Current exposure limits

Rock drillers working at surface and underground mines are covered by Mine Safety and Health Administration (MSHA) regulations. Nonmining hard rock drillers are covered by Occupational Safety and Health Administration (OSHA) regulations.

MSHA PEL

Surface coal mines

Surface coal mine operators must comply with the MSHA permissible exposure limit (PEL) of 2.0 milligrams of respirable



coal mine dust per cubic meter of air (2 mg/m^3). However, when the respirable quartz (crystalline silica) content of the dust is greater than 5%, the PEL is reduced as follows [30 CFR 71.101]:

$$PEL\ (mg/m^3) = \frac{10}{\%\ quartz}$$

For metal and nonmetal surface and underground mines, the MSHA PEL for respirable dust is calculated as follows [30 CFR 56.500]:

$$PEL\ (mg/m^3) = \frac{10}{\%\ crystalline\ silica + 2}$$

OSHA PEL

The current OSHA PEL for respirable

crystalline silica (quartz) is an 8-hour time-weighted average (TWA) of 100 micrograms per cubic meter (100 μg/m^3, or 0.10 mg/m^3) [29 CFR 1910.1000].

NIOSH REL

The NIOSH recommended exposure limit (REL) for respirable crystalline silica is 50 μg/m^3 as a TWA for up to 10 hours/day during a 40-hour workweek [NIOSH 1974]. This REL is intended to prevent silicosis. However, evidence indicates that crystalline silica is a potential occupational carcinogen [NIOSH 1988; IARC 1987; DHHS 1991], and NIOSH is in the process of reviewing the data on carcinogenicity.

Health effects of crystalline silica exposure

A worker may develop any of three types of silicosis, depending on the airborne concentration of crystalline silica:

- Chronic silicosis, which usually occurs after 10 or more years of exposure to crystalline silica at relatively low concentrations
- Accelerated silicosis, which results from exposure to high concentrations of crystalline silica and develops 5 to 10 years after the initial exposure
- Acute silicosis, which occurs where exposure concentrations are the highest and can cause symptoms to develop within a few weeks to 4 or 5 years after the initial exposure [Peters 1986; Ziskind et al. 1976]

Silicosis (especially the acute form) is characterized by shortness of breath, fever, and cyanosis (bluish skin); it may often be misdiagnosed as pulmonary edema (fluid in the lungs), pneumonia, or tuberculosis. Severe mycobacterial or fungal infections often complicate silicosis and may be fatal in many cases [Ziskind et al. 1976; Owens et al. 1988; Bailey et al. 1974]. Fungal or mycobacterial infections are believed to result when the lung scavenger cells (macrophages) that fight these diseases are overwhelmed with silica dust and are unable to kill mycobacteria and other organisms [Allison and Hart 1968; Ng and Chan 1991]. About half of the mycobacterial infections are caused by *Mycobacterium tuberculosis,* with the other half caused by *M. kansasii* and *M. avium-intracellular* [*Owens* et al. 19881]. *Nocardia* and *Cryptococcus* may also cause lung infections in silicosis victims [Ziskind et al. 1976]. Investigations usually show the lungs to be filled with silica crystals and a protein material [Owens et al. 1988; Buechner and Ansari 1969].

Case reports

Case No. 1—Acute Silicosis:

A 33-year-old male quarry rock driller developed respiratory symptoms in August 1986 after working in Pennsylvania surface coal mines since 1975 [Goodman et al. 1992]. A chest X-ray in August 1986, showed relatively minor abnormalities, but the worker's symptoms improved and he continued to work.

In May 1987, the driller's respiratory symptoms returned along with severe weight loss, fevers, night sweats, joint pain, reduced lung function, swollen lymph nodes, and progressive worsening of his chest X-ray. Antibiotics did not improve his condition, and open lung biopsies confirmed acute silicosis.

After treatment with high-dose corticosteroids and antituberculosis drugs, the driller stabilized and improved slightly until February 1990, when his condition deteriorated. He died of progressive respiratory failure from silicosis in September 1991.

The driller reported that most of the drilling he did before 1983 involved wet techniques to suppress dust. Thereafter he drilled without dust suppression measures and without a respirator, even though the dust was sometimes so thick that he "couldn't see anything."

Case No. 2—Acute and accelerated silicosis

In April 1979, a 34-year-old male rotary driller reported a 6-month history of shortness of breath, dry cough, weight loss, and pale skin color on body extremities [Banks et al. 1983].

For the preceding 5 years, this worker had operated a rotary drill at a surface coal mine using dry drilling methods. Examination revealed increased heart and breathing rates, abnormal lung sounds, healed ulcers on the fingertips, reduced lung function, and abnormal chest X-rays. Open lung biopsy confirmed acute silicosis. Although the patient was treated with aggressive therapy for 8 months, lung function continued to deteriorate and the patient died of respiratory failure in June 1981.

Discovery of this case of acute silicosis led to a medical survey of nine other drillers who worked for the same company. Two of the workers, aged 28 and 31, had accelerated silicosis and had been drillers for fewer than 6 years. Exposure concentrations are unknown because the crystalline silica content was not measured in the coal dust samples collected during the years 1972-80. However, much of the rock encountered by the drillers was sandstone, which is likely to have had a high crystalline silica content.

Case No. 3—Accelerated and chronic silicosis

Seven cases of silicosis in surface min-

ers were reported from a single hospital in West Virginia during the period 1978-88 [Parker et al. 1989]. All cases were in men aged 25 to 51 who were involved with surface drilling for 3 to 19 years.

Five of the drillers suffered from accelerated silicosis: one was infected with *Mycobacterium tuberculosis*, one had a positive tuberculin skin test without proven active infection, and one had progressive massive fibrosis (a condition in which large areas of lung tissue become scarred and collapse).

The other two drillers suffered from chronic silicosis. Both were in advanced stages of the disease, including progressive massive fibrosis.

Case No. 4—Chronic silicosis

A survey of 18 caisson drilling sites in Hong Kong [Ng et al. 1987] identified 12 cases of chronic silicosis among 118 workers exposed to high concentrations of silica. Six of these workers also had active cases of tuberculosis. All 12 workers had 10 to 20 years of occupational exposure.

Site visits showed little evidence of attempts to control dust at the source. For example, dust suppression measures were not used with pneumatic tools, and exhaust ventilation was not supplied in the shafts. In deeper caissons, fresh air was usually supplied by a compressor through a makeshift duct, but the blowing increased airborne dust concentrations. Some dust was suppressed by the natural seepage of water at the bottom of the excavation, and workers at some sites routinely wet the workface to suppress dust.

In the past, reusable cloth masks were commonly used at caisson drilling sites. More recently, however, workers have provided their own particulate filter masks.

Conclusions

The cases of silicosis described in this article illustrate the risk of serious or fatal illness in rock drillers and the conditions that favor the development of silicosis. These conditions are as follows:

- The presence of respirable crystalline silica dust
- Inadequate dust control measures
- Inadequate respiratory protection
- The absence of adequate medical screening and monitoring programs
- The absence of adequate air monitoring programs for respirable dust

Recommendations

NIOSH recommends the following measures to reduce crystalline silica exposures in the workplace and prevent silicosis and silicosis-related deaths:

1. Before mining begins, assess the potential for exposing workers to crystalline silica during removal of the overburden.
2. Conduct air monitoring to measure worker exposures.
3. Use control measures such as wet drilling and exhaust ventilation to minimize exposures.
4. Practice good personal hygiene to avoid unnecessary exposure to silica dust.
5. Wear washable or disposable protective clothes at the worksite; shower and change into clean clothes before leaving the worksite to prevent contamination of cars, homes, and other work areas.
6. Use respiratory protection when source controls cannot keep silica exposures below the NIOSH REL.
7. Provide periodic medical examinations for all workers who may be exposed to crystalline silica.

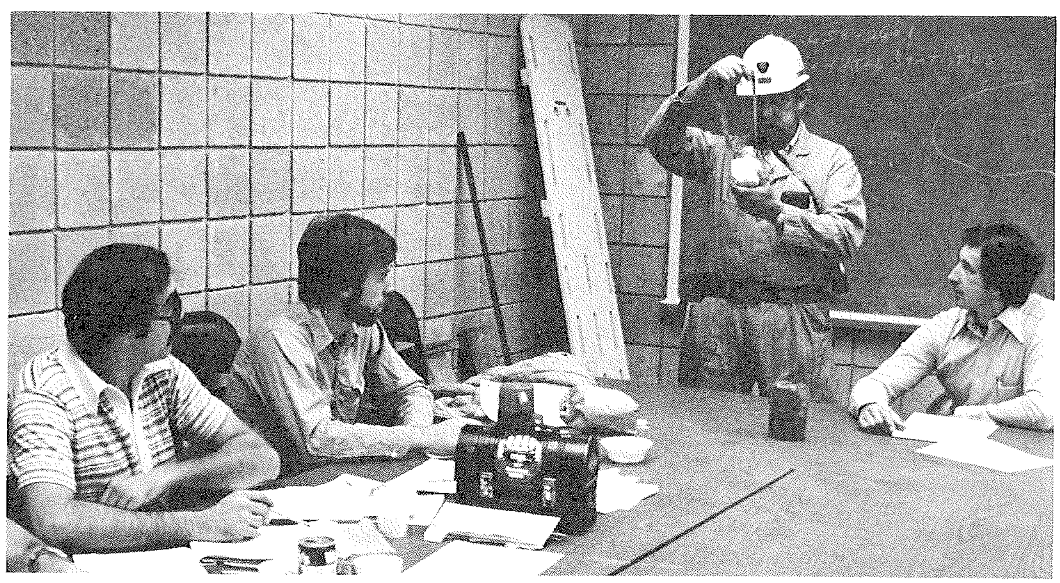
8. Post signs to warn workers about the hazard and to inform them about required protective equipment.
9. Provide workers with training that includes information about health effects, work practices, and protective equipment for crystalline silica.
10. Report all cases of silicosis to State health departments and to OSHA or MSHA.

