BULLETIN

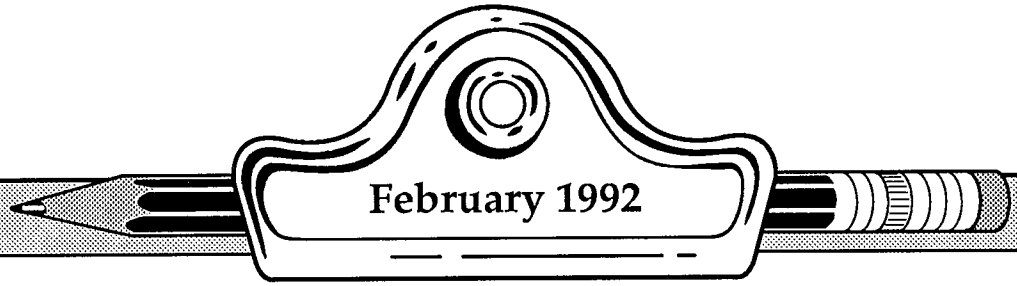
HOLMES SAFETY ASSOCIATION

E PLURIBUS UNUM

SAFETY EFFICIENCY

MINERAL INDUSTRIES

February 1992



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Please note: The views and conclusions expressed in HSA Bulletin articles are those of the authors and should not be interpreted as representing official policy of the Mine Safety and Health Administration.

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 NUMBER	LOCATION
Madison Materials Guntersville	9523	Guntersville, AL
Memphis Archeological & Geol. Soc.	9524	Memphis, TN
Centre Lime & Stone Co., Inc.	9526	Pleasant Gap, PA
Jeffrey Safety Association	9527	Saulsbury, TN
Elizaville Sand & Gravel	9528	Elizaville, NY
DalSanto Brothers Inc.	9529	St. Charles, IL
Hayes Washed Sand & Gravel Co.	9530	Novi, MI
Crystal Shop	9531	Memphis, TN
Cabot Safety Corp.	9532	Mesa, AZ
Boilh Mining Co.	9533	Smithfield, OH
Arrowhead Pit	9534	Hopedale, OH
V&M Mining Co.	9537	Pikeville, KY
Big Oak Construction	9538	Ashcamp, KY
Mining Development Services	9539	Stigler, OK
San Xavier Rock & Materials	9540	Tucson, AZ
Balke Pit, Figgins Sand & Gravel	9542	Belgrade, MT
J.A. and W. A. Hess, Inc.	9543	Hazleton, PA
Holnam Inc.	9544	Artesia, MS
Arden Shell Trucking	9545	Gladwin, MI
Weldon's Transit Mix, Inc.	9546	Harrison, MI
Vulcan Materials Company	9547	Gate City, VA
Vulcan Materials Company	9548	Norton, VA
Vanderbilt Minerals/Sidehill	9549	Beatty, NV

NAME	CHAPTER NUMBER	LOCATION
Summit, Inc.	9550	Lead, SD
Fisher Industries	9551	Spearfish, SD
Yellowstone Mine	9552	Cameron, MT
Richmond Hill, Inc.	9553	Lead, SD
Cyprus West Windsor	9554	Windsor, VT
Tilcon N.Y., Inc.	9557	Haverstraw, NY
Holnam, Inc.	9558	Saratoga, AR
Quarrie	9559	Cotter, AR
Rock Products	9560	Heber Springs, AR
Arkhola	9561	Ft. Smith, AR
Carter	9562	Greenwood, AR
Mable's Chapter	9563	Little Rock, AR
Quarrie	9564	Mt. Home, AR
Bob's Construction Sand & Gravel	9565	Henderson, NV
White Grow Gypsum	9566	Bozeman, MT
Vanderbilt Minerals	9567	Beatty, NV
Geochem Mines – February Premier	9568	Goldfield, NV
Dixie Inn Plant #904	9569	Minden, LA
Little River #902	9570	Ashdown, AR
Delight Chapter	9571	Delight, AR
Eagle Mills	9572	Bearden, AR
Palumbo Sand & Gravel	9573	Somers, NY

"Safety in Welding and Cutting" details practices and procedures

ANSI rule covers labeling, ventilation, protective equipment, and individual responsibilities

By August F. Manz, Director-at-Large, American Welding Society, Miami, Florida

Proper labeling, ventilation, physical protection, and fire prevention are among the key elements of welding safety. These points are discussed in detail in "Safety in Welding and Cutting" (ANSI/ASC Z49.1-88). The latest edition, published by the American Welding Society (AWS), is an update of the 1983 version, and is printed in a new two-column format—the standard is on the left with pertinent commentary on the right.

New labeling

An important, industry-wide labeling practice that indicates specific hazard levels is followed in the standard. In essence, the practice requires that the signal word:

- "Danger" appear on things that can kill;
- "Warning" appear on things that can cause serious harm or injuries;
- "Caution" appear on things that cause minor injuries.

This three-tier labeling procedure anticipates the expected ANSI Z535 Standard, which outlines an industry-wide labeling system.

Following the signal words "danger," "warning" or "caution," which identify hazard levels, labels describe the hazard and its consequences and list the appropriate precautionary measures. The AWS "Safety in Welding and Cutting" standard spells out these measures:

"Before use, read and understand manufacturers' instructions, Material Safety Data Sheets (MSDSs), and your employers' safety practices." The standard points out that MSDSs are required by OSHA standard 29 CFR 1910.1200.

"Keep your head out of fumes." Fume plumes are the clearly visible columns of fumes that rise directly from the welding or cutting action.

Use enough ventilation, exhaust, or both to keep fumes and gases from your breathing zone and the general area."

Adequate ventilation is defined by five factors:

- Volume and configuration of the spaces in which operations occur;
- Number and type of operations that generate contaminants;
- Allowable levels of specific toxic or flammable contaminants which are generated;
- Natural air flow;
- Location of the welders' and other persons' breathing zones in relation to the contaminants or sources.

The recommended method to de-

termine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed.

Physical protection

In addition to ventilation, the AWS standard cites requirements for adequate physical protection.

"Wear correct eye, ear, and body protection." Requirements for protective clothing are detailed; eye and face protection must comply with ANSI Standard Z87.1, "Practices for Occupational and Educational Eye and Face Protection." An updated filter selection guide helps determine the appropriate lens shades.

Welding helmets with filter plates protect against arc rays, weld sparks, and spatter that impinge directly against the helmet. But they are not intended to protect against slag chips, grinding fragments, wire wheel bristles, and similar hazards that can bounce or ricochet under the helmet. Spectacles with side shields, goggles, or other appropriate eye protection must be worn to protect against these hazards.

Protective, flame-resistant gloves made of leather or other suitable materials are recommended. Insulated linings should be used to protect body areas exposed to high radiant energy. In production work, flame-resistant leggings or sheet-metal screens in front of workers' legs provide protection against sparks and molten metal in welding and cutting operations.

Preventing contamination

Other requirements of the new AWS standard include special precautions for working in confined spaces. According to the new commentary, service equipment must be located to prevent contamination of the atmosphere in confined spaces. This contamination may come from leaks in gas cylinders or fumes from welding power sources or similar equipment.

The standard also points out that brazing furnaces are, in many respects, a type of confined space. Brazing furnaces employ a variety of atmospheres to exclude oxygen during the brazing process. Potential hazards in operating brazing furnaces are:

- Personnel entering or working in adjacent areas may be asphyxiated where there is insufficient oxygen in the atmosphere to support life.
- Explosive mixtures of flammable gas and air can develop within the furnaces during generation or venting of atmospheres in them.
- Hazardous fumes or gases can accumulate in the work area due to the brazing process.

Individuals responsible

Job supervisors play a key role in providing a safe work site by making sure that conditions remain safe and ready for use. This can be aided by installing a mandatory "hotwork" authorization program. "Hotwork" is defined in the standard as any work involving burning, welding, or similar fire-producing operations.

Managers, job supervisors, and welders must be certain that there is fire protection equipment around welding and cutting sites. Supervisors should assign fire watchers as needed.

Fire watchers, as explained in the

AWS standard, are persons assigned to work with welders to watch for fires resulting from welding, cutting, and brazing operations. The standard states that fire watchers, *especially,* must watch for fires in areas not readily observed by welders, such as on opposite sides of walls, levels below, or hidden areas. They also must observe work areas for at least half an hour after the welders have left.

As many know, safety is a responsibility shared among managers, supervisors, and welders. At the highest level, management should ensure that supervisors and workers are trained in proper welding safety practices. Supervisors, then, are responsible for handling equipment and on-site processes safely. Welders, the third link in the safety chain, must understand hazards and safe equipment operations; they should follow procedures spelled out in standards, manufacturers' instructions, MSDSs, and company policies. This joint responsibility, fully exercised by all three parties under the guidance of the new AWS Z49.1 "Safety in Welding and Cutting" standard, maximizes safety.

Wyoming's Powder River Basin announces mine training programs

Wyoming surface mine foreman's review

Preliminary plans are now in progress for the formation of Wyoming surface mine foremen review classes. Call (307) 686-8178, so a determination can be made on the composition of these classes. A study guide is available for $6.00 a copy at the 1001 Plaza Center office.

