BULLETIN

HOLMES SAFETY ASSOCIATION

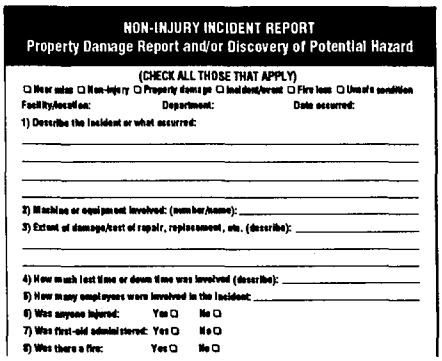
E PLURIBUS UNUM

SAFETY EFFICIENCY

MINERAL INDUSTRIES

October 1994

contents



NON-INJURY INCIDENT REPORT
Property Damage Report and/or Discovery of Potential Hazard

(CHECK ALL THOSE THAT APPLY)

☐ Near miss ☐ Non-injury ☐ Property damage ☐ Incident/threat ☐ Fire loss ☐ Unsafe condition

Facility/location: Department: Date occurred:

1) Describe the incident or what occurred:

2) Machine or equipment involved: (number/name):

3) Extent of damage/cost of repair, replacement, etc. (describe):

4) How much lost time or down time was involved (describe):

5) How many employees were involved in the incident:

6) Was anyone injured: Yes ☐ No ☐

7) Was first-aid administered: Yes ☐ No ☐

8) Was there a fire: Yes ☐ No ☐

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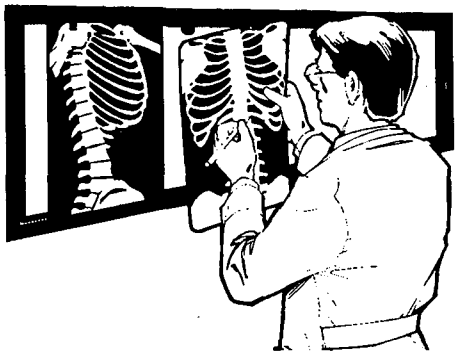

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Please note: The views and conclusions expressed in HSA Bulletin articles are those of the authors and should not be interpreted as representing official policy of the Mine Safety and Health Administration.

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
Surface No. 1	10906	Bickmore, WV
Arkhola Sand & Gravel	10907	Ft. Smith, AR
KTK Mining & Const. Co., Mine #8	10908	Pikeville, KY
Twin Lakes Chapter	10909	Mountain Home, AR
Brock Quarry	10910	Alma, AR
Lapis Plant #10	10911	Pleasanton, CA
John L. Holliday, Inc.	10912	Ripley, WV
Forcey Coal, Inc.	10913	Madera, PA
Northern Illinois Service	10914	Rockford, IL
Arroyo Seco Pit	10915	King City, CA
Goldstream Joint Ventures	10916	Fairbanks, AK
Energy Transport Systems, Inc.	10917	Summersville, WV
Greenwich Highway Dept.	10918	Greenwich, NY
F & G Gravel	10919	Greenwich, NY
W.E. Williams Paving	10920	West Stockbridge, MA
Holts Summit, Plant #1	10921	Jefferson City, MO
Stadium West, Plant #2	10922	Jefferson City, MO
Highway 94 East, Plant #3	10923	Jefferson City, MO
Rolla, Plant #4	10924	Jefferson City, MO
High Hill, Plant #8	10925	Jefferson City, MO
Highway 63 North, Plant #I0	10926	Jefferson City, MO
Highway 54 South, Plant #12	10927	Jefferson City, MO
Ortega Rock	10928	San Juan Capistrano, CA
Mission Viejo Materials, Inc.	10929	San Juan Capistrano, CA
Lynch Creek Quarry	10930	Eatonville, WA
Belfair Sand & Gravel, Inc.	10931	Belfair, WA
Mankato Aglime & Rock Co.	10932	Mankato, MN
Tholin Trucking & Excavating	10933	Ballston Spa, NY
Ames Construction, Inc.	10934	Victor, CO
Pedus Security	10935	Point of Rocks, WY
Robert Coons	10936	San Manuel, AZ
United Linings	10937	Phoenix, AZ
Harry Evans	10938	Jarales Valencia, NM
Mid-America Bldg. Maint. Inc.	10939	Morenci, AZ
T.I.C.—Kennedy	10940	Bunhead, CA
ISR—Vanleuven	10941	Tyrone, NM
TLA—Ames	10942	Castle Rock, CO
Ray Concentrator	10943	Casa Grande, AZ
Adot/Cox	10944	Gilbert, AZ
Sturgeon Elect	10945	Tucson, AZ
Phoenix	10946	Tempe, AZ
Cyprus Tohono Corp., #1	10947	Casa Grande, AZ
Cyprus Tohono Corp., #2	10948	Casa Grande, AZ
Modular Mining	10949	Tucson, AZ
Brown's Rye Creek Ent.	10950	Payson, AZ
White County	10951	Pangburn, AR
Table Rock Asphalt of Branson	10952	Hollister, MO
Olson & Taylor, Inc.	10953	Arlington, WA
Dicalite Miners	10954	Burney, CA
The T.W.C. Phoenix Chapter	10955	Phoenix, AZ