These recommendations are discussed briefly in the following subsections:

Initial assessment: Before mining begins, geological reports and other information should be reviewed to determine the potential for exposing workers to crystalline silica during removal of the overburden.

Air monitoring: Air monitoring should be performed to measure worker exposure to airborne crystalline silica and to provide a basis for selecting engineering controls. Air monitoring should be performed as needed to measure the effectiveness of controls. Air samples should be collected and analyzed according to NIOSH Method Nos. 7500 and 7602 [NIOSH 1984] or their equivalent.

Engineering controls: Effective source control measures and good work practices should be implemented to minimize worker exposure to crystalline silica. Examples of control measures include dust-suppression skirts, wet drilling, local exhaust ventilation, and isolation of the worker in enclosed drilling rig cabs with positive-pressure air-conditioning [Volkwein 1988; Stern 1977].



Personal hygiene: The following personal hygiene practices are important elements of any program for protecting workers from exposure to crystalline silica:

- All drillers should wash their hands and faces before eating, drinking, or smoking.
- Workers should not eat, drink, or use

tobacco products in the drilling area.

- Workers should shower before leaving the worksite.
- Workers should park their cars where they will not be contaminated with silica.

Protective clothing: The following measures should be taken to ensure that the drillers' dusty clothes do not contaminate cars, homes, or worksites other than the drilling area:

- Workers should change into disposable or washable work clothes at the worksite.
- Workers should change into clean clothes before leaving the worksite.

Respiratory protection

Respirators should not be used as the only means of preventing or minimizing exposures to airborne contaminants. Effective source controls such as dust-suppression skirts, wet drilling, enclosed cabs, local exhaust ventilation, and good work practices should be implemented to minimize worker exposure to silica dust. NIOSH prefers such measures as the primary means of protecting workers. However, when source controls cannot keep exposures below the NIOSH REL, controls should be supplemented with the use of respiratory protection during rock drilling operations.

When respirators are used, the employer must establish a comprehensive respiratory protection program as outlined in the *NIOSH Guide to Industrial Respiratory Protection* [NIOSH 1987a] and as required in the OSHA respiratory protection standard [129 CFR 1910.1341] and in MSHA standards [30 CFR 56.005, 57.5005, 70 Subpart D]. Important elements of these standards are:

- an evaluation of the worker's ability to perform the work while wearing a respirator,
- regular training of personnel,
- periodic environmental monitoring,
- respirator fit testing,
- maintenance, inspection, cleaning, and storage, and

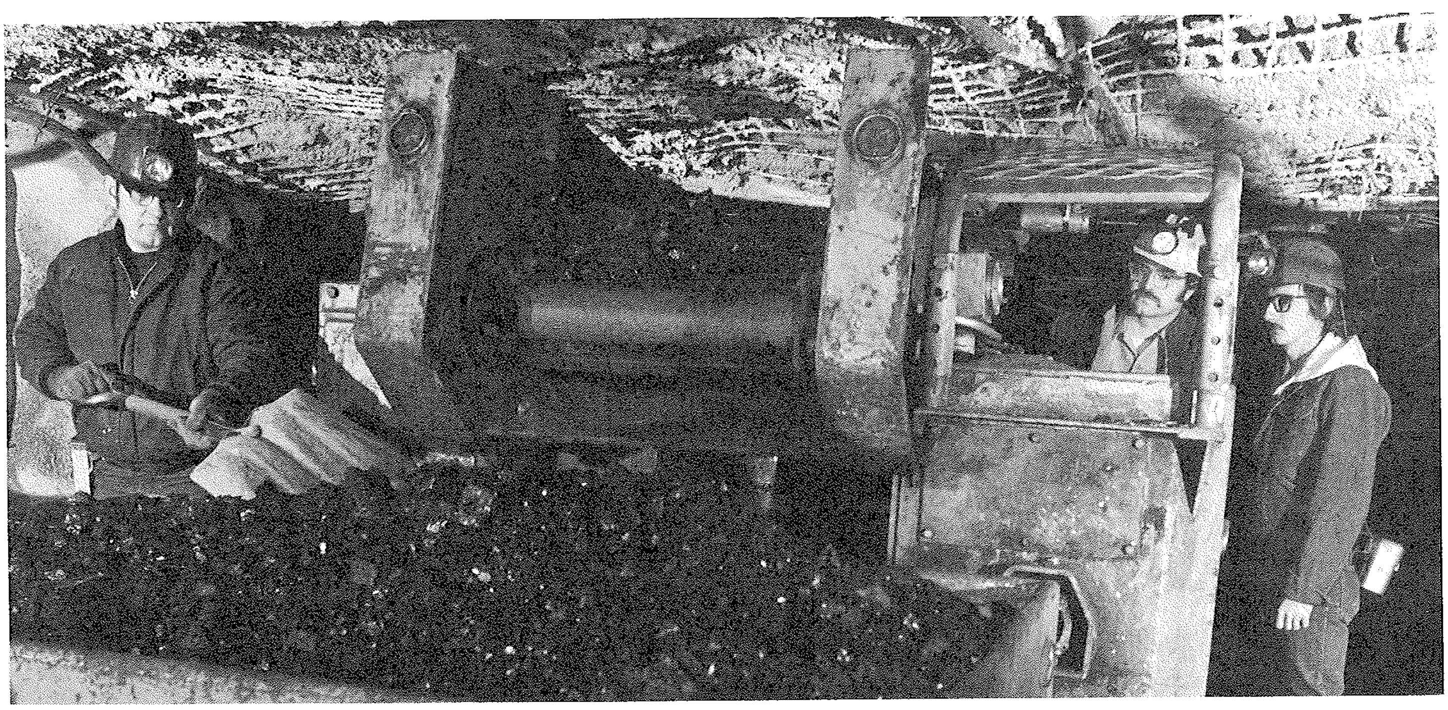


Table 1.—NIOSH-recommended respiratory protection for workers exposed to respirable crystalline silica

Condition	Minimum respiratory protection* required to meet the NIOSH REL for crystalline silica (50µg/m^3)†
≤500 µg/m^3‡ (10 x REL)§	Any air-purifying respirator with a high-efficiency particulate filter
≤1,250 µg/m^3 (25 x REL)	Any powered, air-purifying respirator with a high efficiency particulate filter, or Any supplied-air respirator equipped with a hood or helmet and operated in a continuous-flow mode (for example, type CE abrasive blasting respirators operated in the continuous-flow mode)
≤2,500 µg/m^3 (50 x REL)	Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter, or Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
≤50,000 µg/m^3 (1,000 x REL)	Any supplied-air respirator equipped with a half-mask and operated in a pressure-demand or other positive pressure mode
≤100,000 µg/m^3 (2,000 x REL)	Any supplied-air respirator equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode (for example, a type CE abrasive blasting respirator operated in a positive-pressure mode)
Planned or emergency entry into environments containing unknown concentrations or concentrations ≤500,000 µg/m^3 (10,000 x REL)	Any self-contained breathing apparatus euipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode,** or Any supplied-air respirator equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode**
Firefighting	Any self-contained breathing apparatus equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode**
Escape only	Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter, or Any appropriate escape-type, self-contained breathing apparatus

* Only NIOSH/MSHA-approved equipment should be used.

† These recommendations are intended to protect workers from silicosis; only the most protective respirators are recommended for use with carcinogens.

‡ ≤ = less than or equal to.

§ Assigned protection factor (APF) times the NIOSH REL. The APF is the minimum anticipated level of protection provided by each type of respirator.

** Most protective respirators.

- selection of proper NIOSH-approved respirators.

The respiratory protection program should be evaluated regularly by the employer.

Table 1 lists the minimum respiratory equipment required to meet the NIOSH REL for crystalline silica under given conditions. Workers should wear the most protective respirator that is feasible and consistent with the tasks to be performed. For additional information about respirator selection, consult the *NIOSH Respirator Decision Logic* [NIOSH 1987b]. Workers should use only those respirators that have been certified by NIOSH and MSHA [NIOSH 1991].

Medical monitoring: Medical examinations should be available to all workers who may be exposed to crystalline silica. Such examinations should occur before job placement and at least every 3 years thereafter [NIOSH 1974]. More frequent examinations (for example, annual) may be necessary for workers at risk of acute or accelerated silicosis. Examinations should include at least the following items:

- A medical and occupational history to collect data on worker exposure to crystalline silica and signs and symptoms of respiratory disease
- A chest X-ray classified according to the 1980 International Labor Office (ILO) Classification of Radiographs of the Pneumoconioses [ILO 1981]
- Pulmonary function testing (spirometry)
- An annual evaluation for tuberculosis [ATS/CDC 1986].

Warning signs: Signs should be posted to warn workers about the hazard and specify any protective equipment required (for example, respirators).