MSHA electrical certification test

The electrical testing schedule follows:

March 3-4, 1992
June 9-10, 1992
September 1-2, 1992

Commercial drivers license classes

As of April 1, 1992, all commercial motor vehicle drivers must have a commercial drivers license (CDL). A CDL preparation course will furnish assistance in passing the knowledge tests for DOT's commercial and heavy vehicle drivers license examinations. All classes are held at 1001 Plaza Center [in Gillette] for a fee of $30.00. The following schedule will be observed:

February 12, 7 a.m. to 4 p.m.
February 19 & 26, 6 p.m. to 10 p.m.
March 11, 7 a.m. to 4 p.m.
March 18 & 25, 6 p.m. to 10 p.m.

On-site classes can also be arranged.

Industrial hygiene classes offered

Julie Faroni will be offering an industrial hygiene class on March 4-6 from 9 a.m.-5 p.m. at 1001 Plaza Center [in Gillette] for a fee of $115.00. The class will present the basic principles and techniques for recognizing, evaluating, and controlling the chemical and biological stresses pertaining to the surface coal mining workplace environment. Call (307) 682-7400 to register.

Holmes Safety Association
Monthly safety topic

Fatal machinery accident

GENERAL INFORMATION: A 44-year-old mine foreman, with 21 years of experience, died as as a result of being pinned by an overhead airlock door that was accidentally lowered as he was passing beneath in a rubber-tired personnel carrier.

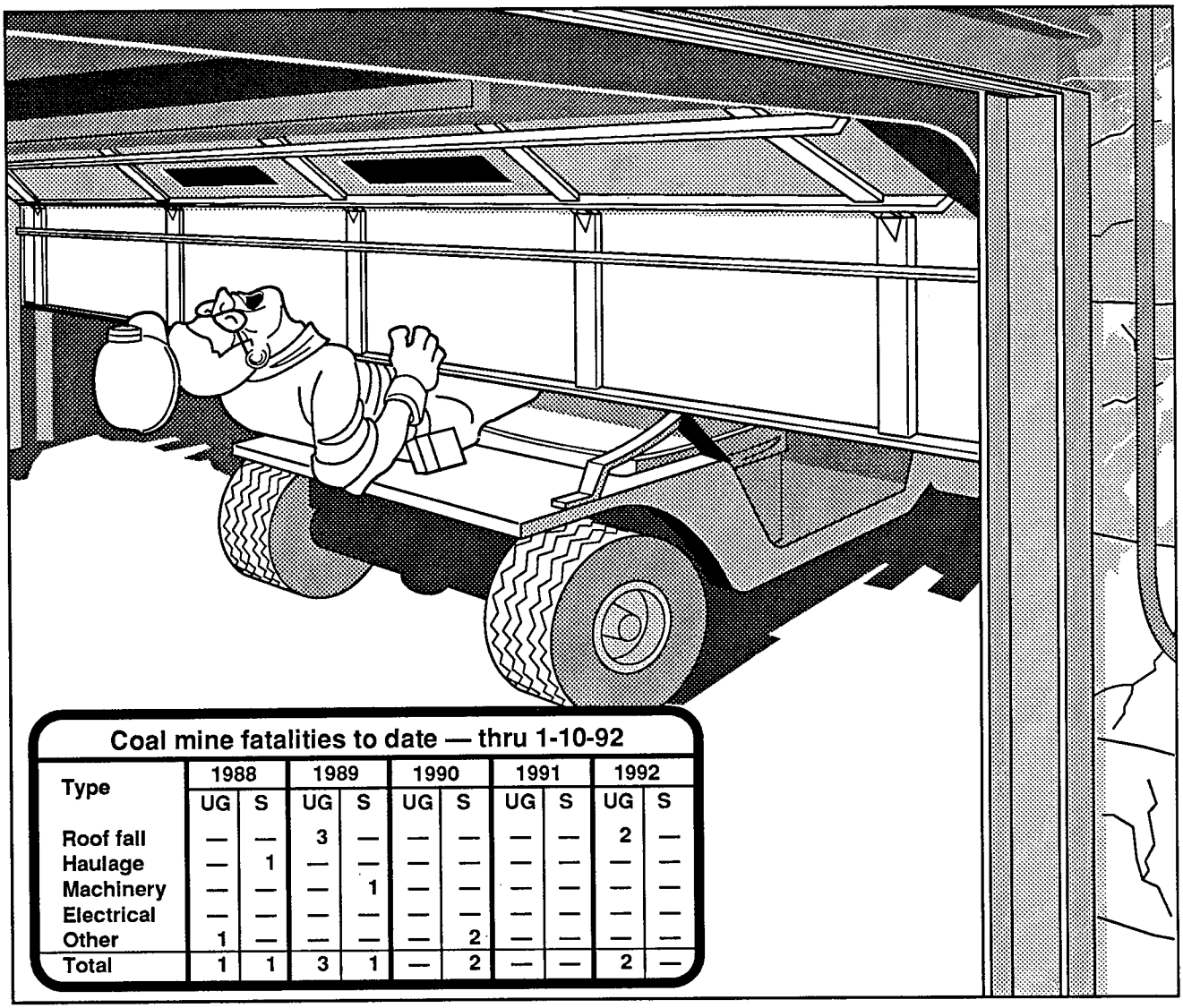
The mine has two shafts, one production and one divided man-material shaft, which also contains the main upcast and downcast air. It is over 1,000 feet to the 5-foot thick seam. The total employment is 260, with four conventional sections producing 8,200 tons daily.

DESCRIPTION OF ACCIDENT: On the day of the accident, the 7:00 a.m. to 3:00 p.m. shift entered the mine, proceeded to their assigned work locations, and commenced routine coal production activities. The victim assigned the outby personnel to various work areas. He spent the first half of the shift traveling throughout the mine, visiting many of these areas.

At about 1:00 p.m., the victim arrived at the second 48-switch where it was undergoing repairs by two general laborers. The victim instructed them to repair the No. 4 unit switch, where a bus and a supply trailer had derailed that morning. The laborers loaded their tools and asked the victim if he would take some track bolts and follow them. He agreed and the laborers got on their rubber-tired personnel carrier, which was facing inby. The victim, also driving a personnel carrier, which was facing outby, drove to the second 48 header and turned around. At that point, the victim was 200 to 300 feet behind them, traveling in the same direction. They saw the victim's headlights and, after turning the warning light on at the top of the northeast hill, they proceeded down. At the bottom of the hill, they passed the switch to deactivate the warning light, knowing the victim would deactivate the switch as he passed.

To get to the No. 4 unit, it was necessary to travel along the northeast track entry and pass through a set of two air-operated airlock track doors. These doors were located about 1,300 feet from the shaft bottom. When the laborers arrived at the outby door, one of the laborers activated the switch to open the airlock door. They then passed through the open door and proceeded toward the switch to close the airlock door, about 160 feet inby. As one laborer drove by the switch, he swung away so the other laborer would not activate it. This would allow the victim, following behind, to pass through and hit the switch to close the door. When the laborers arrived at the next switch, they activated it, opening the inby airlock door. They then passed through this door and continued along the track entry.

The switch to close the inby airlock door was located 136 feet inby. Again, the laborer-driver swung away to prevent the other laborer from activating the switch, but they were still close



Coal mine fatalities to date — thru 1-10-92

Type	1988		1989		1990		1991		1992	
	UG	S	UG	S	UG	S	UG	S	UG	S
Roof fall	—	—	3	—	—	—	—	—	2	—
Haulage	—	1	—	—	—	—	—	—	—	—
Machinery	—	—	—	1	—	—	—	—	—	—
Electrical	—	—	—	—	—	—	—	—	—	—
Other	1	—	—	—	—	2	—	—	—	—
Total	1	1	3	1	—	2	—	—	2	—

enough for this laborer to reach it. Out of habit, and not realizing that the victim was close behind, the passenger-laborer reached up and activated the switch to close the inby airlock door. The driver shouted "No," but the switch had already been thrown.

The laborers immediately stopped the personnel carrier and looked back toward the airlock door. They could see the headlights of the victim's personnel carrier under the partially closed airlock door. The victim apparently had proceeded directly beneath the open airlock door when the switch was activated. They ran back to the door and found the victim pinned down in the cab of the personnel carrier by the partially closed door. They were unsuccessful in raising the airlock door to free the victim. One of the laborers called for help and, with the help of others who quickly arrived, the airlock door was lifted and the victim removed from the personnel carrier. CPR was begun and continued as the victim was transported to the surface. He was pronounced dead on the surface by the county coroner.

CONCLUSION: The accident occurred when a passenger riding on a personnel carrier activated the switch to close the airlock door, not knowing the victim was traveling close behind.

Study reveals causes, costs of accidents

Interviews with 26,000 people who have experienced losses due to accidents offer new insights.

By Jim Castelli

Accidents on the job make up 20 percent of all non-fatal accidents, but they account for almost half of all accident-related costs. At the same time, workers injured on the job recover a lower percentage of their economic loss than those involved in non-work accidents.

These are some of the findings from a major new study, "Compensation for Accidental Injuries in the United States," conducted by Deborah Hensler and 10 other researchers at the Rand Institute for Civil Justice. The study was partly funded by a grant from the U.S. Department of Health and Human Services. It was designed to examine the causes and costs of accidents, as well as the way victims are compensated through insurance, workers' compensation, government programs, legal action (tort liability), and other sources.

