
BULLETIN



September 1992



September 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	NAME	CHAPTER NUMBER	LOCATION
N.Y. Traprock-West Nyack Plant	9824	West Nyack, NY	Green Mountain Explosives	9849	Manchester, NY
N.Y. Traprock-Safety Dept.	9825	West Nyack, NY	Ludlow Mines	9850	Windsor, VT
N.Y. Traprock-Clinton Point	9826	Poughkeepsie, NY	Youngman Rock, Inc.	9851	Eufaula, OK
Austin Powder Co.	9827	Kingston, NH	Allts Assorted Aggregates	9852	Hyde Park, NY
William E. Dailey, Inc.	9828	Shaftsbury, VT	Liberta Bros. Excavating	9853	Pine Plains, NY
Omya East, Inc.	9829	Florence, VT	Manchester Gravel & Concrete	9854	Manchester, MI
World International Testing	9830	Steubenville, OH	Smith Whetstone Co., Inc.	9855	Hot Springs, AR
Diamond Coal	9831	LaFollette, TN	Robinson Sand & Gravel	9856	Dardanelle, AR
Amlaw Pit	9832	Lebanon Springs, NY	C & N Quartz Crystal Mine	9857	Ashdown, AR
Hecla Mining Co., Republic Unit	9833	Republic, WA	Lude Farms	9858	Belmont, OH
Colarusso Quarry	9834	Hudson, NY	Preece Energy, Inc. No. 4 Mine	9859	Turkey Creek, KY
W.V. Institute of Technology	9835	Montgomery, WV	Preece Energy, Inc. No. 1 Mine	9860	Turkey Creek, KY
Bardon - Trimount	9836	Wrentham, MA	Twin Oaks Mining Co., Inc.	9861	Turkey Creek, KY
DMC Electric	9837	St. Albans, VT	Ringold Mining	9862	Maidsville, WV
U.S.W.A. Amalgamated Local #4	9838	Barre, VT	Chuck Barnes Electric, Inc.	9863	Tyler, TX
B & J Coal Co.	9839	Hackett, AR	Kraus Construction Co.	9864	Ft. Smith, AR
Nelson Brothers	9840	Hurricane, WV	Sheldon Slate Products Co.	9865	Middle Granville, NY
Green Mt. Talc	9841	Chester, VT	Butch Wilson Excavating	9866	Chester, VT
Boyd Engineering	9842	Havana, AR	Battle Mountain Gold Company	9867	San Luis, CO
Belco Materials, Inc.	9843	Nowata, OK	Twin Mountain Construction Co.	9868	Albuquerque, NM
Mountaineer Minerals	9844	Gilbert, WV	El Jay Double Cone #2	9869	Durango, CO
Jamb Mining, Inc.	9845	Cedar Bluff, VA	Benson Brothers Aggregates	9870	Austin, CO
Route 82 Sand & Gravel	9846	Pleasant Valley, NY	Benson Brothers Shale Pit	9871	Austin, CO
Roe Jan Sand & Gravel	9847	Redhook, NY	C. E. Mills Construction Co.	9872	Montrose, CO
Winnie Enterprises	9848	Redhook, NY	Luck Bros., Inc.	9873	Plattsburgh, NY

Holmes Safety Association Monthly Safety Topic



Fatal explosives accident

GENERAL INFORMATION: A 34-year-old foreman with 16 years of experience was fatally injured in an explosives accident at an underground coal mine.

DESCRIPTION OF ACCIDENT: The crew of 10 miners, under supervision of the victim, entered the mine and proceeded to the worksite at about 7:00 a.m. At approximately 9:15 a.m., the drill operator moved and positioned the drill in the No. 3 Entry outby one row of pillar blocks in anticipation of the places being blasted.

The shot firer helped move the cutting machine from the right side of the section to the left side of the section at the beginning of the shift before he gathered his explosives and detonators and went to the place to be charged and blasted. The victim helped the shot firer load the holes and told the shot firer to extend the cable used to detonate the shot outby and around the corner of the block to be blasted. The victim told the shot firer to shoot the place, which he did, assuming that the victim was safely away from the shot.

The shot blew out and the victim died from forces generated by the blown out shot.

CONCLUSIONS: The accident and resulting fatality was caused by faulty blasting practices.

Several other factors contributed to the accident. First, the method of mining underway at the time of the accident was in conflict with the method outlined in the approved roof control plan. Second, mining the inby side of the pillar block and the short length of the blasting cable caused the shot firer to seek refuge alongside the same block being blasted which resulted in the victim being in a hazardous location. Third, sightlines or other methods of directional control were not being used in the block being mined at the time of the accident. Fourth, the victim failed to evacuate the area before the blast, and placed himself near the block to be blasted; and fifth, the shot firer failed to ensure that everyone was in a safe location prior to the blast.



Means of Prevention

1. All persons should be a safe distance from the blasting area.
2. It should not be assumed that blasts will not shoot through a pillar.
3. Blast holes should be stemmed with less explosives.

Good housekeeping...more than meets the eye

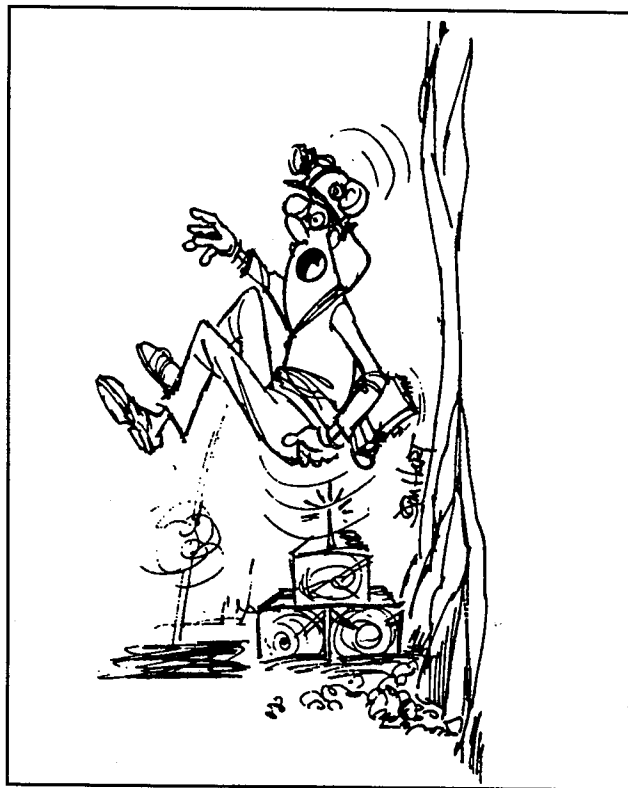
Since childhood, we've all been told "If you make a mess, clean it up," and "Put that away when you're finished with it." That's still good advice when it comes to preventing many accidents caused by less-than-tidy workplaces. But good housekeeping is largely the result of systematic planning and design. A few accident descriptions illustrate this:

A miner, taking jumbo steel off of a rack, was struck when the steel fell. The drill steel racks were overloaded. Having sufficient storage space in the right locations makes it easier to keep workplaces tidy. Just-in-time inventory management ensures that they do not become too full, blocking, or spilling out into work areas.

A miner was checking pumps which were mounted on a pad. He stepped off the pad, slipped, and fell. There was water on the floor. If the water was the result of a spill, the question is, "Why wasn't it cleaned up?" Are housekeeping standards adequate and enforced? Are miners sufficiently trained? Or better yet, could equipment or processes be redesigned to prevent future spills. For example, if water on the floor is unavoidable in the pump area, then grated flooring could have prevented this accident.

An employee sat on a nail protruding from scrap material. Substandard housekeeping caused this accident. Planning for efficient handling of waste materials is a key element of good housekeeping. An adequate number of waste containers conveniently located