Winter Alert Checklist!

☑ A drop in barometric pressure can increase the release of methane in underground coal mines. Always maintain adequate mine ventilation and make frequent checks for methane and proper air flow.

☑ Know your mine's ventilation plan and escapeways. Properly maintain methane detection devices. Communicate changing mine conditions to one another during each shift and to the oncoming shift.

☑ Properly maintain and check mine bleeder systems to ventilate abandoned areas and remove dangerous gases.

☑ Control coal dust with frequent and liberal applications of rock dust. Maintain water sprays and other coal dust suppression devices in good working condition.

☑ Make frequent visual and sound checks of mine roof during each shift. *NEVER* travel under unsupported roof.

Stay alert! Stay alive!

Take special care during the Winter Alert period (October-March)

Reprinted from an ***Alert! Checklist*** *provided by the Virginia Department of Mines, Minerals, and Energy, October 1993.*

Holmes Safety Association monthly safety topic

Fatal electrical accident

GENERAL INFORMATION: A general mechanic, age 49, was fatally injured when he touched an energized ungrounded electric motor assembly, located on a floating pump platform, and fell into the river and drowned. The victim was in a metal boat on the river and was observing the rotation and operation of the pump and motor when he contacted the motor housing. He had 11 years maintenance experience with the company, of which more than 2 years were in mining.

The sand and gravel operation employed four employees, working one shift per day, five or six days per week. Sand and gravel was dredged from the river by a diesel powered pump and transported to the plant by a 12-inch pipeline and booster pump systems, located at intervals along the one-half mile distance between the dredge and the plant.

At the plant, the material was separated into various sizes for the various markets available. The sizing was done by screening the material after the classifiers removed the water and large rocks. It was then put into storage bins for loading into independent and company trucks for delivery.

DESCRIPTION OF ACCIDENT: The victim reported for work at his usual time of 7:00 am. He was to test run the new diesel powered booster pump. The plant operator started the primer pump. The motor ran for 2-3 minutes and stopped. The heater overload protection device had tripped. It was reset, started and it tripped again.

About 7:50 am, the contractor electrician checked the motor circuit. When it was started, he saw the amperage was high and erratic, the motor made a growling noise, got very hot, and produced a strong burning smell. The contract electrician suggested the motor had a bad bearing. He told the victim not to touch the motor while it was running. The plant operator killed the power in the main plant breaker, and the contractor electrician left the mine.

The victim disconnected the motor from the platform and the portable cable with the help of the dredge operator, and the plant operator. The dredge operator told the victim that the white wire connected to the motor lug had to be removed before the motor could be removed. The men were in the boat and standing on the pump platform when removing the motor and pump. This activity caused the platform to bob up and down and expose the SO cable to the hinge pinch point on the platform. Subsequent investigation revealed that the outer protective jacket of the cable and the green ground conductor insulation had been cut. About 10 of the 25 strands in the conductor had been severed. It appeared that this damage was caused by the cable being caught in the pinch point of the platform hinge. The exposure of this bare conductor to the water would allow a clear electrical path through the water, the aluminum boat, the metal platform frame, and anything bridging this potential. The green conductor of the cable was attached at the motor junction box to a phase lead to the motor. The white colored conductor was fixed to the grounding lug of the motor case. The reversal of the ground and phase conductor would effectively diminish ground fault capability to the motor, and would energize the case of the motor and pump, and all attached metal of the platform.