Researchers at Rand, which is based in Santa Monica, California, conducted telephone interviews with members of 26,000 households that had suffered economic loss due to accidents in 1989. They conducted follow-up interviews with 2,800 people from that group. They excluded accidental deaths because, while they make up a small proportion of all accidents, their costs are disproportionately high.

Overall, researchers found that, in 1989, one American in six sustained an accident-related injury which resulted in measurable economic loss. Of those, the study says, "about one-third suffer a moderate to very severe injury that imposes significant costs on them and on society." About three-fourths of the injuries occurred in 1989; the rest of the economic loss resulted from earlier injuries.

Here are some of the study's findings about those accidents:

- About one-fourth occur on the job or during commutes.
- About one-fourth involve people who work at home.
- About 30 percent occur during leisure time.
- Slips and falls cause about 40 percent.
- About 30 percent are caused by products, such as toys, tools, sports equipment, or household items.
- About 20 percent involve motor vehicles.
- Fewer than 10 percent cause very serious injuries and 20 percent cause moderately serious injuries.
- Most accidental injuries to young people occur outside of work and motor vehicles and are minor.
- Adults' injuries are roughly divided between home and work.
- Men are more likely to be injured on the job.
- Lower-income Americans are more likely to be injured on the job or in motor vehicles.

The study reports that the total cost of injuries—including old ones—in 1989 was $175.9 billion, or 4 percent of the gross national product. This includes $97.9 billion in medical and other direct costs and $78 billion in work loss. The work loss includes:

- Sick leave ($23.3 billion)
- Restricted time ($7.4 billion)
- Time lost by the disabled ($45.9 billion)
- Work time lost by family members who cared for the accident victims ($1.4 billion).

The cost of on-the-job accidents is $83 billion, 47 percent of the total, according to the study. It says costs of work-related accidents are high because they cause the most time lost from work. Motor-vehicle accidents account for 20 percent of all accidents and 21 percent of the cost. All other accidents account for 60 percent of the total and 32 percent of the cost.

For all accident injuries, the study says, individuals pay about 38 percent of the cost and are reimbursed for about 62 percent from other sources. But those injured on the job pay about 46 percent of the cost, and receive only about 54 percent of the cost from other sources. Those involved in both motor-vehicle accidents and all other accidents receive 69.5 percent of their losses and pay 30.5 percent of the cost themselves.

Of those injured on the job, 59.7 percent receive workers' compensation, a resource not available to those not injured on the job. But those not injured on the job are more likely to receive payment from their own health, auto, or accident insurance.

Those injured in motor-vehicle accidents are the most likely to sue and to receive payment through legal claims of tort liability against others involved in the accident: 31.4 percent of those involved in motor-vehicle accidents, 7.5 percent of those injured on the job, and 6.3 percent of those injured in other accidents receive payment from tort liability claims. In most cases, however, those covered by workers' compensation are barred by law from suing their employers.

The study says future research will focus on the lifetime costs of injuries and the differences in loss and compensation for loss among different demographic and socioeconomic groups.

Little killers

A new study estimates that small particles of soot, dust, and dirt in the air help kill 60,000 Americans a year, mostly those over 65 who already suffer from heart and lung diseases.

The national estimate is based on a study of the relationship between the mortality level and the daily level of total suspended particulates (TSP) in Philadelphia between 1973 and 1980. The researchers, Douglas Dockery of the Harvard School of Public Health and Joel Schwartz of the Environmental Protection Agency, claim that TSP kills even at levels well below existing standards.

They found that as the TSP rate in Philadelphia increased, so did the death rate. The death rate increased by 7 percent for each 100 micrograms of TSP per cubic meter of air. When they apply that rate to the United States, Dockery and Schwartz claim that TSP accounts for 3 percent of the 2 million deaths in

the United States each year.

Ergonomic relief

"Good ergonomics is good economics," Dan MacLeod, an ergonomics consultant from Bloomington, Minn., told a conference on workplace safety and health regulation.

MacLeod says ergonomics redesign leads to higher productivity, and poor product quality is inevitable when employees work in a badly designed workplace. Many product-quality problems are the result of job design that makes it "impossible to do a quality job," he says.

"There are limitations of the human body to repetitive motion and awkward postures," and overtaxing the body "leads to mistakes," according to MacLeod.

The use of tools that require both hands, instead of one, helps reduce the strain on hands and wrists, he says. A match between the tool and the worker's hand size, and tilted and adjustable surfaces in the workplace, also reduce strain.

MacLeod adds that "sometimes making a job easier for a worker makes it faster, too." He asserts that a quality product is the biggest payoff for good job design.

Teens need health help

Perhaps one in five of America's 31 million adolescents—those age 10 to 18—has at least one serious health problem, according to a Congressional Office of Technology Assessment report. The report says school-linked health centers may be a method to provide much-needed health care for adolescents.

"U.S. adolescents often face formidable barriers in trying to obtain basic health care," the report says. Other findings include:

- One in seven adolescents has no health insurance.
- One-third of poor adolescents are not covered by Medicaid.
- Half of all Black, Hispanic, American Indian and Alaska native adolescents are from low-income families.
- Seventeen percent of white, non-Hispanic adolescents live in families that are poor or near poor.

Despite a longstanding belief by medical providers that special skills are needed in order to treat adolescents, there is fewer than one such professional for every 1,000 adolescents, the report says.

The "most promising recent innovation" to address the problem is the school-linked health or youth services center, according to the report. Congress could also expand Medicaid, discourage private health insurers from limiting coverage for adolescents and children, and increase spending on training for health-care providers for adolescents, it suggests.

Perils of protective apparel

Job tasks that require physical exertion in protective clothing create a risk of hyperthermia and may cause individuals a "significant" reproductive hazard, according to an article in a recent issue of the *American Journal of Industrial Medicine.*

Authors Jacqueline Agnew, Melissa A. McDiarmid, and Peter S.J. Lees of the Johns Hopkins School of Hygiene

and Public Health, and Richard Duffy of the International Association of Fire Fighters, cite several studies from the late 1980s that link hyperthermia in humans to decreased sperm counts, abnormal sperm, maternal fever resulting in birth defects, and hearing loss in children of exposed mothers.

According to the authors, noise and physical exertion may also adversely affect human reproduction. Testicular damage, hormonal change, and impotence; amenorrhea; delivery of premature and low-birth-weight babies; and miscarriages are some consequences of physical activity on reproductive health, the authors say.

Until recently the study of occupational reproductive hazards has focused primarily on females. "There is good evidence that workplace hazards to male reproductive health have been overlooked," they claim.

One study suggests that males may be more sensitive than females to exposure to reproductive toxins. "Effects in both males and females need to be considered when studying an agent's potential as a reproductive hazard," according to the authors.

Don't neglect indoor air

The Coalition for Consumer Health and Safety, an organization of consumer groups and insurers, has urged Congress to improve health and safety protections and improve indoor air quality.

Indoor pollution control, greater restrictions on tobacco and alcohol, improved food-nutrition labeling, and motor-vehicle safety are among the coalition's top 1991 priorities, according to a coalition report.

At a press conference to release the report, Sen. John Chaffee (R-R.I.), sponsor of legislation on indoor air pollution, said, "There is mounting evidence that the air we breathe indoors may be at least as polluted with cigarette smoke, radioactive radon gas, and formaldehyde as the smog outside. We have not yet turned our attention to the environment where Americans spend an average of 90 percent of their time—indoors."

Rep. Henry Waxman (D-Calif.), Chairman of the House Energy and Commerce Committee's Health and Environment Subcommittee, says priorities include: stronger laws to regulate pesticide residues in foods, legislation that requires the Food and Drug Administration to set standards for seafood and gives the agency greater enforcement powers, and tougher standards for tobacco warning labels and advertisements.

"Consumers demand that the federal government play a central role to ensure the safety and effectiveness of their products," he says.

Fired employee collects

A jury awarded more than $261,000 to a mining company employee who was fired when he refused to enter a cyanide pit until his surgical wound healed.

The Nevada Supreme Court upheld the decision. To fire an employee who seeks a safe and healthy work environment is contrary to public policy, according to the court. Robert C. Jones followed company policy when he informed his immediate supervisor that

it was unsafe for him to work in the area. He then offered to take any other temporary job that would not place him in danger. He was told to go home and was fired the next day. Western State Minerals' mine manager acknowledged that Jones had the right under company procedures to refuse assignment to the pit.

"We conclude that it is violative of public policy for an employer to dismiss an employee who refuses to work under conditions dangerous to the employee," the court said.

Serious smoke

The executive committee of the Environmental Protection Agency's (EPA's) Science Advisory Board has recommended that EPA Administrator William Reilly accept two reports that describe environmental tobacco smoke (ETS) as a Class A carcinogen, the most stringent carcinogen classification. An EPA spokesman says asbestos is an example of a Class A carcinogen. The executive committee claims ETS should be regulated in workplaces and public-access areas.

*Reprinted from the August 1991 issue of the National Safety Council's magazine, **Safety & Health.***

Maintenance

An exercise to keep your plant in shape

Got a screw loose somewhere?

