BULLETIN

July 1992

July 1992

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KEEP US IN CIRCULATION

The Holmes Safety Association Bulletin contains safety articles on a variety of subjects: fatal accident abstracts, studies, posters and other safety-related topics. This information is provided free of charge and is designed to assist in presentations to groups of mine and plant workers during on-the-job safety meetings.

Welcome new members

NAME	CHAPTER NUMBER	LOCATION
D & Y Construction	9724	Alvarado, TX
NO. 1 Surface	9725	Fayetteville, WV
3M Production	9726	Little Rock, AR
3M Electrical	9727	Bautite, AR
Raven Mining Company	9728	Van Lear, KY
Ohio Division Mines	9729	Shadyside, OH
Western States Energy	9730	Bolder City, NV
Vanderbilt Gold Corp.	9731	Las Vegas, NV
Spartan Rock Products, Inc.	9732	Lexington, KY
Sterling North Mine	9733	Columbiana, OH
David Lawrence Excavation	9734	West Monroe, LA
Wayne's Excavation	9735	Mcgehee, AR
Amanda Dock Inc.	9736	London, WV
Anthracite Energy, Inc.	9737	Lower Shaft, PA
Mullinax Sand & Gravel	9738	Sheridan, WY
Char-coal Company, Inc.	9739	East Lynn, WV
Big Sandy Terminal, Inc.	9740	Kenova, WV
D.W.L., Inc.	9741	Glade Spring, VA
Krulock, Inc.	9742	Morristown, OH
Guernsey Stone & Construction	9743	Sheridan, WY
Hard Rock Coal Company	9744	Berlin, PA
A.P.C.O.	9745	Brookfield, CT
Canyon Mines & Minerals	9746	Fontana, CA
Ensafe, Inc.	9747	Hartford, KY
Becker Minerals, Inc.	9748	Charlotte, NC
Gibson	9749	Henderson, TX
Paxton Pit	9750	Paxton, IL
North Shore Stone	9751	Flat Rock, OH
Mine Electrical Systems Division	9752	Pittsburgh, PA
Wade Eagle	9753	Lyburn, WV
Bandmill Mine	9754	Lyburn, WV
Rum Creek Preparation Plant	9755	Lyburn, WV
Central Shop	9756	Lyburn, WV
Elkay Construction Crew	9757	Lyburn, WV
Elkay Truck Garage	9758	Lyburn, WV
Elkay 4-A	9759	Lyburn, WV
Meredith Branch	9760	Lyburn, WV
Camp Branch Mine	9761	Lyburn, WV
Buffalo Construction Crew	9762	Lyburn, WV
Lorado No. 5 Plant	9763	Lyburn, WV
Opal Safety Association	9764	Lafayette, LA
Houston Regional	9765	Channelview, TX
WFS - Baton Rouge	9766	Baton Rouge, LA
Lafayette Regional	9767	Lafayette, LA
United Companies of Mesa No. 1	9768	Grand Junction, CO
United Companies of Mesa No. 2	9769	Grand Junction, CO
United Companies of Mesa No. 3	9770	Grand Junction, CO
A. Graziano, Inc.	9771	Braintree, MA
S & S Aggregate	9772	Zanesville, OH
Vassar Drying Plant	9773	Saginaw, MI

Holmes Safety Association Monthly Safety Topic

Fatal powered haulage accident

GENERAL INFORMATION: A 30-year-old laborer with five months of experience was fatally injured when he was pinned and crushed by a shuttle car.

DESCRIPTION OF ACCIDENT: At 4:00 p.m., the maintenance shift entered the mine and proceeded to the working section to perform routine repairs on mining equipment and do some needed clean-up work. The crew included a foreman, miner operator, utility man, and a laborer. It was common practice at the mine for the maintenance crew to operate the continuous miner and load coal when their assigned work was completed.

The crew began to mine coal at about 9:00 p.m., after they finished their maintenance work. The miner operator ran the continuous miner, loading coal about three crosscuts inby the belt-conveyor tail piece to the right, and the victim drove the shuttle car. The utility man was performing some other repair work at the tool sled just outby the belt-conveyor tailpiece and the foreman was at the continuous miner.

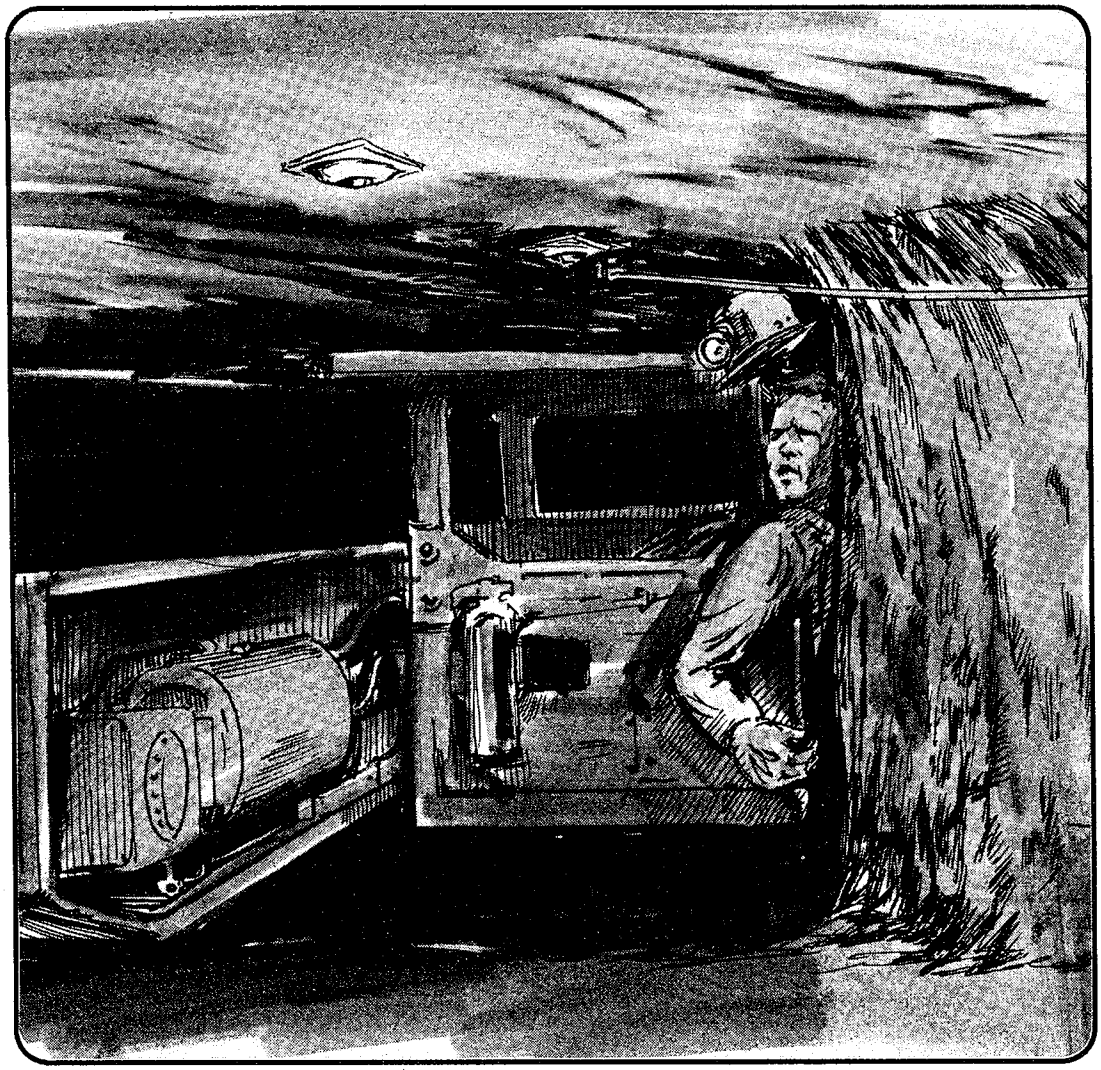
Each loaded shuttle car was trammed to the tailpiece of the belt conveyor located in the No. 4 Entry. The victim trammed the shuttle car through a crosscut between the Nos. 3 and 4 Entry to reach a side-dumping location beside the tailpiece where he discharged each load of coal from the shuttle car onto the tailpiece. It took about five minutes for the victim to make a round trip from the continuous miner to the belt conveyor and back to the miner.

