BULLETIN

HOLMES SAFETY ASSOCIATION

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SAFETY EFFICIENCY

MINERAL INDUSTRIES

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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 health and safety-related topics. This information is provided free of charge and is designed to assist in presentations to groups of mine and plant workers during on-the-job safety meetings.

Welcome new members

NAME	CHAPTER NO.	LOCATION
United Materials of Great Falls	10829	Great Falls, MT
Sleepy Valley	10830	Hot Springs, AR
Penn/Bolt No. 1 Mine	10831	Joffre, PA
Washington County Safety	10832	Ft. Edward, NY
Donager #1 Mines	10833	Cedar Grove, WV
Calico Chapter	10834	Batesville, AR
Lang Brothers, Inc.	10835	Bridgeport, WV
DLX, Inc.	10836	Ison, KY
Warren C. Hartman Contractor	10837	Clearfield, PA
Precision Samplers, Inc.	10838	South Charleston, WV
C. Wright Construction Co., Inc.	10839	Meridian, ID
Cleveland Electric	10840	Little Rock, AR
Rixey Chapter	10841	North Little Rock, AR
United Westerners	10842	Guion, AR
Highland Gypsum	10843	Murfreesboro, AR
Cadence Environmental	10844	Foreman, AR
Montana Limestone Company	10845	Bridger, MT
Richland Mine	10846	Hanson, KY
Mosler Rock Products	10847	Newbury Park, CA
Solvay Minerals, Inc.	10848	Green River, WY
Loveless & Loveless, Inc.	10849	Columbia, SC
Red Oak Mine	10850	Chapmanville, WV
Tapo Rock & Sand	10851	Simi Valley, CA
Ash Grove Leamington	10852	Nephi, UT
Jackson County	10853	Newport, AR
CWL—Jonesboro	10854	Jonesboro, AR
Helderburg Mouse Cadets	10855	Westerlo, NY
Cabazon	10856	Beaumont, CA
Beakham Pit And Mill	10857	Beaumont, CA
D & S Leasing Company	10858	Gilbert, WV
Elkay Mining Company	10859	Lyburn, WV
Big Branch Coal Company	10860	McCarr, KY
Mountaineer Mine	10861	Wharncliffe, WV
Mingo Logan Coal Company	10862	Wharncliffe, WV
Asphalt Chapter	10863	Searcy, AR
Bearco Preparation Plant	10864	Wharncliffe, WV
Great Falls Sand & Gravel	10865	Great Falls, MT
Shumaker Trucking & Excavation	10866	Great Falls, MT
Thompson Pit	10867	Vaughn, MT
Open Buckle Pit	10868	Vaughn, MT
Portable Crusher Highway 101 S.	10869	Coos Bay, OR
A.D. Naylor's Contracting	10870	Oakland, MD
Radabaugh Trucking, Inc.	10871	Arthurdale, WV
Armstrong Creek Machine	10872	Kimberly, WV
Clayton Quarry—Plant #135	10873	Clayton, CA
Channel & Basin Reclamation	10874	Tujunga, CA
Royal Cement Company	10875	Logandale, NV
Barry A Gunn, Const. For Safety	10876	Meridian, ID
Calico Rock Products, Inc.	10877	Barstow, CA
Wayne J., Sand & Gravel, Inc.	10878	Moorpark, CA

Holmes Safety Association monthly safety topic

Fatal fall of roof accident

GENERAL INFORMATION: A 43-year-old mechanic/welder, with four years of mining experience, was fatally injured when a large slab fell from the back and struck him. The scaler operator and maintenance leadman, who were nearby, were also struck by the slab and received injuries. The left side of the scaler operator's body was struck resulting in a broken left arm, broken left leg, five broken ribs, and a broken shoulder blade. The maintenance leadman sustained a minor facial laceration. The victim had a total of four years and one month of mining experience with three years and one month at this mine.

The operation was an underground adit limestone mine with associated mill. The mine and mill had operated continuously at this location since 1985.

Limestone was mined from the Plattsmouth/Kerford ledges. The limestone was drilled with diesel-hydraulic drill machines. It was blasted and hauled to the mill in 35-ton Euclid haul trucks. The material was crushed and screened to various sizes and was transported to surface stockpiles in 35-ton haul trucks. Front-end loaders were used to load the construction and aggregate materials into customer trucks or railroad cars for various market destinations.

The mine and mill operated two 10-hour shifts a day, six days a week. Total employment at the mine was 62 persons. At the time of the accident, 19 persons were working at the mine.

Limestone was extracted by the room-and-pillar mining method. The mining cycle sequence consisted of drilling, blasting, mucking, scaling, and rockbolting. The drilling and blasting cycles were generally several months ahead of the mucking cycle, and it was not uncommon to have 100 headings blasted. The scaling sequence was obviously out of order in this mining cycle. Scaling should always follow the blasting cycle to ensure the safety of those required to perform other work activities in the area. The pillars were used as primary ground support for the mine. The rooms and the pillars were 30 feet by 30 feet. The height of the back was 22 feet. Ground support included 7-foot roofbolts, 3/4-inch in diameter. The bolts were secured with resin epoxy and were inserted through steel plates which measured 6 inches square by 3/16-inch in thickness. Steel strapping mats were used as added ground support with the bolts. Steel strapping was used in haulageways and primary travelways. Bolts without mats were used in mining areas unless ground conditions warranted strapping mats. Bolting was completed with two mobile mechanical bolting machines. Bolts were installed on a 5 foot by 5 foot pattern. Manual hand scaling was completed using scaling bars. Monthly torque tests were conducted and recorded.

The accident occurred in Room 6, Crosscut 12 of Section 7 in the underground mine. A Gradall mine scaler had been used to scale the roof, face and walls in preparation for bolting the roof prior to drilling and blasting. The scaler was a mobile, front-wheel drive unit with an enclosed operator's cab attached to the 360 degree turntable continuous boom assembly. The triangular boom was hydraulically operated and had a maximum reach of 44 feet. A metal hook, attached to the boom, could be hydraulically operated to dislodge loose materials during the scaling process.

DESCRIPTION OF ACCIDENT: on the day of the accident, the victim, a mechanic/welder, reported for work at his normal starting time of 12:00 noon. The victim had performed his routine assigned tasks and was in the maintenance shop late in the shift which was scheduled to end at 10:00 p.m.

The scaling machine operator (injured) had been scaling in Section 7, Crosscut 12, Room No. 6 when he noticed that the cab of the scaling machine was vibrating. He discovered a crack in the cab's mounting brackets which required welding. About 9:45 p.m., he went to the maintenance shop and informed the maintenance leadman of the need for a welding job on the cab of his scaling machine.

The victim, who was in the shop at the time, explained that it would only take a few minutes to complete the repairs. The maintenance leadman took the victim and

scaling machine operator to the plant to get the welding truck. The victim and the scaling machine operator then proceeded underground to the location of the scaler.

The maintenance leadman arrived at the section about 10:05 p.m., to follow up on the welding project. The victim and the scaling machine operator were on the machine welding the crack behind the cab. The maintenance leadman visually inspected the roof and, feeling it looked okay, climbed up on the scaler machine to see how work was progressing. The victim told the maintenance leadman they had finished the repairs on that part of the cab at the time the mine leadman arrived to check on the welding progress.

As the scaling machine operator descended the ladder on the scaler, he noticed a small crack on the right side of the cab. He told the victim about it and he agreed that he would take care of it. The scaling machine operator climbed down the ladder to ground level and the victim climbed onto the ladder to reach the area of the broken weld. The scaling machine operator was holding the victim on the ladder to help support him. The maintenance leadman was standing on the platform of the scaler and the mine leadman was at ground level observing. The victim completed the welding and had handed the welding leads to the maintenance leadman when a large slab from the back fell on the victim and the scaling machine. The cracked areas had been welded previously but the welds had failed. The mine leadman was hit slightly by rock and his hardhat was knocked off but he did not sustain any injuries. He noticed the maintenance leadman staggering around. He grabbed the maintenance leadman and asked him if he was okay and he replied that he was. The maintenance leadman did not recall how he ended up on the ground from his position on the scaler platform.

They then looked for the victim and the scaling machine operator. They found the scaling machine operator unconscious with his feet pinned beneath the slab. It was apparent that the victim was under the slab as one leg was protruding from beneath it. The mine leadman checked the victim for vital signs and found none. He then sent the maintenance leadman to get help while he attempted to determine the scaling machine operator's injuries. The scaling machine operator regained consciousness and the mine leadman stayed with him keeping him calm and still until the rescue team arrived.

An officer from the sheriff's department arrived at the mine site at about 10:30 p.m., and was escorted to the accident site. Rescue personnel arrived on the scene and confirmed that the victim had no vital signs. The scaling machine operator was then removed from the mine and flown by helicopter to the hospital.

Five rescue personnel returned to the accident site and removed the large slab from the victim's body. He was transported to a local funeral home.

CONCLUSION: The direct cause of the accident was the failure to detect hazardous ground conditions and take necessary corrective action to support it or take it down prior to performing maintenance in the area. HSA

October 1, 1898; Maffett Slope; Wilkes-Barre (Midvale), Pa.; 5 killed

(Transcript taken from microfilm record of "Sunday Morning Leader," Oct. 2, 1898, courtesy of the Wyoming Historical & Geological Society, Wilkes-Barre, Pa.)

Four men were smothered to death in the Kidney vein of the New Maffett slope adjoining the Prospect shaft yesterday, by smoke emanating from fire in a set of timbers in the gangway leading to their chambers. The men were smothered to death by smoke from the burning timbers, and when found lay face downward in the ditch along the gangway where they had fallen exhausted. Origin of fire unknown.

About 9 o'clock a Slavish woman appeared in the crowd at the top of the slope and stated that she believed her husband had lost his life in the mine as he had not returned from work. She was not certain as to his place of employment, but believed he worked in Maffett. The search party succeeded in passing the fire and scrutinized every nook and corner in the vicinity, examined the old workings carefully but could find no other body. The search was continued during the night. The fire was extinguished before night.

Reprinted from the U.S. Bureau of Mines ***Historical Summary of Coal Mine Explosions in the U.S., 1810-1958.***

Miners killed by falls of unsupported roof: searching for clues about how to prevent future tragedies

By Robert H. Peters, Research Psychologist, Pittsburgh Research Center, U.S. Bureau of Mines, Pittsburgh, Pa.

During the past 8 years, 53 of our nation's miners lost their lives because the victim travelled inby roof supports and the roof fell on them. Are the people at your mine different than those who have been killed by unsupported mine roof? Is your mine different than mines where people have been killed by unsupported roof? This article attempts to help you answer these questions by showing how these 53 miners compare to other groups of miners in terms of their experience, age, and certain characteristics of the mine where they were employed.

Most miners have been told that it is very dangerous to go under unsupported roof and know that mine safety regulations prohibit this behavior. Nevertheless, accident investigations and data from interviews with coal miners suggest that there are individuals in the coal mining work force who, in certain circumstances, do not hesitate to go under unsupported roof. Hopefully, this type of tragedy will never happen at your mine. However, have you ever stopped to think about why it won't, or how your mine is (or is not) different than mines that have experienced these tragedies'?

Characteristics of the miner

Table 1 shows the median, mean, minimum, and maximum values for the age and experience levels of three categories of miners.[1] The first category consists of the 53 miners killed by a roof fall while under unsupported roof during the period 1986-1993. The second category consists of the 189 people who were killed by some type of underground mining accident other than a fall of unsupported roof during the period 1986-91.[2] The third category of miners is the underground coal mining workforce. Estimates of workforce characteristics are based on survey data obtained from 622 coal mining operations during 1986 (1).[3]

Age. Both the mean and median of the ages of miners killed by falls of unsupported roof are a little lower than the corresponding values for miners killed by some other type of accident. Likewise, the estimated average age of the entire workforce is a little higher than the average age of miners killed by falls of unsupported roof (38 versus 35.3 years).