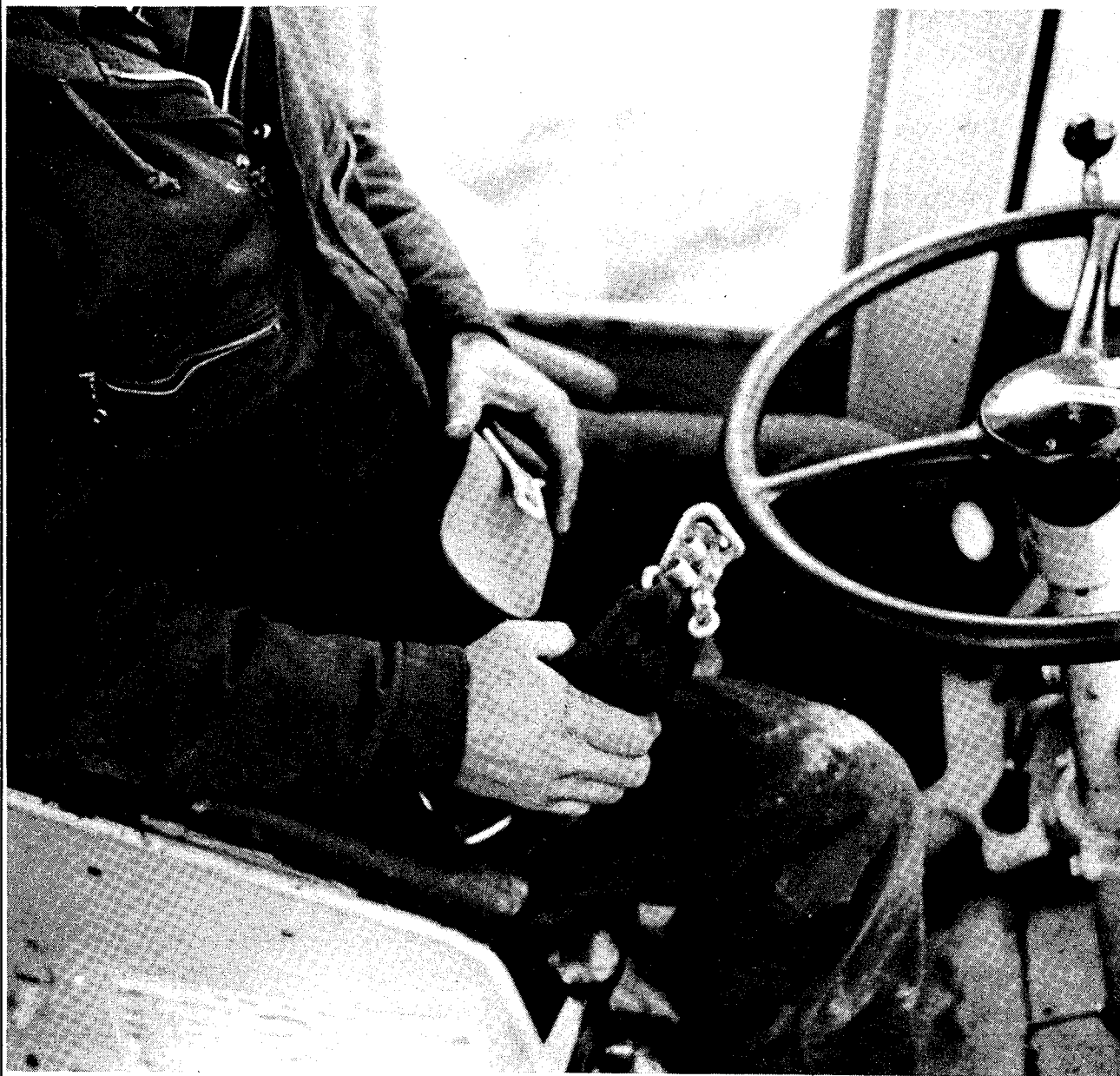
encourages miners to live up to standards. Better yet are processes or materials that contain, reduce, or eliminate waste.



These are just a few examples of accidents that might have been prevented if housekeeping had been considered from a more systematic point of view. From the arrival of supplies at the loading dock to shipping the final product, the design of materials handling processes and other systems plays a vital role in ensuring orderly workplaces. And orderly workplaces are not only safer, they're more productive. Our childhood lessons are still valuable, but there's a lot more to good housekeeping than meets the eye.

From: Mines Accident Prevention Association, Ontario

Seat Belts Save Lives ...



BUCKLE UP

Truck built stockpile accidents

Stockpiles are unstable structures. When material is loaded out of a stockpile, the slopes may stand at an angle steeper than the material's angle of repose. Such slopes should not be relied on to support the weight of heavy equipment.

Other factors affecting stockpile stability include: weather conditions such as moisture, and freeze and thaw cycles; cracks in the material, the composition of the material itself; and vibration generated by nearby equipment or blasting.

Often accidents occur when trucks dump directly over the edge of the pile. A slope only has a certain amount of strength, and the added stress on the material from the truck's weight and from the outward force resulting from braking of the truck, increase the potential of a collapse. The table below shows this.

Safety Precautions

- The area near the edge of a steep slope may not support the weight of a haul truck.

- Dump back from the edge of the slope at least one truck length.
- Check the area for cracks and slopes steeper than the angle of repose of the material.
- Maintain adequate and substantial berms.
- Back up slowly; come to a gradual stop at the dumping point.
- Keep the top of stockpiles sloped so that in backing up to dump, trucks are going up a slight grade.
- Back up perpendicular to the edge of the slope.
- Wear your seat belt at all times.
- Check for the location of overhead power lines.
- Follow the signals of the spotter, if one is used.

REMEMBER: Load-out areas are dangerous. Keep workers and customers away from the slope and the potential of sliding material.

From: North Carolina Department of Labor, Mine and Quarry Division

Weight of Truck (tons)	Braking Speed (mph)	Stopping Point (ft.)	Pounds of Force
20	10	10	13,000
20	5	10	3,000
35	10	10	23,400
35	5	10	5,800

Table 1
Force Exerted by Trucks Stopping

Sentinels of safety

The 1991 Sentinels of Safety award winners were announced recently. These awards recognize mining companies in different operational categories who achieve the greatest number of employee work-hours without a lost work-day injury. First-place winners in each category receive a trophy, a Sentinels of Safety flag, and a Certificate of Accomplishment for each employee. Following are award winners and runners-up by category.

The following operations were the top finishers in the Underground Metal category: **Jefferson Zinc, Union Zinc, Inc.**, Jefferson City, Tennessee - 188,858 hours; **The Doe Run Company, Fletcher Mine and Mill**, Viburnum, Missouri - 150,348 hours; **The Doe Run Company, Viburnum No. 29 Mine**, Viburnum, Missouri - 55,488 hours; **The Doe Run Company, Viburnum No. 28 Mine and Mill**, Viburnum, Missouri - 47,264 hours; and **Cyprus Minerals Inc., Casa Grande Mining Corporation**, Casa Grande, Arizona - 43,776 hours.

The top five finishers in the Underground Nonmetal group included: **Western Ag-Minerals, Nash Draw Mine**, Carlsbad, New Mexico - 193,711 hours; **United States Gypsum Company, Shoals Mine**, Shoals, Indiana - 163,305 hours; **Greer Limestone Company, Greer Mine and Mill**, Morgantown, West Virginia - 117,050 hours; **Martin Marietta Corporation, Ames Mine**, Ames Iowa - 64,387 hours; and **Martin Marietta Aggregates, Weeping Water Mine**, Weeping Water, Nebraska - 61,644 hours.

The following mines were top finishers in the Open Pit Group: **Magna Copper Company, Magna Open Pit**, San Manuel, Arizona - 484,885 hours; **E.I. DuPont DeNemours and Company, Dupont Florida Mine and Plant**, Stark, Florida - 339,717 hours; **IMC Fertilizer, Incorporated, Four Corners Mine**, Bartow, Florida - 317,914 hours; **Mobil Mining and Minerals, Big 4 Mine**, Bradley, Florida - 279,831 hours; and **Agrico Chemical Company, Payne Creek**, Mulberry, Florida - 172,006 hours.

Five members of the Quarry Group received Sentinels recognition including: **Dravo Basic Materials Company, Three Rivers Quarry**, Smithland, Kentucky - 173,164 hours; **McGeorge Contracting Company, Granite Mountain Quarry No. 1**, Sweet Home, Arizona - 165,656 hours; **Florida Crushed Stone Company, Brooksville Gregg Mine**, Brooksville, Florida - 140,054 hours; **Vulcan/ICA Distribution Company, Brooksville Rock Operations**, Brooksville, Florida - 118,226 hours; and **Puerto Rican Cement Company, Cantera Cana**, Ponce, Puerto Rico - 114,729 hours.

The top operations in the Bank or Pit Group were: **W.R. Bonsal Company, Bonsal Mining Division**, Lilesville, North Carolina - 144,319 hours; **Gifford Hill Company, Incorporated, Little River Plant**, Ashdown, Arizona - 112,153 hours; **U.S. Silica Company, Columbia Plant**, South Congaree, South Carolina - 96,675 hours; **Becker Minerals, Incorporated, Senter Mine**,

Lillington, North Carolina - 87,231 hours; and Thelen Sand and Gravel, Incorporated, Thelen Pit, Antioch, Illinois - 86,227 hours.

The following finished at the top in the Dredge Group: U.S. Silica Company, Millville Plant, Newport, New Jersey - 85,755 hours; Vulcan Materials Company, River Street Plant, Chat-

tanooga, Tennessee - 68,699 hours; Greenville Gravel Company, Greenville Plant and Dredge, Greenville, Mississippi - 57,673 hours; La Farge Corporation, Longville No.45, Lake Charles, Louisiana - 57,345 hours; and Louisiana Industries, Price Aggregates Plant, Isabel, Louisiana - 51,437 hours.

Oxyacetylene welding—some safety concerns

by

*Michael Sheridan, P.E.
Mining Engineer
MSHA Safety and Health Technology Center
Industrial and Electrical Safety Division
Denver, Colorado*

The welding/cutting process

Inexpensive and portable, oxyacetylene (gas) welding and cutting is used throughout the mining industry. Welding and cutting is done to repair or to modify machines and equipment. This article looks at some of the safety concerns related to gas welding.