Fifteen shuttle cars of coal had been loaded by about 10:30 p.m., when the victim did not return to the continuous miner. The foreman went to see why the shuttle car had not returned to pick up more coal. At 10:45 p.m., the section foreman found the victim a few feet away from the tailpiece, where he had been pinned and crushed between the rear support of the operator's cab of the shuttle car and the corner of the outby coal pillar. The shuttle car was still running and had the victim's upper body pinned against the coal pillar. The victim was unconscious and showed no signs of life. The foreman called immediately for help from others on the section and used the telephone at the tailpiece to call to the surface for an ambulance.

The foreman and utility man trammed the energized shuttle car away from the victim and administered CPR but the victim did not revive. The victim was transported from the mine and carried to the hospital where he was pronounced dead on arrival from severe crushing injuries to his chest and upper body.

CONCLUSION: The accident occurred because the victim was operating the shuttle car while leaning his head and upper body outside the confines of the cab.

A contributing factor to the accident was that the canopy on the shuttle car, while it satisfied legal requirements, greatly restricted the space in the operator's cab. The canopy also obstructed the operator's visibility in seeing ahead of the shuttle car in the direction it was traveling. Additional investigation showed that the victim routinely operated the shuttle car with his head and upper body outside the confines of the operator's cab.



Drug abuse treatment works

12-year follow up of NIDA study of treatment outcome confirms that road to recovery often takes years

By Neil Swan, NIDA Notes Contributing Writer

Researchers have published findings from one of the National Institute on Drug Abuse's (NIDA) longest studies of treatment outcome and addiction "careers." It shows that drug treatment works, but it typically involves a lengthy recovery period.

NIDA's latest findings on addiction careers come from a 12-year follow up study of participants in the Drug Abuse Reporting Program (DARP), which initially looked at people enrolled in treatment programs from 1969 to 1973. The DARP data provided some of the first hard evidence of the effectiveness of drug abuse treatment.

After the initial DARP treatment outcome study, samples of DARP clients who were addicted to opiates were followed up 6 years and 12 years after they first began treatment. In the recently published 12-year follow up, 490 of the original DARP clients, who had entered DARP's first nonhospital treat-

A look at treatment effectiveness for opioid users

From 1 to 12 years after they entered treatment in the Drug Abuse Reporting Program (DARP)

	Before treatment entry	Years after treatment entry				
		1	2	3	6	12
Percent using opioids daily	100	47	34	28	25	24
Percent reporting any opioid use	100	63	51	45	42	39

Researchers followed 405 male opioid users for 12 years after they entered drug abuse treatment in DARP. Following the initial DARP treatment, clients reported receiving sporadic treatment, entering and leaving therapy several times during the follow-up period. At the end of the 12-year follow-up, 24 percent still used opioids daily while 39 percent reported using opiods, but not on a daily basis.

Source: Opioid Addiction and Treatment: A 12-Year Follow-Up. Adapted with permission of Krieger Publishing Co., Malabar, Florida.

ment programs from 1969 to 1972, were interviewed. Sixty-three percent of the heroin users interviewed had gone at least 3 years without relapsing to daily opioid use.

However, the heroin users reported following an on-again, off-again path toward recovery, with repeated periods of addiction and treatment. Following the time in DARP community-based programs, treatment clients reported undergoing an average of six periods of treatment, extending over 10-1/2 years. During the years when they were still using heroin daily, admissions to treatment occurred about every 1-1/2 years.

While 3 out of 4 of the heroin users relapsed to daily use one or more times during the 12-year study, 76 percent said they did not use heroin or other opiates daily in the year prior to the follow up interview.

These findings from DARP are the longest ever observance of a national sample of treated drug abusers and are part of NIDA's continuing efforts to monitor drug treatment outcomes. Now NIDA is about to launch its third major examination of drug treatment outcomes.

The 12-year DARP follow up results are based on work supported by NIDA and were published by Drs. Dwayne Simpson and the late S.B. Sells, both of Texas Christian University.

The initial DARP outcome study had found that three types of outpatient treatment—methadone maintenance, therapeutic community (in which clients live drug-free in a highly structured residential facility), and outpatient drug-free therapy with counseling—were notably more effective than short-term detoxification. Clients in detoxification, in which patients receive prescribed medication but usually no counseling or other therapy, had recovery records no better than those who were admitted to DARP but did not show up for treatment. Partly as a result of this finding, many experts don't consider detoxification to be a drug abuse treatment, but rather a first step in preparing the client for longer drugfree therapy.

Methadone maintenance was found to be the most popular form of treatment for those addicted to heroin, reflecting a tendency over time for users in all types of treatment to gravitate toward treatments that included methadone.

Clients in therapeutic community programs "appeared to register greater philosophical introspection than did those affiliated with other treatments, but there were uncontrolled factors that may confound these interpretations," the authors observed. These factors include the clients' personal "motivation and social skills," which are important for recovery but which "traditionally have been poorly measured in drug abuse research." The following include other major findings from the 12-year follow up:

- After multiple intervals of addiction and treatment, 76 percent of those interviewed had not used opioids daily in the previous year, 63 percent had not used opioids daily in the last 3 years, 48 percent had not used opioids daily in the last 6 years, and 29 percent had abstained from daily opioid use over the last 10 years.

• One-quarter of those interviewed reported no relapse to daily heroin use following DARP treatment.
• Few study participants used opioids continuously throughout the 12 years. Only 27 percent reported daily opioid use for more than 3 years at a time, and only 41 percent for 2 years.
• More than half of all recovering opioid users interviewed 12 years after starting treatment said they had quit daily opioid use while they were enrolled in a treatment program.
• One-quarter of those interviewed reported using alcohol as a substitute for opioids.
• Quitting daily opioid use is not simply a matter of growing older. "The length of time required for addicts to reach the point of quitting is . . . determined by their personal resources and the relative balance of the psychological costs and rewards associated with addiction," the authors concluded. "Family needs and social values eventually assume a high priority among most addicts who quit."