Experience in job. The median number of years experience that Group 1 miners had in the job that they were performing when they were killed was 4 years. The corresponding values for Groups 2 and 3 are, respectively, 4 years and 3 years. The mean values for Groups 1 and 2 are nearly identical.

Total mining experience. Both the mean and median number of years of total mining experience for miners killed by falls of unsupported roof are a little lower than the corresponding values for miners killed by some other type of accident. The estimated median years of total mining experience of the entire workforce is a little lower than the corresponding value for miners killed by falls of unsupported roof (11 versus 12 years). Thus, it does not appear that miners who have been killed by falls of unsupported roof differ very much from other miners in terms of their total mining experience or their job experience.

Experience at this mine. There are very sizeable differences between the groups in terms of the amount of experience the individuals had working at the mine where they were employed. The median number of years experience miners had working at their mine before they were killed by a fall of unsupported roof was only 0.6 years. This means that about half of these victims had been working at the mine for less than 8 months when they were killed. This value (0.6) is about one-fourth of that for miners killed in other types of accidents (2.5) and less than one-tenth of the corresponding value for the remainder of the underground workforce (9 years)! Similarly, the mean value for Group 1 is substantially lower than the mean for Group 2.

The differences between Groups 2 and 3 may reflect the victim's lack of familiarity with the new mine—the physical characteristics of the mine, the equipment, the habits of coworkers, or various factors associated with management. Prior research strongly suggests that lack of familiarity is a significant contributor to injuries among underground coal miners (Goodman &

Garber, 1988). Perhaps the new employee tries to win the approval of supervisors by showing them that he is willing to take shortcuts or risks in order to appear more productive. Or, perhaps he tries to gain the respect of his co-workers by showing them that he is not afraid to perform risky behaviors.

The factors mentioned above also might explain some of the differences between Group 1 and Group 3. The differences between Group 1 and Group 3 may also reflect the fact that there can be substantial differences in the stability of the roof from one mine to another. Miners who are used to working where falls of unsupported roof happen very rarely may develop the habit of doing certain things under unsupported roof. If these miners should go to work at a different mine where falls of unsupported roof are more common, it may take some time for them to change their old habits. Once they are firmly established, habits can be very difficult to change. Unfortunately, miners may be killed by a roof fall before they even have a chance to realize that their old habits are much more dangerous in their new work environment. Therefore, it is very important that all newly employed experienced miners be reminded of the importance of never going under unsupported roof. This is especially important for miners who have recently worked at mines where roof conditions were stable. Such individuals may have developed a complacent attitude about going under unsupported roof.

When newly employed people are first assigned to work near face areas, they should be closely monitored to ensure that they are not exposing themselves to unsupported roof during the course of performing certain activities associated with their job. If they are, corrective actions need to be taken immediately (see Peters (3, 4) for a discussion of several strategies for changing unsafe employee behaviors). If the individual persists in the behavior, it may be necessary to reassign them to a job where they are not required to work in close proximity to areas of unsupported roof.

Distance beyond the last row of bolts. MSHA's reports on fatal accidents involvlng miners killed while under unsupported roof were reviewed to deterrnine how far beyond the last row of supports the victim was at the time they were killed. Most of the victims were found within 4 feet of the last row of supports. Thus, it is important that miners realize that it is NOT safe to go even a short distance beyond the last row of bolts.

Table 1.—Comparison of miner characteristics

Miner characteristic		GROUP 1. Miners killed by roof falls While under unsupported roof (N=53)	GROUP 2. Fatalities **not** due to falls of unsupported roof (N=189)	GROUP 3. Estimates of coal mining workforce in 1986
Age	Median	35.0	37.0	NA[1]
	Mean	35.3	38.5	38
	Min-Max	20-60	19-62	NA
Experience in job	Median	4.0	4.0	3
	Mean	5.7	5.9	NA
	Min-Max	0.01-24	0.02-30	NA
Total mining experience	Median	12.0	13.9	11
	Mean	12.8	14.3	NA
	Min-Max	0.3-28	0.12-44	NA
Experience at this mine	Median	0.6	2.5	9
	Mean	2.1	5.5	NA
	Min-Max	0.02-19	0.02-38	NA

[1] Not available.

Characteristics of the mine

Table 2 shows characteristics of underground coal mines that fall into three categories. These categories correspond to the ones in Table 1. The 52 mines in Group 1 are operations where one or more miners were killed by a roof fall while under unsupported roof during the period 1986-1993. All of the 155 mines in Group 2 are operations where one or more miners were killed by some type of underground mining accident other than a fall of unsupported roof dunng the period 1986-91. The mines in Group 3 are all the operations where fatalities did NOT happen during the period 1986-91. The statistics for Group 3 mines are based on data from 1988 because that year is near the middle of the time period 1986-91. Many of the mines in Groups 1 and 2 were not in operation during the entire period for 1986-91. In order to arrive at an estimate of the "typical" levels of

Table 2.—Comparison of mine characteristics

Mine characteristic		GROUP 1. Mines with fall fatalities under unsupported roof (N=52)	GROUP 2. Mines with fatalities **not** due to falls of unsupported roof (N=155)	GROUP 3. All mines operating in 1988 (N= 1,841)
Annual production (tons)	Median	72,896	335,151	63,279
	Mean	230,146	687,028	221,298
	Min-Max	3,362-1,980,072	2,245-3,296,794	NA[1]
Annual employee hours	Median	26,867	121,071	20,666
	Mean	78,338	234,785	72,186
	Min-Max	1,200-780,926	1,783-1,485,845	NA
Seam height	Median	42	54	42
	Mean	50.7	58.6	49.3
	Min-Max	26-120	24-144	NA
Lost-time injury rate (per 200K hrs)	Median	15.3	14.0	14.0
	Mean	17.5	17.8	21.4
	Min-Max	0-90.4	0-46.3	NA
Productivity (tons per employee hr)	Median	2.4	2.7	2.6
	Mean	3.0	3.0	2.9
	Min-Max	0.8-6.9	0.7-7.8	NA

[1] Not available.

production, employment, and lost-time injuries for each of these mines, we used the average of the annual figures that each mine reported for its production, employment, and lost-time injuries for each of the years dunng 1986-91 that it was in operation. The figures for employment, and lost-time injuries reflect underground units only. Surface workers at underground mines are excluded from the analyses.

Group 1 versus Group 3 mines. Mines where a fatality occurred due to a fall of unsupported roof produced an average of 8,848 more tons of coal per year than mines where there were no fatalities. Similarly, the median of the annual tons of coal produced for Group 1 mines is 72, 896, which is 9,617 tons more than the median for Group 3 mines. There is a similar difference with respect to the mean and median values for annual number of hours worked by undcrground employees. In comparison to Group 3, the workforce at mines in Group 1 appears to be a little larger. The median of the rates of lost-time injuries per 200,000 hours worked by underground employees is a little higher for Group 1 mines than for Group 3 mines (15.3 versus 14.0). The median number of tons produced per hour of underground labor is slightly lower for Group 1 mines than for Group 3 mines (2.4 versus 2.6). Finally, there is no difference in terms of the median seam heights for Group 1 and 3 mines. The median for both groups is 42 inches. In terms of the parameters listed in Table 2, it appears that mines where fatalities occurred under unsupported roof are fairly similar to mines that did not have any fatal accidents.

Group 2 mines versus Groups 1 and 3. The group of mines that experienced fatalities caused by accidents *other than* falls of unsupported roof (Group 2) appear to be different from the mines in Groups 1 and 3 in two respects. Group 2 mines are larger, and operate in higher seams. The injury rate and productivity rate for Group 2 mines is about the same as for the other two groups.

Conclusions

It may be tempting for us to assume that mines where people are killed by falls of unsupported roof are somehow different from the mine where we work. This is part of how we rationalize that horrible events "could not happen to me." We may imagine that our mine is somehow different from mines in which people get killed. In some instances there are valid reasons to hold such beliefs. However, in other instances we are just fooling ourselves. Trusting areas of unsupported roof not to fall on you because ... *[fill in this blank with your favorite reason]* is one of those instances. The statistics in table 2 show that (1) miners have been killed by unsupported roof in a wide variety of mines since 1986, and (2) what is "typical" (or the median) for this group of unfortunate mining operations looks very similar to what is typical at the many mines where fatalities did not occur.

The Bureau of Mines has been conducting research to learn more about why miners go under unsupported roof and what types of actions might help to eliminate this behavior. The results have been published in previous editions of the *Holmes Safety Bulletin*

as well as in various Bureau of Mines reports (Information Circulars 9283, 9300, and 9332). HSA

Notes:

[1] The median is the middle value in a set of numbers arranged in order of magnitude, i.e., the 50th percentile value. For example, if the median age of a group of miners is 35.5, we know that half of the miners in that group are younger than that age and half of them are older.

[2] 1991 is the most recent year for which we currently have complete data.

[3] Estimates are based only on underground employees. Employees who work at the surface of underground operations were excluded. It is possible that characteristics such as age and experience levels have shifted since 1986. Although more recent estimates of these characteristics are unavailable for the entire workforce, we do know the age and experience levels of a few thousand underground coal miners who have experienced work related injuries during the period 1986-91. The medians for these miners are: Age: 35.0; Experience in job: 4.0; Experience at this mine: 9.0; Total mining experience: 12.4. These values are very similar to the ones obtained from the 1986 survey of the workforce.

References:

*1. Butani, S., and A. Bartholomew, "Characterization of the 1986 Coal Mining Workforce." **Bureau of Mines Information Circular Report 9192**, 1988, 57 pp.*
*2. Goodman, P., and S. Garber, "Absenteeism and Accidents in a Dangerous Environment: Empirical Analysis of Underground Coal Mines." **Journal of Applied Psychology**, v. 73, No. 1, 1988, pp. 81-86.*
*3. Peters, R. "Strategies for Encouraging Miners to Stay Away from Unsupported Roof and Perform Self-Protective Actions." **Bureau of Mines Information Circular Report 9283**, 1991, 29 pp.*
*4. Peters, R. "Miners' Views About How to Prevent People From Going Under Unsupported Roof." Paper in Preventing Coal Mine Groundfall Accidents: How to Identify and Respond to Geologic Hazards and Prevent Unsafe Worker Behavior. Proceedings of U.S. Bureau of Mines Technology Transfer Seminars, **Information Circular Report 9332**, 1992, pp. 25-31.*
*5. Peters, R., and R. Randolph. "Miners' Views About Why People Go Under Unsupported Roof and How To Stop Them." **Bureau of Mines Information Circular Report 9300**, 1992, 59 pp.*

"Had to tell myself to settle down"

Quick thinking saves a life

By H. L. Boling

Trying to save a life and apply CPR is a huge responsibility that can become very scary, especially when the life you are trying to save is that of a loved one. However, when the moment comes to apply basic life support and your adrenalin is traveling 90 miles an hour, you keep telling yourself to settle down and do your job—and you do.

This is what Janet Mullens did when her mother suffered a heart attack at Janet's house. Janet did not hesitate to help. She immediately checked for vital signs and found none, quickly established an airway, instructed her 17-year-old son to call 911, and then started CPR.