Tighten it! The effort expended could prevent a costly breakdown or save yourself or a co-worker a serious injury.

Keeping machines, tools, and facilities in good working order is good business for a number of reasons, each one resulting in financial savings. Routine and preventive maintenance ensures that equipment down-time is kept to a minimum, thus stabilizing production levels and saving costs involved in major repairs or replacement.

If tools and machines are working efficiently, the tendency to use makeshift tools or rig devices of "personal engineering design" is lessened. The right tool in good condition saves more than time and effort.

Identifying hazards resulting from

normal wear and tear should be part of a systematic maintenance inspection.

Before beginning the maintenance inspection of an area, the supervisor of that area, who knows the work procedure and can answer questions that may arise, should be contacted. A checklist should be used during the inspection so that every aspect of the work process and every detail of machine operation is thoroughly examined. Be careful not to let familiarity with work processes and equipment affect the quality of the inspection. Take plenty of notes in order to present a detailed report.

Guarding hazardous equipment parts and operations is an established method of preventing injuries, so it's important to have machine guards in place and working properly.

Other safety devices, including two-hand controls and deadman clutches, should be checked regularly.

Machinery and equipment mounting and anchoring methods should be inspected to make sure they are holding tightly. Loose nuts and bolts can not only cause machine parts to fly off, but also increase noise levels when they vibrate or rattle.

The way that certain work procedures are structured has a great effect on the safety of the operation. This includes the tasks performed both by the machines and the employees. The entire process should be examined from start to finish, with the question "what if" in the inspectors' minds at all times.

When routine or preventive maintenance has been performed on machinery, that piece of equipment must be locked out and tagged. Locking the main machine power source on the "off' position is the sure way to protect the maintenance workers from injury.

Color coding, for example, not only highlights hazardous areas and conditions but also creates a more orderly work atmosphere.

Other parts of the physical plant, including walls and floors, should be in good repair.

Stairways and landings should be clutter-free and well-lighted. Handrails should be secure and smooth.

Hoses and electrical cords should be kept out of aisles and other areas frequented by workers. Cords on tools should be unfrayed. Repairs should be made immediately.

Fire hazards of various degrees may be found throughout the workplace; so all workers should know where fire extinguishers are. They should be fully charged and readily accessible.

Lunchroom and break areas should not be overlooked during a maintenance inspection, because hazards can be found among scattered litter and overflowing trash bins.

Outside the plant, weeds and grass should be mowed and trimmed. Traffic and parking areas should be free of trash and obstructions.

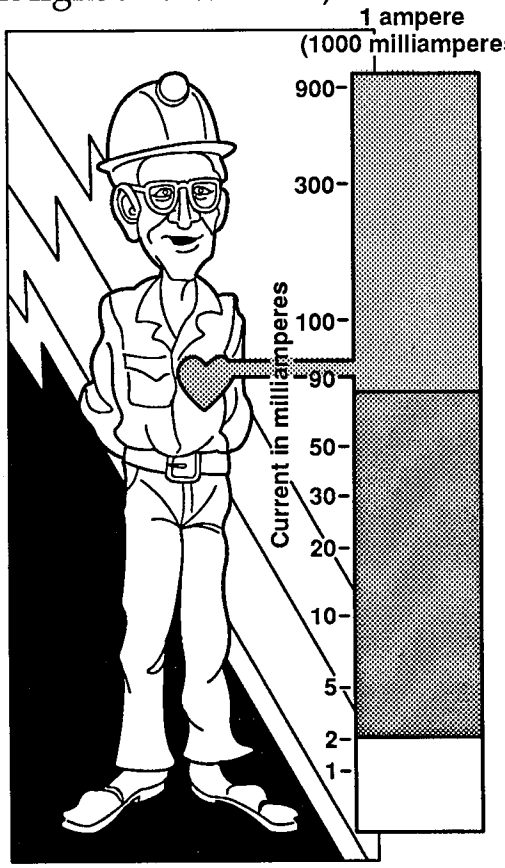
Whether your workplace combines maintenance and housekeeping inspections or keeps them separate, it should be scheduled on a regular basis to repair or clean up areas that present hazardous conditions.

Reprinted from the August-September 1991 issue of the state of Nevada's ***Mine Safety Sense.***

Electricity—A dangerous friend

Safety reminder

Electricity is an everyday part of our lives, both on and off the job, helping us to complete tasks more efficiently, providing us with light and warmth, and even entertaining us. However, if taken for granted, electricity can quickly turn from a helpful friend to a dangerous and deadly enemy.



While electrical contact injuries are not common and often consist of burns from arcing or electrically generated heat, it can take only one shock exposure to prove fatal. And contrary to popular belief, it doesn't take megavolts to kill you.

In a standard 120 volt household circuit, it takes less than one ampere (amp) of electricity to light a 100 watt bulb. The chart shows the effects on the human body of various lesser levels of current (measured in thousandths of an amp or milliamps). If you grab a wire with only 10 to 20 milliamps of current, you cannot let go of it because the electricity flowing through the muscles of your hand paralyzes them. Above 20 milliamps, you may have trouble breathing and can experience muscle contractions severe enough to snap bones. Anywhere between 80 and 200 milliamps, the current can disrupt the rhythm of your heart, causing it to stop. At 300 milliamps, your breathing stops entirely. Above 400 milliamps, severe burning is likely depending on the length of contact. And remember, any of this can occur with less than the power required to light one bulb!

As little as 27 volts have caused fatalities where the body's conductivity has been increased by being wet. Victims have also survived exposure to much higher voltages because the severe muscle contractions threw them away from the contact, the electricity entered and exited the body without passing through the heart, or for a variety of other fluke circumstances. But would you like to take that chance? The important point to remember is that a single exposure can kill.

Courtesy of ***Mines Accident Prevention Association,*** *P.O. Box 1468, North Bay, Ontario, Canada P1 B 8K6, November 1991.*

CHECK THE ROOF frequently while working

Caution!

Read this for your safety

Signs, signals, and labels cue employees to safety.

A 20-year-old song by the Five Man Electrical Band recently has become popular again. The new release by Tesla goes something like this: *Signs, signs, everywhere signs. Blockin' up the scenery, breakin' my mind.*

The songwriter complains that there are too many signs to tell him what to do. His life, he goes on to sing, would be better off with fewer signs.

It's an idea that sounds good in the idealistic world of rock music and television. But what would happen if the singer found himself in a studio that had caught fire? If he's smart, the first thing he'd do is look for a sign to tell him where to find an exit quickly. Suddenly he would discover that signs are his best friends.

Maybe, he would write the lyrics: *Signs, signs, savin' my life. Makin' me smarter, makin' me safer.*

Signs, signals, and labels not only can help in an emergency situation, they can help prevent a situation from becoming an emergency. The work environment can present a host of circumstances where orderly job procedures and safety can be disrupted by someone who doesn't know the proper safe job procedure.

Not everyone in a plant or office can be expected to know every danger or potential hazard. The Occupational Safety and Health Administration (OSHA) calls for specifications to point out where and when warning signs or signals must be used. There are hundreds of different colors, shapes, and designs of warning signs that make hazards clear.

Standards set signage

The danger behind some signs might be obvious. It's easy to figure that if a warehouse uses an overhead crane, for instance, there must be an alarm or other effective warning signal to let nearby workers know it is in use and a potential hazard. Other signs might seem a pain in the neck and useless until one gives them a second thought.

OSHA calls for appropriate marking of permanent aisles and passageways. The singer might think it's foolish for someone to put up a sign to tell him where to walk. But if he worked in a plant and a 1-ton lift truck whipped past him, he'd be glad he heeded the sign that tells him to keep out of its path.

Label chemicals properly

The American National Standards Institute has published a voluntary standard, *Hazardous Industrial Chemicals—Precautionary Labeling Symbols* (ANSI Z 129.1-1988). Symbols covered by this standard address four types of hazards:

- **Toxic/poisonous**—The familiar skull and crossbones employs a white background with black letters and symbol.
- **Corrosive**—A tipped test tube that pours liquid on a hand appears in a white upper half background with black letters and print over a black lower half with white letters.
- **Flammable**—White flames appear on a red background with white letters.
- **Explosive**—Black printed radiating blast waves and flying shrapnel on an orange background with black letters and print.

The standard also addresses irritants, combustible liquids, pyrophoric chemicals and oxidizers, sensitizers, physiologically inert vapors or gases, and other hazardous materials.

This standard is generally accepted in the chemical industry and is incorporated into other labeling schemes.

Transportation of chemicals requires special labeling. CFR 49, parts 100 to 177, Transportation, is the definitive source for Department of Transportation shipping and labeling requirements. It contains detailed information on labels necessary to transport chemicals in accordance with the law.

Another labeling scheme frequently employed in the chemical industry is the National Fire Protection Association's (NFPA) 704 Hazard Identification System. This system identifies hazards to people who must protect manufactured and stored materials from fires and explosions.

This system employs three squares to identify the three hazard categories:

- Blue represents health
- Red signifies flammability
- Yellow depicts reactivity

The system also has a fourth square for additional appropriate symbols.

Each square then designates a number between zero and four to describe the degree of the hazard; four is severe and zero is minor.