None of the men were wearing life jackets while performing this work. The motor and attached pump were transported to a local repair shop and returned in full operating condition. The crew reinstalled the motor on the float platform. The dredge operator observed the victim connect the motor wiring the same as it was when they removed it from the platform.

At about 11:15 am, the victim verified correct rotation on the motor by having it bumped while he held the boat against the metal platform. They then decided to test run the pump. The dredge operator was in the boat with the victim and observed that the motor made a strange sound, and that fish were floating to the surface. He asked the victim to have the motor shut off. The victim instead got on his

knees in the boat, extended his left arm, while holding onto the front of the boat with his right hand and touched the pump frame or some part of the metal platform with his left hand. The dredge operator stated that the victim appeared to become rigid. The dredge operator knew not to touch him and tried to back the boat away but could not because it was tied off. The movement of the boat caused the victim to roll into the water. The dredge operator put his hand into the water to grab the victim and got shocked. He saw the radio on the victim's belt in the water, so he could not call the plant operator. He stomped on the bottom of the boat and screamed for help. The plant operator heard a voice in apparent distress and shut off the all plant power. He then drove to the pump site, ran down to the bank, and saw that the victim had been electrocuted. The dredge operator heard the motor stop humming and pulled the victim into the boat. The plant operator called the office on the truck radio for help and an ambulance. The plant operator and the dredge operator started CPR, but their efforts were not working. The rescue squad arrived and took over. The victim was transported to the hospital emergency room and was pronounced dead at 12:06 p.m. The cause of death was listed as electrocution with terminal submersion.

CONCLUSION: The direct cause of the accident was a combination of factors. The white phase conductor of the portable cable was connected to the motor casing, while the green grounding conductor of the portable cable was partially cut and submerged in the river. This condition caused the motor housing to become energized, which in turn, energized the area of the platform. There was no effective fault path back to the fused disconnect at the plant master control center which resulted in an ungrounded motor housing. Also, the failure to wear a life jacket allowed the victim to have his head submerged for some period of time after he fell out of the boat.

Failure to conduct continuity checks to ensure grounding circuit integrity after the motor was reinstalled was a contributing factor.

There appeared to be a lack of understanding of basic electricity by personnel at the mine, including the victim. Trouble shooting experience and procedure also appeared to be lacking. The distance between the motor and the master control center was so great that it was unlikely the fuses could be opened by a ground fault at the motor. HSA

U.S. Bureau of Mines *Technology Transfer Seminars*

on "Improving safety at small underground mines" Fall 1994

VIRGINIA

Oct 18 Richlands, VA, Southwest Virginia Community Coll.
Oct. 19 Norton, VA, Holiday Inn
Oct. 20 Grundy, VA, United Coal Company Training Center

PENNSYLVANIA

Nov. 1 Uniontown, PA, Holiday Inn
Nov. 2 Indiana, PA, Holiday Inn
Nov. 3 Somerset, PA, Ramada Inn

KENTUCKY

Nov. 15 Prestonsburg, KY, Jenny Wiley State Resort Park
Nov. 17 Pineville, KY, Pine Mountain State Resort Park

The seminar is free and open to anyone interested in attending. Topics include:

(1) Preventing back injuries through job redesign;
(2) Easy to construct materials handling devices;
(3) Ground control during pillar extraction;
(4) Emergency response planning;
(5) Developing safety programs for small mines;
(6) Guidance for shiftwork schedule design;
(7) Safety in extended cut sections; and
(8) Creative ideas for training at small mines.