Training: Workers should receive training [30 CFR 48; 29 CFR 1926.21] that includes the following:

- Information about the potential adverse health effects of crystalline silica exposure
- Material safety data sheets for crystalline silica 129 CFR 1926.591

Preventing silicosis and deaths in rock drillers

Take the following steps to protect yourself from crystalline silica exposure:

- Be aware of the health effects of crystalline silica dust listed in *NIOSH Alert: Request for Assistance in Preventing Silicosis and Deaths in Rock Drillers* .
- Participate in any medical examinations, air monitoring, or training programs offered by your employer.
- Use engineering controls such as local exhaust ventilation, wet drilling, dust suppression skirts, and enclosed drilling rig cabs with positive-pressure air conditioning.
- Use the respiratory protection recommended in *Alert*.
- Change into washable or disposable work clothes at the worksite.
- Do not eat, drink, or use tobacco products in the drilling area.
- Wash your hands and face before eating, drinking, or smoking outside the drilling area.
- Shower and change into clean clothes before leaving the worksite.

Reprinted from the August 1992 issue of ***Alert****—a publication of the National Institute for Occupational Safety and Health*

Safety begins at the top

A good safety program requires strong leadership.

Chief executive officers should be visibly and actively behind successful safety and health programs. For example, the CEO should be obsessed with safety and health, employee satisfaction and the design of ergonomically safe equipment.

The CEO should never stop being the company's chief safety and health controller, including being out in the workplace several times a week to see that hazards are properly controlled and inspecting the overall safety situation.

Any recognized hazard should be brought to the supervisor's attention on the spot, as well as being reported to the attention of the department manager for follow-up. Repetitious uncontrolled hazards should be reported to the employees at monthly safety and health committee meetings. The CEO should be known throughout the company as one who gets livid about uncontrolled safety and health hazards.

This attention to safety and health hazards at the top will energize the management staff and let everyone know that safety and health priorities are clear to the entire company. As a result, you will see a drastic improvement in your safety records, and this will roll over into improved work quality and employee morale.

Questions you might ask your company include: Are the senior officers actively involved in your safety- and health-improvement strategies and programs? Does your company have a formal safety and health program? Does it have a safety and health improvement plan? Was it prepared by a team which represented all parts of the organization? Are there specific goals for safety and health improvement? Are the goals and results tied to individual responsibilities and performance appraisals?

You must be able to control the hazards of your operations and processes effectively to consistently produce good safety records month after month and year after year.

The safety and health improvement plan should include supervisors and employees working in a joint effort. The company's safety and health educational activities should teach employees to recognize, understand and control hazards of their jobs. The safety and health program should emphasize the need for, and concepts of, safety and health improvement, methods to establish safety and health requirements, hazard elimination and control through teamwork, and maintenance of performance standards.

Hold that "tiger team"

Safety improvement teams (SIT), consisting of managers from each plant or department, are the liaison with the work force and upper management. These are sometimes referred to as "tiger teams." Each SIT manages the program on a daily basis and also has the authority to create a subcommittee to eliminate recurring hazards or errors.

Does your company use safety statistics to help guide its program? Are you using the lost-time statistics or the total cases incident rate? Or both? Of course, the total cases incident rate will include lost-time accidents and is the rate that is more indicative of how you are doing. Do you have a training program to teach supervisors and employees the statistical methods? Do they understand what injury frequency rates mean? Are appropriate problem-solving safety meetings held on a regular basis to review hazards that are revealed from your statistics? When accident trends and recurring hazards are revealed, do you have a program to track these problems and follow through until they are corrected? Are these statistics understood in the company?

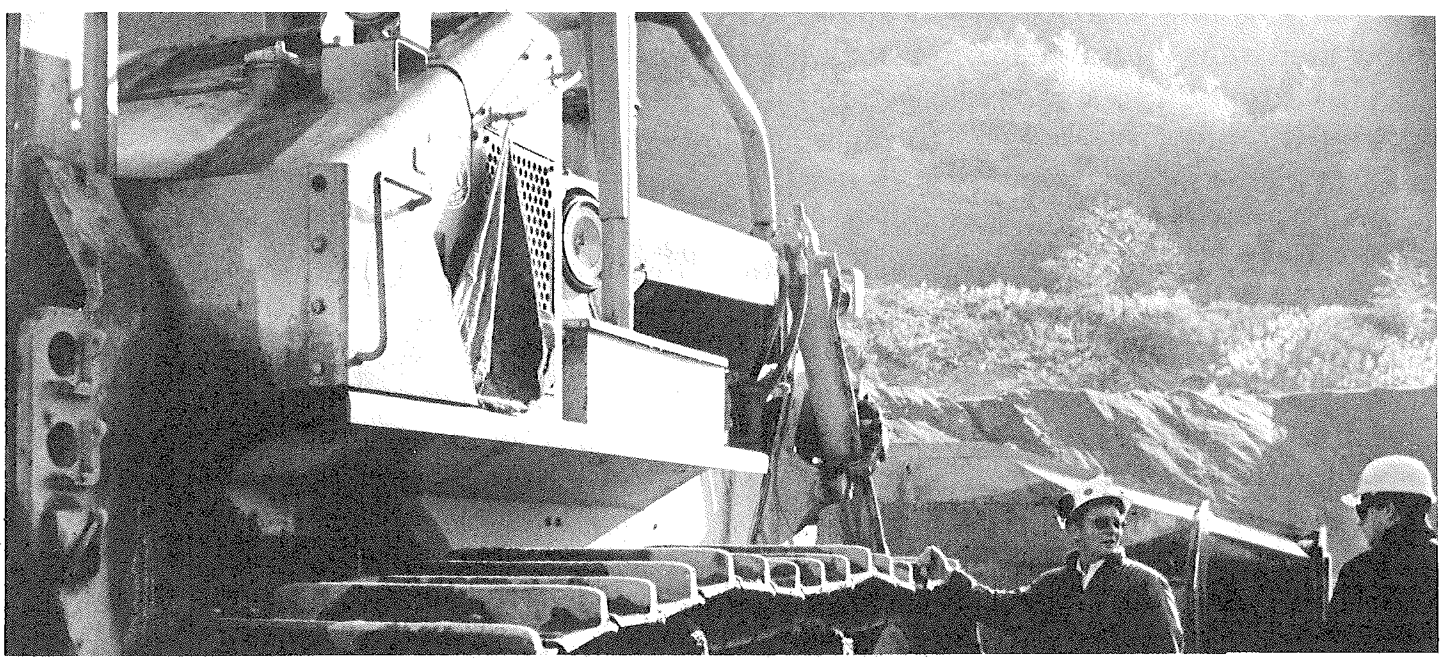
Has your company developed formal supplier safety management guidelines? Do you have standards by which to designate "safety approved" suppliers? All chemicals coming into the plant should be approved by the industrial hygiene or safety department. Do you have built-in controls to prevent the maintenance department, for example, from going to the local hardware store and buying a paint or solvent that has not been approved by the industrial hygiene or safety department.

Even though you give careful attention to recognizing and controlling hazards early in the production process, you still need regular safety inspections to make sure the hazards are being controlled.

Attention must be given to product safety and your sales effort. Therefore, you should have methods to test your finished products to detect hazards before the products are shipped to customers. Does your safety and health department provide your sales department with material safety data sheets (MSDS) for the safe handling of company products? For product safety, do you measure the defect rate, analyze causes for these defects and take corrective action on a regular basis? Is the occurrence and recurrence of hazards or problems declining steadily? Formal safety and health strategic planning in operational goals should be encouraged.

Safety is strategic

Every company should incorporate safety and health into its strategic planning



process. Each business unit of a corporation should be asked to identify the role of safety and health in its strategy, define the elements of safety and health in its strategic program, outline long-range safety and health-related goals, and indicate how staff will meet these goals. A company's strategy should include a clear working definition of safety, such as "Safety is the elimination or control of recognized HAZARDS to attain an ACCEPTABLE level of RISK." It should also include a commitment to safety by all levels of management, and employee training and development programs to support the program.

Your safety and health improvement efforts will not succeed without the active involvement of employees. Your program should include a joint safety and health program that teaches supervisors and employees how to work together to resolve safety and health issues.

After a period of training in safety problem-solving methods, several employee safety quality circles should be set up to assess and recommend to management solutions for identified concerns.

Does your safety system have an active program of safety quality circles or similar problem-solving teams? Are your team members trained in recognizing and analyzing safety and health problems?

Employee involvement teams work effectively only if there is a mechanism for review and resource allocation at the senior management level.

Does your company have an executive safety committee chaired by the most senior executive? Does the committee meet regularly to review safety and health improvement ideas? Does it have enough authority to fund projects? Some companies have established a vice president of safety, health, and environment responsible for seeing that the company-wide safety, health and environment policy is being implemented in all departments. The position reports directly to the chairman and CEO, showing senior management's commitment to safety, health and environmental improvement.

Do you regularly review engineering designs to look for opportunities to increase their safety? Are there specific, multifunctional projects under way to "design in" safety rather than "inspect it in"? Is your safety, health and environmental department in close touch with your research organization?

Sometimes safety problems are caused by new products and services which have had insufficient testing before being allowed for commercial use.

Are there clear standards and procedures within your company for determining when a new product was determined to be suitable for release to the market? Are products and services tested and passed before release to customers? If products are significantly changed in the design process, are they requalified before being marketed?

As you implement your safety and health improvement programs, you must check to see if you are getting the desired results.

Safety saves money

One company has adopted cost-of-safety measures and reported impressive cost savings. The company's safety-improvement strategy charges back to departments their costs due to accidental damage, fires, workers' compensation, and first aid rather than spreading these costs over the company or plant. It puts the responsibility where it belongs.