Regarding treatment, the authors suggested that more emphasis on two aspects of treatment will improve outcomes—greater efforts to assess clients' goals and motivations, and improved counseling. Counseling helps people in treatment face reality, set goals, and evaluate themselves, the authors indicated.

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LOOK AROUND

GETTING DOWN

WORK SAFELY

Scientists get to heart of cocaine's toxic effects on the cardiovascular system

By Andrew Keegan, NIDA Notes Staff Writer

Cocaine is a dangerous drug. It can disrupt the normal functioning of the cardiovascular system, especially the heart, leading to serious health problems and even death, particularly in individuals with preexisting cardiovascular problems. But the mechanisms underlying its potential deadliness—how it contributes to sudden death—are still subject to intense investigation.

The effects of cocaine on the cardiovascular system are numerous and grave. Researchers have found that cocaine can lead to:

- reduction of the blood supply to heart muscle (myocardial ischemia) resulting in death of tissue (myocardial infarction);
- inflammation of the muscular walls of the heart (myocarditis);
- disrupted heart rhythms (cardiac arrhythmias);
- rupturing of the aorta;
- stroke; and
- sudden cardiac death.

Two properties of the drug present the clearest danger to users, according to researchers. First, cocaine is a powerful local anesthetic; it blocks nerve conduction and the sensation of pain. This action also depresses or slows heart function and may promote irregular heart rhythms.

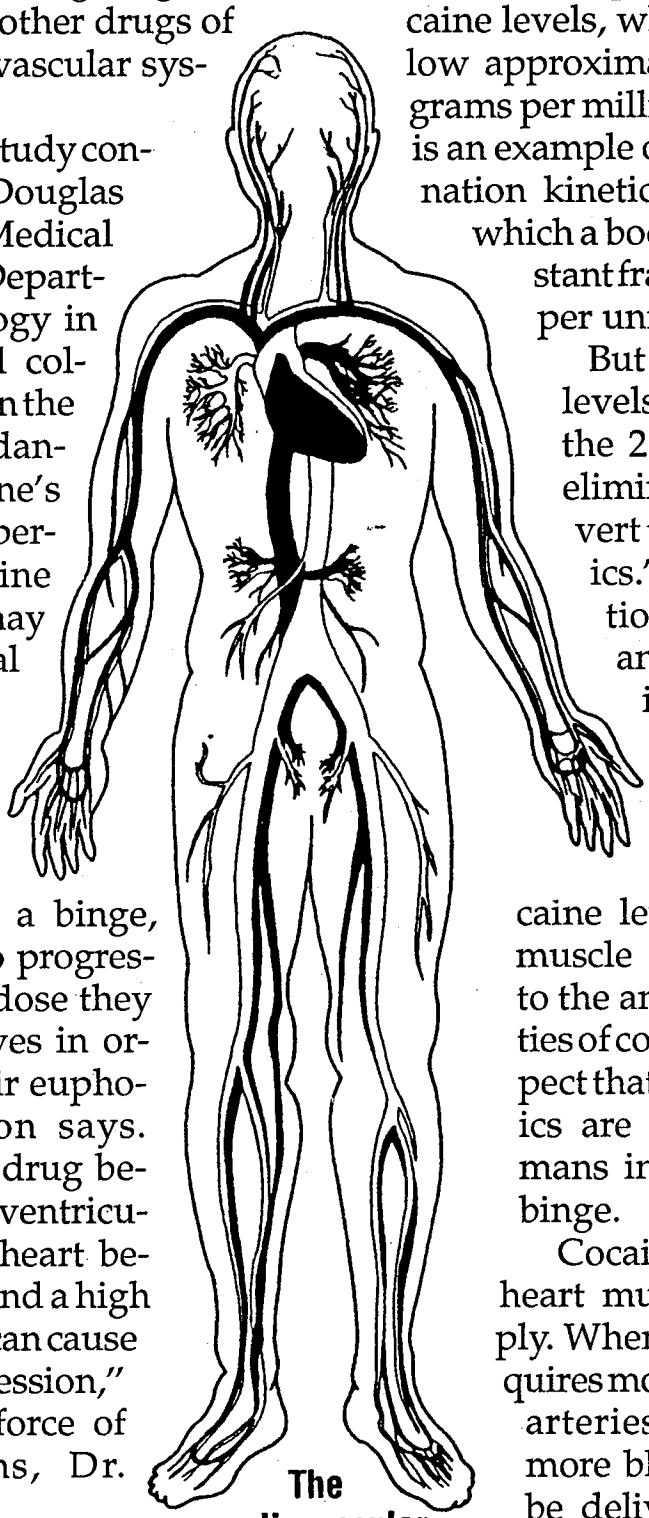
Second, cocaine activates the body's sympathetic nervous system, which causes constriction of blood vessels, increased heart rate, faster electrical impulse conduction in the heart, and increased heart contractions. One way that cocaine accomplishes this effect is by blocking the reuptake of chemical monamines—dopamine, norepinephrine, epinephrine, and serotonin—by cells of the nervous system. These natural stimulants then accumulate at the nerve cells and/or in the bloodstream.

Researchers have yet to sort out the enormously complex dose-response relationship for these two opposite actions of cocaine. There is some evidence, however, that cocaine affects the cardiovascular system in two phases: at low doses, sympathetic nervous system responses dominate; at higher doses, local anesthetic actions exert the most powerful effects. Further complicating this scenario is the fact that cocaine also is a central nervous system stimulant—it affects the brain's limbic forebrain structures, which also influence cardiovascular actions.

Cocaine's local anesthetic properties—which cause the heartbeat to slow at small doses but increase heart rate and blood pressure after moderate doses—most probably pose the greatest threat to the heart. "If you give a large enough dose of cocaine, it can produce myocardial depression most likely by its local anesthetic action," says Dr. Pushpa V. Thadani, who heads

National Institute on Drug Abuse's (NIDA) program investigating the effects of cocaine and other drugs of abuse on the cardiovascular system.

A NIDA-funded study conducted by Dr. R. Douglas Wilkerson, of the Medical College of Ohio's Department of Pharmacology in Toledo, and several colleagues sheds light on the dynamics and the dangers posed by cocaine's local anesthetic properties during a cocaine binge. Tolerance may develop to the central nervous system stimulating effects of cocaine but not to cocaine's local anesthetic actions. Therefore, "during a binge, people may need to progressively increase the dose they are giving themselves in order to maintain their euphoria," Dr. Wilkerson says. Blood levels of the drug begin to soar, and left ventricular function of the heart becomes impaired. "And a high enough blood level can cause severe cardiac depression," a decrease in the force of heart contractions, Dr. Wilkerson adds.



The cardiovascular system

The danger of a cocaine binge is compounded because of the unique way cocaine is eliminated from the body. Research by Dr. Wilkerson indicates that cocaine is eliminated from the bodies of dogs at a rate that is independent of blood cocaine levels, when this level is below approximately 2 to 3 micrograms per milliliter (μg/mL). This is an example of "first order elimination kinetics," the process by which a body eliminates a constant fraction of a substance per unit of time.