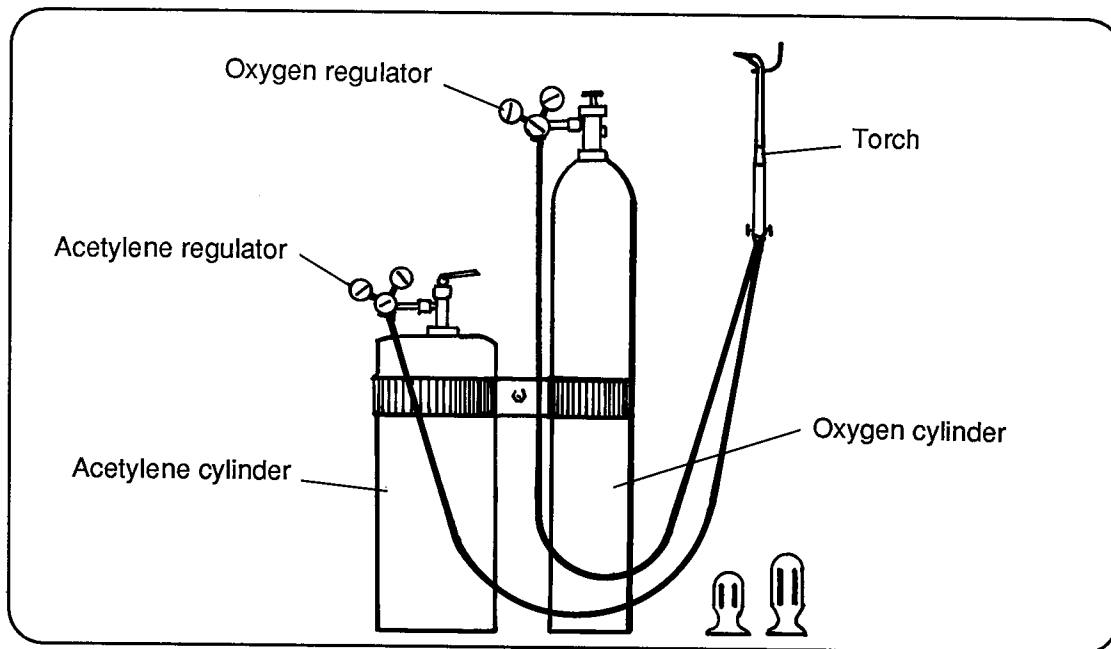
It is the welder's job to control and direct the heat on the edges of metal to be joined, while applying a suitable metal filler to the molten pool. Combustion of gases, usually acetylene and oxygen, produces the intense heat needed to weld. This is why the process is called oxyacetylene welding or gas welding. Gas welders may also do flame cutting to cut various metals to a shape or size desired, or to remove excess metal from castings.

Equipment

Oxyacetylene welding equipment consists of fuel gas, oxygen gas, regulators, hoses, torch handle, welding attachment, tip, filler metal as needed, and a spark lighter. In place of the welding attachment, a cutting attachment is used when cutting is to be done.

Fuel gases and oxygen are stored in cylinders which can be used either at the work location or attached to manifolds. Regulators attached either to the cylinders or to the manifold supply lines reduce gas storage pressure to the correct operating pressure. A pressure adjusting screw controls the operating pressure.

The welding hose connects the regulator outlet to the welding torch handle.



Hoses used for oxyacetylene welding have to conform to the Compressed Gas Association's standards for rubber welding hoses. These hoses are usually siamese. The red hose is used for fuel gas and the green hose for oxygen.

The welding torch handle has two valves. One valve controls the fuel gas and the other valve controls the oxygen. A welding, heating, or cutting attachment is connected to the handle for the required application. When welding, filler metal is added as needed. Flashback arresters and reverse-flow check valves are connected between the handle and the hose for the fuel gas and oxygen, and may also be connected to the outlet side of the regulators. The torch is ignited with a spark lighter.

The following checklist describes how to safely ignite a welding torch:

Checklist for igniting welding torches

Check the cylinder valve for dirt, oil and grease. Remove dirt and dust with a clean cloth. **Do not use the cyl-**

inder if oil or grease is present. Contact the gas supplier immediately.

- Briefly open and close ("crack") valves on each cylinder to blow out any dirt or dust.
- Check regulators for dirt, dust, oil, grease, and damage. Remove dirt and dust with a clean cloth. **Do not use the regulator if it has oil or grease on it or if it is damaged. Have it cleaned or fixed at an authorized repair shop.**
- Attach oxygen regulator to the oxygen cylinder. Tighten the regulator.
- Attach the fuel gas regulator to the fuel gas cylinder. Tighten the regulator.
- Be sure the regulator adjusting screws are released.
- Stand to the side of the oxygen cylinder away from the regulator and slowly open the oxygen cylinder valve until maximum pressure is indicated on the high pressure gauge.

☑ Stand to the side of the fuel gas cylinder away from the regulator and slowly open the fuel gas cylinder valve until maximum pressure is indicated on the high pressure gauge.

☑ Connect the oxygen hose to the oxygen regulator. Tighten the hose.

☑ Clear the oxygen hose of dust and dirt by turning the oxygen regulator screw to let 3 to 5 p.s.i. gauge escape through the hose for 5 to 10 seconds.

☑ Check the torch handle for dirt, dust, oil, and grease. Remove dirt and dust with a clean cloth. **Do not use the torch handle if it has oil or grease on it. Have it cleaned or fixed at an authorized repair shop.**

☑ Connect the flashback arresters and reverse-flow check valves to the torch handle for both oxygen and fuel gas.

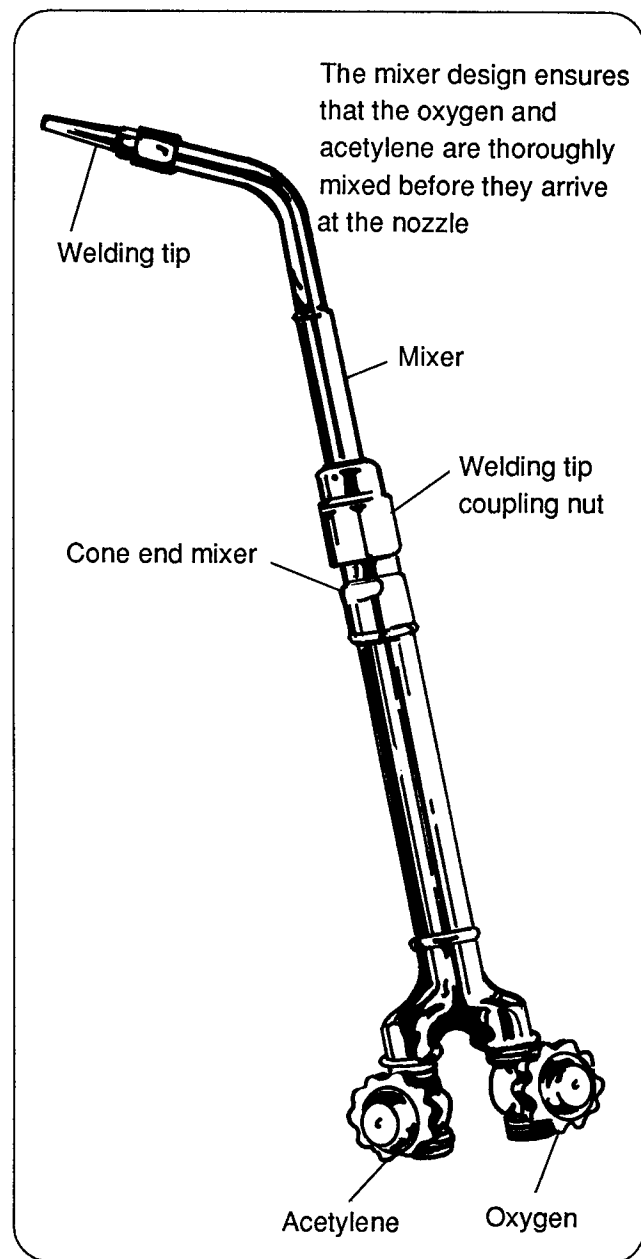
☑ Connect the torch handle to the hose.

☑ Connect either a welding attachment, cutting attachment, or heating attachment as required. **Select a clean tip based on gas flow requirement.**

☑ Open oxygen valve on torch handle and adjust the oxygen regulator to the required range. Close the valve on the torch handle.

☑ Open fuel gas valve on torch handle and adjust the fuel gas regulator to the required range. Close the valve on the torch handle.

☑ Don protective goggles.



☑ Open the torch handle fuel gas valve 1/2 turn and ignite with the spark lighter.

☑ Open the torch handle fuel valve until the tip quits smoking.

☑ Open the torch handle oxygen valve until a bright neutral flame is observed.

The following checklist describes how to safely extinguish a welding torch:

Checklist for extinguishing welding torches

- Close torch handle oxygen valve.
- Close torch handle fuel gas valve.
- Close both cylinder valves.
- Open torch handle valve to drain oxygen. Close valve when finished.
- Release adjusting screw on oxygen regulator (turn screw counterclockwise).
- Open torch handle valve to drain fuel gas. Close valve when finished.
- Release adjusting screw on fuel gas regulator (turn screw counterclockwise).

Health concerns for welders

Fumes and gases

Oxyacetylene welding liberates fumes and gases as the filler metal, flux, workpiece, and fuel gases vaporize, oxidize, and condense. Fume and gas generation rates depend on fuel, the process used (for example, welding with filler metal and flux vs. cutting), the temperature and duration of heating, and the composition of the workpiece. Adequate ventilation is especially important when welding or cutting zinc, brass, bronze, lead, cadmium, or beryllium-bearing metals as fumes from these materials are toxic and very hazardous to your health.