Do you measure the results of your safety efforts? Do you measure your safety cost regularly? Are there specific programs in place for reducing these costs? Do you track workers compensation claims, first aid claims, employee safety complaints, and reduction in claims and litigation? Have you reduced your workers' compensation insurance costs?

Do you ensure that proper safety analysis and contingency procedures are in place?

Are all labels, warnings, and instructions prepared to ensure proper product and service use and customer safety?

A most important criterion for a safety program is employee satisfaction and morale. Unless you know what your employees actually think about your efforts in safety and health, you will not be able to focus your efforts for best results.

Therefore, a critical question is whether your company takes regular measurements of the safety program as perceived by employees.

Without employee involvement your program most likely will fail. Therefore, you should rely heavily on employee focus groups, surveys and questionnaires to monitor employee satisfaction.

At one company, a cross-section of employees is contacted every 90 days to give the company on-going feedback about its standing with employees. Another company supplements its tracking system with employee interviews to ensure that the company's internal measures remain relevant to how employees judge the company's safety and health program.

Are there specific, multifunctional project teams working on employee improvement projects?

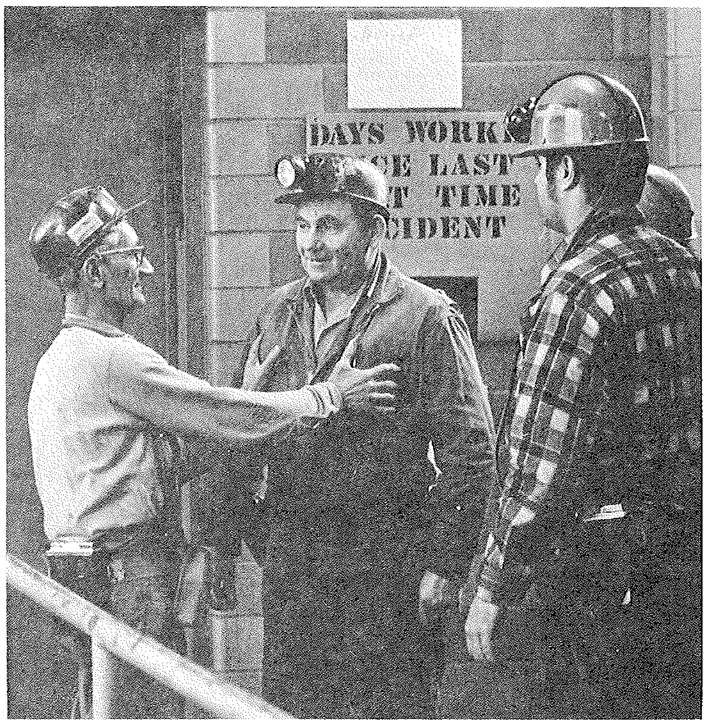
Use the questions we have suggested to assess whether your employees' satisfaction and safety management processes are operating effectively and in a comprehensive and integrated manner. We should strive for continuous improvement and ensure that these noble endeavors become an integral part of our culture.

CHECK for equipment defects BEFORE each shift

Don't let unsupported roof go unnoticed: what you don't know *CAN* hurt you

By Robert H. Peters[1] and Arnold C. Love[2]

Coal miners do not like the idea of being under unsupported roof. Most of them know that roof falls are the leading cause of fatal accidents among underground coal miners. About half of the victims of these accidents are under unsupported roof at the time they are killed. It is disturbing to suddenly realize that you are standing in an area where the roof has not yet been supported—nothing is preventing you from being crushed by thousands of tons of rock at any moment. Yet, many coal miners unintentionally find themselves in this situation on a rather frequent basis. To discover more about this problem, Bureau of Mines researchers recently interviewed 268 miners from 6 different mines.[3] They wanted to find out (1) how often miners unintentionally find themselves under unsupported roof, (2) why it happens, and (3) how it can be prevented.



Frequency of unintentionally going under unsupported roof

Miners were first asked if they had ever unintentionally gone into an area of unsupported roof. Eighty-two percent of the sample indicated that they could recall such an incident. Those who could recall a time that they had unintentionally gone under unsupported roof were asked to estimate how long ago the most recent incident had occurred. Here is the distribution of miners' estimates concerning how long it had been since they had unintentionally gone under unsupported roof.

Estimate (months)	Miners in agreement with estimate, (%)
0-1	24.1
1-6	20.3
6-12	15.5
12+	40.1

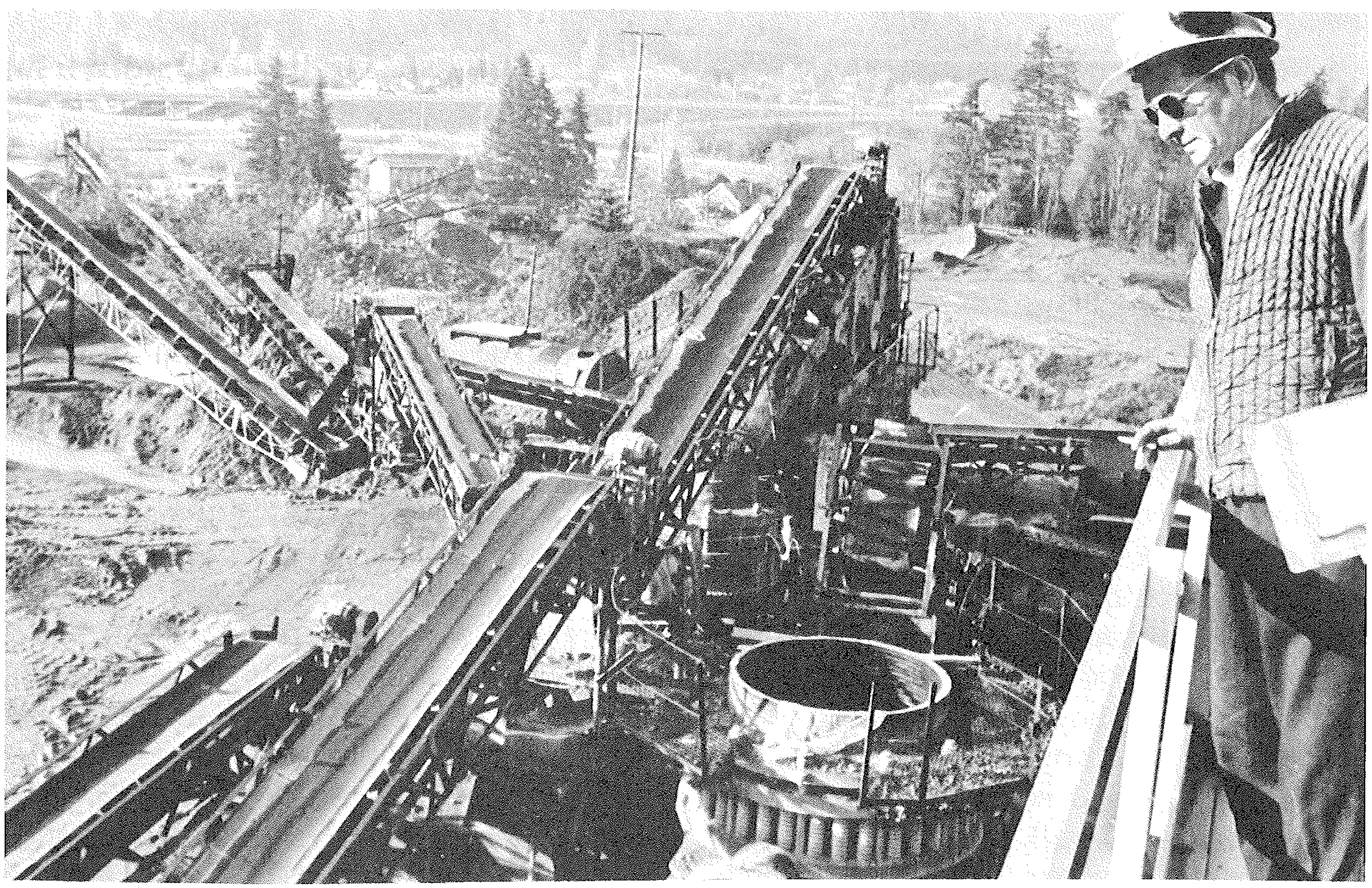
Approximately 60% of those who could recall an instance in which they had unintentionally gone under unsupported roof estimated that the most recent incident had occurred within the past year. About 24% thought that the most recent incident had occurred within the past month. Of course, the frequency of unintentionally going under unsupported roof may actually be higher than these numbers suggest because miners may go under unsupported roof without ever realizing that they were under it.

Why do miners unintentionally go under unsupported roof?