The NFPA 704 has been further adapted into the Hazardous Materials Identification System (HMIS) labeling system, which is also used in the chemical industry. The difference between these two systems is that the HMIS uses a fourth blank square to indicate special hazards or designate personal protective equipment via an alpha-pictograph system. The hazard-severity definitions also differ somewhat.

OSHA also addresses labeling in parts 1910.120p (Hazard Communication) and 1910.1450 (Laboratory Standard Chemical Hygiene Plan), as well as under EPA, RCRA, CERCLA and SARA for hazardous waste labeling (CFR 40, parts 260-271).

Whatever labeling system a com-

pany uses, it is important that employees understand it well enough to recognize the hazards depicted by it. Understanding the potential hazards chemicals present includes more than just knowledge of symbols. Industry uses thousands of hazardous chemicals every day, and more than one labeling system may be used to delineate the hazards in any one workplace.

In general, instruct employees to look for the specific hazard—flammable, toxic, corrosive, explosive. Then, they should look for the signal word—warning, danger, caution. Train them to find and follow the precautions for safe use, such as wear protective gloves during use, wash hands after handling, etc.

Finally, employees should be familiar with procedures to follow in case of exposure or contact.

Labels and hazard standards

American citizens long have cherished their right to speak, their right to worship, and their right to vote. People also have their right to know.

Symbols are key elements of any label or sign, but never are they more important than in hazardous chemical labeling.

OSHA issued its Hazard Communication Standard in 1983. The standard went into effect in 1985. It requires all manufacturers and importers of chemicals to evaluate their products for potential hazards and transmit that information to users. The key aspect of the standard is the communication of chemical hazards to individual workers most at risk. In other words, workers have the right to know what can harm them.

The standard's process resembles a flow-chart of safety information with three participatory groups. First, manufacturers and importers determine the hazards of each of their products. Then they convey the information to employers in companies that handle those products. Third, and finally, employees must receive complete and clear information from their employers. Once manufacturers and importers have identified specific chemical exposures, the process can be broken down into five distinct steps: product labeling, availability of material safety data sheets (MSDSs), employee training, annual inventory and listing of on-site hazardous wastes, and development of a written plan that outlines a company's hazard communication program.

"Employees have a right to know what chemicals or solvents they're exposed to," says Charles Saraca, division manager of National Marker Co. in Pawtucket, Rhode Island, a division of Cranston Print Works Co. National Marker was one of the first safety-label manufacturers to market right-to-know stations. The station concept was developed about the same time OSHA issued the standard. Major companies such as AT&T and General Motors use National's stations, which Saraca prefers to call right-to-know information centers.

The stations are plastic boards on which employers can attach binders for MSDSs and bins for information and training pamphlets. OSHA requires employers to place this material in an area of easy access for the employee. To

comply, many employers place the right-to-know stations near time clocks.

Hazard communication stations take the labeling of chemical containers one step further. They contain material that explains in lay terms the various signs and symbols on those labels. They also may include general information on chemical safety. National Marker's stations are part of a comprehensive chemical-safety program designed and written by Neil Langerman, Ph.D., president of Chemical Safety Associates Inc., and a leading authority on chemical spills.

The program offers scientific identification of each chemical product at the work site, a common synonym for the product, a signal word (danger, caution, or warning), instructions in case of exposure, and a spill-response procedure. "The whole program flows so that the employees have all the information they need. We also keep it very simple so that everyone can understand it," Saraca says.

Labels were relatively simple before OSHA issued its Hazard Communication Standard. Now, they are integral parts of company-wide safety programs and cannot be seen merely as individual squares of paper glued to the sides of jars and bottles. The extra effort required to design, place, and read labels is well worth the time spent when employers and employees consider the number of lives saved and injuries avoided when workers understand the substances with which they work.

Signs for fire safety

Proper labeling of safety equipment is as important in the home as it is in the workplace. Every workplace and home should have fire extinguishers. Homeowners who've bought and placed extinguishers in their kitchens no doubt feel safe and secure. But they must read the label to learn how to use and care for them.

The label contains the following elements: maintenance instructions, a caution (Do Not Refill), a warning (Improper use could cause injury), instructions for safe use including NFPA text and symbols, and other cautions, such as the proper temperature for storage, Underwriters Laboratories listings, American National Standards Institute standard that covers the product's design and use, other miscellaneous compliances and identification numbers, as well as the name of the manufacturer of the fire extinguisher.

NFPA Standard No. 10 classifies the four classes of fires and the corresponding extinguishers that can help put them out. NFPA system uses blue symbols for the appropriate use, as well as black symbols with diagonal red lines to indicate what fires the extinguisher is not suitable to extinguish. The system also lists the class letter in a figure for easy identification. The classes include:

Class A —ordinary combustibles. The letter "A" should appear in a green or white triangle.

Class B—flammable liquid and gas fires. The "B" should be placed in a red or white square.

Class C—electrical. "C" should be in a blue or white circle..

Class D—combustible metals. A yellow or white five-pointed star should contain the letter "D."

Since the classes increase in severity from A through D, employees who work with combustible metals should know how to extinguish Class A through C fires as well.

Underwriters Laboratories issues a block of approval numbers that are to be stamped consecutively on each label. "UL is very stringent about maintaining control over those numbers," says Mike Gipson, fire-safety product manager for Pittway Corp.'s BRK Electronics division.

Much of UL's concern with control over approved labels stems from the high regard in which consumers hold the testing authority's seal of approval. The only sanctioned approvals are those with UL-designated numbers.

"We design the artwork for our labels and send it to UL for approval," Gipson says. UL allows very little latitude in the design of fire extinguisher labels. "We want to have our name on there as big as possible, but UL is very rigid as to the size and placement of the manufacturer's logo," Gipson says.

Labels help protect workers

Signs, signals, and labels can help alert us to danger whenever heavy machinery, electrical power sources, or harmful chemicals are nearby. There are no universal standards for warning signs to be attached to plant machinery. Still, employers can improve safety if they provide signs about the potential dangers of the machines along with other safety information including what protective equipment to wear.

Even a machine that is shut down for repairs can present a hazard. OSHA also has written regulations that call for warning labels to be attached to machinery that has been shut down and locked out for maintenance.

Lock and tag

Plant managers must make sure workers shut down their machines and affix padlocks to ensure that they are locked out, so no unauthorized use occurs while they are repaired. Energy sources to the machine—electrical, hydraulic, pneumatic, gravity, etc.—must be locked out as well. "There's always a possibility that some residual energy may be left in the power line," says Joel Hershokowitz, product manager for IDESCO Corp., a manufacturer of warning signs and labels in New York City. The law requires employees to sign and date tags when they service a piece of equipment.

Production-quota pressures might tempt managers to turn on a machine before it has been released. OSHA's lockout requirement guards against such a possibility. It is intended to prevent injury to a repair person, inspector, or other personnel who might come in contact with the machine, without the operator's knowledge.

OSHA-mandated lockout labels must include identification information on the person in charge of the lockout, and who eventually will end the lockout and return the machine to service. IDESCO's LockWrap Padlock Labels personalize the warning so that workers won't turn on a machine before it is released. It includes a picture of the person in charge of the lockout with written identification and information.

IDESCO's Real Life tag also includes a photo of the person who must repair or maintain a machine and the words:

"Do Not Operate—My Life Is On The Line!"

"If an employee sees a picture of someone he or she has eaten lunch with in the cafeteria for the last 15 years, that person will think twice before turning that machine on," Hershkowitz says.

Signs help save lives

Machinery signs should be only one facet of an employer's overall hazard identification program. Signs such as "Exit" and "Open Door Slowly" should be coupled with other signs to advise workers where to walk and which hazards to look out for in order to create the safest work environment possible.

In an emergency, such as a fire, signs should clearly point workers toward exits and emergency-response equipment.

Protect labels

Most plant managers learn that they must identify worker hazards in the workplace through the use of warning labels. In addition, the labels themselves must be protected from spills, tears, and accidental removal to remain effective. Laminated covers protect against spills and accidental removal.

Signs, signals, and labels may be a pain to some rock stars, but they can help prevent pain, or worse, in the rest of us.

Reprinted from the August 1991 issue of the National Safety Council's ***Safety & Health*** *magazine.*

Pump down the volume

Noise is everywhere in the environment—in hair dryers, power tools, lawn mowers, rock concerts, motorcycles, and garbage trucks. Unfortunately, these everyday sounds may be slowly and painlessly damaging your hearing.

Permanent hearing loss can be caused from one extremely loud sound, like a firecracker exploding close to your head, or from constant loud sound, such as regularly listening to loud music on stereo headsets.

Of course, you can't avoid noise, but you can do something to save your hearing for the more pleasant sounds of life.

Wear hearing protectors when exposed to loud music (rock concerts, mowing the lawn, hunting, boating). Cotton in your ears won't work. Hearing protectors can be ear plugs (not swimmers' plugs) or earmuffs. Check with your audiologist, local drug store, or sports shop to find them.

Look for the noise rating when buying appliances and power tools. Choose quieter models especially for equipment that you use often or close to your ears like a hair dryer.

Limit periods of exposure to noise. If you're at a rock concert, walk out for a while to give your ears a break. Don't sit right in front of the speakers. Sit in the middle of the audience, not up front.