The topics presented may vary slightly from state to state. Each attendee will receive a proceedings containing the 13 papers prepared for the seminar. For additional information contact:

Ms. Millie Miller
U.S. Bureau of Mines
P.O. Box 18070
Pittsburgh, PA 15236
Telephone: 412-892-4321
HSA

Submitted by: Bob Peters, U.S. Bureau of Mines

JOB SAFETY ANALYSIS WORKSHEET

Haul Truck Driver

Sequence of basic job steps:	Potential accidents or hazards:	Recommended safe job procedures:
1. (a) Check oil, fuel, water, tires, horn, and back-up signals. (b) Drain air tank and close valve. Check for leaks. (c) Check condition of seat belt for defects.	**1.** (a) Fall from bumper or fender. *(FB)* (b) Brake failure. *(SB)* (c) Backing accident. *(SB)* (d) Sprained ankle. *(OE)*	**1.** (a) Keep firm grip and foothold. Install slip-proof surface on fenders and bumpers. (b) Always make sure air tank valve is closed before getting into truck. (c) Check horn, signals, and back-up alarm devices and use as required. (d) Wear high top shoes and keep properly laced to support ankle. (e) Replace or repair seat belt as needed.
2. Start engine and build up air pressure to required level.	**2.** (a) Slip climbing into truck. *(FB)* (b) Run off ramp or into wall. *(CW)*	**2.** (a) Keep steps and handle clean of dirt and oil at all times. Get firm grip and foothold getting into or out of truck. (b) Never move truck until buzzer stops or air pressure is up. Check to be sure you have good brakes.
3. Drive to quarry to be loaded.	**3.** (a) Run off haul road. *(CW)* (b) Back into loader. *(CW)* (c) Back over employee. *(SB)* (d) Fall from moving truck. *(FB)*	**3.** (a) Drive at safe speed. Keep safe distance from edge of ramp. (b) Keep spotter in view at all times or stop. Follow his signals. (c) Use proper signals, back-up alarms, etc., when backing or pulling forward. (d) Keep truck doors closed. (e) Wear seat belt.
4. Haul rock from pit to feeder and return. Haul waste to waste pile, or atone to stock pile.	**4.** (a) Back truck into feeder. *(SA)* (b) Hit by falling rock. *(SB)* (c) Back over waste pile, or stock pile. *(FB)* (d) Changing gears on ramp. *(FB)* (e) Broken drive shaft, brakes won't hold.	**4.** (a) Back into dump position slowly. Don't hit stop block too hard. (b) Stay in cab of truck when lading if canopy is provided over cab. (c) Be sure truck is in level position and a safe distance from edge of waste pile (or stock pile) before dumping. (d) Do not shift gears on ramp. Shift to lowest gear needed before starting up ramp. (e) One truck on the ramp at a time. (f) Wear seat belt.

Sequence of basic job steps:	Potential accidents or hazards:	Recommended safe job procedures:
5. Clean rock from haul road and ramp.	**5.** (a) Pull muscle. *(OE)* (b) Run over by truck. *(CB)*	**5.** (a) Lift with back straight and knees bent. If too heavy, get help. (b) Never stop on ramp. Stop only in safe level place, use emergency brake, and scotch safely. (c) Wear seat belt.
6. Park truck at end of shift, or for repairs, etc.	**6.** (a) Fall getting out of truck. *(FB)* (b) Runaway truck. *(CB)*	**6.** (a) Keep a firm grip and footing. Do not jump. Use steps. (b) Place truck in first gear. Pull up emergency brake and chock wheels.
7. Maintenance and repairs. (a) Open air tank valve. (b) Service, fuel, etc. (c) Report condition of truck, signal devices, etc.	**7.** (a) Air pressure injury to hand or arm. Dust or dirt blown into eyes. *(E)* (b) Burns. *(E)* (c) Crushed by falling truck body. *(CBT)*	**7.** (a) Open valve with pliers; wear gloves. Keep face and hands out of air stream. (b) Use proper tool and care when checking hot radiator; no smoking when refueling. (c) Always use pin, chock, or prop under raised bed. (d) Report condition of truck to supervisor daily.
8. Other assigned duties.	**8.** Various.	**8.** Follow basic safety rules and J.S.A. for other jobs. Always wear seat belt while vehicle is in operation.