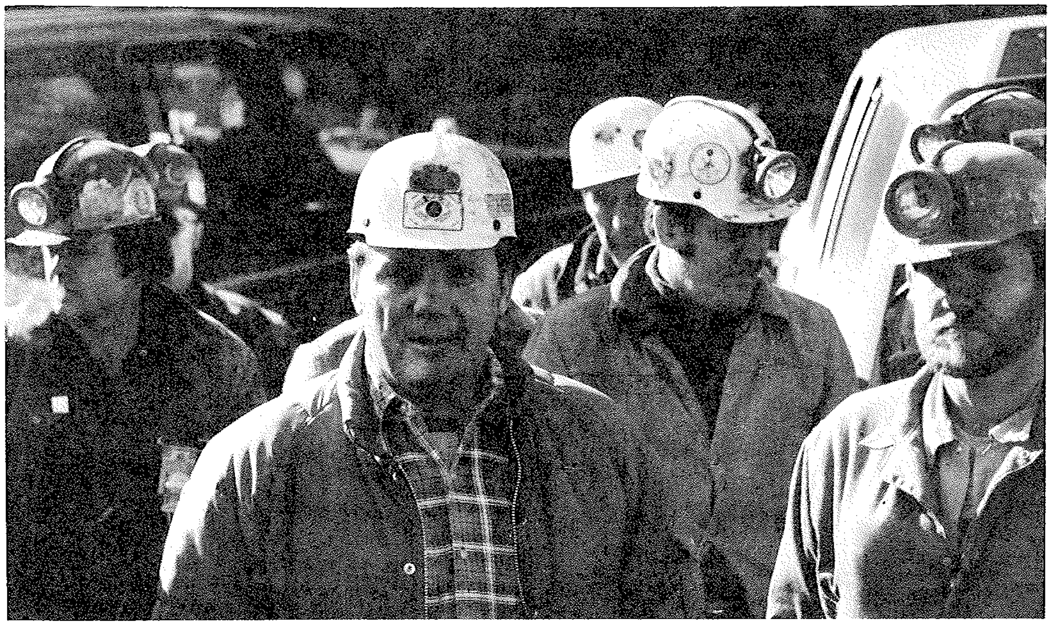
The reasons for this type of behavior can stem from either the person or their environment. Miners' responses to interview questions suggest that both types of factors are important.

Personal factors

When people are preoccupied with personal problems or are fatigued, they usually do not concentrate as well on avoiding certain hazards in their work environment such as unsupported roof. If employees are alert and able to concentrate on their work, they will be less likely to go under unsupported roof. The miners interviewed for this study were asked to indicate whether they agreed or disagreed with the statement, "One of the main reasons miners occasionally go inby supports is that they are so distracted by personal problems that they forget to stay away from unsupported roof." Two-thirds of the sample agreed with this statement and the other one-third disagreed. This suggests that the majority of miners believe that preoccupation with personal problems is an important contributor to going under unsupported roof.



Sometimes the absence of warning signs leads miners to assume that an area has been bolted when it actually has not. As they were describing recent incidents in which they had unintentionally gone under unsupported roof, several of the miners mentioned that someone had neglected or forgotten to post a sign on the last row of bolts to warn others of the danger. A cue that sometimes misleads miners into assuming that an area has been bolted is the presence of rock dust. The standard procedure at most mines is to bolt the roof before applying rock dust. However, several miners mentioned that they had unintentionally gone under unsupported roof because the area had been rock dusted, leading them to believe that it was bolted.



Another factor which may influence the chances of unintentionally going under unsupported roof is seam height. One of the 6 mines in the Bureau's sample had a low seam height (approx. 40-42 inches). The other 5 mines had seams high enough to allow people to walk in a fully or almost fully upright posture. A few of the miners from the low seam mine mentioned that they thought people who work in low seam mines were more likely to unintentionally go under unsupported roof. They noted that (1) it is more difficult to look at the roof from a crawling position than from a standing position, and (2) when operating equipment, such as a scoop, it is sometimes difficult to see whether the roof ahead is bolted or not without getting off the equipment to get a better view.

Miners' responses to some of the interview questions tends to support the assertion that people who work in low seam mines are somewhat more likely to unintentionally go under unsupported roof. Comparing the responses of miners from the low seam mine to the responses of miners from the other five mines in the sample, it was found that a higher percentage of the miners from the low seam mine indicated (1) that they could recall an instance in which they had unintentionally gone under unsupported roof (88.4% versus 80.6%), and (2) that the most recent time they had unintentionally gone under unsupported roof was within the past week (12.1% versus 3.9%).

Each time miners reported being able to recall an instance of unintentionally going under unsupported roof, we also asked them to tell us what they were doing when they realized they were beyond the last row of bolts. Here are the activities cited most frequently:

- walking (59)[4]
- hanging or extending ventilation tube (11)
- operating a scoop (9)
- repairing a continuous miner or bolter (8)
- hanging ventilation curtain (8)
- rock dusting (7)
- operating a bolter (7)
- operating a continuous miner (6)
- carrying supplies (6)
- setting timbers (5)
- operating a ram car or shuttle car (4)

Miners were also asked what could be done to make it more likely that people will notice that the roof is unsupported. Here are some of their suggestions:

1. Do not leave an area of unsupported roof without posting warning devices. It is especially important that crosscuts and breakthroughs **not** be left unbolted at the end of a shift. If this situation cannot be avoided, be sure to post multiple warning signs.
2. Do not rock dust an area until it has been bolted. (Rock dusted areas are often assumed to be bolted.)
3. Use a standardized warning device with some type of conspicuous feature (e.g., a unique color) to warn people that they are approaching unsupported roof. In order to rule out the possibility that miners might misinterpret what it means, this warning device should not be used for any other purpose.

Conclusion

The results of our study suggest that most miners who work at face areas of the mine unintentionally go under unsupported roof, and some do it rather often. When miners are struck by large pieces of falling rock they are usually severely injured or killed. Therefore, it is important that mine operators and face crew workers do all that they can to *prevent* people from unintentionally going inby supports. Miners need to be made aware that seemingly little things like forgetting to post a warning sign or rock dusting before bolts are installed can lead their coworkers into a deadly trap. If casual reminders don't work, consider instituting some method of giving people feedback about these key behaviors. Start posting the number of times these potentially hazardous conditions are observed and set realistic goals for their elimination in the near future. Unless appropriate actions are taken to modify employee behaviors, the unsafe conditions are likely to persist, and may even become more prevalent. To think that people always look at the roof to check for bolts is a faulty (and potentially dangerous) assumption. Human nature being what it is, miners will sometimes fail to take notice that they are entering an area of unsupported roof unless something catches their attention.

This article is the last of a series of four articles that have been published in the Holmes Safety Association *Bulletin* concerning the findings of a Bureau of Mines study on how to prevent coal miners from going under unsupported roof. For further information concerning human factors contributing to groundfall accidents contact Robert H. Peters at (412) 892-6895.

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[2]*Industrial Engineer, Pittsburgh Research Center, U.S. Bureau of Mines, Pittsburgh, PA.*

[3]*See the January 1993 issue of the* ***HSA Bulletin*** *for a description of the mines included in the sample.*

[4]*Numbers in parentheses indicate the number of persons who replied as indicated.*

Holmes Safety Association Monthly safety topic

Fatal powered haulage accident

GENERAL INFORMATION: A 53-year-old loader operator was fatally injured when the front-end loader he was operating overturned. The victim had 7 years mining experience as a loader operator, all with this company, the last two years of which he worked on an intermittent basis.

The company was a cement mill normally operating three shifts, 8 hours a day, 7 days a week. A total of 272 persons was employed.

Limestone to produce the cement was mined from a quarry nearby and transported by trucks to the plant where the material was crushed and then conveyed to raw mills and kilns. The final product was shipped in bags and bulk to various customers in the area. A coal plant, adjacent to the mill supplied fuel to fire the kilns.

DESCRIPTION OF ACCIDENT: On the day of the accident the victim arrived at the mill at approximately 10:15 p.m. and talked with other employees until 11:00 p.m. He then reported to his assigned area at the coal section to wait in his parked front-end loader for work assignment.

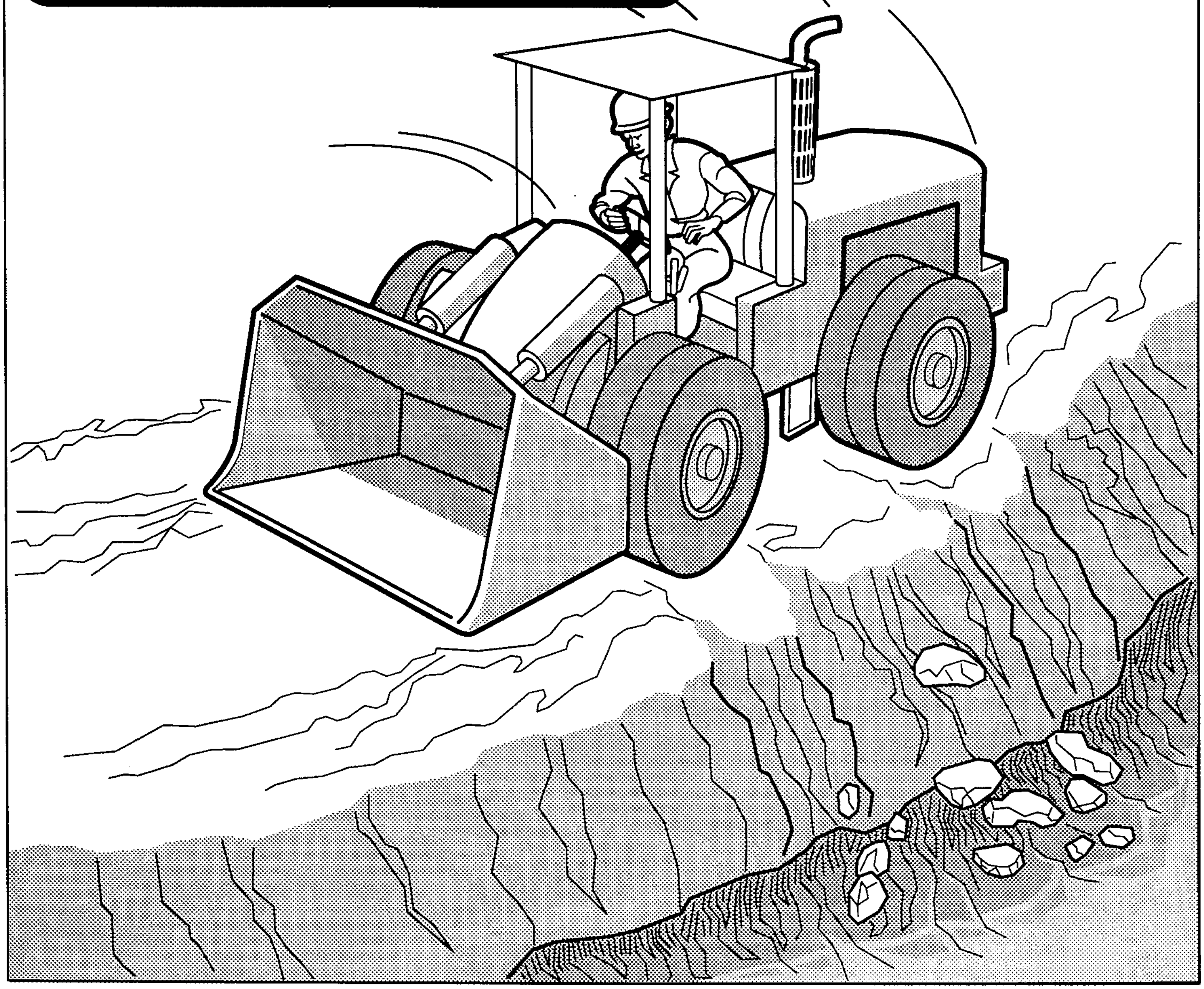
At 11:20 p.m., the coal section primary crusher operator instructed the victim to proceed to the feeder area to fill the coal silo to its full capacity. The coal feeder area was located at the opposite end of the elevated roadway from where the victim was parked. The crusher operator activated the feeder, conveyor, and crusher, and then went to the raw mill area. When the victim finished his assigned task he proceeded to return to the coal section where he was previously parked. As he drove past the clinker storage building, the loader went over the edge of the road where no berm existed, fell approximately 9 feet to the ground and overturned.