The American Conference of Governmental Industrial Hygienists publication, *Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment*, lists worker exposure limits for fumes and gases. Refer to the latest issue of this publication and the applicable section of *Title 30, Code of Federal Regulations (30 CFR)* to determine permissible exposure limits for fumes and gases.

Health concerns for welders

- Fumes and gases
- Strains and sprains
- Cumulative disorders
- Noise exposure
- Heat exposure
- Burns

Obtain Material Safety Data Sheets (MSDS) from manufacturers to determine possible fume constituents. Also, remember that contaminants or coatings on a workpiece can add to the fume or gas problem, so be sure to remove any contaminants or coatings before beginning to weld.

Welding must be done in a well-ventilated area to control concentrations of fumes and gases. There must be sufficient movement of air to prevent accumulation of toxic fumes or possible oxygen deficiency. Adequate ventilation is extremely critical in confined spaces where dangerous fumes, smoke, and dust are likely to collect. Examples of ventilation methods include natural ventilation, overhead exhaust hoods, portable local exhaust fans, downdraft tables, and crossdraft tables. Natural ventilation occurs when

doors and windows are open and may be assisted by fans. Overhead hoods, downdraft tables, and crossdraft tables work well for fixed welding stations. Portable local exhaust fans can be used anywhere in the shop.

Required ventilation velocity depends on fume and gas types, generation rate and distance from the workpiece. NIOSH and MSHA-approved respiratory protection must be worn until effective ventilation is established to control overexposure. A separate air supply may be needed if a welder is working in a confined space. NOTE: All respirator programs for metal and nonmetal mines must comply with the standards in the latest edition of *ANSI Z88.21969, Practices for Respiratory Protection*, for proper industrial hygiene practice.

Strains and sprains

Strains and sprains may occur when proper lifting techniques are not used to move equipment or workpieces. Securely position the material to be welded. Get help with heavy loads and use a lifting device (such as a crane) to position extremely heavy objects. Occasional breaks and stretching can reduce the risk of strains or sprains. Return all equipment and supplies to proper storage when the job is done. Make additional trips or get help as needed so that you don't overload yourself, or carry material so as to block your view.

Cumulative disorders

Welders may be afflicted by other cumulative disorders such as carpal tunnel syndrome, bursitis, and tendin-

itis. Carpal tunnel syndrome can cause the victim's hand to ache, or become numb and weak. Work reassignment, changes in weld joint design, or use of a special glove with a splint may help to reduce or eliminate these types of injuries.

Noise exposure

Exposure to excessive noise causes loss of hearing. When welding operations must be performed in areas with high levels of background noise, the noise level must be reduced to a safe level. If this cannot be done (or a noisy welding process is used), proper hearing protection combined with limited noise exposure time may reduce welder's hearing loss.

Heat exposure

Exposure to excessive heat may result in heat exhaustion or heat stroke. Periodic work breaks to cooler areas and drinking ample amounts of water can prevent these afflictions from affecting welders.

Burns

Welders can be burned by hot spatter and slag, contact with hot metal, and contact with the torch flame.

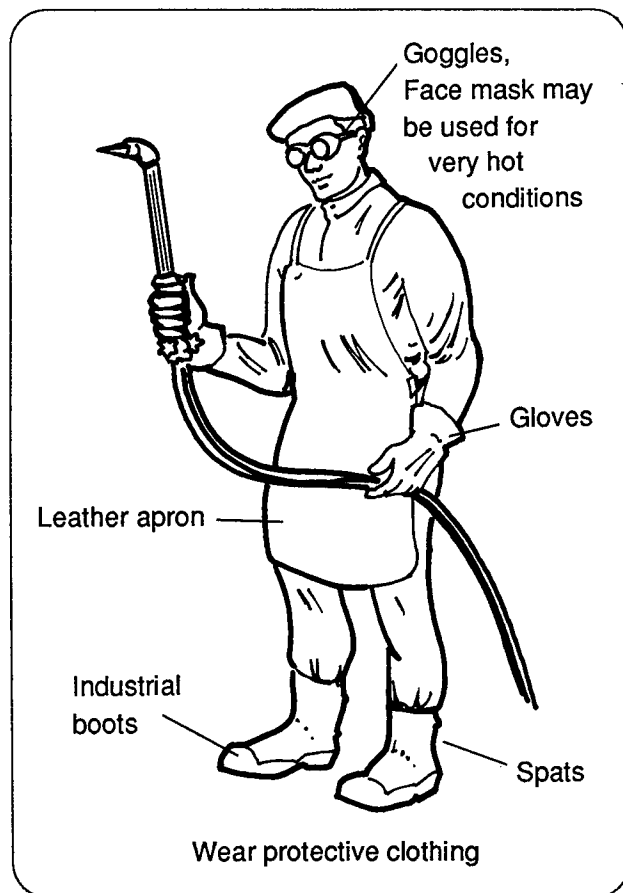
To protect their bodies from burns, welders should wear the following: caps, cuffless pants with covered pockets, substantial shoes or boots with the pants worn outside, dry leather gloves, flame-resistant ear plugs for out-of-position welding, and leather aprons, capes, jackets, suits, and leggings as needed. Wear woolen or cotton flame-retardant treated clothing. Do not wear clothing or shoes made of synthetic

materials around welding operations as these garments may melt or easily ignite.

Keep clothing tight at arms, cuffs, collars, button, or zipper areas. Also remove frayed or loose strings from clothing and remove flammable materials such as matches and plastic lighters from pockets.

To protect their eyes from the bright torch flame, welders need to wear close-fitting goggles with lenses of the correct shade number. The table below explains this.

Install a protective barrier as needed to shield other workers from flash, sparks, smoke, and fire. People in the immediate area should wear close-fitting safety glasses to protect their eyes from hot spatter and slag.



Safety concerns for welders

Electrical hazards

Be sure to keep hands and clothing dry at all times and do not weld in damp areas. Never stand or lie in

puddles of water, on damp ground, or against grounded metal when welding without suitable insulation. Use a dry board or rubber mat to stand on. Be sure to inspect the welder for proper overcurrent protection and check

Viewing Lens Filter Plate Numbers

Process	Plate Thickness	Shade Number
Gas welding of steel	Under 1/8 inch.....	4,5
	1/8 to 1/2 inch.....	5,6
	Over 1/2 inch.....	6,8
Gas cutting of steel	Under 1/8 inch.....	3,4
	1/8 to 1/2 inch.....	4,5
	Over 6 inches.....	5,6

gauges. Examine cables for exposed conductors, nicks, or abrasions. Examine clamps and the electrode holder for defects. Inspect goggles, hood, and gloves. Repair or replace damaged equipment.

Welders' safety concerns

- Electrical Hazards
- Fire and Explosion Hazards
- Tanks and Closed Containers
- Oxygen
- Gas cylinders
- Falls
- Confined spaces

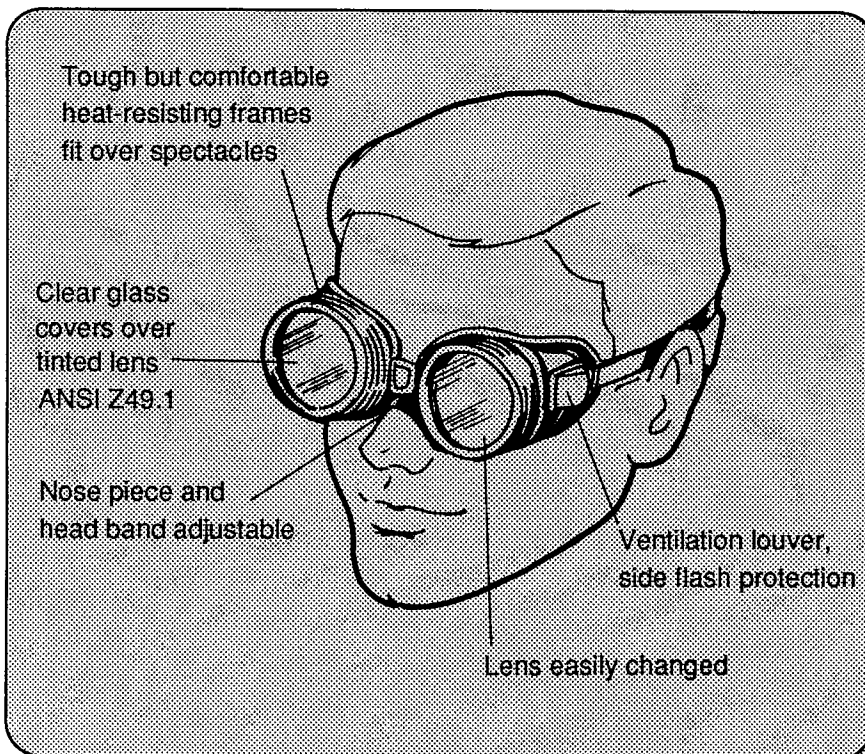
Fire and explosion hazards

Molten slag and spatter are potential ignition sources for fires and explosions. Because slag and spatter cannot be eliminated, welders should be careful to observe proper procedures.

The following checklist describes some ways to prevent welding and cutting-induced fires and explosions.