Janet said she couldn't remember how long she performed CPR, but does remember getting very tired. She knew she had to continue if she was going to help her mother. By the time the ambulance arrived, Janet's mother had started coming around and was talking a little to Janet and to her son. Later, the doctors advised Janet that the immediate life support action she performed had saved her mother's life.

Janet said she was very thankful for the CPR and first aid classes she had received from the Phelps Dodge Morenci, Inc. (PDMI) Safety Department. She wanted to let everyone know that if they were ever faced with a similar situation all they have to do is settle down and start CPR. It's a very nervous moment, but you can do it.

She felt very confident that with all the CPR training and first aid instruction employees have received at PDMI everyone here has that capability. She wants you to know that you can and will remember what to do, that the knowledge always seems to stay with you.

Janet Mullins, a strong believer in being prepared

"In my case," she said, "I had to just tell myself to settle down and start helping my mother, and I did."

We all thank Janet for taking the initiative in helping others. The mining community is very proud of Janet. HSA

*Reprinted from the February 1994 issue of the **Morenci Copper Review**.*

Rich Irish Mag claim had an interesting, but violent, history

By Bill Epler, Staff Reporter

One of the great mines in the old Arizona copper camp of Bisbee was the Irish Mag. Even more interesting is the history behind it, one of those tales that have made so much of the West's mining history so fascinating.

Early in the 1840s as mining was getting under way in Bisbee, a hard-headed, burly, irascible miner named Jim Daley staked a single mining claim on the west ridge of Sacramento Hill in Bisbee. He named it the Irish Mag after one of the more popular "ladies of the evening" who worked in Brewery Gulch.

He figured the Irish Mag was valuable because the Copper Queen Consolidated Mining Company, the forerunner of Phelps Dodge Corporation, had recently staked a group of claims in the area. His plot was to stake the claim before the Copper Queen could and then sell it to them at an exorbitant price.

Daley had a real Jekyll and Hyde personality. He had a flair for arguments and a very short temper. He always wore a gun on his hip and slept with a rifle beside his bed at night.

But he had an equal passion for flowers. His lovely garden, filled with larkspur, roses, and zinnias and tended by his common-law wife, was almost a community park.

Miners' wives on their morning shopping tours left their babies there in the cool shade of a juniper tree. Passing teamsters, horseback riders, and buggy riders were welcome to stop and, along with their animals, drink from his spring, one of the rare sources of good water.

The garden also had another civic virtue—it supplied all the flowers for funerals.

Daley, however, was never as peaceful as his garden, and the Irish Mag claim was the subject of numerous disputes for many years.

The first confrontation came when Ben Williams, superintendent of the Copper Queen, accidentally removed some rocks from Daley's claim. Daley became so enraged he went to Dr. James Douglas, president of the Copper Queen, and told him that Williams had offered him a bribe to murder Dr. Douglas.

Convinced that Daley was a dangerous lunatic, Dr. Douglas seriously tried to settle the feud between Daley and Williams.

An opportunity presented itself a short time later when Daley offered to sell his Irish Mag claim to Dr. Douglas for $10,000—a proposal Douglas was eager to accept as the fastest way of making peace.

Rejection led to murder

But Williams thought it would look like they had given in to blackmail and threatened to resign as superintendent if the claim was purchased.

As a result of Williams' objections, Dr. Douglas reluctantly declined Daley's offer. Daley became so incensed that he attacked the first man he saw. The unfortunate individual was a prospector innocently washing his clothes at the spring below Daley's house. Daley jumped on the man and proceeded to beat him mercilessly.

A deputy sheriff attempted to intercede, but Daley quickly drew his gun and shot the officer in the foot. Following the brawl, Daley vowed to kill anyone who tried to serve a warrant on him.

On April 10, 1890, when Sheriff Bill Lowther tried to arrest the assailant, Daley shot and killed the sheriff. Daley immediately fled into the mountains. The enraged citizens of Bisbee searched the hills for the murderer, but despite a massive search by lawmen throughout the West, no trace of Daley was ever found.

Since Daley was a fugitive, it was not very likely he would return to Bisbee to claim his property. Therefore, everybody and his uncle suddenly appeared to gain possession of the Irish Mag. It took 10 years of litigation to determine the legal heir to his property.

One claimant, saloon keeper Martin Costello, said he had purchased the Irish Mag from Daley's common-law wife, Angela Diaz, for $1,000.

A second claimant appeared in person with her 18-year-old son. She had traveled to Bisbee from Leadville, Colorado, and insisted they were Daley's lawful wife and son.

A third claimant named Andy Meehan, who operated a Bisbee saloon on Main Street, came

forward with a deed to the Irish Mag allegedly signed by Daley.

Unfortunately for Meehan, his saloon was going broke so he had to use his Irish Mag deed to pay off a debt to the Cohen brothers, who were local cigar store owners and occasional loan sharks.

But the Irish Mag brought them no better luck. They sued Costello and the case remained in the courts for 10 years, enriching the lawyers and ruining the Cohens.

Finally, the case reached the U.S. Supreme Court, which ruled in favor of Costello. He was so overcome with joy that he set up free drinks for all comers, touching off a 3-day drunk that became a part of Bisbee legend.

While the title to the Irish Mag was tied up in court, the Copper Queen discovered impressive copper ore bodies on the Silver Spray claims, next to the Irish Mag. This discovery greatly enhanced the value of Daley's property.

The Calumet and Arizona is born

In 1901, after securing title to the Irish Mag, Martin Costello was able to sell it and other claims in the area for $500,000 to the Lake Superior and Western Development Company. This firm later became the Calumet and Arizona Mining Company, commonly called the C&A.

The C&A found the Irish Mag to be even richer in copper than the adjacent Spray. The main ore body, discovered in 1902, was at least 325 feet thick and contained 9 percent ore.

Although incredibly rich, the mine was short-lived, lasting less than 15 years. In 1917, the mine was closed and the surface facilities removed.

During the Irish Mag's life span, the C&A paid out more than $15 million in dividends to its shareholders, which is pretty good for a 2-acre parcel of ground!

In addition to paying out all those dividends, the C&A invested heavily in the district, buying and locating large blocks of claims, and opening up additional rich mines. A subsidiary, New Cornelia Copper Company, developed the open pit copper mine in Ajo. As a result of all this activity, the C&A became a strong rival of the Copper Queen and Phelps Dodge.

But because of too generous dividends, the C&A was in no shape to weather the financial storm that came with the Great Depression. It was short on money and long on ore reserves, while conservative Phelps Dodge's position was just the opposite. As a natural result, the C&A merged with Phelps Dodge in 1931.

For the next 43 years, until the mines closed in 1974, most of Phelps Dodge's Bisbee production came from the mines acquired through the merger, as did its New Cornelia Branch in Ajo, which closed during the copper depression of the 1980s.

And all this began when eccentric Jim Daley staked the Irish Mag on the slope of Sacramento Hill. HSA

Reprinted from the October 1993 issue of Rocky Mountain Pay Dirt.

January 24, 1884; Crested Butte Mine, Crested Butte, Colo.; 59 killed

At about 8 a.m., shortly after the fireboss finished examining the mine and reported to the miners that their working places were free from gas with exception of No. 18 room, No. 2 level, a violent explosion traversed the mine from that room to the surface. The fireboss had warned the miner that the brattice leading to the room face was broken near the entry and gas had accumulated. While the fireboss was on the surface gathering materials to repair the brattice, the miner went into the room and nailed up the loose boards. The men were not removed from the return side, and the gas was moved out to the entry where it was ignited by the open lights. The explosion was carried by dust, and many of the men were caught in the flame and force. Of the men in the mine, 59 were killed and 12 escaped before being overcome by afterdamp. The damaged fan was repaired, and ventilation was gradually restored.

The men and officials at this mine were accustomed to move small bodies of gas with no precautions and were not aware of the hazards of larger accumulations. The next major disaster occurred in 1893; but there were 16 minor explosions in the intervening 9 years, caused by ignitions of gas by open lights or of dust by black blasting powder. Although the inspector energetically tried to bring attention to explosion hazards, the danger was usually accepted or ignored. HSA

From the report of State inspector of coal mines, 1883-1884.

Safety reminder—Total involvement safety

"Management support and supervisor accountability are major pillars in a safety program; a third pillar—employee involvement—is needed in safety programs of the 1990s."

So wrote Walter Tyler in an article in *Professional Safety*, published by the American Society of Safety Engineers. In Ontario, [Canada] we are well ahead of most American jurisdictions in involving employees in safety. All of our provincial safety associations, agencies, and boards are bipartite, with equal representation from management and labor. And so are the Joint Health & Safety Committees (JHSCs), which are required in every workplace with 20 or more employees.

But according to the principles of the Internal Responsibility System (on which [the Canadian] *Occupational Health and Safety Act* is based) none of these bodies have **direct** responsibility for safety. Direct responsibility in the workplace belongs to those who actually plan and carry out production, i.e., managers, supervisors, and workers. All the others, including safety departments, unions, JHSCs, etc., have **contributive** responsibility. They are there to advise, support, consult-audit, inspect or in other ways to assist those with direct responsibility.

To quote a Ministry of Labor document on the Internal Responsibility System (IRS), for IRS to work effectively, managers must ensure that mechanisms are in place for "Joint co-operation and problem solving amongst the workers and supervisors", and must be committed to "joint cooperative problem solving and decision making." Supervisors are responsible for "involving workers in problem, solving and decision making." And workers must co-operatively "participate in joint decision making and problem solving."

Joint Health & Safety Committees are a valuable forum for sharing information reaching consensus and making recommendations. But they are not the final answer to employee involvement. That must occur every day on the line. Safety, like quality, is part of production—**not** someone else's responsibility. HSA

Reprinted from the Ontario [Canada] Natural Resources Safety Association's March 1994 issue of ***Safety Reminder.***

Haulage trucks large and small

Moving Morenci rock for 60 years

By Bill Conger

Haulage trucks, along with trains, have played a major part in mine production over the years .

The Morenci Open Pit Mine is now 57 years old. When ground was broken to initiate the immense operation, rock from all direct mining operations was hauled exclusively by truck. The first two years of mining consisted of stripping barren material to expose the ore body.

This was done by electric shovels with 4.5 cubic-yard dippers loading the barren material into dump trucks, most of which were rated at 22.5-yard capacity.

This translates to about 32 tons of load per truck, although early reports indicated the trucks hauled as much as 42 tons. Eighteen of these trucks did the initial bench development.