A laboratory technician went to pick up samples at the cement mill at 12:25 a.m. As he walked in front of the coal mill area he saw the overturned loader and immediately ran towards the loader. He tried to locate the victim and when he could not find him, he contacted the control room on his two-way radio to report the accident.

The plant foreman responded to the call and immediately went to the scene of the accident. He positioned his truck to direct the headlights toward the loader and looked inside the operator's compartment. He was unable to see and proceeded to the guardhouse for a flashlight. When he returned, he again looked inside the operator's compartment of the loader and found the victim. Apparently he had died instantly as his head had been crushed between the loader and the canopy which collapsed. When the loader was returned to the upright position, the coroner pronounced the victim dead. The body was extracted from the wreckage and removed from the mill property at 7:30 a.m.

Metal and Nonmetal mine fatalities to date — thru 04-12-93

Type	1989		1990		1991		1992		1993	
	UG	S	UG	S	UG	S	UG	S	UG	S
Electrical	1	0	0	0	0	3	0	1	0	1
Fall of roof/back	2	0	1	0	0	0	0	0	2	0
Haulage	1	1	0	4	0	3	1	3	0	1
Machinery	0	4	0	2	0	0	0	4	0	3
Other	2	8	1	2	4	3	0	1	0	1
Total	6	13	2	8	4	9	1	9	2	6



CONCLUSION: The cause of the accident was failure to provide a berm on the edge of the elevated roadway. A contributing factor may have been that a competent person designated by the operator did not examine the work areas to detect conditions that might adversely affect health and safety of the workers. Contributing to the seriousness of the injury involved was the fact that the loader was not equipped with a roll-over protective structure.

Windsor commended for safety achievements

Mine employees earn recognition from agencies for decades of fatality-free coal production

By Dave Waitkus

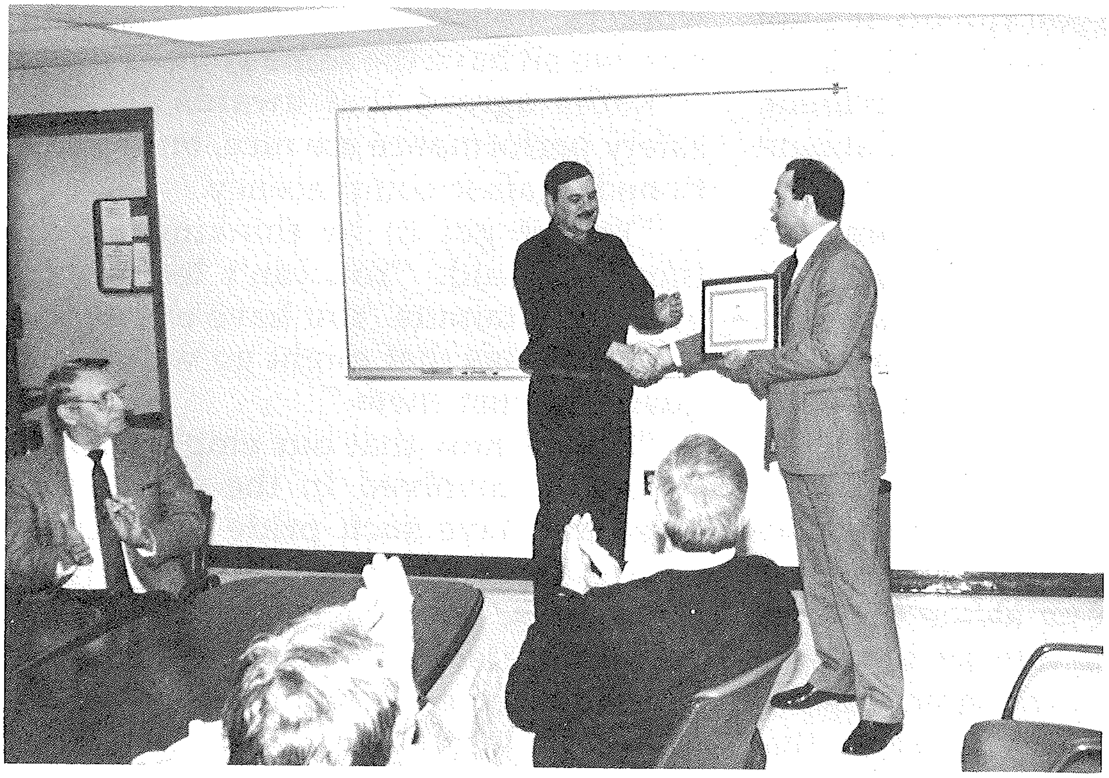
Windsor Coal Company received three awards February 2 for safety accomplishments mine employees have achieved.

Windsor received a Mountaineer Guardian Award and a Certificate of Achievement from the West Virginia office of Miners' Health, Safety & Training. Doug Conaway, administrator of mine safety and enforcement for the office, presented the awards to Bill Mathews, general manager at Windsor, and Joe Taggart, an outside supplyman and president of United Mine Workers of America Local 6362 that represents Windsor miners.

Employees at Windsor earned the Mountaineer Guardian for mining 15 million tons of coal from 1977-92 without a fatality. The Certificate of Achievement reflected the fact that in 1992 Windsor marked 35 consecutive years without a fatality.

Windsor also received a Holmes Safety Association award from Ron Keaton, manager of the Mine Safety and Health Administration's District 3. The Holmes award noted that "Windsor Coal is hereby recognized for working 23,500,000 employee-hours, from 1957 to 1992, in the coal industry without incurring a fatal accident."

Ron Keaton (third from left), manager of District 3 for the Mine Safety and Health Administration, presents a Holmes Safety Association award to Bill Mathews (third from right), general manager of Windsor Coal. Looking on are Hugh H. "Luke" Lucas (far left), vice president—mining operations for the AEP Fuel Supply Department; Robert Crumrine (second from left), subdistrict manager, MSHA; J. E. "Jach" Katlic (far right), senior vice president—fuel supply for the AEP Service Corporation; and Joe Taggart (second from right), an outside supplyman at Windsor and president of United Mine Workers of America Local 6362 representing Windsor miners.



Doug Conaway (right), administrator of mine safety and enforcement for the West Virginia Office of Miners' Health, Safety & Training, presents a "Certificate of Recognition" to Bill Mathews, general manager of Windsor Coal Company, during a ceremony at the mine in West Liberty, WV.

"These awards are a tribute to the dedication to safety by *all* employees at Windsor Coal," said Mathews. "These go to the people who work safely day in and day out."

"The membership of Local 6362 and the company have a great working relationship," added Taggart. "Without that, you'd never see these kinds of statistics."

Referring to the Mountaineer Guardian, Conaway said, "This award exemplifies what I've heard from AEP all along. That is, you can mine coal, you can be productive, and you can be safe."

"I know I speak for people in companies, management, and union representatives, as well, that some day we will be presenting awards for *accident-free* coal, not just fatal-free coal," he continued. "It's achievable, that's what we're striving for and this operation is way ahead of everybody."

"Safety and production do go hand-in-hand, it's not just a cliché." said J.E. "Jack" Katlic, senior vice president-fuel supply for the AEP Service Corporation. "This mine has tripled its productivity while it has an accident incident rate under one. [Windsor's rate, which is derived by multiplying the number of lost-time accidents by 200,000, then dividing by the number of employee-hours for the year, was 0.61 for 1992.]

"When you put it all together, it's like that Super Bowl team—you're going to be looking at that Dallas team for a long time," he added. "You're going to be looking at a group here that will set a mark for the industry for a long time."