Checklist for fire and explosion prevention

- ☑ Check for explosive gases before performing work in a potentially explosive atmosphere.
- ☑ Test for gas continuously if performing work in a potentially explosive atmosphere.
- ☑ Check the area around the work site for flammable materials. Remove flammable materials before starting to weld or cut.
- ☑ If flammable materials cannot be removed, put a shield around the work site to prevent potential ignition
- ☑ Have fire watchers equipped with sufficient firefighting equipment near the work site.
- ☑ Purge closed containers of their contents before welding and cutting.
- ☑ Ventilate closed containers during welding and cutting
- ☑ Do not weld directly on concrete or similar material. Entrapped water may explode from the heat of the welding or cutting process.



Work must be done sometimes in areas which may contain potentially explosive atmospheres such as methane/air mixtures. The atmosphere in these areas must be checked for explosive gases. These gases must be at harmless concentrations before work begins. Gas concentrations must be monitored continuously during welding and cutting to ensure that safe levels are not exceeded.

Be sure the correct type of fire extinguishing equipment is immediately available at the work site.

In addition to providing proper fire extinguishers, check the work site for flammable materials and move them at least 15 feet in all directions from the welding area. Isolate the work site with nonflammable shields or barriers if flammable materials cannot be removed. Cover with noncombustible materials open gear cases or machine components containing lubricants at least 15 feet in all directions from the welding area. Also, remove compressed gas cylinders and hoses at least 25 feet from the welding area. If the risk of fire is great, use fire watchers near the work site during and after welding and cutting to detect and control any fires which may occur before they become a problem. Make sure that fire watchers have sufficient firefighting equipment and that they know how to use it correctly.

Tanks and closed containers

Tanks and closed containers which previously held flammable substances such as fuels, lubricants, or solvents are potential bombs. No welding or cutting may be done on used drums, bar-

rels, tanks, or other containers unless they have been thoroughly cleaned of all combustible substances that may produce flammable vapors or gases. Flammable and explosive materials include gasoline, light oil, or acids that react with metal to produce hydrogen, and nonvolatile oils or solids that release vapor when heated.

While welding or cutting, be sure that containers are ventilated. Never cut or weld directly on concrete or similar materials because the heat generated by the process may cause entrapped water to explode.

Oxygen

Remember these safety points about oxygen. Oxygen must not contact grease or oil as a spontaneous ignition will occur, resulting in either a fire or an explosion. Be sure to remove and change greasy or oily clothing and gloves before starting to weld or cut. Never use oxygen as a substitute for compressed air. Oxygen lowers the ignition point of materials that burn in air and a spark in an oxygen-enriched atmosphere can quickly ignite a fire.

Gas cylinders

Acetylene cylinders contain a porous material saturated with liquid acetone. If the tank is laid on its side, some acetone may flow out through the regulator and into the welding hose. The acetone can destroy the neoprene seals in the regulator and corrode the hose from the inside. A hose that has been internally exposed to acetone may appear to be in good condition but it can burst or explode during use. Therefore, if acetylene cylinders have been

transported or stored lying down, stand them upright for at least an hour before use to prevent possible acetone leakage.

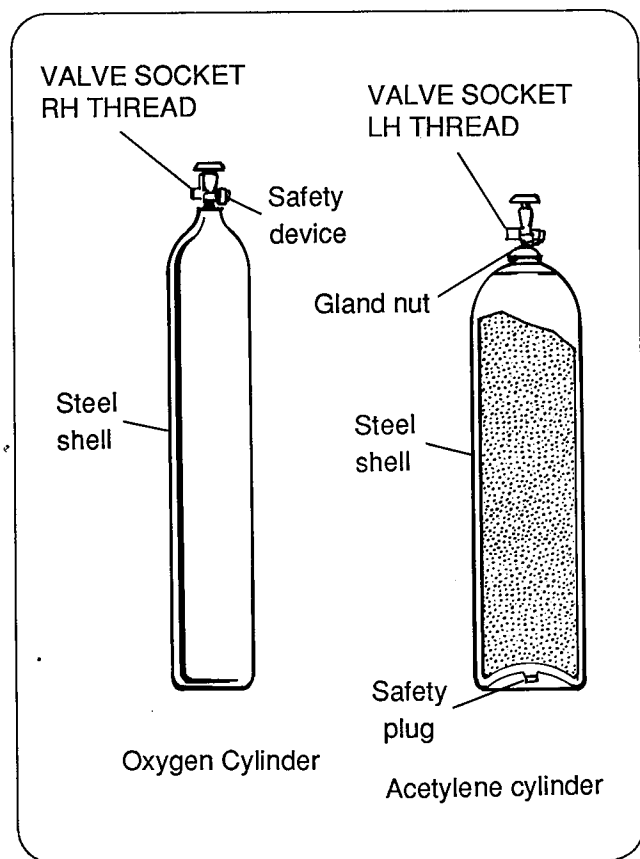
Transport cylinders in holding devices or boots with metal protection caps tightly in place. Roll cylinders at an angle or transport them on a two-wheeler to the storage area. Do not lift cylinders by their caps. Avoid dragging cylinders or allowing them to strike violently against each other or against other objects.

Store gas cylinders securely in an upright position in a well-ventilated area to prevent a build-up of explosive gas mixtures and a displacement of air. Keep cylinders where sparks or slag will not contact them. Cylinders should not be handled by the valve protection cap but by suitable slings. Use chains or straps to secure cylinders to carts, benches, walls, posts, racks, and in vehicles, and get help if needed to handle or move cylinders. Store full and empty cylinders separately, grouped by gas type. Acetylene and oxygen cylinders should be stored a minimum of 20 feet apart or separated by a 30-minute fire wall. Label cylinders as "empty" when the gas has been expended. Do not allow water and tools to accumulate on cylinders.

Cylinders must be stored with their respective regulators. Remove the regulators when not in use and replace the valve protection cap. Replace damaged regulators or regulators that have been contaminated with grease or oil. Be sure to remove the regulators, close the valves and secure the valve protection cap before transporting a cylinder.

Should a cylinder spring a leak, put

the cylinder outside, notify the gas supplier, and follow their instructions. Never use a cylinder that does not have a proper label. Notify the supplier for removal and identification. Never weld on or otherwise damage cylinders. Return cylinders to the supplier for refilling. The supplier will examine cylinders and remove from service those that are damaged.

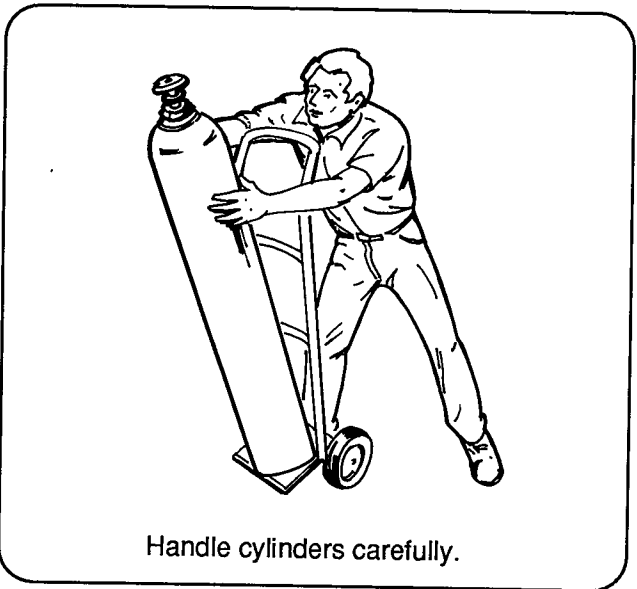


Safety lines and belts

Welders must wear safety belts and lines if there is a danger of falling. Another person must tend the welder's lifeline when the welder is working in a confined space.

Conclusion

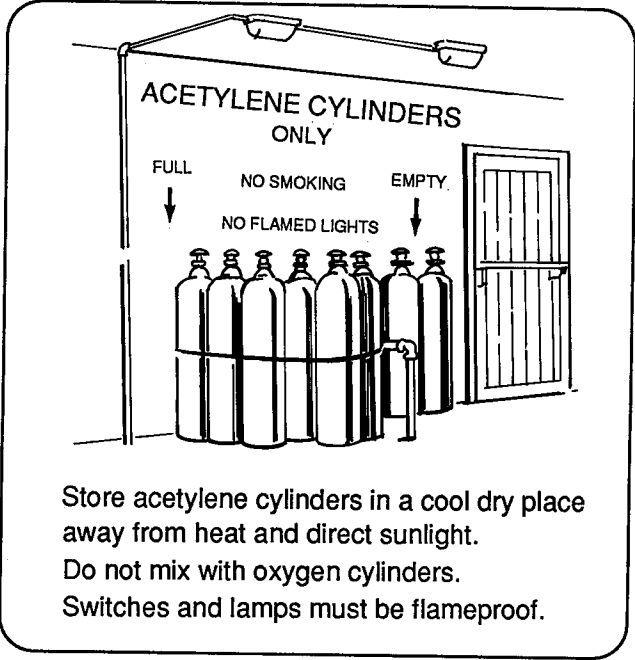
Remember, welding is safe if it is done correctly. Pay attention to the potential hazards mentioned in this article and weld safely.



Handle cylinders carefully.



Make sure cylinders are secure.



Store acetylene cylinders in a cool dry place away from heat and direct sunlight.
Do not mix with oxygen cylinders.
Switches and lamps must be flameproof.

Holmes Safety Association Monthly Safety Topic



Fatal explosion of gas accident

GENERAL INFORMATION: A 44-year-old maintenance man with 5 1/2 years of experience was fatally injured at a surface crushed stone operation when a tank he was working on exploded and crushed him.