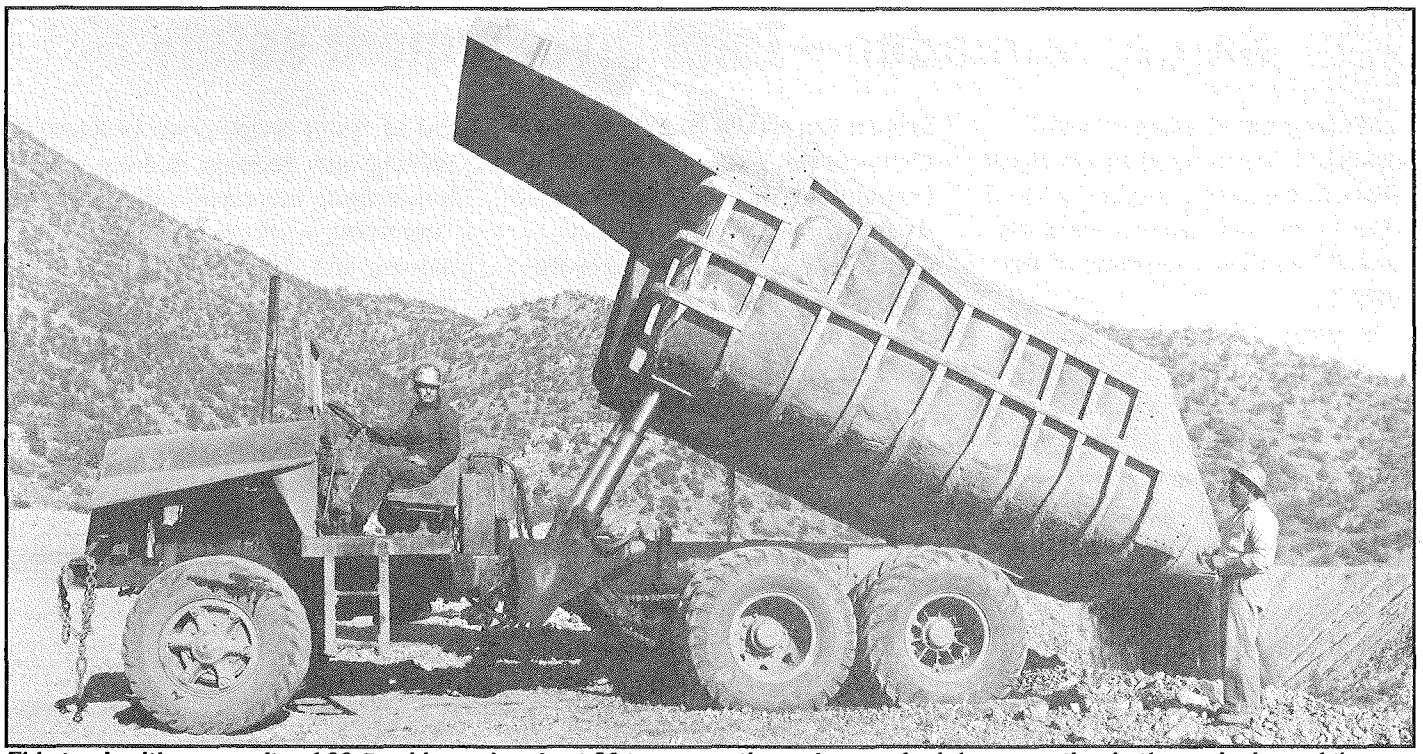
The trucks were chain driven and initially gasoline powered. Later, they were converted to diesel. Open air drivers' seats characterized most of the trucks.

Some of our retirees will tell you it got pretty miserable during the cold winter months. Snow in the Mine meant that a truck driver himself would be snow-covered and unofficial reports indicated that drivers kept a stock of snowballs on the seat next to them to retaliate against passing trucks.

Dick Nations, retired Mine Foreman, drove the 22.5-yard dump trucks during his early days at Morenci. He relates that the lip of the truck bed extending over the cab was the truck driver's only protection from the elements.

Heat for the driver during the winter was provided by an open fire in a five-gallon bucket in the truck fueled by the end of a mashed-up railroad tie. Steering the truck required "quite a man." One had to brace his feet solidly to make a turn.

Fixing broken chains on a chain-drive truck was a nightmare for mechanics. They would fish the chain out of the mud, mend it and



This truck with a capacity of 22.5 cubic yards, about 32 tons, was the mainstay of mining operation in the early days of the Morenci open pit. Picture taken in 1944.

reattach it. In bad weather this was done while lying in the mud or snow.

Smaller five-yard capacity trucks and shovels with one and one-half yard dippers were used to establish roadways and benches. They were also used to construct the main railroad from the Mine to the Reduction Works.

By 1939 trains were introduced into the active mining areas and began to take over as mine benches became established. Truck mining then was confined to newly opened levels that were not yet installed with track.

Some ore was encountered during the early stripping operations. This was delivered by haulage trucks to the No. 6 concentrator located above the Morenci High School football field. The concentrator had been reactivated in 1939 to test different ways of treating the ore (that high school and most of the No. 6 concentrator are now under a low grade ore stockpile).

In 1943, construction on the new Morenci concentrator and smelter in the present location was completed, and the first ore was delivered from the mine by trains. By that time, the haulage trucks were only handling about 20 percent of the total material mined.

Average cost of operating a 22.5-

In the early days of the Morenci open pit, trucks such as this one, with a capacity of only 5 cubic yards, about 7 tons, were employed in the mine—especially in confined areas. This photo was taken in April 1939.

yard truck for eight hours was about $35, including labor, repairs, supplies, fuel and lubricants. By 1943 these haulage trucks had handled about 30,000,000 tons of rock.

Around the end of the decade of the 40s, the chain-driven 22.5 yard haulage trucks were scrapped and replaced with somewhat smaller but much more modern 25-ton capacity trucks. They even had cabs!

A few years later, around 1956, the first of a fleet of 35-ton capacity trucks of the same type was purchased. A careful engineering study was done to see if the purchase of such a large truck was feasible. Some of those 35-ton trucks, which now seem small, are still in use today.

The role of truck mining continued to play second fiddle to the trains. The use of trucks was limited to either developing and stripping of top mining levels to make room for mining below, or to start dropcuts at the bottom of the open pit. In ore areas the trucks would dump into railroad cars from the loading dock in the bottom of the Mine. The trucks were also used in the limestone and silica quarries.

Meanwhile, advancement in haulage truck technology was making even larger trucks available for open pit mining. In 1968, new 65-ton capacity trucks were purchased to develop new mining areas south and west of the Mine.

During the late '60s, Phelps Dodge began development of two new open pit mines: one at Tyrone, New Mexico, and the other at the scene of the old Metcalf workings, located above the site of the long-gone town of Metcalf.

Tyrone purchased a fleet of 85-ton capacity trucks which were converted to 100-ton capacity by extending the sides of the beds. Mining at Metcalf also was done by a fleet of 100-ton trucks. As little as 10 years earlier, such immense trucks would have been considered an impossibility.

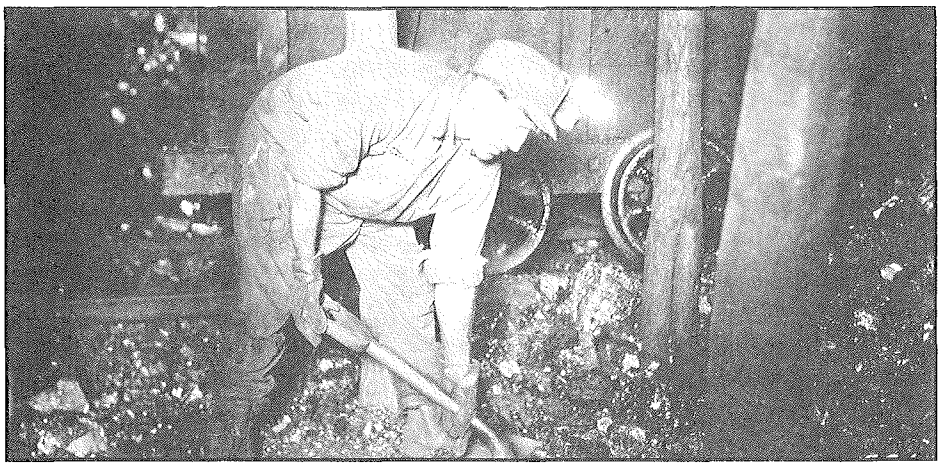
Truck mining continued at Metcalf until 1980 when operations were suspended and all mining equipment, including shovels and trucks, were moved to the Morenci Mine. This was a result of the low price of copper which could not sustain the high stripping ratio of leaching material to ore at Metcalf. Ore could be mined at a much lower cost at Morenci.

The year 1982 saw the first 170-ton capacity haulage truck in the Morenci Mine. Since then, 190-ton and 240-ton capacity trucks have been added to the fleet. These gigantic trucks are loaded by shovels with dippers that hold up to 40-cubic yards of material (almost 50 tons). Today, all ore and leach from the mine is hauled by these trucks ranging from 170 to 240-ton capacity.

The original 22.5-yard trucks of the 30s and 40s, which cost about $16,000, were considered to be monsters by anybody's standards.

Today's 240-ton truck costs about $1,500,000 and is more than seven times as big as the early-day behemoth! HSA

Reprinted from the February 1994 Morenci Copper Review



Jan. 15, 1905; No. 1 Mine; Decatur, IL; 6 Killed

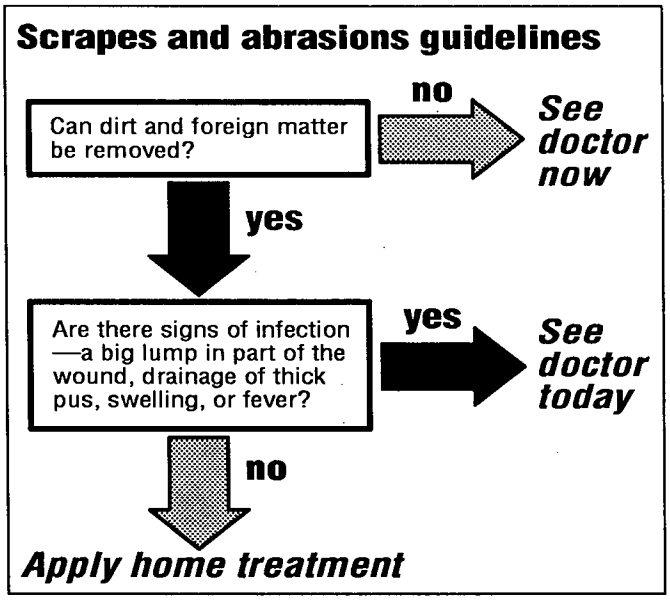
January 16, 1905, shortly after noon, a fire broke out in No. 1 mine, Decatur, Macon County, which resulted in the death of six men. The fire was discovered in the mule stable and undoubtedly was caused by sparks from a pipe or partially consumed cigarette. At the time the fire was discovered, about 60 men were in the mine, but the prompt action of the mine manager in sending runners to give warning, all escaped but the six unfortunates referred to above. The alarm was immediately sent to the city fire department, which responded promptly, but, owing to the location of the fire so far underground, considerable time was consumed in preparing to reach it. By hard work, the fire was brought under control, seven men were rescued and all the bodies recovered. HSA

From the 1954 State Coal Report, Illinois Department of Mines and Minerals.

First aid... *scrapes and abrasions*

❑ Scrapes and abrasions are shallow wounds, although several layers of skin may be torn or even totally scraped off.

❑ Because abrasions expose millions of nerve endings (all of which send pain impulses to the brain), this type of wound tends to be more painful than a cut.



Home treatment

1. Pain can be treated for the first few minutes with an ice pack enclosed in a plastic bag or towel. The worst pain subsides fairly quickly; aspirin or acetaminophen may be taken, if necessary.

2. Remove all dirt and foreign matter by washing the wound with soap and warm water.

The use of Mercurochrome, iodine, or other antiseptics is *not* necessary and can be painful.

Antibacterial ointments (e.g., Neosporin) are optional; their main benefit is to keep bandages from sticking to the wound.

3. Apply an adhesive bandage if the wound continues to ooze blood (remove it and replace it when it gets wet). Most scrapes scab very quickly; this is nature's way of "dressing" the wound.

4. If there is a clean, loose skin flap, leave it there to form a natural dressing.

If the skin flap is dirty, cut it off carefully with nail scissors—if it hurts, stop! You're cutting the wrong tissue.

5. Watch for signs of infection—pus, severe redness, swelling, or fever. Don't worry about redness around the edges; this is a normal sign of healing.