Katlic told the representatives that Windsor and the rest of the mining and transportation operations of the AEP Fuel Supply Department are more than willing to share the ideas and programs that have helped them become industry leaders in safety performance.

"We've always had an open door at all our operations," he said. "It's times like these that tell the rest of the industry that this is what you can do. It's not a dart that you throw without looking. These things don't happen by accident. They take dedication and a commitment from everyone."

"It's not so much your programs, it's your philosophy," added Keaton. "We can come up with all kinds of programs, and we have some good programs, but there are very few people who are endowed with the philosophy that you have."

Mathews said the Windsor philosophy is simple, yet requires constant reminders to everyone at the mine.

"At the end of the day we recognize that we're all here for the same reason," he explained. "That's to make sure that everybody here goes home safely, with no accidents and no fatalities. We have different ways of doing that, but the goal is the same. Whether it's the salaried workers, hourly workers, or the agencies, we all have the same goal—safety."

Katlic agreed that awards for past safety performance are nice, but he cautioned against complacency.

"You've got to be thinking all the time," he said. "You can't let up, not even for a minute. You have to be looking for things that might go wrong and guard against them."

"I think now that our employees are so totally involved in the safety process, and have such pride in their accomplishments, that they motivate themselves," he added. "Again, we can't get complacent. We've got to continue to encourage each other."

"This is just the start of it," concluded Taggart. "We've got a lot yet that we can do, and this is only the beginning."

Reprinted from the March 1993 issue of the ***Coal Courier.***

Wood and Morrell honored at Ohio HSA meeting

Lifesaving awards presented at Ohio State Council meeting on March 10, 1993

By Dave Waitkus

Chuck Wood and John Morrell were honored recently at the 2nd Annual Meeting of the Ohio State Council of the Holmes Safety Association. The meeting was held in Worthington, Ohio.

Wood, a section supervisor-training at Southern Ohio Coal Company's Meigs Division, received a "Dedication To Safety Award" from the Ohio Department of Industrial Relations' Division of Mines. The award was presented to Wood "in recognition of Outstanding commitment to health and safety standards in the work place."

Morrell, a section supervisor-outby at Southern Ohio Coal's Meigs No. 2 mine, received a Holmes Safety Association award "For Saving A Life."

Last July, while attending a family dinner, Morrell saved his sister's life by using the Heimlich maneuver. Morrell learned the technique during a training class at the Meigs Division. Ironically, Wood was the instructor of the class.

John Morrell (left) and Chuck Wood proudly display the awards they received from the Ohio State Council of the Holmes Safety Association.

An 18-year veteran of the Meigs Division, Wood has served in the medical corps for the U.S. Army, as a station chief for the Southeastern Ohio Emergency Medical Services, as captain of the Wellston Fire Department, and as a state Emergency Medical Technician (EMT) instructor.

While continuing his volunteer work as a rescue squad member in Oak Hill, Ohio, Wood joined the Meigs Division in 1975 as a general inside laborer. He moved to the safety department at Southern Ohio Coal's former Meigs No. 1 mine in 1977 as an environmental technician. Wood was later promoted to safety assistant and served as briefing officer of the Meigs No. 1 mine rescue squad.

He transferred to section supervisor-training at the Meigs Division office in 1984. In his position, he is responsible for the training and retraining of all EMTs at Southern Ohio Coal, as well as the annual safety training for all Meigs Division employees.

"We are serious about safety," says Wood, a Wellston resident. "A lot of it comes from the quality people we have at Southern Ohio Coal and the support we get from the top down."

"You sometimes present materials and wonder if any of it is sticking," he continues. "Then you come upon something like what happened to John (Morrell) and it makes it all worthwhile."

"Once it happened, it was just like in the classroom," recalls Morrell, referring to his lifesaving actions. "It's amazing how fast it comes to you."

Morrell says his sister, Arlene, who is confined to a wheelchair and cannot speak, began having problems midway through a family meal. John immediately got behind her, lifted her from the chair and applied the Heimlich.

"Chuck gives you a good idea on how to perform simple lifesaving techniques claims the Athens, Ohio, resident, who is a nine-year veteran at Meigs. "If I wouldn't have had the training, I wouldn't have known what to do."

Later, during another visit with his sister, Morrell says she pointed to letters which spelled out, "You saved my life."

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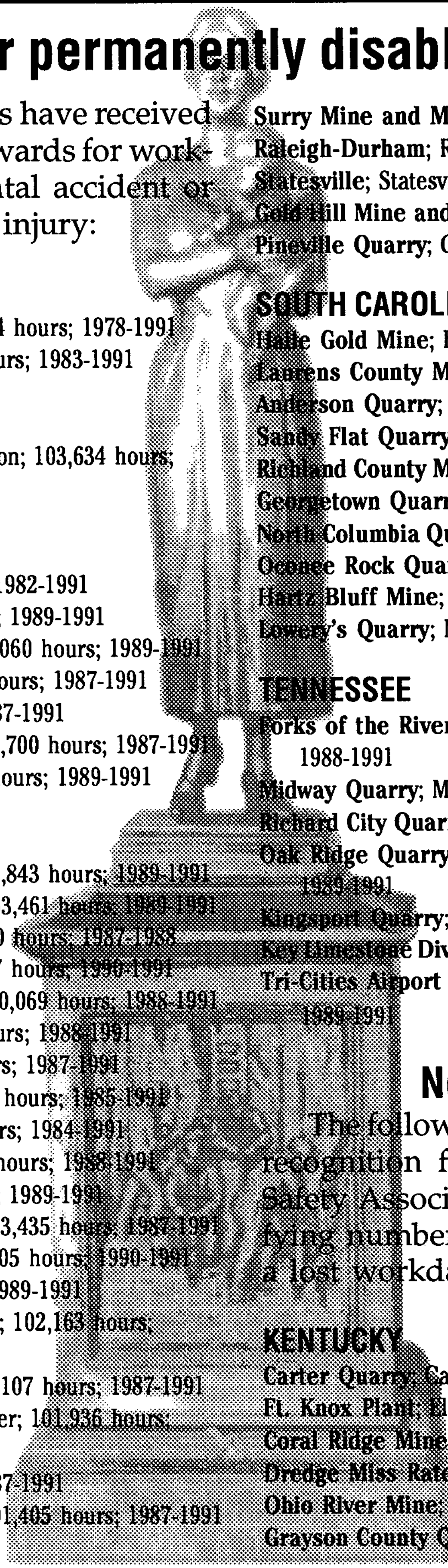
No fatals or permanently disabling injuries



The following operations have received Joseph A. Holmes Safety Awards for working without incurring a fatal accident or permanent total disabling injury:

ALABAMA

Ohatchee Quarry; Alexandria; 501,764 hours; 1978-1991
Glencoe Quarry; Glencoe; 291,548 hours; 1983-1991

GEORGIA

Huber Wilkinson County Mine; Macon; 103,634 hours; 1987-1991

KENTUCKY

D Quarry; Morehead; 345,635 hours; 1982-1991
"V" Quarry; Morehead; 169,884 hours; 1989-1991
Elkhorn Stone Quarry; Elkhorn; 117,060 hours; 1989-1991
Lebanon Quarry; Lebanon; 106,119 hours; 1987-1991
Hartford; Hartford; 100,830 hours; 1987-1991
Pace Quarry and Mill; Glasgow; 100,700 hours; 1987-1991
Price Valley Quarry; Stats; 100,595 hours; 1989-1991

NORTH CAROLINA

Quartz Operations; Spruce Pine; 616,843 hours; 1989-1991
Neverson Quarry and Mill; Bailey; 153,461 hours; 1989-1991
Elliott Mine and Mill; Erwin; 127,470 hours; 1987-1988
Gardner Quarry; Bunn Level; 113,437 hours; 1990-1991
Crabtree Mine and Mill; Raleigh; 110,069 hours; 1988-1991
Shelton Quarry; Pelham; 107,879 hours; 1988-1991
Jamestown; Jamestown; 105,946 hours; 1987-1991
Salisbury Quarry; Salisbury; 105,235 hours; 1985-1991
Denver Quarry; Denver; 104,614 hours; 1984-1991
Moncure Quarry; Moncure; 104,248 hours; 1988-1991
Plant #2; Spruce Pine; 103,501 hours; 1989-1991
Fleming Mill and Pits; Louisburg; 103,435 hours; 1987-1991
Greystone Quarry; Henderson; 103,305 hours; 1990-1991
Belgrade; Maysville; 102,686 hours; 1989-1991
Bessemer City Plant; Bessemer City; 102,163 hours; 1987-1991
Lemon Springs; Lemon Springs; 102,107 hours; 1987-1991
Fletcher Limestone Co., Inc.; Fletcher; 101,936 hours; 1989-1991
Clarks; New Bern; 101,620 hours; 1987-1991
Mallard Creek Quarry; Charlotte; 101,405 hours; 1987-1991
Surry Mine and Mill; Mt. Airy; 101,264 hours; 1987-1991
Raleigh-Durham; Raleigh; 100,896 hours; 1989-1991
Statesville; Statesville; 100,416 hours; 1989-1991
Gold Hill Mine and Mill; Gold Hill; 100,085 hours; 1989-1991
Pineville Quarry; Charlotte; 100,049 hours; 1990-1991