But when blood cocaine levels in dogs rise above the 2 to 3 μg/mL level, elimination processes revert to "zero order kinetics." Thus, the elimination rate is reduced, and levels of cocaine in the blood rise precipitously when more cocaine is added to the system. As blood cocaine levels rise, the heart muscle is directly exposed to the anesthetizing properties of cocaine. Scientists suspect that these same dynamics are at work when humans indulge in a cocaine binge.

Cocaine also affects the heart muscle's oxygen supply. When a healthy heart requires more oxygen, coronary arteries widen, allowing more blood and oxygen to be delivered to muscle fibers. But cocaine appears to interfere with this delicately balanced relationship. It increases the heart's need for oxygen, while simultaneously inhibiting its oxygen supply.

Although the mechanisms behind these actions have not yet been determined, the net result is that the heart may receive less oxygen than it requires. This can result in the death of heart muscle tissue, known as myocardial infarction.

The electrophysiological functioning of the heart is also grievously affected by cocaine. In fact, the assumed cause of most reported cocaine-related deaths is the triggering of erratic heart rhythms, according to Dr. Wilkerson. Once again, the mechanism causing these lethal rhythms is uncertain—there have been very few studies of the effects of cocaine on cardiac electrophysiology. But some potential mechanisms underlying these chaotic disruptions of heart rhythms include the local anesthetic action of cocaine on the heart, activation of the sympathetic nervous system, or some combination of the two.

There's more. Circumstantial evidence indicates that genetic factors, which vary greatly among individuals, may place some individuals in special jeopardy. In an experiment conducted by Dr. Peter Temesy-Armos, a NIDA-funded investigator at the Medical College of Ohio, 5 of 12 dogs suffered extremely rapid heart beats following a 4 milligrams per kilogram dose of cocaine. In two of these animals, lethal disruptions of heart rhythms occurred. This suggests that some people may be particularly sensitive to cocaine's myocardial effects, and that cocaine's devastating effects on the cardiovascular system may not be dose-dependent.

NIDA-funded research by Dr. James R. Woods, Jr., and Mark A. Plessinger of the University of Rochester indicates that animals are more sensitive to cocaine when they are pregnant because the female hormone progesterone appears to amplify cocaine's cardiovascular effects. Moreover, during pregnancy, cocaine produces life-threatening heart rhythms at one-third the dose required to produce these same effects in the nonpregnant state.

Researcher Steven S. Hull and his coworkers at the University of Oklahoma found that cocaine appears to inhibit the parasympathetic nervous system, which acts to slow down a rapidly beating heart. Other clues to cocaine's effect on the cardiovascular system come from a study using positron emission tomography, a nonsurgical technique for observing functional changes within the human body, conducted by Drs. Nora D. Volkow and Joanna S. Fowler, NIDA-funded researchers at the Brookhaven National Laboratory in Upton, New York. Their research indicates that cocaine may bind directly to heart tissue, slowing the passage of sodium ions into heart cells and creating an irregular heart beat.

The vast majority of studies cited in this article are based on animal experiments because clinical evidence directly linking cocaine to sudden death in humans is sparse. It is virtually impossible to determine a cause-and-effect relationship between cocaine and sud-

den death for a number of reasons. For example, many people who die with cocaine in their systems also test positive for other drugs, making it impossible for scientists to ascertain that cocaine is the sole cause of death. "We can say that a death is cocaine-associated," Dr. Thadani says, "but the exact cause of death is still open to speculation."

Even when people have consumed only cocaine, the exact cause of death still cannot be easily determined unless the precise dosage of the drug is known and all bodily functions are closely monitored. And clinical studies must be conducted with low doses of cocaine, to ensure the health of the experimental subjects. At low dosage levels, cocaine's most destructive traits are not demonstrated.

Autopsy reports of cocaine addicts, however, have yielded important information. For example, Dr. Frederick A. Dressler of the Department of Medicine at St. Louis University found that cocaine addicts have increased amounts of atherosclerotic plaque in their major coronary arteries, which can block arteries and constrict blood flowing from the heart.

Attempting to get a handle on cocaine's effects on the cardiovascular system is like trying to decapitate the many-headed Hydra of Greek mythology—every time one head is cut off, two grow back. But progress is being made, and the many effects of this potent drug on the cardiovascular system are slowly being discovered.

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Holmes Safety Association Monthly Safety Topic

Fatal electrical accident

GENERAL INFORMATION: A 40-year-old mechanic with 14 years of experience was fatally injured and a 58-year-old mechanic with 17 years of experience was seriously burned at a surface sand and gravel operation when a crane they were working on contacted overhead wires and electrocuted them.

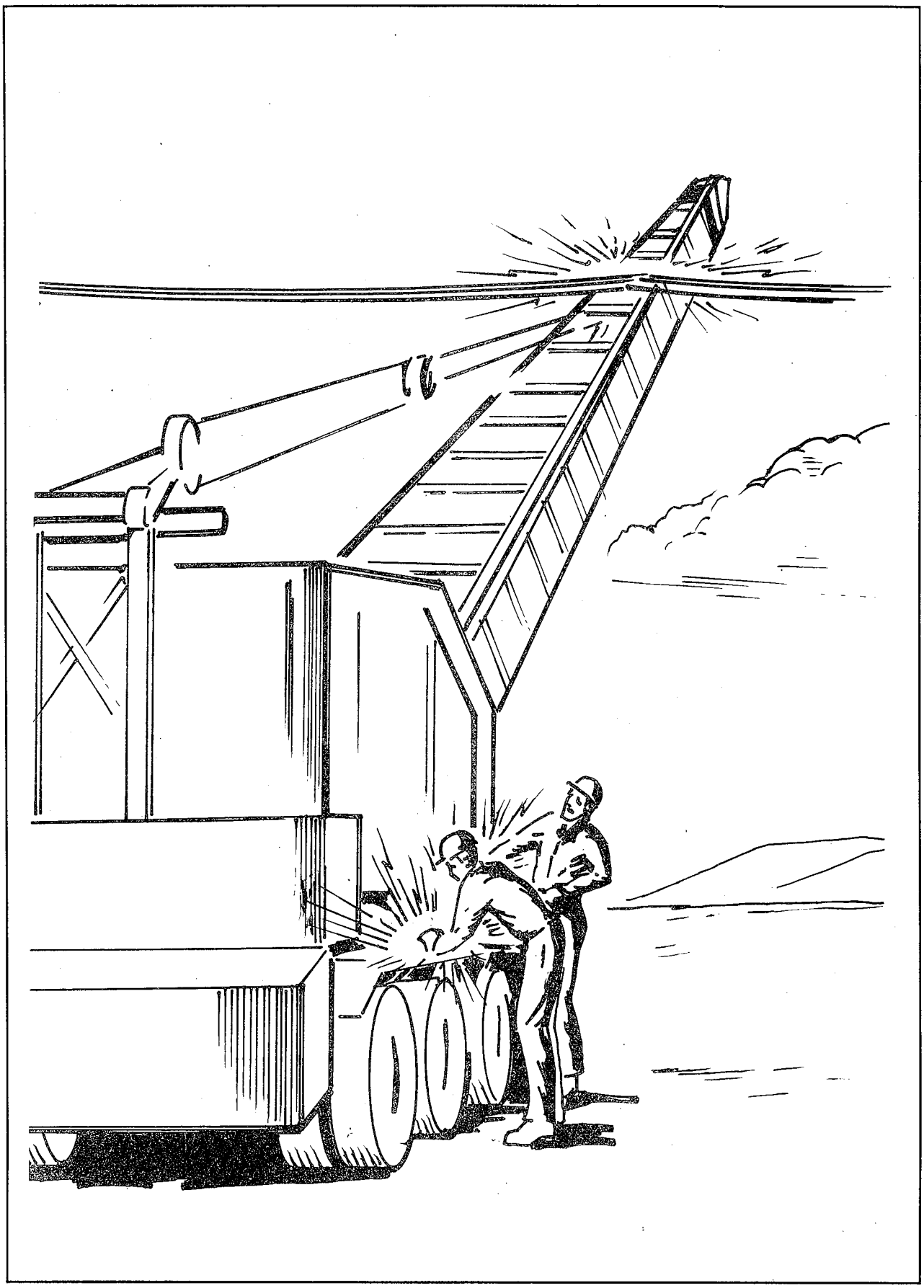
DESCRIPTION OF ACCIDENT: Both victims started work at their usual time of 6:30 a.m. Part of their job required use of a rubber-tired mobile crane to install or remove parts of a dredge. Work progressed normally, the job was finished at 1:30 p.m., and the crew prepared to move to another part of the mine. The crane operator backed the crane up a short incline to the main plant pad.