Infection will not be obvious in the first 24 hours. If infection does appear, or if the scrape is not healed within two weeks, see your doctor. HSA

Reprinted from the October 1993 issue of Arch of West Virginia's ***Health Letter****— adapted from* ***Take Care of Yourself*** *by Donald Vickery, MD, and James Fries, MD.*

First aid... *minor burns*

First-degree burns cause skin redness. Second-degree burns cause redness, blistering, and swelling.

The degree of pain is not related to the severity of the burn. The most serious burns—third-degree burns—destroy all nerve endings and are painless.

What to do

1. Immediately put the burned area under cold running water. Or, apply a clean washcloth that has been soaked in cold water. Do apply ice directly to the skin.

Cold will relieve pain, and decrease temperature of the burned skin (which limits tissue damage).

Treat the burn with cold water or cold compresses until the pain has stopped. For a minor *mouth* burn, the victim can suck on an ice cube.

Note: If you are not close to cold running water, you can pour any cold liquid on a burn—iced tea, a soft drink, beer, etc., to decrease skin temperature.

2. Do not break the blisters. If they burst by themselves, leave the overlying skin where it is so that it may form a natural wet "dressing."

3. Cover the burn with a non-fluffy bandage—fluffy bandages can stick to a burn.

Do *not* apply anesthetic creams or sprays. They may slow healing.

Do *not* use butter or vaseline. They may slow healing and increase the risk of infection.

Antibiotic creams (e.g., Neosporin) probably neither help nor hurt minor burns. HSA

For extensive burns, go to a hospital emergency room.

If a minor burn shows signs of infection (i.e., pus, increased pain, redness, and swelling), see your family doctor.

Reprinted from the March 1994 issue of Arch of West Virginia's ***Health Letter.***

Don't improvise!
Use the correct tool for the job

Courtesy of Canada's
Ontario Natural Resources Safety Association

Noise's temporary, long-term effects on hearing loss must be quantified

Exposure duration formulas will determine whether noise exceeds the OSHA/MSHA allowable standard

By D. Jeff Burton, PE, CIH, Consultant/Educator in Industrial Ventilation, IVE Inc., Bountiful, Utah.

As a developer of training courses and materials, I have collected and developed a number of simplifying methods for explaining and solving complex problems. This column, adapted from my *Industrial Hygiene Workbook*, covers the subject of noise in terms I think almost everyone can understand.

The November 1993 column discussed the difference between frequency (pitch measured in Hertz) and sound pressure (loudness measured in decibels) and showed how to calculate total noise exposure from various sources.

Let's continue with a discussion of the types of hearing loss and how to estimate total noise exposure over time to determine compliance with OSHA's standard.

Types of loss.

Various exposures to noise can result in three types of loss to hearing range or ability.

4,000-Hertz Shift or "notch." Hearing loss in and around a pitch of 4,000 Hz is often associated with industrial hearing loss and exposures to loud noises. The 4,000 Hz shift may be used to differentiate noise-induced and age-induced hearing loss.

Temporary losses. Temporary losses of hearing are called "temporary threshold shifts," or "auditory fatigue." Loud industrial noises typically cause temporary shifts in hearing range at high frequencies of 4,000-6,000 Hz. The lowest intensity sound pressure level capable of producing a temporary loss is about 80 dB at these higher frequencies.

These shifts are recoverable after a period of time out of the noise source. Most of the loss occurs within the first two hours of exposure. Recovery occurs one to two hours after leaving the noisy environment, but full recovery may take as long as 48 hours. The number of recoveries from temporary losses varies with the individual.

Permanent losses. Long-term exposure to industrial noise, usually considered to be 10 years or more, often creates the greatest permanent loss at the pitch of 4,000 Hz (the "4,000 Hz shift").

With continued exposure, the loss shifts or extends to frequencies above and below 4,000 Hz. Because work induced hearing losses occur at frequencies above normal speech frequencies, hearing impairment can occur without the person knowing it.

Other causes. Exposure to high-intensity noise is just one cause of permanent hearing loss. Others include:

- **Nosacusis**—hearing loss caused by injury and illness.

Table 1.—Using the permissible continuous noise exposure limits as defined by 29 CFR 1910.95, a worker's daily dose can be estimated by filling in a simple formula or this chart.

dBA	Hours exposed	x	Multiplier	=	Dose portion
≤80	4	x	0.0		0
85			0.063		
87			0.083		
89			0.11		
90	2	x	0.125		0.25
91			0.14		
93			0.19		
95	2	x	0.25		0.50
97			0.33		
99			0.44		
100			0.50		
101			0.59		
103			0.77		
105			1.00		
107			1.32		
109			1.75		
111			2.27		
113			3.03		
115			4.00		

Sum of dose portions = 0.75

Sum >1 exceeds allowable exposure
Sum <1, below allowable.

• **Presbycusis**—hearing loss caused by aging and the use of drugs.
• **Conductive hearing loss**—not usually associated with damage to the inner ear. Rather, loss is caused by impairment of sound transmission due to infection, ear wax and so forth.
• **Sensorineural hearing loss**—poor transmission of sounds by nerve pathways.

Federal standards.

OSHA's standard, 29 CFR 1910.95, for industrial workers [and MSHA's 30 CFR 70.500 and 71.800 for coal miners; plus 30 CFR 56.5050 and 57.5050 for metal and nonmetal miners] describes maximum allowable noise levels.

Table 2 provides OSHA's permissible continuous noise exposure levels as measured using a slow-response SPL on the A-weighted scale (dBA).

The American Conference of Governmental Industrial Hygienists (ACGIH) sets a standard for noise as well. Table 3 presents ACGIH's threshold limit values for continuous noise exposure as measured using a slow-response SPL on the A-weighted scale (dBA) and an ANSI Type S2A sound level meter.

Estimating noise dose.

When the daily noise exposure is composed of two or more periods of different noise levels, their combined effect can be estimated by using the formula:

Table 2.—OSHA's permissible continuous noise exposure levels as measured using a slow-response SPL on the A-weighted scale (dBA.)

Duration hours/day	Sound Level, dBA, slow response
16	*85
8	90
6	92
4	95
2	100
1	105
0.5	110
0.25 or less	115

**85 dBA limit is used for estimating daily noise dose.*

Sum = C1/T1 + C2/T2 + C3, / T3,—etc.,

where: C_n = total duration of exposure at a specific noise level.

T_n = total duration of exposure permitted at that level.

If the Sum >1, the dose exceeds allowable exposure; if the Sum <1, the dose is acceptable below allowable exposure.

All exposures exceeding 80 dBA should be included in the rating.

Using formula and table.

A worker is exposed to:
75 dBA for four hours
90 dBA for two hours and
95 dBA for two hours.

Has this exposure exceeded the OSHA[/MSHA] allowable exposure?

$4/\infty + 2/8 + 2/4 = 0.25 + 0 + 0.5 = 0.75$

Table 3.—ACGIH's threshold limit values for continuous noise exposure as measured using a slow-response SPL on the A-weighted scale (dBA) and an ANSI Type S2A sound level meter

Duration hours/day	Sound Level, dBA, slow response
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115

Sum <1; therefore, combined exposures are within allowable limits.

This equation may also he represented by the table above, which lists OSHA's[/MSHA's] dBA levels and multipliers according to the standard formula to calculate noise dose. From the example above, I've filled in the hours exposed at corresponding dBA levels and the answer: again, the Sum <1, and combined exposures are within allowable limits. HSA

Reprinted from the February 1994 issue of Occupational Health & Safety.

Mine instructors conference to be held

The Annual National Mine Instructors Conference will be held October 11-13, 1994, at the National Mine Health and Safety Academy. The conference is for mine trainers who are interested in getting fresh ideas about instructing safety and health topics. Also planned for this year's conference is a materials swap forum. If you would like your name added to the mailing list, contact Linda Elswick, National Mine Health and Safety Academy, P.O. Box 1166, Beckley, WV 25802-1166, call (304) 256-3252, or fax (304) 256-3251. HSA

Holmes Safety Association monthly safety topic

Multiple fatal roof fall

GENERAL INFORMATION: A 23-year-old shotfirer, with 2 years of mining experience, and a 44-year-old section foreman, with 23 years of mining experience, were killed in a roof fall while loading coal from the working face.

The mine is opened by three entries into the face of a highwall and has one working section. There are two production shifts, six days per week. The mine produces 2,400 tons of coal daily.

DESCRIPTION OF ACCIDENT: About 1:00 p.m., the roof in the No. 8 room of the No. 1 Unit began snapping and popping, beginning at the second open crosscut and extending inby to the working face. The section foreman instructed the roof bolter operator to drill two test holes into the roof approximately 10 feet toward the face, past the inby rib of thc second open crosscut in the No. 8 room.

After the roof bolter completed drilling, he told the section foreman that the test holes had revealed a crack about one-half inch wide that was located about 8 to 10 inches into the strata.

The roof bolter was given no further instructions concerning the No. 8 room, and about 2:00 p.m., the dayshift crew left the unit and travelled via diesel mantrip to the surface.

Upon reaching the surface, the section foreman met the section foreman victim, who was the section foreman for the oncoming shift. According to the section foreman's sworn testimony, he told the section foreman victim that the roof in the No. 8 room had been popping and described the crack that the test holes had revealed in the roof. The section foreman did not enter the hazardous conditions his crew had discovered in the roof of the No. 8 room into the Preshift/Onshift Examination Book.

At 2:30 p.m., the No. 1 Unit crew entered the mine under the victim's supervision and traveled to the No. 1 Unit where mining progressed normally.

About 5:30 p.m., the loader operator finished loading the coal from the face of the No. 9 room and trammed the loading machine to the second open crosscut in the No. 8 room. The section foreman (victim) approached the loader operator and told him he would operate the loading machine while the loader operator ate lunch.

The victim trammed the loading machine to the last open crosscut between the No. 8 and 9 rooms which had been "holed through" from the No. 9 room during the dayshift. During the second shift, the cutting machine operator had undercut the remaining web of coal which had allowed this coal to fall to the mine floor. The victim loaded several shuttle cars from this pile of coal and then began to load coal from the face of the No. 8 room.

After the victim finished loading the shuttle car, the driver changed to the outby drivers seat and saw the loader operator walking inby between his shuttle car and the right hand rib towards the shot firer (victim). The canopy on the loading machine was 90 degrees from its proper position and afforded no protection for the operator. From the corner of his eye, he saw the roof fall and cover both victims. He accelerated away and parked his shuttle car in the second open crosscut.

Another shuttle car operator had parked his shuttle car between the second and third open crosscut of the No. 8 room while waiting for the other shuttle car operator to finish loading. He heard the loader operator shout and saw him run from the face area as the roof began falling.

He told the loader operator and the shuttle car operator to get timbers, the unit scoop, first aid supplies, and to call the second shift mine foreman, who was on the surface. Recovery of the victims was started immediately.

CONCLUSION: The roof fall occurred because unstable roof conditions, which concealed a slip in the strata, had been detected, but were not corrected by the installation of additional roof support prior to loading coal.

A contributing factor to the accident was the overdrilling of holes in the mine roof during the roof bolting installation process. Several of the holes in the roof fall area had been overdrilled by 5 to 6 inches resulting in part of the resin not being properly mixed. HSA

New book recalls days of tokens and coal company stores

A retired pathologist has written a book he hopes will preserve the history of coal tokens used in place of cash by mine companies in the early 20th century, the Associated Press reported.

Until as late as the 1940s, coal companies across the country paid miners with coal tokens, which could only be used at a store near the mine and owned by the company, said Dr. David Orrahood of Owensboro, Ky.

Coal tokens called "flickers" have been documented as early as 1880 and most were out of circulation by the late 1930s.