Recommended personal protective equipment—safety glasses, hard hat, and safety shoes (no lowcuts)

1. *Struck by (SB)*
2. *Struck against (SA)*
3. *Contacted by (CB)*
4. *Contact with (CW)*
5. *Caught on (CO)*
6. *Caught in (CI)*
7. *Caught between (CB)*
8. *Fall—same level (FS)*
9. *Fall to below (FB)*
10. *Overexertion (OE)*
11. *Exposure (E)*

Submitted by Marino J. Franchini of the New York Department of Labor HSA

Bessie Mine, Palos, Alabama; 30 killed; November 14, 1916

A night shift of 38 men was in the mine. The fireboss found gas in 4 rooms and the entry and aircourse faces off 15 right and told the machinemen not to cut those faces. Gas had accumulated when a door was propped open. Machinemen went into the entry to cut a new room neck, igniting the gas with their lights. The explosion was carried through the mine by coal dust and came out the slope mouth, wrecking and burning the fanhouse and other buildings. Some stoppings and timbers in the mine were blown down, and the mine was wrecked. Eight men survived, 5 escaping after 3 hours through an opening far removed from the slope. Three others remained at a break in a compressed-air line until a rescue party with breathing apparatus reached them 15 hours after the explosion. They testified that there was a very strong outward wave followed by a return wave of equal force. Coke crusts were found in many parts of the mine on both inby and outby sides of projections. HSA

Reprinted from the USBM ***Bulletin 586.***

Incident reporting:
A vital part of quality safety programs

By George Swartz

A missing element in many safety programs is the identification, investigation, and correction of workplace incidents. Today's near miss can be tomorrow's fatality.

To avoid confusion on this broad subject matter, this article defines incidents as:

- fires of any size;
- close call/near-miss events;
- observance of unsafe behavior(s);
- discovery of unsafe condition(s);
- identification of property, equipment or product damage.

Organizations generally refer to claims as accidents. Although many never require medical treatment, they do involve product and property damage. (Per our definition, an incident may cause damage to property or product, and may result in the need for employee first-aid treatment. However, incidents should not involve medical treatment covered by workers' compensation.) It is difficult to imagine a workplace devoid of incidents, which illustrates how prevalent they are throughout industry.

Incident vs. accident

Most safety programs focus primarily on accidents with injuries. However, more incidents occur in the workplace than actual accidents. A typical accident can be identified in several ways. First, the employee notifies management that he/she has been injured and requires medical treatment. Next, the employee leaves to receive such treatment. Then, management files an employer's first report of injury to begin the workers' compensation process. An internal accident investigation may be conducted to identify related causes and determine corrective actions needed to prevent recurrence

Accident and associated reports are routinely processed throughout industry, and are often required under state workers' compensation law. Examination of events preceding most accidents commonly reveals telltale activities or signs that predict the accident. When an employee is injured, coworkers frequently comment about an apparently missed safeguard or unsafe behavior. Had management heeded these comments, the accident could have been prevented.

"I knew he was going to hurt himself one day by doing that" is one common response to injury. Or, an injured employee or department supervisor may comment, "But we've **always** done it that way." Through observation of work habits, workplace conditions, and the first-aid treatment log, management should be able to identify those employees headed toward an accident. Ignoring the many incidents along the way only allows an accident to occur.

Chance is one determining factor in whether people escape injury. Safety practitioners generally agree that many incidents, or opportunities for injury, will occur before a single accident is experienced. Studies conducted industry-wide use a simple equation: For each injury, there are "X" close calls or opportunities for the injury. Unfortunately, this equation clearly illustrates that if incidents had been considered serious, studied, corrected and documented, many workplace injuries would not have an opportunity to occur. Often, however, supervisors assert, "I'm too busy to inspect all of these incidents." They should be reminded of an excellent policy: "Condition corrected—accident prevented."

Hazard awareness

Oil spilled on the floor or a missing guard rail present clear hazards. Are employees (including supervisors) concerned enough to clean up the oil or replace the guard rail upon first observation? Does anyone inquire about how conditions deteriorated to this hazardous level?

Daily exposures to workplace hazards are numerous. After a period of time, employees mentally accept these hazards as normal—they "simply are." Employees and supervisors often adapt and become conditioned to the environment created within the workplace.