Turn down the volume on stereos and stereo headsets. If a friend can hear the music from your headset when standing 3 feet away, the volume is definitely too high. Listen if a friend tells you to "pump down the volume."

Reprinted from the April 1991 issue of ***Media Update****, a publication of the American Speech-Language-Hearing Association.*

Holmes Safety Association
Monthly safety topic

Fatal powered haulage accident

GENERAL INFORMATION: A 38-year-old company president died of crushing injuries when his clothing became entangled on the stub shaft of the tail pulley for the crusher discharge/wash plant feed conveyor. The victim had 11 years of mining experience, all with this family-owned operation.

Sand and gravel was mined from an open pit using a front-end loader and a backhoe for below water table extraction. Material was carried to the plant by front-end loader. After crushing, washing, and screening, finished products were stockpiled with conveyors.

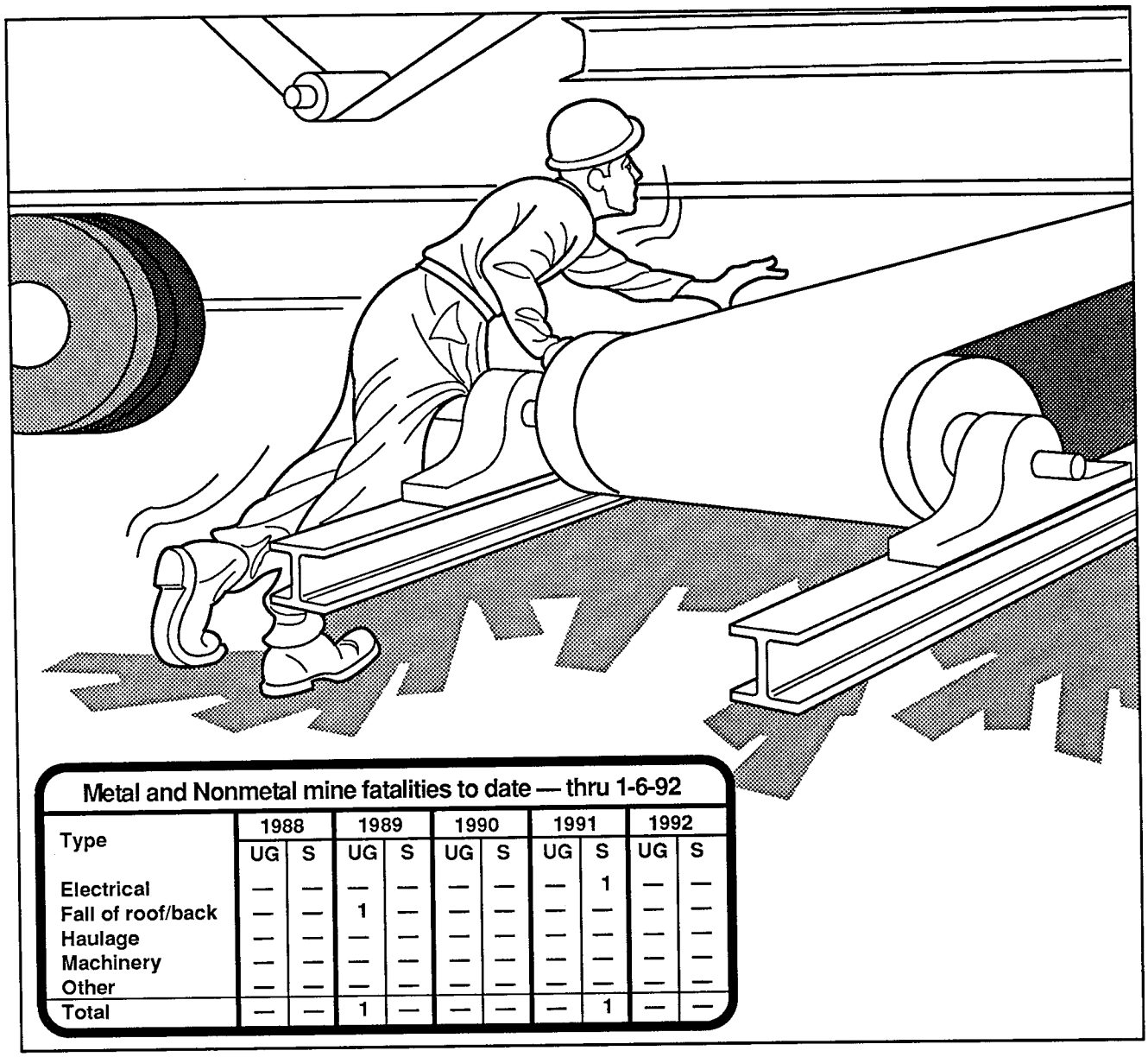
Employment at the mine included the president and one employee. One shift of 10 hours, 5 days a week, as needed to supply demand, was common.

DESCRIPTION OF ACCIDENT: At approximately 9 a.m., the victim and the employee arrived at the mine site and started operations for the day. Plant start-up and operations went smoothly until approximately 10:30 a.m. The employee was dumping a loader bucket of material into the crusher feed bin with the front-end loader when he observed that the conveyor feeding the wash plant had stopped and the drive v-belts were smoking. He immediately parked the loader on the hopper ramp and ran to the generator where he de-energized the crusher and wash plant feed conveyors. He yelled for the victim, obtained a shovel, and proceeded to the wash plant feed conveyor area.

The employee found the victim with his coveralls wound around the shaft on his right side and all bent over. The employee checked for a pulse and, finding none, rushed to a neighboring farm and called for assistance. He then returned to the accident scene and tried to free the victim.

The rescue crew removed the victim and he was pronounced dead at the scene by the county coroner. The victim died of a broken neck and crushing internal injuries.

CONCLUSION: The conveyor involved in the accident had been modified. It had been extended from approximately 25 feet to nearly 50 feet. The drive had been changed from a tail pulley chain sprocket drive to a head pulley v-belt drive. The drive shaft had a keyway 1/2-inch wide by 1/4-inch deep the full length of the shaft end and extended 6-1/4 inches beyond the frame-mounted bearing and housing. The extended shaft was on the left side of the conveyor, as observed from the tail pulley end, and was 18 inches off the ground and 28 inches from the crusher plant. The chain sprocket had been removed from the tail pulley shaft. The shaft rotated at about 110 rpm.



Metal and Nonmetal mine fatalities to date — thru 1-6-92

Type	1988		1989		1990		1991		1992	
	UG	S	UG	S	UG	S	UG	S	UG	S
Electrical	—	—	—	—	—	—	—	1	—	—
Fall of roof/back	—	—	1	—	—	—	—	—	—	—
Haulage	—	—	—	—	—	—	—	—	—	—
Machinery	—	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—
Total	—	—	1	—	—	—	—	1	—	—

Several wrenches and pry bars were found in the vicinity of the victim. The wrenches would not fit any bolts/nuts on the conveyor or crusher in the vicinity of the accident. There was no physical evidence that the victim had attempted to use the pry bars.

A 2 foot by 3 foot piece of sizing screen had been provided as a guard and was normally leaned up against the conveyor frame in an unsecured manner. This screen was found leaning against the crusher plant frame approximately 10 feet from the accident site. Reportedly, the tail pulley area had been cleaned the day before with the front-end loader and the unsecured guard had been set back in position.

The direct cause of the accident was the victim exposing himself to the operating, unguarded, tail pulley drive shaft end while he performed, or prepared to perform, some unknown task in the tail pulley area. In addition to better guarding, de-energizing the conveyor may have provided another alternative safeguard.

How to age gracefully

Older adults have much to gain from an active lifestyle.

By Ruth A. Mack

Which age group benefits the most from exercise?

a) toddlers
b) teens
c) middle-age adults
d) older adults

The answer is d, according to William Evans, author of *Biomarkers*, a book about exercise and aging.

Senior citizens don't have to run marathons to reap the benefits of physical fitness. Brisk walking, swimming, and simple weight-lifting benefit people at any age. Recent studies show that even leisure activities—gardening and bowling, for instance—burn off calories and help maintain overall fitness. What's most important, say experts, is to find an enjoyable activity, exercise on a regular basis, and consult with a physician before you leap into a program—regardless of your previous athletic stature.

Prime the pump

If you are an older adult, it is important to start slow and pace yourself. Dr. Evan W. Kligman, director of the geriatric program at the University of Arizona College of Medicine, says exercise can help your heart pump more efficiently, strengthen muscles and bones, improve flexibility, help maintain balance, enhance oxygen intake, lower blood pressure, and normalize blood sugar. Aerobic exercise—any activity done repetitively for about 20 minutes and at least three times a week—improves heart rate and, according to studies, benefits overall life span.

Aerobics in waist-deep water or swimming laps provides cardiovascular benefits and builds stamina without stress on joints. Other activities that do not overly tax the body include bicycling, rowing, dancing, and skating. According to studies by Dr. Thomas Hickey of the University of Michigan, exercise lowers blood pressure and reduces arthritic pain, even in people with chronic conditions who previously were overweight and inactive.