DESCRIPTION OF ACCIDENT: A foreman and the victim started work at about 7:00 a.m. Their main task was to perform maintenance work on equipment but an alternate job was to prepare a pair of 200 gallon diesel fuel tanks for use as a portable fuel supply for the drill's air compressor in the quarry. The tanks were side by side on a small trailer frame which had been welded to the frame of a pickup truck. They were about two feet apart on the truck.

On the day of the accident, the foreman and the victim worked to further secure the frame of the trailer to the frame of the truck. After lunch, both men repaired and maintained other equipment until about 1:30 p.m. when they resumed work on the fuel tanks.

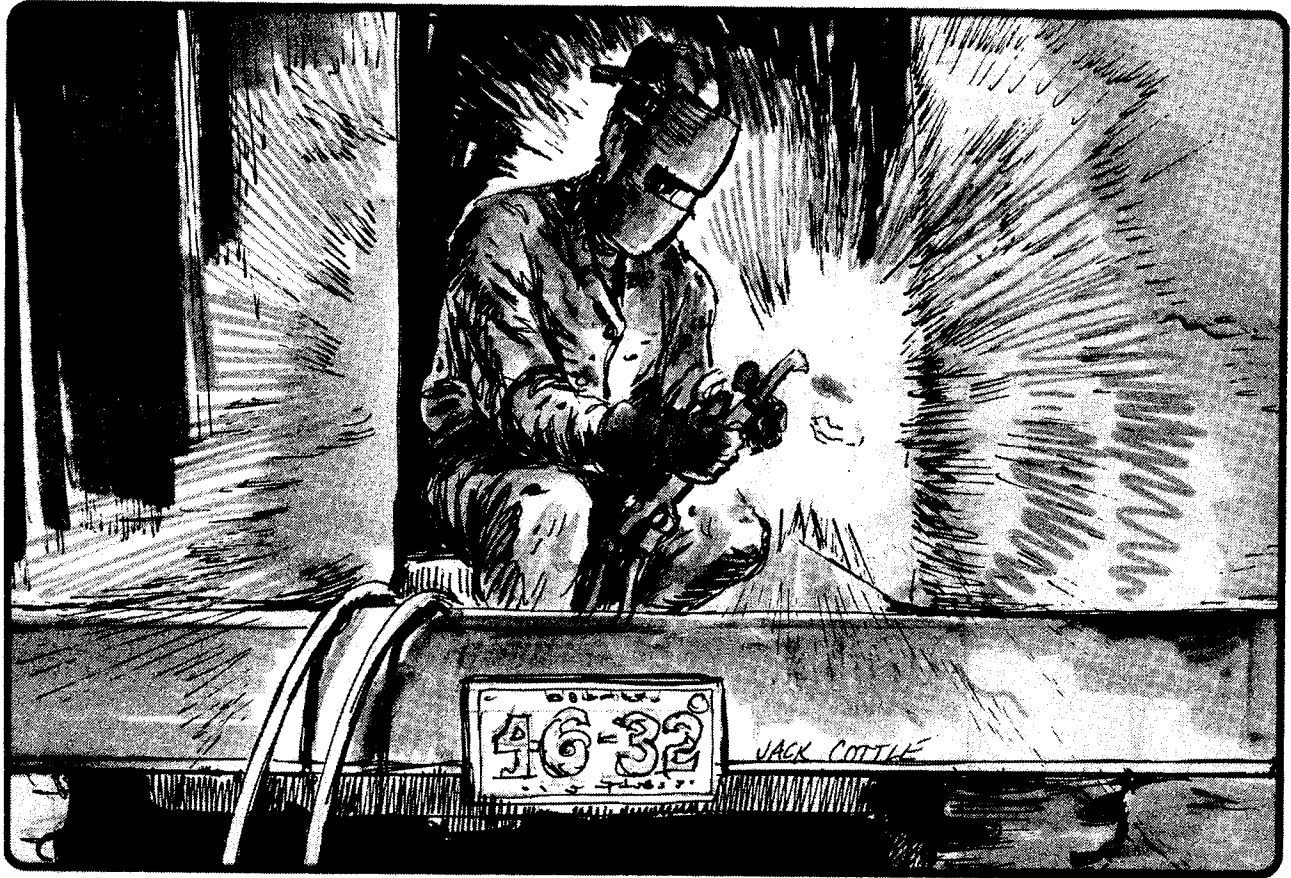
They filled both tanks with water and allowed them to overflow for about 30 minutes. While the tanks were full of water, they welded two threaded 1/2-inch nipples to the bottom of the end wall of the first tank. They then welded 1 1/2-inch nipples to the bottom of the facing walls of each of the two tanks.

Next, they penetrated the walls through each nipple with an electric drill and water began flowing from the tanks. Water was seeping from a weld at the bottom of the second tank but the foreman believed it posed no problem, so plugs were removed from both tanks to let them drain completely. The foreman then went into the nearby shop area to locate additional pipe connectors and some wrenches. The victim stayed outside.

Suddenly, the foreman heard an explosion. He ran to the truck and found that the side of the second tank had blown out, crushing the victim against the other tank. The foreman telephoned for help but the victim was pronounced dead at the site by the rescue squad.

CONCLUSION: The victim was fatally injured when he resumed welding on the leaking fuel tank after the water had been drained from it. Enough fuel remained in the tank, despite the water having been in it, that welding heat ignited fumes in the tank which exploded. Investigators found a small pinhole caused by the welding on the inside of the tank which exploded.

Contributing factors to the accident were failure to refill the tanks with water before the second interval of welding and failure to sample for gases.



Means of Prevention

Before welding, cutting, or applying heat with an open flame to containers that have contained flammable or combustible liquids, flammable gases, or explosive solids, the containers shall be—

1. Drained, ventilated, and thoroughly cleaned of any residue.
2. Vented to prevent pressure buildup during the application of heat.
3. Filled with an inert gas or water, where compatible.
4. Determined to be free of flammable gases by a flammable gas detection device prior to and at frequent intervals during the application of heat.

Job safety analysis in the coal mining industry

A primer for the review of existing programs and development of new programs



What is job safety analysis (JSA)?

Job Safety Analysis (JSA) is a process used by people who perform and supervise work to review potential hazards related to their tasks. The JSA process is fairly simple. Supervisors and employees work together to break a job into individual tasks. Each task is then examined for potential hazards. The results of this examination are used to develop safe work procedures. Recommendations arising from JSA are used as resources to develop health and safety training for specific jobs or tasks. They may also be used for making follow-up observations to ensure safe performance of a task.

History of JSA

JSA began in World War II when thousands of new employees went to work in defense plants and manufacturers recognized the need for an effective way to train these new employees to work safely. Companies which developed effective JSA programs experienced continuous improvement in their safety records.

Tips for developing a JSA Program

Each mine needs to customize and fit its own JSA program to its own needs. For example, one organization may use an on-the-spot type of analysis, perhaps involving a checklist, while another firm may use a more detailed, written JSA.

The following tips are based on the experience coal companies have had in developing successful JSA programs and are offered to those companies who desire to implement their own JSA system. The basic rule is to **KEEP IT SIMPLE!**

Tip: Meet with supervisors and employees at the start to explain what JSA's are, how they will be used, and why you decided to start JSA's.

Tip: Involve both supervisors and hourly employees in the safety analysis of the job. Let them determine the safest and best method of performing the job step or task. This can be done either informally with discussions on the job and a follow-up review of the JSA, or in a meeting of several employees and a supervisor.

Tip: Start with the job that can have the greatest impact. In an underground mine, this might be a roof bolter's job.

Tip: JSA's work best on routine, repetitive types of jobs such as roof bolters or dozer operators. Other approaches can be used more effectively in the nonroutine jobs.

Tips for JSA

- Keep it simple!
- Get everyone involved from the beginning
- Start with the job that can have the greatest impact
- Pick a routine job
- Start with only one or two jobs
- Use large steps
- Decide on specific responsibilities
- Ensure commitment
- Minimize paperwork

Tip: Start with one or two jobs. If you start with too many jobs, you may not have the time or resources to fully implement the jobs while interest and commitment are high.

Tip: Use large steps while writing a JSA. Don't break the steps down too fine. Use steps such as pre-operational checks, mount and dismount, tram, etc.

Tip: Decide on specific responsibilities. Be sure that everyone completely understands their responsibilities. The larger an organization, the more important this becomes.

Tip: JSA depends on commitment at all levels of an organization to be successful. Try to get the JSA for a particular job, such as roof bolter, implemented in a relatively short time. Interest diminishes if the supervisors and employees have to wait too long to see results.

Tip: Correcting employees when observed not following the work procedures established by the JSA is a must for the program to be effective. Many supervisors need training on how to correct their employees effectively and constructively. An essential element for the program is for supervisors to be comfortable in training and correcting employees and doing follow-up observations.

Tip: Minimize paperwork—paperwork jungles kill JSA programs.

Audiovisual and printed material on JSA is available from the Customer Services Branch at the National Mine Health and Safety Academy.