Orrahood said his book, "U.S. Coal Tokens of the Americas," is meant to keep alive the history of the flickers.

"There's very little written about what I've written here," said Orrahood, who dedicated the book to people who died while working in the mines. "What I'm trying to say and the purpose for writing this book is they're all gone now."

Most people alive today never worked in a coal mine that paid in flickers, Orrahood said. But there are a few who remember their parents being tied to the company store.

Claude Travis, a retired Muhlenberg County miner, remembers going to the Beech Creek Coal Company Store with his father. "A family could buy anything from gasoline to clothes to furniture at a company store," he said. The quality was good, but the prices were higher than regular stores.

If miners wanted to exchange the tokens for cash, they rarely received 100 percent value, Travis said.

"They pretty much had you from start to finish," he said.

"More than 20,000 company stores have been documented and one-third of those issued tokens," Orrahood said.

Orrahood, who has tokens from 300 companies in his collection, said his most valuable token was issued by the Green and Barren River Coal Co.

For each mine it owned, a company issued tokens that ranged in value from 1 cent to $10, Orrahood said.

A coal token's value depends on its rarity, said Frank Westerfield, a coal token dealer. When coal tokens were ruled illegal, many companies dumped them into rivers or coal shafts.

Coal tokens from Ohio mines are more valuable than Kentucky and West Virginia mines because there were fewer coal companies in that state, Westerfield said. Kentucky mines make up 18 percent of issued coal tokens, while West Virginia mines make up 55 percent, Orrahood said.

"Along with monetary value, the few thousand people who collect coal tokens appreciate the historical value," Westerfield said. Orrahood's book taught Westerfield a few things about coal mining in Daviess County.

"It's like any hobby—if you search deep enough you'll find something interesting," he said. "You learn things as you go." HSA

*Reprinted from the December 1993 issue of **Pay Dirt**.*

Medusa honored for safety strides

Industry awards local scholarships

By Brian McGillivary, News-Review staff writer

Medusa Cement Co. of Charlevoix edged out several other companies to win the Northwest Michigan Industrial Association's 1994 Gerald "Smitty" Smith Safety Award for the most improved safety record.

"Safety directors don't make the records, it's the people who work in the manufacturing plant who improve the safety record year after year," said Medusa safety director Nancy Staley.

"My goal for the year 2000 is to have no accidents in my company," Staley said.

Left-to-right: Bill Joy, Administrator of NMWIA; Nancy Staley, Safety Director for Medusa Cement Co.; and Pat Gagliardi, State Representative for Drummond Island Michigan.

At Thursday night's meeting, association president Fred Polhemus, noting the closeness of the safety records, also awarded several honorable mentions this year in addition to second and third place.

Top of Michigan Electric Co., Boyne City, won second place and third place went to RKC Corp. of Cheboygan. Receiving honorable mentions were: Control Engineering's plants in Pellston, Boyne City, and Harbor Springs; Augat Automotive of Boyne City; Lexamar Corp. of Boyne City; Michigan Maple Block Co. of Petoskey; Northern Diecast Corp. of Harbor Springs; Petoskey Plastics, Inc. of Petoskey, and Harbor Industries Inc. of Charlevoix.

After awarding two $500 North Central Michigan College scholarships to John Munn of Harbor Industries and Peter Spencley of Lexamar Corp., association members listened to several speakers about local assistance available to them.

Barb Kerridge of Lexamar Corporation and the Northern Michigan Area Safety Directors Association spoke about the importance for Michigan industrial firms to see the state maintain the Michigan Occupation Safety and Health Administration (MIOSHA).

"You have free MIOSHA available at your fingertips," Kerridge said. "Everybody here should utilize it."

"We're afraid we are going to lose MIOSHA, and if we lose MIOSHA, we lose a good friend of industry."

Kerridge said MIOSHA will provide free inspections without penalties or fines for infractions, as long as the company agrees to a good faith effort to fix any problems. MIOSHA offers free safety training seminars for safety directors and supervisors, and provides free consultations for new business startups and existing business.

Kerridge explained it's free because MIOSHA is funded through workers compensation payments industry is already making.

In addition, Kerridge told association members they can help set the rules for their own industry by asking to get appointed to a MIOSHA standards commission. The commissions can help write the industry standard for Michigan when it adopts federal Occupational Safety and Health Administration laws.

Thomas Bass of the Service Corps of Retired Executives (SCORE) spoke of the free advice and counseling available from the 15 active members of SCORE.

He said when helping new businesses get started and existing businesses with problems, they invariably find three problems business fails to recognize.

"People ought to know what their costs are, and they don't. People ought to know what their cash requirements are, and believe me, they don't. And the talents of their people are not being utilized," Bass said. HSA

When lost minutes mean lost lives

The most important thing to a person in the early stages of a heart attack is time. And for the past 10 years, Dr. Raymond Bahr has been putting time on the side of heart attack victims through his Early Cardiac Care Program. His efforts have resulted in the opening of Chest Pain Emergency Rooms (CPERs) in nearly 300 hospitals, and public education programs on how to recognize the early signs of a heart attack.

According to Dr. Bahr, it is vital that people heed an often ignored risk factor for heart attack—chest discomfort. He further believes that if all 6,700 hospitals in the U.S. had CPERs, heart disease would no longer be the leading cause of death. Although you may or may not have a CPER in your area, the important lesson to be learned from Dr. Bahr is that **you should never ignore chest discomfort and that, if it occurs, you should seek help as soon as possible.**

If you would like to know about facilities in your area you may write to:

Dr. Raymond Bahr
St. Agnes Hospital
900 Caton Avenue
Baltimore, MD 21229

HSA

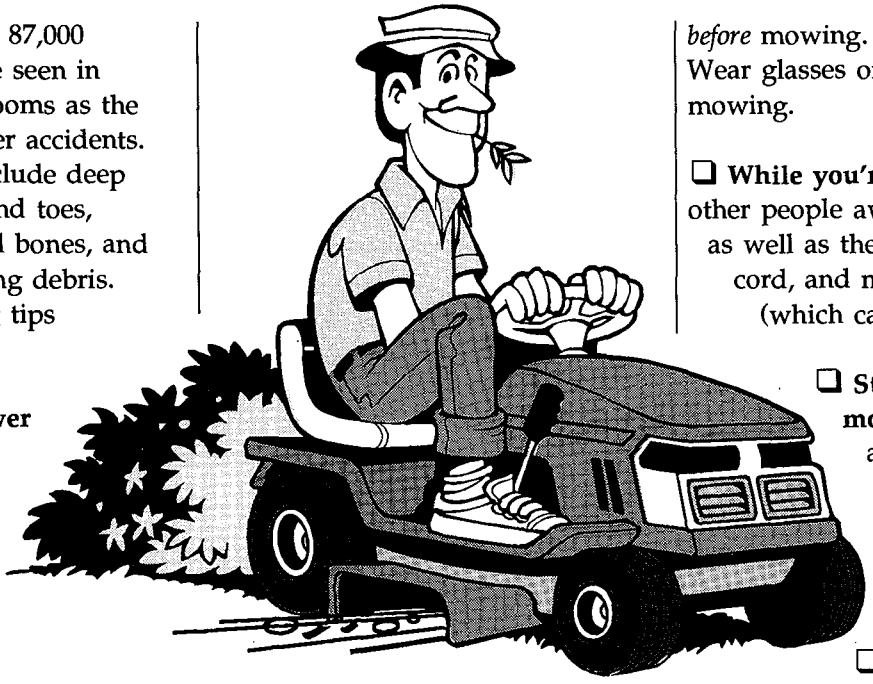
Reprinted from the 1994, Volume 4, Number 1, issue of ***CardiSense****, a publication of Marion Merrell Dow Inc.*

Respect your lawn mower

In 1990, more than 87,000 American adults were seen in hospital emergency rooms as the result of power mower accidents.

Typical injuries include deep cuts, loss of fingers and toes, broken and dislocated bones, and eye injuries from flying debris.

Take the following tips seriously:



❑ **Buy a power mower that has a deadman control** that stops the mower when the handle is let go. Do not disconnect this control.

❑ **Do not allow kids younger than 12** to use walk-behind mowers, or those younger than 14 to use ride-on mowers.

❑ **Wear sturdy shoes** (NOT bare feet, sandals, or slippery sneakers) while mowing.

❑ **Wear ear protection with any machine** that is loud enough to prevent you from holding a normal conversation (foam ear-plugs are available in most drug stores).

❑ **Pick up or rake away stones,** sticks, and other small objects *before* mowing.

Wear glasses or goggles while mowing.

❑ **While you're cutting grass,** keep other people away from the mower, as well as the gas can, power cord, and mower exhaust (which can throw objects).

❑ **Start and refuel your mower outdoors,** not in a garage or shed. Mowers should be refueled with the motor turned off and cool.

❑ **An adult should make all blade settings and should dislodge blade debris.** Do this with the mower shut off, and the spark plug removed or the cord unplugged. HSA

Reprinted from the April 1994 issue of the Arch of West Virginia ***Health Letter****.*

TRAM conference to be held

The Twenty-first Annual Training Resources Applied to Mining Conference (TRAM XXI) will be held August 15-17, 1994, at Penn State. It is sponsored by the Pennsylvania State University, West Virginia University, and the University of Kentucky. The conference is for persons interested in mining and management issues for training activities. For more information, contact Kelly Henry, Department of Mineral Engineering, The Pennsylvania State University, 104 Hosler Building, University Park, PA 16802-5000 or call (814) 865-3437. HSA

Bloodborne pathogens

By now these two words should be commonly understood by Emergency Personnel, Medical Specialists, and Safety Managers, but there still is fear and a mystique that surrounds them. We'll try to shoot straight from the hip and explain what's important and what to do if you've been confused.

For hundreds of years diseases have stalked mankind, Polio, Measles, TB, Rabies, Hepatitis, AIDS, and others. Many are spread by casual contact, a sneeze or saliva, and others by blood; Hepatitis B and AIDS are spread by blood to blood contact. If you are infected and your blood gets in mine, I "may" develop Hepatitis B or AIDS; fortunately not from tears, sweat, saliva or a sneeze. The Hepatitis B virus (HBV) infects the liver; it's more common than HIV and AIDS, and a greater risk on the job. Many HBV infected people have no problems or symptoms. Some however, develop serious or fatal problems such as cirrhosis, liver cancer, or chronic liver disease.