SOUTH CAROLINA

Haile Gold Mine; Kershaw; 112,655 hours; 1985-1991
Laurens County Mines; Enoree; 109,922 hours; 1989-1991
Anderson Quarry; Anderson; 104,965 hours; 1989-1991
Sandy Flat Quarry; Taylors; 104,360 hours; 1989-1991
Richland County Mines; Columbia; 103,248 hours; 1987-1991
Georgetown Quarry; Jamestown; 102,583 hours; 1989-1991
North Columbia Quarry; Columbia; 102,268 hours; 1989-1991
Oconee Rock Quarry; Walhalla; 101,140 hours; 1983-1991
Hartz Bluff Mine; Summerville; 100,254 hours; 1985-1991
Lowery's Quarry; McConnells; 100,114 hours; 1988-1991

TENNESSEE

Forks of the River Quarry; Knoxville; 110,464 hours; 1988-1991
Midway Quarry; Mascot; 106,741 hours; 1989-1991
Richard City Quarry; Richard City; 104,809 hours; 1986-1991
Oak Ridge Quarry and Mill; Oak Ridge; 104,096 hours; 1989-1991
Kingsport Quarry; Kingsport; 103,454 hours; 1989-1991
Key Limestone Division; Jacksboro; 102,421 hours; 1989-1991
Tri-Cities Airport Quarry; Blountville; 100,199 hours; 1989-1991

No lost workdays

The following operations have received recognition from the Joseph A. Holmes Safety Association for working the qualifying number of hours without incurring a lost workday injury:

KENTUCKY

Carter Quarry; Carter; 96,459 hours; 1987-1991
Ft. Knox Plant; Elizabethtown; 63,084 hours; 1990-1991
Coral Ridge Mine; Fairdale; 60,362 hours; 1983-1992
Dredge Miss Rate; Louisville; 57,805 hours; 1990-1991
Ohio River Mine; Paducah; 57,223 hours; 1988-1991
Grayson County Quarry; Leitchfield; 56,704 hours; 1990-1991

Caldwell Quarry; Albany; 55,037 hours; 1986-1991
Indian Creek Quarry; Mt. Sterling; 53,712 hours; 1988-1991
Williams Quarry; Columbia; 53,688 hours; 1989-1992
Henderson County Sand Co.; Henderson; 51,765 hours; 1987-1991

TENNESSEE

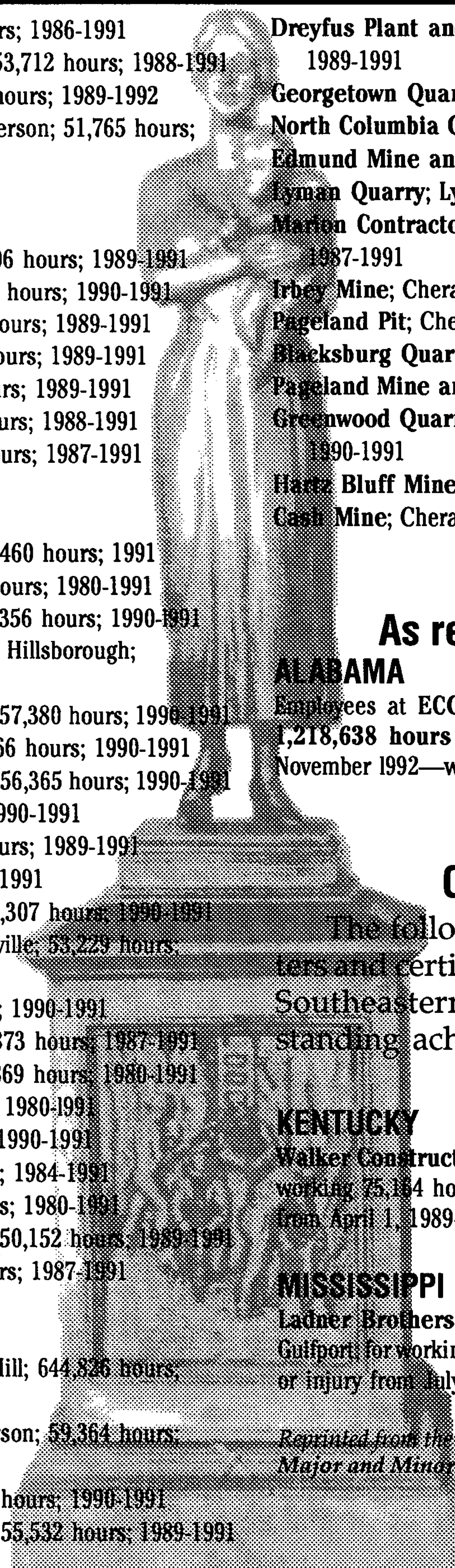
Sevierville Quarry; Sevierville; 58,106 hours; 1989-1991
Cleveland Quarry; Cleveland; 54,736 hours; 1990-1991
Tazewell Quarry; Tazewell; 54,071 hours; 1989-1991
Riverside Drive; Knoxville; 52,120 hours; 1989-1991
Bloomingdale; Kingsport; 51,479 hours; 1989-1991
Millertown "A"; Knoxville; 51,066 hours; 1988-1991
Industry Drive; Kingsport; 50,074 hours; 1987-1991

NORTH CAROLINA

Raleigh Mine and Mill; Raleigh; 60,460 hours; 1991
Cabarrus Quarry; Concord; 59,060 hours; 1980-1991
Chapel Hill Quarry; Chapel Hill; 58,356 hours; 1990-1991
Piedmont Minerals Company, Inc.; Hillsborough; 57,759 hours; 1990-1991
North Durham Quarry; Rougemont; 57,380 hours; 1990-1991
Elm City Quarry; Sharpesburg; 56,866 hours; 1990-1991
Cape Fear Sand and Gravel; Erwin; 56,365 hours; 1990-1991
Woodleaf; Woodleaf; 55,162 hours; 1990-1991
Thomasville; Thomasville; 54,909 hours; 1989-1991
Bakers; Monroe; 54,485 hours; 1990-1991
Smith Grove Quarry; Mocksville; 54,307 hours; 1990-1991
Hendersonville Quarry; Hendersonville; 53,229 hours; 1990-1991
Boone Quarry; Boone; 52,376 hours; 1990-1991
Central Quarry Shop; Durham; 51,873 hours; 1987-1991
Harnett County Pits; Cameron; 51,869 hours; 1980-1991
Brickhaven; Moncure; 51,374 hours; 1980-1991
Reidsville; Reidsville; 50,833 hours; 1990-1991
401 Sand Pit; Raeford; 50,720 hours; 1984-1991
White Pit II; Greenville; 50,270 hours; 1980-1991
Pine Hall Mine and Mill; Madison; 50,152 hours; 1989-1991
Gainey Mine; Goldsboro; 50,045 hours; 1987-1991

SOUTH CAROLINA

Holly Hill Quarry and Mill; Holly Hill; 644,826 hours; 1990-1991
Jefferson Quarry and Plant; Jefferson; 59,364 hours; 1989-1991
Sandy Flat Quarry; Taylors; 56,587 hours; 1990-1991
Richland County Mines; Columbia; 55,532 hours; 1989-1991
Dreyfus Plant and Quarry; Columbia; 55,214 hours; 1989-1991
Georgetown Quarry; Jamestown; 52,727 hours; 1990-1991
North Columbia Quarry; Columbia; 52,430 hours; 1990-1991
Edmund Mine and Mill; Columbia; 51,994 hours; 1990-1991
Lyman Quarry; Lyman; 51,049 hours; 1989-1991
Marion Contractors Mine #l; Marion; 50,945 hours; 1987-1991
Irbey Mine; Cheraw; 50,763 hours; 1980-1991
Pageland Pit; Cheraw; 50,762 hours; 1987-1991
Blacksburg Quarry; Blacksburg; 50,661 hours; 1989-1991
Pageland Mine and Mill; Jefferson; 50,541 hours; 1989-1991
Greenwood Quarry and Mill; Greenwood; 50,533 hours; 1990-1991
Hartz Bluff Mine; Summerville; 50,254 hours; 1988-1991
Cash Mine; Cheraw; 50,140 hours; 1988-1991



As reported by industry

ALABAMA

Employees at **ECC International**, Sylacauga, have worked **1,218,638 hours in two years**—from November 1990 to November 1992—without a lost-time accident or injury.

Congratulations

The following operations received letters and certificates of recognition from the Southeastern District Manager for outstanding achievements in safety:

KENTUCKY

Walker Construction Company; 213 Quarry; Mt. Sterling; for working 75,164 hours without a reportable accident or injury from April 1, 1989-November 1, 1992.

MISSISSIPPI

Ladner Brothers Sand and Gravel, Inc.; Ladner Pit No. 1; Gulfport; for working 133,961 hours without a lost-time accident or injury from July 1985-June 1992.

*Reprinted from the December 1992 issue of **Southeast News: Major and Minor.***

The last word...

"Experience teaches you to recognize a mistake when you've made it again."

"Art, like morality, consists of drawing the line somewhere."

"Quotations are a columnist's bullpen. Stealing someone else's words frequently spares the embarrassment of eating your own."

"Nothing is impossible for the man who doesn't have to do it himself."

"A censor is a man who knows more than he thinks you ought to."

"A committee is a cul-de-sac down which ideas are lured than quietly strangled."

"As scarce as truth is, the supply has always been in excess of the demand."

"Hell is paved with Good Samaritans."

"A friend in need is a friend to dodge."

"You can't depend on your eyes when your imagination is out of focus."

"Cabbage: A vegetable about as large and wise as a person's head."

"Nobody outside of a baby carriage or a judge's chamber believes in an unprejudiced point of view."

"For people who like peace and quiet: a phoneless cord."

NOTICE: We welcome any materials that you submit to the Holmes Safety Association 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 1993 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

Phone: (703) 235-1400