The 15-minute videotape, "Job Safety Analysis: A Practical Approach," (Academy Catalog No. VC 885), discusses the JSA process. Viewers learn

how to determine which jobs to select for JSA, to separate jobs into basic steps for JSA, to identify the hazards associated with each job step, and to use methods to control each hazard. This VHS videotape was produced in 1990 and is suitable for coal and metal/non-metal operations.

"Job Safety Analysis Process: A Practical Approach" is suitable for use at coal and metal/nonmetal mines. This set of materials consists of an Instruction Guide (Academy Catalog No. IG 83), and a Participant's Guide (Academy Catalog No. IG 83A.) These items are designed to enable miners and supervisors to work together to identify

hazards and to develop step-by-step procedures that make up the safest, most effective way to complete a major task. There is no charge for one copy of each booklet. Additional Instruction Guides are available at \$2.00 each and additional Participant's Guides are available for \$1.00 each. To order, contact the National Mine Health and Safety Academy, Customer Services Branch, P.O. Box 1166, Beckley, West Virginia 25802-1166. Telephone (304) 256-3257.

Reprinted from material prepared by the BCOA Training Committee and BCOA members of the National Mining Committee on Job Safety Analysis.

Bee stings

People stung by honeybees, wasps, hornets and yellow jackets occasionally experience severe allergic reactions. Individuals who experience serious reactions should be urged to secure any possible immunizations or antibody prescribed and have it readily available to prevent a more serious reaction in the future.

Signs and symptoms



Bee stings cause local irritation and pain in the region stung. Moderate swelling and redness may occur, as well as itching, burning, and pain.

First aid treatment

Determine if the stinger is still attached in the body. If it is, remove the stinger to prevent further injection of toxin.

Carefully scrape off the stinger from the skin in a downward motion (do not squeeze toxin into the body).

Apply ice or ice water to the sting to slow absorption of the toxin into the bloodstream.

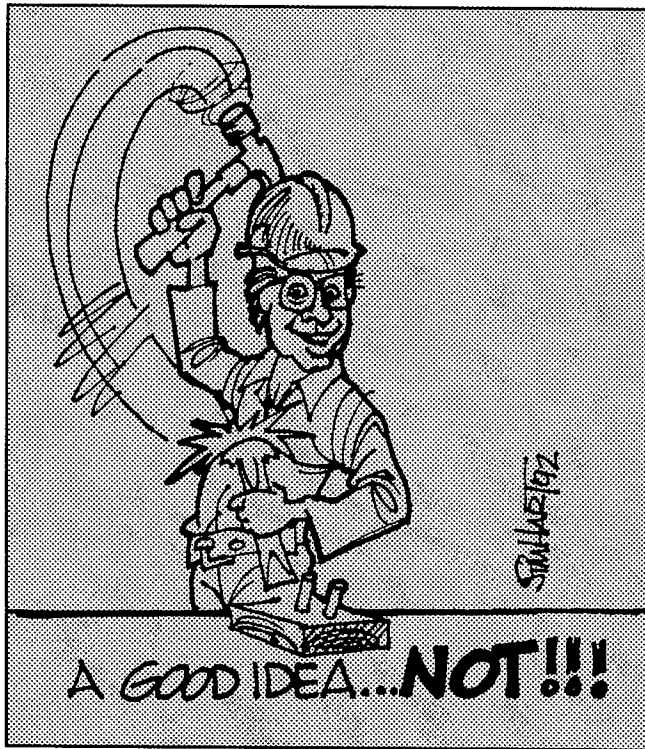
Observe the victim for signs of allergic reaction. If the victim is allergic, maintain an open airway and get them to medical help as quickly as possible.

From: North Carolina Department of Labor, Mine and Quarry Division .

Hand tool safety

Compared to other risks faced in our industry, using hand tools may not seem like such a big deal. Yet each year there are hundreds of injuries, most of them fortunately minor, that result from the improper use of hand tools. All too often, we take our "tools of the trade" for granted, largely because we use them every day. That's

why it's so important from time to time to refresh our memories about some of the basic rules of hand tool safety.



Use tools in the proper manner as you've been trained. Pull on wrenches rather than push them and don't use a hollow pipe to extend the wrench for more leverage. Cut away from your body when using blades. If you're not familiar with a tool, find out how to use it before you use it.

Keep tools clean and in good repair at all times. Inspect your tools before each use. A mushroomed head on a chisel, for instance, can splinter; a loose hammerhead can fly off. Repair or discard any tool that's in less than perfect condition.

Transport and store tools safely. Never carry sharp objects in your pocket. Store heavy tools on low shelves where they won't fall and hurt someone. Don't leave cutting edges exposed.

Wear the appropriate personal protective equipment. When using hand tools, there is hardly any occasion when safety glasses are not in order. Similarly, leather or cut-resistant gloves should be used when using tools that could cut or puncture.

Consider the ergonomics of your tools. Repeated use of tools that are poorly designed or don't fit your hand can cause cumulative trauma disor-

Hand tool safety rules

- Use the right tool for the job
- Use tools in the proper manner
- Keep tools clean and in good repair
- Transport and store tools safely
- Wear appropriate personal protective equipment
- Consider ergonomics of tools

Use the right tool for the job. Never "make do" with whatever's handy. For example, a ball peen hammer is required to strike steel objects such as a cold chisel. A claw hammerhead can splinter on impact. Similarly, a metric wrench can slip on a nonmetric bolt.

ders such as carpal tunnel syndrome. Watch to see that your wrist stays in a straight position as much as possible. Pliers with bent rather than straight

handles is just one example of tool redesign that helps prevent excessive bending of the wrist.

From: Mines Accident Prevention Association, Ontario

Status of MSHA rulemaking

The Mine Safety and Health Administration's Office of Standards, Regulations and Variances coordinates the development and issuance of safety and health rules and revision of the existing rules. Public involvement is invited. Following is the status of rules presently being developed/revised:

Air quality and chemical substance: Proposed rule published August 29, 1989. Final rule scheduled to be published in 1993.

Civil penalties (excessive history): Proposed rule published January 24, 1992. Extended comment period closed April 24, 1992. Final rule expected Fall 1992.

Confined spaces: Advance notice of proposed rulemaking published December 30, 1991. Extended comment period closed May 1, 1992. Proposed rule expected Summer 1993.

Explosives (Metal/Nonmetal): Final rule effective November 1, 1991. Proposed rule for stayed provisions is being developed and expected out later this year.

Hazard communications: Proposal published November 2, 1990. Final rule expected Spring 1993.

Noise: Advance notice of proposed rulemaking published December 4, 1989. Proposed rule is not expected until next year.

Training for newly employed miners and supervisors: Proposal published September 24, 1991. Extended comment period closed January 24, 1992. Final rule expected Spring 1993.

The **Semiannual Regulatory Agenda** was published April 27, 1992. This document contains the agenda of regulations which have been selected for review or development during the coming one-year period. Copies of this document are available upon request and may be obtained from the address below.

For further information on any of the above subjects please contact Office of Standards, Regulations and Variances, MSHA, 4015 Wilson Boulevard, Arlington, Virginia 22203-1984; telephone (703) 235-1910.

From: Southeast News: Major and Minor, June 1992.

Street smart

Use common sense, trust your intuition and follow these precautions to protect yourself on the street.

Dress appropriately—Avoid flashy clothing or jewelry and dress so you can easily walk or run if necessary.

Use money sense—Don't carry more money or valuables than you can afford to lose. Be cautious about displaying cash and credit cards. If you must carry large amounts of cash, divide it up among several places. A money belt is a good alternative. Carry credit cards only if you plan to use them.

Secure your purse or briefcase—On a busy street carry your purse or briefcase on the side farthest from the curb; stay close to buildings. Carry a shoulder strap purse over one shoulder with the bag suspended between your arm and body. Don't cross the strap over your body. This could cause serious injury as purse snatchers usually yank a purse hard enough to break the strap, while shoving the victim the other way.

Carry small or strapless handbags cradled in your arm like a football. If there's a small strap, then push your arm through it before you cradle the bag with your arm. And don't put your identification on your key ring; that tells a robber where to find the door that fits the key.

Face oncoming traffic when you walk—This tactic prevents an assailant from driving up behind you. Avoid walking alone. If you must, however, walk briskly, purposefully, and confi-

dently. Avoid isolated areas, parks and parking lots; shortcuts may save you time but expose you to danger.

If you are followed down a well-traveled street, slow down, speed up or reverse your direction. These actions tell pursuers that you are aware of them. Then go straight for help. If you are on a deserted street, walk briskly toward other people or a public place to telephone the police. Don't run straight home; the assailant then knows where you live and can return later.

Be street smart

- Dress appropriately
- Use money sense
- Secure your briefcase or handbag
- Face oncoming traffic when you walk
- Don't walk alone at night
- Keep the public in public transportation

Avoid walking alone at night—Use taxicabs whenever practical. If you must walk alone after dark, stay away from parked cars, doorways, alleys or shrubbery. If necessary, do not hesitate to walk in the street. If you usually walk at night vary your route to minimize the possibility of someone lying in wait for you.

Keep the public in public transportation—Wait in well-lighted areas near other people. Many robberies occur on isolated platforms. Sit near a

companion, conductor, or motorman; avoid sitting near an exit door or an open window. Do not sleep while traveling. Keep your arm over your handbag or briefcase at all times and keep your wallet in an inside pocket. Don't wear necklaces, especially in summer months, and turn your rings so the stones don't show. Be aware of who is around you. If you suspect you're being followed, get off at a busy—not deserted—stop or tell the conductor or motorman.