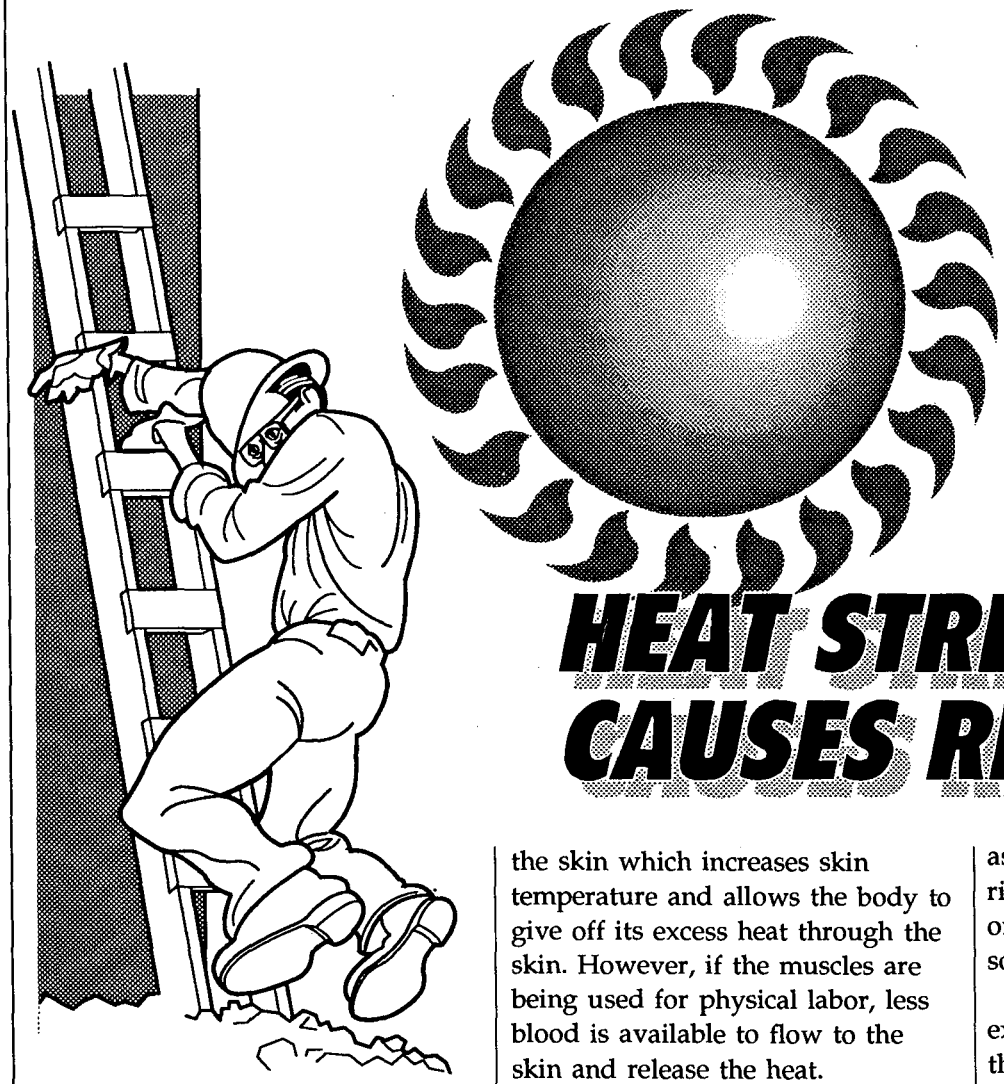
Occupationally transmitted bloodborne infections account for an estimated 250 deaths per year from complications of Hepatitis B, and a gradually rising number of cases of human immunodeficiency virus (HIV) infection and acquired immune deficiency syndrome (AIDS). Who's at risk in the workplace? Anyone who gets someone else's blood into theirs, that reduces the risk to most of us who aren't medical personnel, emergency service providers, or whose regular job causes us to be around blood. The rest of us might encounter blood when providing First Aid, CPR, or helping out after an accident.

How do we deal with contact? If you could be called to accidents routinely, plant nurse, first aider, mine rescue, then be prepared by being immunized for Hepatitis B (there is no HIV immunization), wearing gloves, mask, goggles, and other protective equipment (gowns, aprons) and get some training. For others who might be there in an emergency, put on latex gloves when available, use a mask or goggles around splashes and avoid blood; if it's a minor wound the victim can hold his/her own bandage while you put on gloves. Everyone should know that bloodborne pathogens won't pass through your skin unless it's open (bleeding, scraped, scabbed) or is a mucous membrane (nose lining, inside of mouth, or eyes). Don't smoke or eat after the emergency until you wash your hands, then clean up the trash or debris carefully. First glove up, place refuse in a marked container, a hard plastic or metal container for sharp objects and glass and dispose of it safely; it may need incineration. If floors need mopping, or equipment needs to be cleaned, use a commercial disinfectant or 1 part chlorine bleach to 100 parts water.

If you are directly exposed, report it immediately! Your employer will offer you a confidential medical evaluation which may include a blood test. A medical professional will tell you the results of your evaluation and/or test, plus any conditions that require more evaluation or treatment. Your employer may ask for the source of exposure in order to request that the person be tested. There's a vaccine that helps protect against Hepatitis B, and it can be given after an exposure, but nothing is available to protect against HIV or AIDS.

If you still have questions, call a local or state health department, your nurse, or safety manager or even look up regulations, particularly OSHA 29 CFR 1910.1030. Well that's it in a nutshell, it's not really a tough nut to crack if you get a big hammer! HSA

Provided by the Kansas Small Mine Safety Training at Hutchinson Community College.



HEAT STRESS CAUSES REACTIONS

Four environmental factors affect the amount of stress a worker faces in a hot work area—temperature, humidity, radiant heat (such as from the sun or a furnace) and air velocity. Perhaps most important to the level of stress an individual faces are personal characteristics such as age, weight, fitness, medical condition, and acclimatization to the heat.

The body reacts to high external temperature by circulating blood to the skin which increases skin temperature and allows the body to give off its excess heat through the skin. However, if the muscles are being used for physical labor, less blood is available to flow to the skin and release the heat.

Sweating is another means the body uses to maintain a stable internal body temperature in the face of heat—it just isn't an excuse to sell more deodorant. However, sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids and salts lost are adequately replaced.

Of course there are many steps a person might choose to take to reduce the risk of heat stress, such as moving to a cooler place (Siberia—da!), reducing the work pace or load, or removing or loosening some clothing.

If the body cannot dispose of excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. As the body continues to store heat, the individual begins to lose concentration and has difficulty focusing on a task, may become irritable or sick and often loses the desire to drink—water is especially important here. The next stage is most often fainting and then possible death if the person is not removed from the heat stress. HSA

Heat disorders

Heat stroke, the most serious health problem for workers in hot environments, is caused by the failure of the body's internal mechanism to regulate its core temperatures. Sweating stops and the body can no longer rid itself of excess heat. Signs include (1) mental confusion, delirium, loss of consciousness, convulsions or coma; (2) a body temperature of 106° F or higher; and (3) hot dry skin which may be red, mottled, or bluish. Victims of heat stroke will die unless treated promptly. While awaiting medical help, the victim must be removed to a cool area and his or her clothing soaked with

cool water. He or she should be fanned vigorously to increase cooling. Prompt first aid can prevent permanent injury to the brain and other vital organs.

Heat exhaustion results from loss of fluid through sweating when a worker has failed to drink enough fluids or take in enough salt or both. The worker with heat exhaustion still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache—hopefully not all of the above. The skin is clammy and moist, the complexion pale or flushed, and the body temperature normal or slightly elevated. Treatment is usually simple: the victim should rest in a cool place and drink an electrolyte solution (a beverage used by athletes to quickly restore potassium, calcium, and magnesium salts). Severe cases involving victims who lose their lunch or lose consciousness may require longer treatment under medical supervision.

Heat cramps, painful spasms of the muscles, are caused when workers drink large quantities of water but fail to replace their bodies' salt loss. Tired muscles—those used for performing the work—are usually the ones most susceptible to cramps. Cramps may occur during or after working hours and may be relieved by taking liquids by mouth or saline solutions intravenously for quicker relief, if medically determined to be required.

Fainting (heat syncope) may be a problem for the worker not acclimated to a hot environment who simply stands still in the heat. Victims usually recover quickly after a brief period of lying down. Moving around, rather than standing still, will usually reduce the possibility of fainting.

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impedes a worker's performance or even results in temporary total disability. It can be prevented by resting in a cool place and allowing the skin to dry. HSA

Preventing heat stress

Most heat-related health problems are not so hot. But you and your workers can keep their cool by following a few basic precautions:

1. Acclimatization to the heat through short exposures followed by longer periods of work in the hot environment can reduce heat stress. New employees and workers returning from an absence of two weeks or more should have a 5-day period of acclimatization. This period should begin with 50 percent of the normal workload and time exposure the first day and gradually building up to 100 percent on the fifth day.

2. A variety of engineering controls including general ventilation and spot cooling by local exhaust ventilation at points of high heat production may be helpful. Shielding is required as protection from radiant heat sources. Evaporative cooling and mechanical refrigeration are other ways to reduce heat. Eliminating steam leaks will also help. Equipment modifications, the use of power tools to reduce manual labor and using personal cooling devices or protective clothing are other ways to reduce the hazards of heat exposure for workers.

3. Work practices such as providing a period of acclimatization for new workers and those returning from two week absences and making plenty of drinking water—as much as a quart per worker per hour—available at the workplace can help reduce the risk of heat disorders. Training first aid workers to recognize and treat heat stress disorders and making the names of trained staff known to all workers is essential. Employers should also consider an individual worker's physical condition when determining his or her fitness for working in hot environments. Older workers, obese workers, and personnel on some types of medication are at greater risk.

4. Alternating work and rest periods with longer rest periods in a cool area can help workers avoid heat stress. If possible, heavy work should be scheduled during the cooler parts of the day and appropriate protective clothing provided. Supervisors should be trained to detect early signs of heat stress and should permit workers to stop working if they are extremely uncomfortable.

5. Employee education is vital so that workers are aware of the need to replace fluids and salt lost through sweat. They also need to recognize dehydration so they can avoid exhaustion, fainting, heat cramps, salt deficiency, heat exhaustion, and heat stroke as heat disorders. Workers should also be informed of the importance of daily weighing before and after work to avoid dehydration.

6. If all else fails, use common sense. HSA

EXERCISE YOU CAN FEEL IN YOUR BONES

". . .all parts of the body which have a function, if used in moderation and exercised in labors to which each is accustomed, become thereby healthy and well developed, and age slowly; but if unused and left idle, they become liable to disease, defective in growth, and age quickly."
Hippocrates

Hippocrates made the above observation on exercise 2,000 years ago, but it is still relevant today. In this article we will focus on an exercise regimen you might not be familiar with—resistance training or isotonics.

America has heard the word. That word is exercise and it has turned us into a nation of walkers, joggers, swimmers, and cyclers. And, of course, when we think of the word exercise, we think of aerobic exercise, the kind of exercise that keeps your heart healthy.

But there is another exercise regimen on the horizon. It is called isotonics, also known as strength training, weight training, or resistance training. Research shows that isotonic exercise can increase muscle mass and bone density and, as a result, help ward off the frailness and fractures that often accompany aging. While isotonics isn't new, the research demonstrating its benefit in mature adults is relatively new.

Isotonic versus isometric exercise

Although both isotonic and isometric exercise work muscles against a fixed resistance, the two are different. Imagine putting the palms of your hands together in front of your body and pushing as hard as you can. The muscles of your chest and arms contract but they do not lengthen. This is an example of isometric exercise. During an isometric muscle contraction, the flow of blood to the muscles slows, which can reduce the effectiveness of the exercise. And since people commonly hold their breath during isometrics this sort of exercise should be done with caution since an increase in blood pressure can occur.

In contrast, during isotonic exercise, the muscle contracts and shortens through its full range of motion, while allowing blood to continue flowing to the working muscles. This builds muscular strength while improving flexibility. One example of an isotonic exercise is to hold the arm straight, then bend the elbow—the biceps muscle then contracts and shortens.

How isotonics help prevent disease in older adults

Osteoporosis, a disease afflicting more than 15 million Americans, is characterized by a decrease in bone mass that results in a susceptibility to fractures—especially at the wrist, spine, and hip. Osteoporosis does not occur suddenly. Instead, it is the end result of an unfortunate process in which the calcium content of bones declines after the age of approximately 40 to 45 years. Research shows that individuals lose approximately 0.2% to 0.5% of bone mass per year. And women are particularly hard hit by this decline immediately before, during, and for 10 years after menopause, losing on the average 2% to 5% of bone mineral content per year. Osteoporosis occurs when this bone loss reaches the point where risk of fracture significantly increases. There is much misinformation surrounding osteoporosis. For instance, osteoporosis is thought to be a woman's disease. While it is true that the problem of bone loss is more common and severe in post-menopausal women, older men also experience osteoporosis. This bone loss, combined with the decreased muscle

strength that is often seen in older adults, can cause frailty and interfere with even the simplest chores, such as lifting a bag of groceries. But the good news is that, no matter how old you are, it is never too late to start preserving and strengthening your bones and muscles.