When the crane reached the plant pad area, its tramming engine quit and could not be restarted. Both victims proceeded to the south side of the crane to troubleshoot the problem. The crane operator, in the meantime, started the crane's engine and raised the boom approximately 20 inches above the tramming rack to allow access to the tramming engine compartment.

Nobody noticed the end of the boom contact nearby overhead powerlines and both victims were electrocuted simultaneously when they touched the crane's frame. The crane operator, who was not hurt, jumped clear when the crane's tires ignited and began to burn. One victim was pronounced dead at the site and the other victim sustained third degree burns on his arms, legs, and feet.

CONCLUSION: The direct cause of the accident was the result of physical contact between the crane boom and two phases of an energized three-phase 13.8Kv circuit which energized the frame of the crane.

Contributing factors increasing the severity of the accident was the direct contact of the victim's bodies to the crane's metallic frame and the damp earth in the area of the accident.



Head injuries: do you know what to do?

One of your best workers is acting strange. He slurs his words, he can hardly keep his balance, and doesn't even remember his own name. **What do you do?**

There's a good chance your worker his just hit his head. It might be a laughing matter in cartoons when someone gets a thump on the head, but in real life even a mild blow can cause a serious injury.

Each year, one of every 25 people in the United States suffers a head injury. Nearly 10 million head injuries occur in the workplace and as most people spend half their waking hours at work, it's likely that you'll help take care of somebody with a head injury soon.

Any head injury is a serious matter-even if the victim says he or she feels fine.

Once your injured worker shows any combination of the symptoms in the box below, it is time to provide immediate care.

Your most important act may come before any head injury happens. A good safety training program will make workers aware of many potential hazards. And if they wear their hard hats, you may never have to dip into that well-stocked first aid kit.

Reprinted from Nevada Department of Industrial Relations, Division of Mine Inspection, Mine $afety $ense, January-April, 1992 issue.

Signs of head injury

- A cut, bruise, lump or depression in the worker's scalp
- Loss of consciousness
- Confusion and/or drowsiness
- Bleeding from the nose, ears or mouth
- Clear or bloody fluid from the nose or ears
- Headache
- Vomiting
- Convulsions
- Unequal pupils (when the dark areas in the middle of the colored parts of the eyes are different sizes
- Difficulty speaking
- Restlessness
- Change in pulse rate

Developing a Safety Program

Developing your own safety program is an essential activity for any successful business. Regardless of business size, this is one of the most important, if not the most important, task for a business. In a small operation, often the designated safety person gas limited qualifications or experience for this job. In some cases, such as a family-owned business this task falls upon a family member or a staff person who has some extra time. Regardless of who is selected for the task, it is difficult to keep up with new technology, growing concerns about health and safety, new standards and particularly environmental issues.

Rule number one, in respect to developing a safety program, it "do it now." Don't place your business in the position of having to develop a program in response to an accident, a loss, or governmental rules and regulations. Treat your safety program as a vital element of your business that can contribute significantly to your success and your profitability because it can.

Here are some basic steps for developing a safety program:

Identify potential hazards and problems

Before you start working on the program, identify potential hazards. Develop a program to meet the needs of your organization. It makes good sense to develop a simple accident prevention program for a small business and a more complex program for a larger business.

If your workers are involved in materials handling, you may want to focus on measures to prevent back injuries. An effective accident prevention program can reduce insurance costs, improve employee morale, and increase productivity. Use the team approach to involve all employees in developing programs. Involvement develops commitment which is an essential element for any successful safety program.

Establish goals

Know what you want. Many organizations start a safety program without knowing what they want to do or accomplish. Don't fall into this trap. Using an involvement approach, discuss potential hazards with your employees and ask them for their ideas, suggestions, and concerns.

Use joint decision making to develop ways to minimize hazards. Get input from an outside source (such as a similar organization) if you cannot obtain agreement. Resolve which solutions would be best to meet organization goals.

Resolve what is needed to support the program

Determine what is needed to make the program work. Identify needed resources such as money, equipment, employee support, management support, etc. Don't forget to correlate resources with the tools of the program.

Consider:

- Company policy
- Housekeeping
- Incentives and praise
- Employee training
  - Hazard recognition
  - Power tool safety
  - Welding safety
  - First aid
  - Eye protection
- Discipline
- Emergency plans
- Recordkeeping and reporting

If you have strong involvement in developing the program, support from top management and employees will be strong.

Implement the program

Monitor the results. Measure how you are doing. Provide feedback to all employees on how well the organization is doing, Remember to give credit where credit is due. Recognize each and every achievement. Be firm, but fair in any disciplinary measures and ensure that actions taken focus on correcting inappropriate behavior.

Reprinted from University of Texas at Austin, Industrial Education Department, Texas Mine Safety and Health Program Information Letter.

Avoid anger—Avoid accidents

Temper is a funny thing. You can't get rid of it by losing it. When something goes wrong are you one of those who takes it out on all? Do you get mad and throw things? Do you shout and get others excited when things don't go right?

If you are hot tempered, then you are well on the way to becoming an accident repeater, and to help others do so.

In a pinch, in time of crisis, the person who makes the grade and comes out on the safe side is the one whose coolheadedness and clear thinking have developed habits for decisive action so ingrained that, without hesitation they know what to do, how to do it, and why.

Safety is won by individual effort and group cooperation. It can be achieved only by informed, alert, skillful people who respect themselves and have regard for the welfare of others.