On the behavioral side, exercise reduces stress and depression. It can enhance mental sharpness and improve the quality of sleep. "It's not just physical; it's a psychological mechanism as well. You'll feel better about yourself with exercise," notes Dr. David A. Baron, a clinical director of the National Institute of Mental Health in Bethesda, Maryland. Even more important to older adults, exercise provides opportunities to socialize.

Eat wisely

A healthy diet is crucial to combat heart disease—the No. 1 killer of Americans—and chronic illnesses like hypertension, arthritis and diabetes. Nutrition experts say to keep it simple: eat a well-balanced diet from a variety of foods. However, keep in mind that as we age, our need for calories declines while our nutritional needs stay the same.

"Select foods that are rich in nutrients, such as meat, vegetables, and fruit, because it takes fewer calories to maintain weight," advises Ronni M. Chernoff, Ph.D., nutrition professor at the University of Arkansas.

Eat plenty of protein: dairy products, meat, fish, poultry, eggs, nuts, beans, and peas. Choose lean cuts of meat that are low in saturated fat; try not to eat cholesterol-rich egg yolks more than three times a week; and focus on plant-derived sources of protein, such as beans and nuts. Calcium is a critical nutrient often missing from the diets of older adults. Because older people lose bone density, they need to consume plenty of dairy products, especially milk, says Jeffrey Blumberg, Ph.D., associate director of the U.S. Department of Agriculture.

Complex carbohydrates are essential to a healthy diet. They can be found in breads and cereals; dried beans and peas; starchy foods, such as potatoes, rice, and pasta; and fruits and vegetables. Complex carbohydrates supply energy, vitamins, and minerals. When you substitute complex carbohydrates for high-fat foods, they can even help reduce cholesterol.

Because many older adults eat too little, nutritionists recommend a multimineral, multivitamin supplement to ensure necessary nutrients. Nutritional supplements, however, should never substitute for a good diet.

Many older adults take medications to combat a range of illnesses. But food can interfere with the absorption of medications, and medications can interfere with the absorption of nutrients from food. Even over-the-counter medicines, such as antacids and laxatives, can cause problems. Read labels carefully, follow instructions, and consult with your doctor about which medicines can interfere with nutrients.

Keep a positive outlook

As you age, you undoubtedly experience losses from death, retirement, mobility, and children leaving home. But it is the symbolic losses, such as the realization that you will never be CEO of the company, that most often cause sadness. Depression is not inevitable with aging, however.

Strong social and family ties are critical. "Be in situations where you can socialize with people of all ages," says Baron. With age, your opportunities to travel, resume education, and pursue hobbies are often increased. And while retirement can be a wonderful opportunity to develop new interests, it is by no means mandatory at any age. The message from experts is: be flexible.

To combat feelings of sadness and isolation, look within your community for networks of support and to find meaningful activities. Dr. James Webster, director of Northwestern University's Center for Aging, advises older adults to adopt an "it's never-

too-late" attitude. "Everything from smoking cessation to seat belts is important," he says. "It is important that you maintain contact with your community, however you do it."

Experts stress individually tailored solutions. For example, studies show that pets help older adults socialize, exercise, feel safer and more needed, and even lower blood pressure. But a dog or cat isn't right for everyone. If you adopt an animal, be sure it is one you are able to physically handle. In conjunction with Ralston Purina Co., the American Society for the Prevention of Cruelty to Animals sponsors a Pets for People program that matches adults over 60 with a dog or cat free of charge.

Libraries across the country offer special programs for seniors, carry large-print books, and increasingly furnish videocassettes that provide instruction and education, as well as entertainment—all available with a library card.

Update yourself

Doctors stress the importance of routine checkups to maintain health and detect illnesses early. Be sure to have a yearly physical that includes tests for chronic illnesses—diabetes, high blood pressure, and vision and hearing impairments. Women need yearly mammograms and regular Pap smears, and men need yearly rectal exams, including an occult blood test and a sigmoidoscopy (an examination of the rectum and colon) every 3 to 5 years after age 50. Also be sure to have regular immunizations.

Check with your physician to learn about safe use of drugs if you take multiple medications. Some medications can cause depression. You also may want to seek counseling about changing nutritional needs, sexuality, and menopause. Seek medical attention if your mood worsens and your energy levels decrease, or if depression interferes with sleep and appetite. Falls are the leading cause of accidental death among adults over age 65. Be aware that exercise, wise use of medications, reduced alcohol consumption, and safe home environments can decrease your chances of falling. Make sure rugs and furniture are secure, lighting is adequate, and bathtubs are equipped with non-slip surfaces.

Experts stress the importance of staying productive, creative, and optimistic through leisure activities. By volunteering, older adults can do meaningful work, socialize, and stay active. In fact, recent research shows that people who volunteer live longer and are healthier.

Today, organizations seek older adults for their responsibility and experience. The U.S. Peace Corps, for example, wants many of its volunteers to be over 50. "Older volunteers bring a lifetime of experience to the job," says Director Paul D. Coverdell.

There is no perfect prescription for achieving a healthy, active lifestyle in our later years. But however you pursue it, vitality will surely be rewarded.

Reprinted from the August 1991 issue of the National Safety Council's Safety & Health magazine.

Skin largest and easiest target for occupational injury, disease

Accurate diagnosis is necessary in the interest of worker health and productivity

By Phillip L. Polakoff, MD, MPH, MEnvSc, Principal, Integrated Health Management Associates, Oakland, CA

Skin disorders are among the most under-recognized, under-reported, and misclassified occupational health problems affecting American workers.

They're not recognized—not the same as unnoticed—because the necessary clinical skills and dermatological expertise may be lacking. Many go unreported, for compensation purposes, because the worker didn't lose any time off the job. Others may be misclassified as an "injury" because the allergic dermatitis resulted from a single exposure to poison ivy. Traditionally, "injury" is the result of instantaneous trauma or a single—usually brief—exposure.

This medical murkiness needs to be clarified in the interest of workers' health and productivity, and to lessen the burden of cost to individual and corporate health-care resources. Commendably, these concerns are being addressed by the National Institute for Occupational Safety and Health (NIOSH), national schools of public health, and appropriate professional organizations.

As the largest and most exposed organ of the body, the skin is understandably the most vulnerable target for occupational and environmental injury and disease. A study in California a few years ago showed that at least one-third of all compensated industrial diseases involved a skin problem. That did not include thousands of cases of dermatitis, the inflammatory form of dermatosis, which were not compensated because the workers didn't lose time from their jobs. One out of five workers with an occupational skin condition did lose some time from work. The average time lost was about nine workdays.

Here are some highlights from another study, this one by the California Department of Industrial Relations:

- Women accounted for 28 percent of all reported dermatological cases, although they make up more than 40 percent of the state's work force.
- In manufacturing, however, women had a higher incidence of skin disease, 4.7 per 1,000, compared to 3.8 for men.
- Agricultural workers were four times as likely to get a job-related skin disease as workers in general, 8.6 per 1,000 as compared to 2.1.

Three causes

Skin problems, generally, can be traced to one or more of three main causes: chemical agents, physical factors, or biological agents.

About 80 percent of all occupational skin diseases are caused by primary chemical irritants, such as inorganic

acids, alkalis, heavy metal salts, tanning agents, bleaches, and chlorine compounds. The other 20 percent are usually due to sensitized or allergic reactions. Almost any chemical and certain plants—poison oak or poison ivy, for example—can cause allergic dermatitis after the person has been sensitized to the active ingredient by at least one prior exposure to it. Sensitizers are found in certain dyes, rubber ingredients, unfinished plastics, and such metals as chrome, mercury, and nickel.

Physical factors include excessive heat, cold, sunlight, ionizing radiation, and artificial ultraviolet light. Artificial ultraviolet light is produced by hot metals, welding, and the plasma torch. Excessive exposure to X-rays and radioactive materials, of course, can produce severe damage to the skin or to the entire body.

As for biological agents, a generalized disease process can come about through bacterial, fungal, and parasitic infections of the skin. Among those potentially at risk from such agents are animal handlers, packinghouse workers, kitchen employees, agricultural workers, bakers, nursery workers, and laboratory technicians.

Other factors in dermatological conditions—usually beyond an individual's control—include the sex of the person, age, skin color (light and dark), texture (thick or thin), type (oily or dry), or a history of allergy.

Another factor that can affect an individual's susceptibility to skin disease—and one certainly within each individual's control—is personal cleanliness. Cuts, burns, and abrasions may become secondarily infected, especially in combination with poor skin hygiene.

The relationship of skin cancer to various occupational exposures has received relatively scant epidemiologic study. Nonmelanoma skin cancers (squamous and basal cell) seem to occur more frequently among outdoor workers and those in jobs that have exposure to coal tar derivatives.

Skin injuries

While skin diseases account for a disproportionately large percentage (about 34 percent) of all cases of chronic occupational diseases identified by the Bureau of Labor Statistics, skin injuries account for an almost equally substantial share. About 35 percent of occupational injuries treated in hospital emergency rooms, and about 23 percent of injuries for which workers' compensation claims are filed, involve skin cuts, lacerations, punctures, abrasions, and burns.

NIOSH has estimated that between 1 million and 1.65 million occupational skin injuries occur annually, with an estimated annual rate of 1.4 to 2.2 cases per 100 workers.