For example, no one in a factory becomes excited when they hear a loud crash, people yell, smoke and dirt fly in all directions, and no one is injured. Such episodes are soon forgotten in the frantic productivity of a typical workplace, which invokes thoughts of the old adage: "There is always enough time to go back and fix a problem, but never enough time to prevent it in the first place." When equipment or product damage occur, along with

downtime, it is no surprise that production schedules are not met.

Significant examples

At the 1991 National Safety Congress in New Orleans, Bob Lunsford, CSP, president of Performance Partners International, related a poignant story about an incident that eventually led to fatality.

An employee was experiencing difficulty with small Allen-head wrenches—other shifts were always losing them. This employee decided to store his tools in a metal pipe tobacco can and hide them securely—inside a large electrical power box. In the morning, he would reach in, retrieve his "tool box" and proceed to work at his machine. At shift end, he returned the tools to the power box.

This process continued for several years without supervisory awareness. Then, one morning, a coworker passed by the machine just as the employee was reaching for the can of wrenches. As he turned to acknowledge the greeting, his shoulder and arm rotated, fatally making contact with high voltage in the power box.

The employee had developed a daily habit of opening the power cabinet, which actually created abundant exposures over the years—all without mishap. Had the greeting been given slightly earlier or shortly later, the employee's flirtation with danger may have continued indefinitely. Conversely, had this behavior been stopped when it started, this tragedy could have been prevented.

Another example provides additional food for thought. This example involves a warehouse employee struck in the eye by a large metal staple while opening a cardboard box. The treating physician warned that had the staple pierced the eye only fractions of an inch farther, the employee could have lost his sight.

What did investigation reveal about this accident?

- Most large boxes in the warehouse had 2-3 staples sealing their lids.
- During a typical work day, hundreds of boxes were opened.
- Eye protection was not a specific job requirement.
- Many workers, including supervisors, had experienced close calls with staples. (This box-opening procedure was a long-time practice at the facility.)
- No serious injuries were previously reported—only a few minor first aid cases.
- Additional concerns involved cuts caused by staples when removing products from boxes, along with a constant housekeeping problem.

What corrective actions were taken?

- The product manufacturer agreed to use glue instead of staples as a box sealer.
- Employees were instructed to use caution when opening remaining stapled boxes.
- Eye protection became a recommended job practice.

Many safety practitioners can visualize situations in their facilities that parallel the preceding chain of events. Throughout industry, it has been proven that if accident causes are not eliminated, the accident will recur.

Many day-to-day incidents combine to trigger accidents. One classic example is the daily puddle of brake fluid left beneath a lift truck. Eventually, fluid loss leads to brake failure, the lift truck crashes into a pallet of expensive products and everyone gets excited (if fortunate, no one is injured). Money is lost due to downtime, damaged product and missed shipments.

How many retrace the steps leading to brake failure? Not many. Why? Because no one was injured. These "near miss" accidents, or "incidents" as industry calls them, indicate that something is wrong. Unless investigated and corrected, the same event can recur. The next time, however, injury or fatality may result.

Formal program required

Had management required a proper incident reporting program, an employee would have acknowledged the puddle of brake fluid long before the crash, and requested proper maintenance. This observable condition would, therefore, receive early attention, making correction possible, and thus avert a costly accident.

Studies reveal that by correcting incidents through a formal program, overall accident rates decline. Numerous side benefits also emerge—reduced waste and downtime, less equipment and product damage, improved OSHA compliance, etc. Overall accident prevention awareness increases as well.

File that report

The best person to inspect, correct and record an incident is the first-line supervisor. This process should be a job requirement, one reviewed during the supervisor's annual salary and job performance review. Employees can assist by calling attention to incidents. Completed incident report forms should also be discussed during safety meetings.