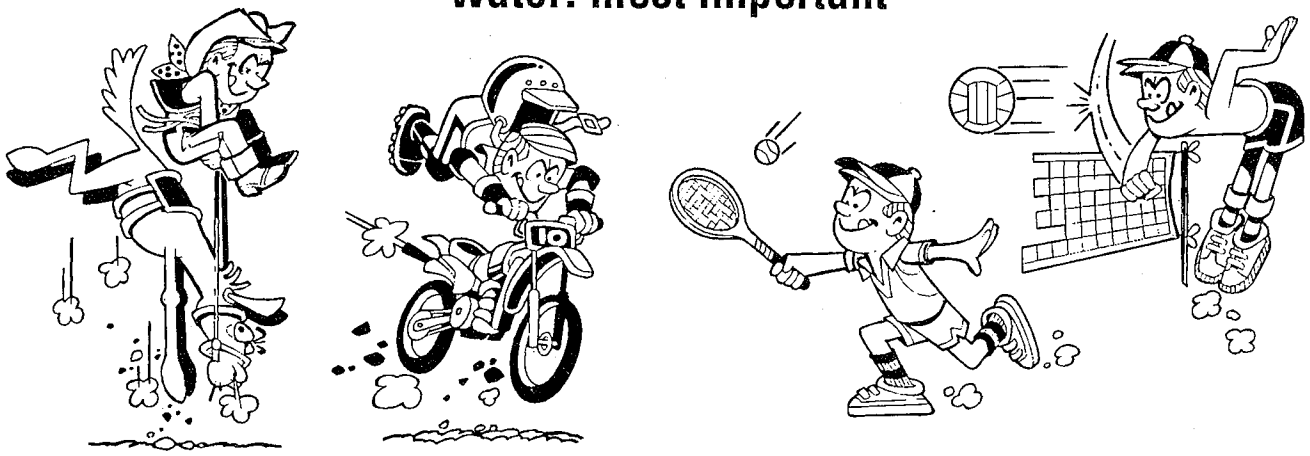
Nobody wants to get hurt nor see anybody else get hurt. But people in our industry are getting hurt. Moreover, their actions frequently cause injuries to others.

You can prevent such mishaps if you take safety to heart. That is, you can prevent accidents to yourself and to your coworkers and to the machines that are your livelihood, if you think clearly and do what you know is right.

Reprinted from Nevada Department of Industrial Relations, Division of Mine Inspection, Mine $afety $ense, January-April, 1992 issue.

There are lots of ways to keep healthy and fit

Water: most important



When you think about nutrition, what comes to mind?

Most people think of vitamins, minerals and protein, getting enough calcium and iron, and not eating too much fat. Because it is so commonplace, it's easy to forget water—the most important nutrient of all.

Fifty-five to 60 percent of the body's weight is water. There's water in and around every cell, providing the perfect environment for cellular function. Water participates in many of the metabolic reactions that occur in the body. While we can survive for weeks without food, we can only survive a few days without water.

Our need for water increases when we exercise. During exercise, water is lost through increased rates of perspiration and respiration. It's important to replenish this water to avoid dehydration and possible heat stress.

Dehydration is harmful

Dehydration is especially dangerous during physical activity because it causes a decrease in blood volume and reduces the body's ability to get rid of excess heat, thus leading to possible heat exhaustion or even heatstroke. Dehydration certainly hurts sports performance, since it decreases maximal aerobic capacity. It also inhibits proper digestive function and is hard on the kidneys.

How much water to drink

Nutritionists advise that most people can meet their fluid needs with six to eight cups daily of water, juices and milk.

You can't count the caffeinated beverages that you drink, like tea and coffee, because they act as diuretics, which means they increase your excretion of water. Similarly, alcoholic beverages also increase fluid needs; one ounce of pure alcohol requires eight ounces of water to be metabolized.

Hot climates and physical activity increase fluid requirements. A good way to see how much extra water you need when you exercise is to weigh

yourself before and after your workout. (Sorry, the weight loss is not fat, but water.) Drink two cups of fluids for every pound lost. Urine should be pale yellow; the darker its color, the greater your need for water.

It's important to space your fluid consumption throughout the day. Drinking a large amount of fluid at one time actually causes the kidney to excrete water, even though you are still dehydrated.

Drinking a few extra glasses of water a day won't hurt you, so it's better to err on the side of generosity when it comes to water intake.

Only when thirsty?

Don't you get enough water if you just drink when you're thirsty?

Unfortunately, thirst is not a reliable indication of dehydration. When thirst strikes, most people drink just enough to relieve their parched throats. Your body may still need more water even though you are not thirsty.

Our sense of thirst becomes even less sensitive as we age. It is very common for older adults to experience chronic dehydration, one symptom of which may be constipation.

Are sports drinks better than water?

They are helpful if you have become dehydrated. If you have lost more than one or two percent of your body weight during activity, then you are definitely dehydrated. For example, if a person who weighs 150 pounds loses over a pound and a half during a workout, he or she is dehydrated. In this case, a sports drink helps a person rehydrate more quickly and more completely than just plain water.

The reason for this is that sports drinks contain salts, which help your body hold water; they prevent the kidney from excreting water before you are rehydrated.

This sodium is of concern, however, for people who are on sodium-restricted diets. While some sodium is lost in sweat, the amount is quite small, especially if the person is acclimated to the heat.

A typical sports drink contains about 50 to 100 mg of sodium. The National Research Council recommends a daily sodium intake of 1,100 to 3,300 mg for most adults.

Some nutritionists have expressed concern that since most Americans consume 10 to 60 times this daily sodium requirement, sports drinks add insult to injury. They certainly aren't necessary for the recreational athlete who plays a leisurely tennis doubles game or a person who walks briskly for half an hour.

Reprinted from the ***Morenci Copper Review****, August 1990, Volume 6, No. 3.*

Back injury awareness

The extent of the back injury problem

Each year back injuries cause much hardship to American workers and their employers. The following facts indicate the extent of America's back injury problem:

- 75 million Americans suffer from back ailments.
- 2.5 million Americans are totally disabled by back injuries.
- 200,000 Americans have back surgery each year.
- 93 million shifts of work are lost each year due to back problems.
- In 1987, 258 back injuries reported from Virginia coal mines accounted for 5,319 days lost from work.
- 92 percent of coal miners say that they work with back pain at least some of the time.
- Back ailments are the second leading cause of hospitalization.
- More back injuries occur in medium-height coal seams than in high or low coal seams.
- Most back injuries caused by lifting involve the lower back.

Why the problem exists

Even when people have been taught to lift properly, many do not use this training in their actual lifting procedures. Many excuses are offered for not lifting properly, most of them hinge on the fact that the person who knowingly lifts improperly lacks commitment to care for his/her back. Information about back injuries includes the following:

- Most back pain occurs as a result of poor posture.
- Poor posture while lifting and sitting are the most damaging activities for the back.
- Back injuries may result from one single incident or may be an accumulation of repeated back stress over an extended period of time.
- The most common type of back injury caused by lifting is the strain.
- The most serious type of back injury caused by lifting is the disc injury.

Risk factors for back injury

There are risk factors that influence whether a person is more likely to receive back injury.