In addition to being a target organ, skin may serve as a route of entry for toxic substances through percutaneous absorption into the body. The skin's ability to absorb is thus both a hazard and a benefit. On one hand, absorption enables dry skin to replenish lost moisture. On the other hand, this function breaches the skin's protective barriers, allowing entry for potentially harmful substances.

Besides cuts, punctures, and other trauma that break the skin, hair fol-

licles and the spaces around skin hairs are the most likely points of entry. Percutaneous absorption of toxins into the body warrants further study. This need was touched on in "A Proposed National Strategy for the Prevention of Dermatological Conditions." The paper was produced by a symposium cosponsored by NIOSH, the Association of Schools of Public Health, and the Association of University Programs in Occupational Health and Safety. The panelists concluded: "Researchers studying occupational diseases that affect other organs or systems should consider the relative contribution of dermal exposure to environmental substances to the total chemical burden of the body and the effect of skin injury and disease on the protective characteristics of the skin."

Strategies

The proposed strategies address a wide range of approaches to the problem, general and specific. For starters, effective planning requires preliminary assessment of several basic elements: the working population at greatest risk, available prevention and control methodologies, health-care delivery practices, resources of professional health and safety personnel, and economic and material resources.

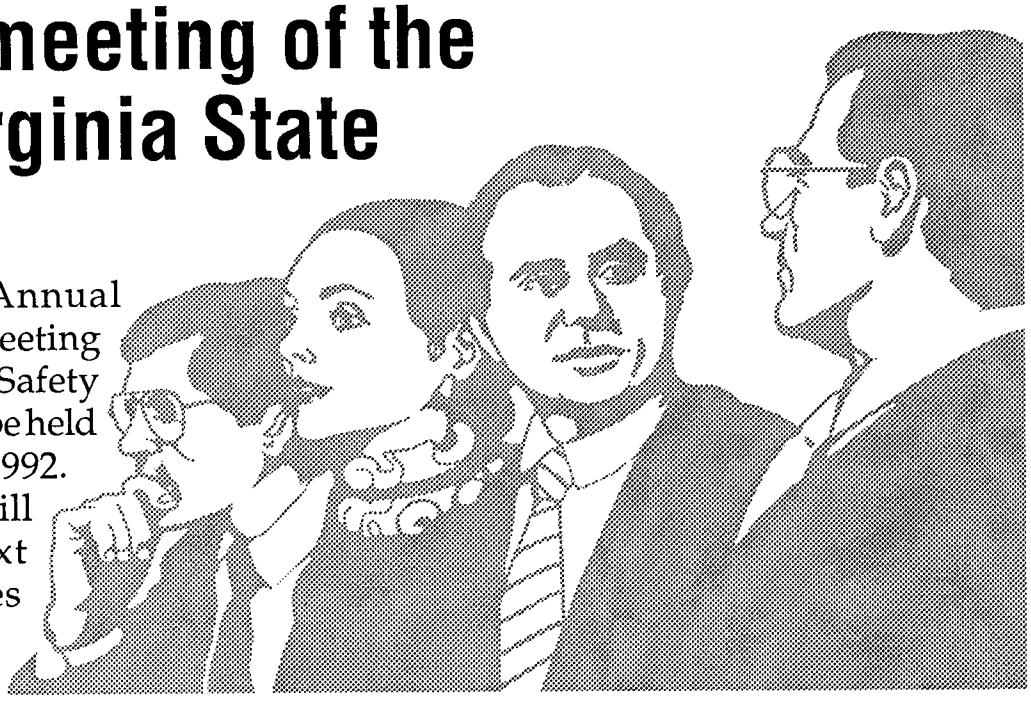
General recommendations included the following:

- Increased use of existing databases that contain information on occupational skin conditions, both in the United States and abroad, to generate hypotheses for research;
- Standardized techniques of investigative epidemiology, not only to test specific hypotheses, but to detect previously unrecognized clusters of skin conditions within different working populations compared with the general population;

Reprinted from the April 1990 issue of ***Occupational Health & Safety*** *magazine.*

Annual meeting of the West Virginia State Council

The Ninth Annual State Council meeting of the Holmes Safety Association will be held on April 10-11, 1992. More details will follow in next month's Holmes Safety Association Bulletin.



Home fire safety

How to make your home fire-safe

Fire is perhaps the most dangerous and deadly of all home emergencies. Protecting your home from accidental fire is one of the most important things you will ever do for yourself and your family. Let this checklist be your guide for making sure that your home is safe from accidental fire.

Fire prevention checklist

Hazard prevention

- Keep burnable materials away from heat sources such as chimneys, water heaters, radiators, portable heaters, etc.
- Store burnable materials away from stairways and walkways (if a fire did break out, they could block your exit). Do not store, use, or carry flammable liquids in open containers.
- Clean ovens, range tops, and exhaust fans to keep them free of grease.
- Make sure that all electrical appliances have been approved by a testing lab (such as Underwriters' Laboratory).
- Replace worn or frayed cords, plugs, or wiring immediately (or have them repaired by a licensed electrician). Turn off gas pilots when working with flammable adhesives.
- Never overload circuits.
- Inspect chimneys and flues regularly to be sure they are in working order.
- Never leave an open flame unattended.
- Quench fireplace and barbecue fires completely before retiring. (Even if there is no visible flame, hot embers can re-ignite.)
- Never smoke in bed or when drowsy.
- Never empty ashtrays into a wastebasket—keep a can filled with baking soda to dispose of butts, or douse them first with water.

Safe practices

- Install at least one smoke detector on each floor of your home.
- Vacuum smoke detectors monthly to keep them dust-free.
- Inspect detector monthly to ensure that batteries and lights work.
- Make sure that security gates and window guards can be opened easily from within the home.
- Establish escape routes from every floor of your home and know where to meet outside.
- If you do not have a fire-escape, keep portable escape ladders on the upper floors of your home.
- Have regular home fire drills.
- Keep a multi-purpose fire extinguisher on each level of your home—and learn how to use it.
- In the event your clothing should catch fire, stop what you're doing, drop to the floor, and roll around until flames are extinguished.

From a poster by Parlay International published in 1988.

Secretary's message...

The Holmes Safety Association (HSA) will be presenting new programs during the next few months in substance abuse and job safety analysis. This material will include both written and video information emphasizing health and safety. I am certain that many district councils will want to include these programs at their meetings.

Several people submitted responses concerning the HSA National Conference agenda listed in the December Bulletin. The responses were supportive of the proposed program. These will be presented at the Executive Committee Meeting in Charleston, West Virginia, on February 4, when the conference agenda will be completed.

In the December Bulletin, we requested your assistance in filling out the mailing list update and returning it to my office. I have received hundreds of responses from HSA Bulletin readers and I personally want to thank them for taking the time to complete the information on the response sheet. I am also asking those members who have not returned their response sheets to please fill them out now and return them to the following address:

Holmes Safety Association
Attn: Robert Glatter
4015 Wilson Boulevard, Room 537
Arlington, Virginia 22203-1984

This year's HSA meeting will be in Split Rock, Pennsylvania. The annual meeting will be May 26-28, 1992. Look for additional details in next month's HSA Bulletin.

1992 South Central District Joint Mine Health and Safety Conference

The 1992 Joint Mine Health and Safety Conference will be held March 30-April 2, 1992, at the Wyndham Hotel in San Antonio. The hotel is located at 9821 Colonnade Boulevard.

Currently, the conference planning committee is developing some of the workshops. The following workshops are planned: Accident Prevention, Texas Workers' Compensation Commission Update, Training Techniques, Asbestos Abatement, Job Safety Analysis and Beyond, 30 CFR Part 50 Reporting, Material Safety Data Sheets, Contractor Training Requirements, New Explosives Standards, and Electrical Safety. For further information, contact the University of Texas, Division of Continuing Education, Industrial Education Department, Austin, Texas 78713-7518, or call (512) 471-4633.

The Secretary of Labor, Ms. Lynn Martin, has been invited to be the keynote speaker. The conference fee of $60 per participant includes all conference activities, a luncheon, and all refreshments during breaks.

Mark your calendar for March 30-April 2, 1992. Let's make this the biggest and best conference yet.

Reprinted from the January 1992 issue of ***Nformation Letter****, a publication of the University of Texas mine safety and health program.*

The last word...

"Money is not important. Henry Ford had millions and never owned a Cadillac."

"An educated mind has difficulty relating to uneducated people. An educated ear never does."

"Life's little mystery: How can a 2-pound box of candy make you gain 5 pounds?"

"Courtesy is owed; respect is earned; love is given."

"People must learn to gather adventures and experiences rather than things or possessions. Possessions will burden you; adventures become memories which will enrich your soul and last forever."

"If faith can move mountains, imagine what hard work can do."

Sign on church bulletin board: "If you have troubles, come in and tell us about them. If you have none, come in and tell us how you do it."

"Education is what you get from reading the small print in a contract. Experience is what you get from not reading it."

"The wheel was man's greatest invention until he got behind it."

"Why, when we're so amply supplied with words of praise, do we spend them in such miserly fashion?"

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 1992 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
4015 Wilson Boulevard, Room 537
Arlington, Virginia 22203-1984

Phone: (703) 235-1400