Remember your best defense—In any attack situation, your goal is to get away with the least injury to yourself.

Your best defenses are to scream for help and run away—not to fight. Don't be a hero. Chances are your attacker is better equipped for combat than you are.

You can also attract attention by using a loud whistle. Keep a whistle strapped to your wrist, not in your purse or around your neck! Other so-called weapons such as small handguns or Mace can easily be grabbed and used against you.

From: Nevada Department of Industrial Relations, Division of Mine Inspection, Mine Safety \$en\$e, January-April, 1992 issue.

HSA slogan contest

The Holmes Safety Association is pleased to announce its Annual Safety Slogan Contest! Here's a chance for chapter members to be creative and to win a \$100 U.S. Savings Bond!

Our 1992 slogan is "Safety Begins With You in '92." The 1993 slogan must be very brief and end with the words, "in '93." The person who submits the winning slogan will receive the \$100 U.S. Savings Bond.

All entries must be received before December 4, 1992, and the winning slogan will appear in the February 1993 Bulletin.

Please send your entries to:

Robert A. Glatter
HSA Secretary-Treasurer
P.O. Box 4187
Falls Church, Virginia 22044-0187

Battery-powered equipment

Most mines use some kind of battery-powered equipment to transport workers, materials, and coal. This equipment requires regular charging and maintenance. Persons operating battery-powered equipment should be properly trained in the use and maintenance of such equipment.

Battery charging station

All battery-powered equipment has a charging station located on the surface or underground. Battery charging stations should be kept clean and free of debris, have proper fire protection, be fireproof, and have proper ventilation (vented to the return). Batteries, when being charged, release hydrogen gas, which is highly explosive. Battery charging stations must be constructed in areas where mine roof and ribs are in good condition. Battery chargers are to be kept in permissible condition, having no broken dials or meters. Power cables are to be hung on insulators and free of cuts and poorly made splices. Power sources to battery chargers can be classified in two ways. When classified as "Power Cables," they must be hung on insulators. When classified as "Trailing Cables," they must have proper restraint clamps. Properly attached ground clamps are also essential.

Battery charging procedures

- Turn off battery-powered equipment.
- Make sure battery charger is "off."
- Attach battery charger ground clamps to equipment frame.

- Disconnect both battery leads before connecting to charger.
- Insert charge plugs (always grasp plugs, not the cable).
- Turn off battery charger when batteries are fully charged.
- Remove charger ground clamps.

Battery maintenance

- Wear eye protection and rubber gloves while servicing batteries.
- Clean batteries with a solution of water and baking soda.
- When replacing lids, make sure they are secure.

Remember these safety tips

- Never tram equipment over cables.
- Keep operator's deck clean.
- Make sure all operating controls are in good working condition.
- Govern speed according to condition of the mine.
- Inspect battery charger before connecting or disconnecting batteries.
- Use audible warning devices when approaching curtains, and in areas where people are working.
- When transporting supplies, make sure they are loaded so the material will not shift or slide.
- Personnel shall ride only in designated compartments.
- All equipment, such as lifting jacks, jack bars, and fire extinguishers, or any other item that is to be carried in mobile equipment, is to be safely secured.
- Always face the direction of travel.
- Always remain seated in the confines of the operator's deck while operating equipment.

- Respect the fact that mine batteries produce up to 300 volts of electricity.
- Remember, equipment is more likely to stick in tram when battery power is low.
- Remember, battery acid can cause severe burns and should be flushed from the skin with water.

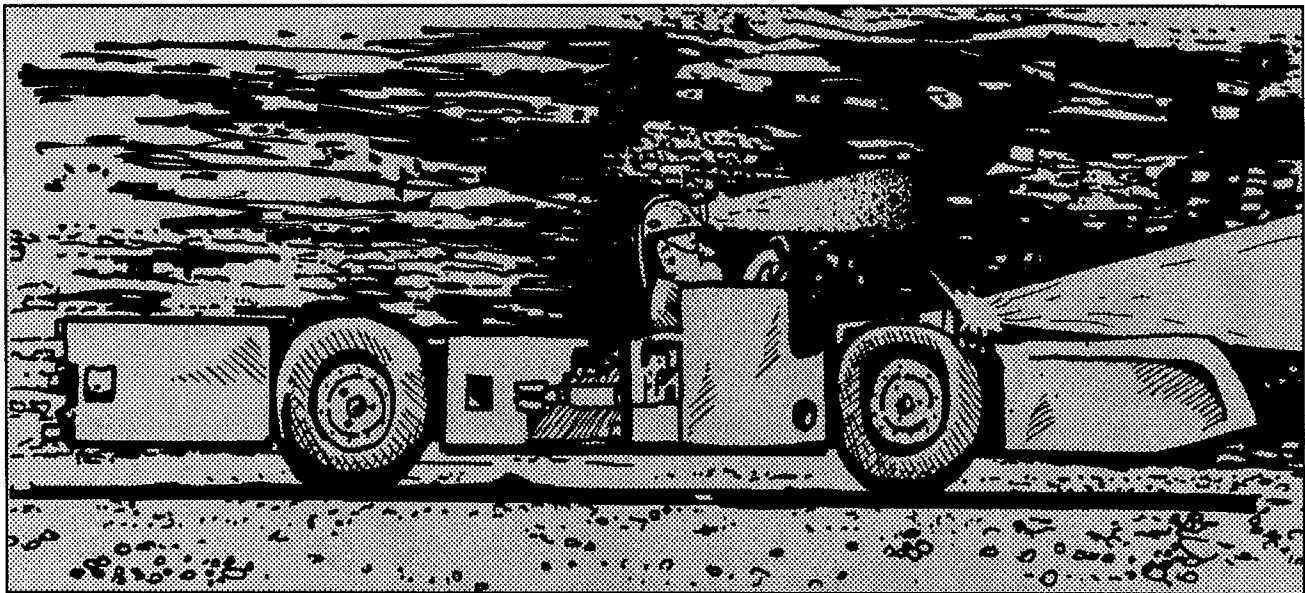
Battery-powered equipment safety quiz

Indicate whether answer is true or false.

1. Battery-powered equipment is safe to operate at any speed.
2. Facing the direction of travel at all times is important when operating mobile equipment.
3. Battery charging stations have to be ventilated to the return.
4. Battery acid can cause severe burns.
5. Personnel can safely ride anywhere on mobile equipment.
6. Ground clamps on battery chargers should be secured to the frame of the equipment being charged.
7. Low battery power can cause equipment to stick in tram.
8. Battery charging stations should be kept clean and free of debris.
9. Battery chargers do not have to be turned off when batteries are fully charged.
10. It is a poor practice to tram equipment over power cables.

ANSWERS: 1. F; 2. T; 3. T; 4. T; 5. F; 6. T; 7. T; 8. T; 9. F; 10. T.

Reprinted from the September 1988 issue of Topic-of-the-Month published by the Virginia Department of Mines.



Secretary's Message

HSA calendar contest

Youngsters, get out your pencils, crayons, paints and paper! The Holmes Safety Association is having a big safety calendar contest open to children or grandchildren (ages 5 through 16) of any mining employee at any HSA Chapter Mine.

Winners will receive a \$50.00 prize and their safety calendar picture will be published in the Holmes Safety Association **Bulletin**. Use your imaginations and good luck!

Contest rules

1. The contest is open to children or grandchildren (ages 5 through 16) of any mining employee at any HSA Chapter Mine.

2. Entrants are to select a subject from the following list and draw or color a picture that shows safe (at home or at work) practices about the subject. The subjects for the contest are: Fire Safety; Don't Do Drugs; Seat Belt Safety; Electrical Safety; Personal Protection/Safety Equipment; Abandoned Mine and Abandoned Well Safety in Your Neighborhood.

3. Safety pictures can be in any form such as pencil drawings, crayon, paints, etc.

4. Be sure to include the following with each entry:

- Artist's Name (with middle initial)
- Artist's Age (1992 birthday age)
- Artist's Address
- School (name only)
- Sponsor (name of mine worker parent, grandparent, or guardian)
- Name and Location of Mine

5. One winning entry will be selected from each age level for a total of 12 winning entries. Winners will receive a \$50.00 prize and their calendar drawing will be published in the Holmes Safety Association **Bulletin**.

6. All entries must be post-marked on or before October 31, 1992.

7. Send your entries to:

Robert A. Glatter
HSA Secretary-Treasurer
P.O. Box 4187
Falls Church, Virginia 22044-0187

Operators are respectfully asked to post and/or provide copies of this notice for employee participation. Thank you!

The last word...

"Leadership is the act of getting others to want to do something that you are convinced should be done."

"If you keep your mind sufficiently open, people will throw a lot of rubbish into it."

"Have confidence that if you have done a little thing well, you can do a bigger thing well, too."

"Most of life is routine—dull and grubby, but routine is the momentum that keeps you going."

"Gossip is the art of saying nothing in a way that leaves practically nothing unsaid."

"By the time you're 80 years old you've learned everything. You only have to remember it."

"Thinking well is wise; planning well is wiser; doing well, wisest and best of all."

"Laughter is the shortest distance between two people."

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
P.O. Box 4187
Falls Church, Virginia 22044-0187**

Phone: (703) 235-1400