The personal risk factors that are specific to the person making the lift include:

- Gender
- Age
- Body height
- Body weight
- Lifting technique

The job risk factors include:

- Weight of the object being lifted
- Location and size of the object being lifted
- Frequency of the lifts
- Balance of the load
- How the load is held
- Layout of the lift/carry
- Environment

Prevention of mine back injuries

The number of back injuries can be decreased by concentrating on the following:

Match the lifter with the lift. Be sure that the lifter has:

- the strength to make the lift,
- the endurance to make the lift.

Avoid repeated strenuous lifting for persons having a history of back problems.

Maintain healthy living habits:

- Get adequate exercise.
- Get a good night's sleep.
- Do not smoke.

Do warm-up exercises.

Use proper lifting procedures.

Use good posture when sitting and standing.

Use the "buddy system"—Remind others when they are about to lift improperly.

Get help before lifting heavy objects.

Back injury safety quiz

Indicate whether answer is true or false.

1. Back injuries affect only the employee, not the employer.
2. Coal miner's back injuries occur more often in low coal seams than in medium or high seams.
3. Most back injuries caused from lifting involve the lower back.
4. Even though they know how, many people lack the commitment to lift properly.
5. Most back pain occurs as a result of poor posture while sitting or lifting.
6. Personal risk factors of back injury include weight of the object being lifted.
7. Lifting technique is a personal risk factor that influences the likelihood of back injury.
8. Strains are the most common type of back injury.
9. The most serious type of back injury caused by lifting is the disc injury.
10. Exercise and sleep can influence the health of your back.

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

Reprinted from the April 1989 issue of the ***Topic-of-the-Month****—Virginia Department of Mines.*

Treat solvents with respect

We've all been guilty of it: using a solvent such as varsol to clean grease or paint from our hands or painting a room with an oil-based paint without proper ventilation. Organic solvents are such a common part of our lives that we forget that they are hazardous substances. Sure, most of us know that many solvents are highly flammable and that their fumes can be explosive. But how many of us are aware of the long term effects they can have on our bodies?

Frequent skin contact with solvents can cause dermatitis, which in some cases may become a permanent condition. Solvents can enter the bloodstream by absorption through the skin or by inhalation of the fumes. Here, the effects can be much more serious. Short term effects may include dizziness, headache, drowsiness, unconsciousness and in rare cases, even death. Long term effects are no less dangerous.

For example, excessive exposure to benzene has been proven to cause leukemia. Methylene chloride (a primary component of an anti-spatter spray used by welders) is a suspected cancer-causing agent. Overexposure to carbon tetrachloride, ethanol, many of the chlorinated hydrocarbons, and petroleum distillates, can permanently damage the liver, kidneys, and the heart.

Evidence is increasing that long term exposure to many organic solvents can permanently damage the brain and the central nervous system. Carbon disulfide, one of the worst in this regard, can literally cause insanity, but the neurotoxic effects of many other organic solvents are limited to permanent fatigue, memory impairment, emotional instability, and inability to concentrate.

Controlling solvent hazards is similar to controlling any hazards, starting with engineering controls as the first line of defense (substituting a safer solvent, using fume hoods, etc.) and working down to personal protective equipment such as respirators, proper gloves, etc.

Be sure to read the Material Safety Data Sheet (MSDS) and follow its recommendations for every solvent in your immediate workplace and treat all solvents with the respect they deserve.

From Mines Accident Prevention Association Ontario.

Flyrock
A Blaster's Worst Nightmare

By Robert E. Morgan, Virginia Division of Mineral Mining, Lynchburg, Va.

Explosives - who needs them?

Today's explosives industry meets its customer's needs by supplying a variety blasting agents designed to improve fragmentation and overall safety. A safe blasting agent, however, is only one half of the equation. Blasting has been and continues to be both an art and a science which relies heavily on good judgement by the blaster-in-charge. In short, blasters who use explosives must ensure that are used safely and effectively. Miscalculation or flawed judgement by the blaster may produce a highly undesirable result—flyrock.

Flyrock - a controllable nightmare

Few situations in surface mining cause such nightmarish images as flyrock—uncontrolled airborne material generated by a blast. The high degree of anxiety arising from flyrock is justified by its high potential for personal injury or property damage. For the blaster-in-charge or the mine operator who assumes overall responsibility for the mining operation, the mere mention of the word flyrock inspires visions of personal injury, damage and long, potentially costly confrontations with property owners and regulatory agencies.

How far can flyrock travel? Examples from some blasting accidents

Commodity	Distance flyrock traveled	Possible cause
Limestone	3,063 ft.	Overloaded holes
Limestone	1,159 ft.	na
Limestone	4,057 ft.	na
Limestone	5,050 ft.	Fissures and stemming
Limestone	4,057 ft.	Overloaded holes
Limestone	6,292 ft.	na
Trap Rock	828 ft.	na
Taconite	11,360 ft.	Stemming
Porphyry	2,119 ft.	Collapsed holes
Sandstone	1,987 ft.	Fissures

Source: Roth, J. "A Model for Determination of Flyrock Range as a Function of Shot Conditions." U.S. Bureau of Mines Open File Report 77-81.

Causes of flyrock

A recent analysis of blasting incidents in Virginia revealed that flyrock often occurred as a result of: Shallow boreholes used to eliminate toe on the face; Insufficient stemming of boreholes; Inadequate burden around boreholes drilled at an angle

Ways to deal with the problem

Use of shallow boreholes to break toe on the face can often be eliminated by increasing subdrilling in the front line boreholes and loading the bottom portion with a high density explosive product. The risk of flyrock resulting from insufficient stemming of boreholes can normally be eliminated by ensuring a 1:1 ratio of borehole stemming to burden.

Studies reveal inadequate burden to be major factor contributing to property damage accidents where rock was thrown more than 1,000 feet. Angled boreholes (which often pose an increased risk of flyrock from inadequate burden) were used in the front row of the shot in most of these cases. Changing the direction of face development when mining an inclined stratum and blasting perpendicular to the strike plane can help to reduce this risk and lead to better fragmentation and ground control. If angled boreholes must be used, then the burden should be measured accurately by mechanical means (burden pole) or by the newly introduced laser profiling system.

Factors in successful blasts

Blasters need to design shots to produce the desired fragmentation with the least potential for personal injury or property damage. While we can never totally eliminate the potential for error, blasters must be sure they have considered all relevant factors and designed the blast to the best of their ability. Attention to detail can reduce the chance of error and improve safety.

Factors in a successful blast

- Evaluation of strata
- Design of drill pattern
- Design of detonation sequence
- Calculation of powder factors
- Compliance with appropriate regulations
- Consideration of nearby property
- Good judgement by the blaster-in-charge

Certification, investigation and information

Operators should be sure blasters are competent in all aspects of drilling and blasting. Virginia (and some other states) have adopted regulations requiring training and certification of blasters. If an accident occurs, the investigating agency should review the cause of the incident and specify preventive measures based on sound practices. Information about the accident should be shared with other blasters.