The research

In a study involving resistance training in a group of 90-year-olds, the results were dramatic. After an 8-week program of high-intensity resistance training, these mature adults saw average gains in muscle strength of 174%!

While it is known that dietary calcium can contribute to bone strength it is now increasingly clear that exercise can play an enormous role in increasing bone strength. Conversely, research shows that 2 weeks of complete bed rest can cause as much calcium loss from bones as 1 whole year's worth of aging. Further, when these bed-rested patients are made to stand for a period of time each day even if they stand still—their bone calcium loss stops. Another research study has also found that bones are strengthened by the movement of muscles and ligaments that attach to them. In fact some research suggests that exercise can improve the body's absorption of calcium, the mineral that can make stronger and more dense bones.

The CardiSense® plan of action

To offer you a safe program of resistance exercise, we consulted Dee Ann Green Birkel, MA, an Assistant Professor and Coordinator of Physical Activity for Older Adults at the School of Physical Education at Indiana's Ball State University (BSU). Ms. Birkel is Director of the BSU Retirees Exercise Program and has long been involved in the study of fitness in the older adult (the results of her vast knowledge and studies can be found in her book *Forever Fit*).

None of these exercises requires special equipment—you can perform them all with such common household items as plastic grocery bags, a 5-oz. cat food can, a 6-1/2-oz. tuna can, an 8-oz. small vegetable can, and 11-1/2-oz. soup can, and a 14-oz. fruit/vegetable can—unopened cans are to be used as weights. **Begin each exercise with the lightest can and increase only when these "weights" become too light. Once you have done the full exercise routine one time and it seems easy, you can then do the whole routine a second time if you wish.**

These exercises should be preceded by a 5- to 10-minute warm-up period during which you walk around swinging your arms as well as shaking your arms and legs.

Also, **never hold your breath while exercising, and remember to exhale on the work phase of the exercise. Diligently follow the breathing instructions as described for each exercise.**

And, of course, stop exercising if you feel any discomfort at all.

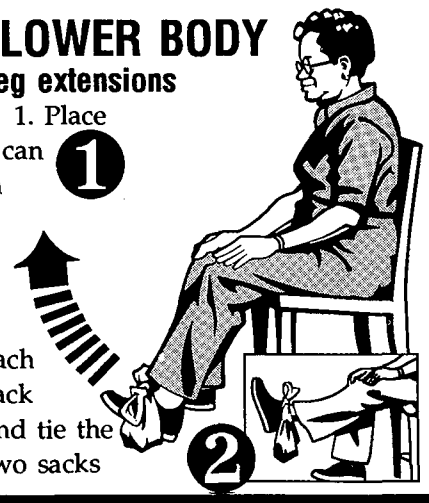
As with any exercise program, you should consult your physician before beginning.

All of the following exercises are to be done sitting in a straight-backed chair.

LOWER BODY

Leg extensions

1. Place a can in each sack and tie the two sacks together. Drape the sacks over your ankle.

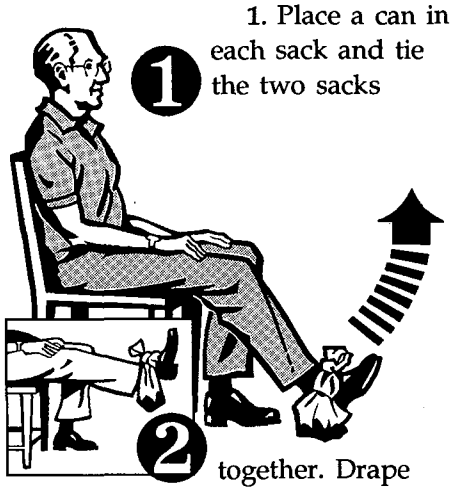


2. Inhale and then exhale as you lift your lower leg from the knee and extend with the foot flexed (toes pointed toward knee). Inhale as you lower your foot.

3. Do 6 to 8 repetitions, **take a deep breath**, and then repeat with the other leg.

Leg Lifts

1. Place a can in each sack and tie the two sacks together. Drape the sacks over your ankle.

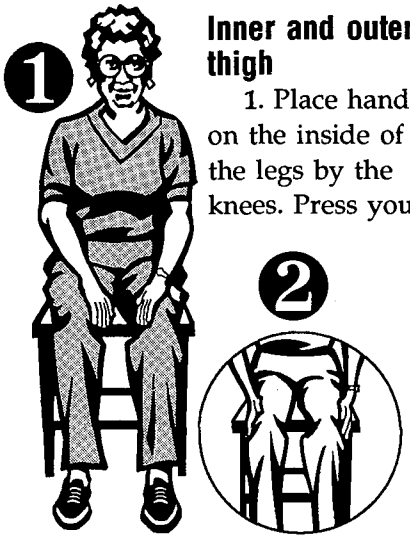


2. Inhale and then exhale as you lift a straight leg so that the back of the thigh clears the chair. Inhale as you lower the foot to the floor.

3. Do 6 to 8 repetitions, **take a deep breath**, and then repeat with the other leg.

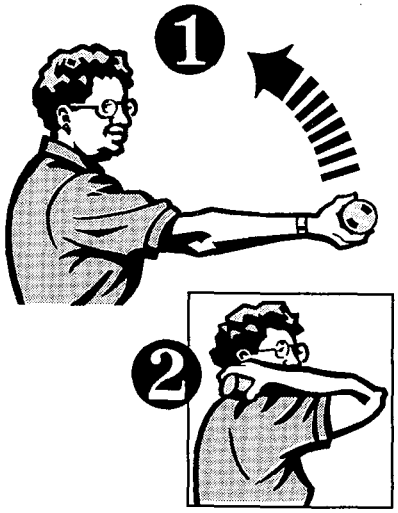
Inner and outer thigh

1. Place hands on the inside of the legs by the knees. Press your hands out and press your legs in as



you exhale. **Take a deep breath** between each repetition and do 6 to 8 times.

2. Place your hands on the outside of your legs by the knees. Press your hands in and press your legs out as you exhale. **Take a deep breath** between each repetition and do 6 to 8 times.



UPPER BODY

Biceps curls

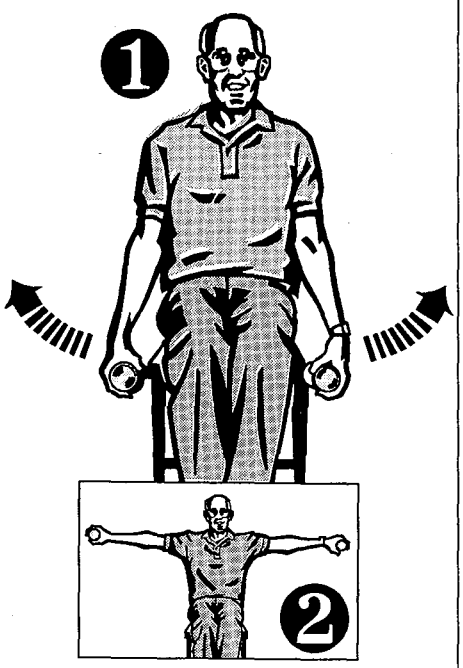
1. Place a can in each hand.

2. Inhale as you extend the right arm out in front and exhale as you bend the elbows bringing the can to the shoulders.

3. Inhale as you straighten the arm and repeat 6 to 8 times.

4. **Take a deep breath**, and repeat with the left arm.

HAVE A SAFE FOURTH OF JULY HOLIDAY



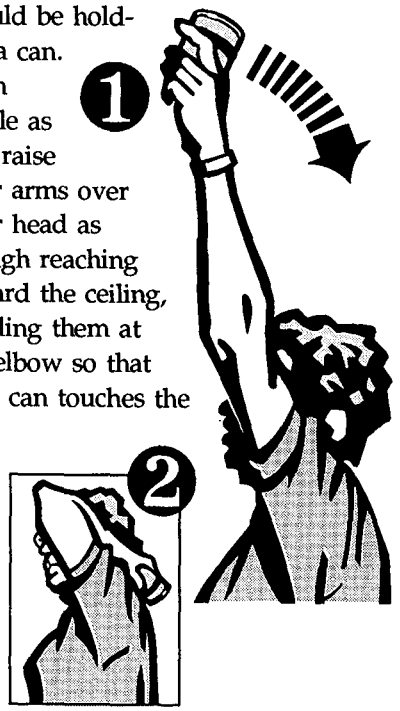
Side arm lifts

1. Place a can in each hand, inhale, and then exhale as you raise the straight arm out to the side. Inhale again and then exhale as you lower it.

2. **Take a deep breath**, and repeat 6 to 8 times.

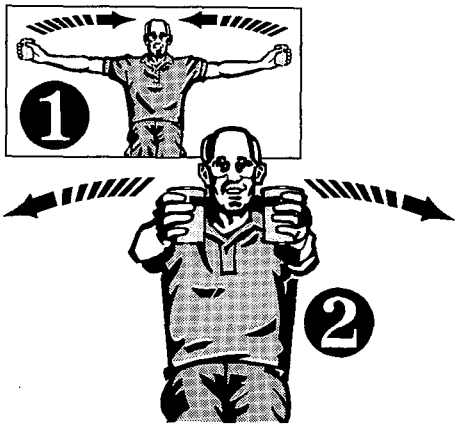
Triceps extension

1. Each hand should be holding a can. Then inhale as you raise your arms over your head as though reaching toward the ceiling, bending them at the elbow so that each can touches the back of your shoulder. Try to keep the elbows as close to your ears and head as possible, and do not lift the shoulders.



2. Exhale as you straighten the arms, reaching towards the ceiling once more, and then inhale as you lower the cans.

3. **Take a deep breath**, and do 6 to 8 repetitions.



Arms Side to Front

Holding a can in each hand, extend your arms out to the side at shoulder height as you inhale. Exhale as you move your arms to front and inhale as you move them to the side. **Take a deep breath**, and do 6 to 8 repetitions.

Follow these exercises with a 5-minute cool down of walking around, swinging and shaking the arms, and legs as you did at the start of the exercises.

Resistance exercises in addition to aerobic exercise, good nutrition, and taking your medication as directed by your physician will give you your best opportunity for a long and healthy life. HSA

Reprinted from Marion Merrell Dow's Volume IV, Number 1, 1994 edition of CardiSense®.

THE LAST WORD...

"El sentido comun es el menos comun de los sentidos." —An Hispanic saying that means, **"Common sense is the least common of the senses."**

"It isn't what you know that counts; it's what you think of—in time."

"The probable reason some people get lost in thought is because it is unfamiliar territory to them."

"Blessed are those who can adjust to a new set of circumstances without surrendering their convictions."

"There is far more hunger for love and appreciation in this world than there is hunger for bread."

"The biggest reward for a thing well done is to have done it."

"People forget how fast you did a job—but they remember how well you did it."

"The best remedy for a short temper is a long walk."

"Information is pretty thin stuff unless mixed with experience."

"The best cure for insomnia is a Monday morning."

"Posterity weaves no garlands for imitators."

"To conquer without risk is to triumph without glory."

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 1994 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