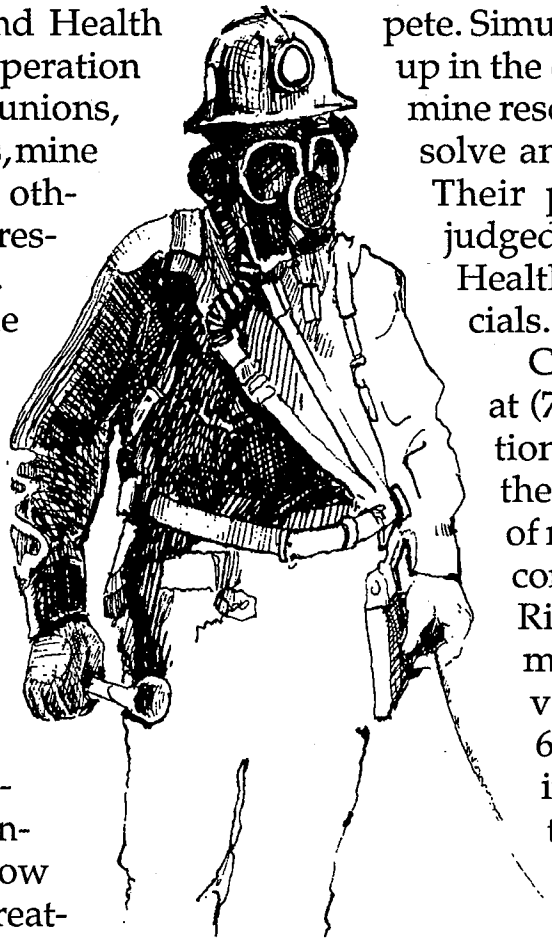
1992 Metal and Nonmetal Safety and Health National Mine Rescue Contest

Las Vegas, Nevada

August 12-13

The 1992 Metal and Nonmetal Safety and Health National Mine Rescue Contest is scheduled for August 12 and 13 at the Las Vegas Convention Center in Las Vegas, Nevada. The contest is sponsored by the U.S. Department of Labor's Mine Safety and Health Administration in cooperation with mine operators, unions, state inspection agencies, mine rescue associations and others interested in mine rescue and recovery work.

The purpose of the contest is to promote mine rescue readiness in the event of mine emergencies by keeping miners up-to-date on advanced rescue procedures concerning ventilation, oxygen breathing apparatus, gas testing, first aid, explosives and other mining technologies. The contest helps miners learn how to better evaluate life-threatening situations that may occur during emergencies.



This year's contest promises to be an exciting and interesting event as top metal and nonmetal mine rescue teams from around the Nation will compete. Simulated mines will be set up in the convention center and mine rescue teams will work to solve an emergency problem. Their performance will be judged by Mine Safety and Health Administration officials.

Contact Richard Feehan at (703) 235-8647 for additional information about the contest. Also, a block of rooms is being held for contest participants at the Riviera Hotel. Accommodations and rates vary. Call 1-800-634-6753 for additional lodging information. Be sure to mention that you will be attending the mine rescue contest.

West Virginia State Council Holmes Safety Association Dedicates the 1992 Meeting to

Bart B. Lay, Jr.

Bart Lay served as President of the West Virginia State Council from April 1985 to April 1992. He served as the President of the National Holmes Safety Association Council from 1989-1990. He supported this Association with his presence for many years. Bart is an individual who believes in the need to provide educational programs to our mining people to maintain a safer and healthier workplace. He believes in and supports programs that recognize those who give their time and talents toward achieving accident-free mining operations. He is an outstanding human being who values people and accepts responsibility of mankind helping one another. We have been priviledged to be led by Bart B. Lay, Jr. for the past eight years. He plans to retire in July of this year.

Bart was born on June 30, 1927, in Gordon, West Virginia. He graduated from Van High School in 1945. After graduation, Bart started working in the mines.

In August 1945, Bart began as a laborer with Y & O Coal Company. He earned his Fire Boss/Mine Foreman's Certificate in 1973. Later that year, Bart accepted a position as a Safety Inspector for the United Mine Workers of America. In 1980, Bart became Deputy Director of the West Virginia Department of Mines. In February 1985, Bart assumed the Director's position in the Department of Mines. In July of 1985, Bart assumed the position of Director of the Division of Health, Safety and Training. In 1991, Bart accepted the position of Safety Manager under the West Virginia Abandoned Mine Lands Agency.

In addition to serving with the Holmes Safety Association for the past eight years, Bart has been active in the community. He serves as a local volunteer firefighter and as a Commander of the local Veterans of Foreign Wars.

Again, we appreciate your contributions to this Association and wish you continued success in the future.

Secretary's Message

The Holmes Safety Association's National Conference was held on May 28 and 29 at Split Rock, Pennsylvania. Over 150 people came to the sessions and we received some very positive feedback from those who attended.

At this meeting, the Executive Committee selected a new president. Thomas J. Ward, Director, Pennsylvania Department of Deep Mine Safety is the new HSA president. The Executive Committee also discussed next year's conference in San Antonio, Texas. The conference date is June 1-3, 1993.

As the National Secretary, I had the honor of selecting the candidates for Woman and Man of the Year. I chose Donna Schorr as the HSA "Woman of the Year" and Jon Montgomery as the HSA "Man of the Year" for 1992.

The April edition of the Bulletin has been delayed until early June. This delay is a result of the publisher declaring Chapter 7 bankruptcy. We have since readvertised the printing contract and awarded the new contract to a firm located in Dayton, Ohio.

In the April edition, I also requested your assistance for the second time, in updating our mailing list. Those people who did not complete the original mail survey in December, have another opportunity to complete the survey in the April Bulletin (mailed in June). If you have not filled out a mail survey, please complete the form and return to:

Holmes Safety Association
c/o Mine Safety and Health Administration
P.O. Box 4187
Falls Church, Virginia 22044-0187

As a reminder, this year's TRAM (Training Resources Applied to Mining) conference is scheduled for August 24-26 at Oglebay Park, Wheeling, West Virginia.

The 1992 TRAM conference will feature a variety of sessions designed to address issues relating to supervisory and management training, technology and maintenance training and developmental workshops for health and safety training instructors.

The registration fee for the conference is $200.00. This fee includes lunch on Monday, a barbecue dinner on Tuesday and breakfast on Wednesday.

For additional information, contact Mike Klishis at (304) 293-4211. He will be glad to answer any questions you may have.

Robert Glatter, Secretary

The last word...

"There are three things to aim at in public speaking; first, to get into your subject, then to get your subject into yourself, and lastly to get your subject into your audience."

"Sweat plus sacrifice equals success."

"The world is full of cactus, but we don't have to sit on it."

"A good name, like good will is got by many actions and lost by one."

"Adolescence is that period in a kid's life when his or her parents become more difficult."

"A vacation is what you take when you can no longer take what you've been taking."

"Liberty is the only thing you cannot have unless you are willing to give it to others."

"We all learn by experience but some of us have to go to summer school."

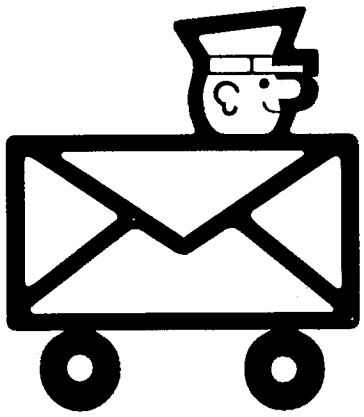
"The really frightening thing about middle age is the knowledge that you'll outgrow it."

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



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