The greatest benefit of an ongoing investigation process is increased awareness and correction

NON-INJURY INCIDENT REPORT
Property Damage Report and/or Discovery of Potential Hazard

(CHECK ALL THOSE THAT APPLY)

❑ Near miss ❑ Non-injury ❑ Property damage ❑ Incident/event ❑ Fire loss ❑ Unsafe condition

Facility/location: Department: Date occurred:

1) Describe the incident or what occurred:

_____

_____

_____

_____

2) Machine or equipment involved: (number/name): _____

3) Extent of damage/cost of repair, replacement, etc. (describe): _____

_____

_____

4) How much lost time or down time was involved (describe): _____

5) How many employees were involved in the incident: _____

6) Was anyone injured: Yes ❑ No ❑

7) Was first-aid administered: Yes ❑ No ❑

8) Was there a fire: Yes ❑ No ❑

9) Was employee wearing required personal protective equipment: Yes ❑ No ❑

10)What steps were taken by you to prevent recurrence: _____

_____

_____

11) What steps were taken by others (maintenance, management, outside sources, etc.) to prevent recurrence: _____

_____

12) Was a health hazard or exposure involved: Yes ❑ No ❑

13) Can this incident or event take place again: Yes ❑ No ❑ Explain on back side

14) Identify additional factors or comments on back of this report.

15) Have you drawn a SKETCH of the details on the back or attached a PHOTO: Yes ❑ No ❑

Signature: _____ Date: _____

Figure 1.—Sample incident report form

of items that can cause injury or loss. The number of incident reports a supervisor should complete is unlimited. However, it is impractical to expect an employee to run around with clipboard in hand, just waiting to complete a blank report form. The best approach: Supervisors should be required to complete as many reports as possible to achieve a safer department. Perhaps initial program focus should be "incidents considered most serious." As department safety increases and hazardous situations diminish, incident reports can focus on basic safety issues.

Completed forms should be accompanied by a photo of the damaged ladder, broken machine guard, oil spill, etc., where possible. The photo enhances the report and, upon correction, provides a visual before-and-after comparison

Figure 1 is a sample incident report. Key questions are identified in an appropriate sequence The "who" involved in the close call is not necessarily required information. In fact, in most cases, the supervisor will not know who is responsible for machine, material or product damage. The key is to conduct an investigation and complete an incident report that help identify the problem and determine corrective actions.

Advantages of Incident reports

Figure 1 mentions downtime and costs associated with the incident. Through regular use of incident reports, one company improved the palletizing of sheet steel by demonstrating (over a given period of time) that incorrect processing of pallet loads resulted in excessive financial loss.

Improved pallets, heavy-duty metal banding and improved transportation were a direct result of proper tracking and documentation of costs related to the process.

Another advantage of incident reports is their immediacy. Often, plant safety personnel recognize and attempt to correct hazards discovered during monthly safety inspections. In these cases, an entire month may pass before a hazard is acted upon. (Remember, when a hazard exists, an accident may not be far behind.) Ongoing incident reporting and corrective action detects many of these dangers early and eliminates them before harm results. This process increases safety awareness among supervisors and employees, and allows management to demonstrate a more immediate concern for both employees and the work environment.

Conclusion

Several safety directors recently discussed the benefits of this ongoing "hazard hunt" process and

agreed that an incident reporting program can play a substantial role in an accident prevention program. Through its constant use and quick hazard identification correction, safety awareness and knowledge are improved. Such a program also involves employees in identifying and correcting workplace hazards.

Why wait for an injury to occur? Why not correct close calls that precede accidents? By adopting a formal incident reporting system, an organization can reduce injuries and losses. HSA

George Swartz, CSP, is director of safety, health and environment for Midas International Corp., Chicago, IL. Named ASSE Fellow in 1992, Swartz, a member of the Greater Chicago Chapter, serves on the Editorial Board, Standards Development Committee and PDC Planning Committee. In addition, he is a member of the National safety Council's Board of Directors and is chairman of its Industrial Division. In 1993, Swartz received the Culbertson Award for Outstanding Volunteer Service from ASSE, the Distinguished Service to Safety Award from NSC's Industrial Division and the Environmental Leadership and Service Award from the Environmental Resource Institute.

Reprinted from the journal of the American Society of Safety Engineers' December 1993 issue of ***Professional Safety****.*

SAFETY NEWS... fire prevention aids

To help prevent fires, the U.S. Consumer Product Safety Commission (CPSC) urges homeowners (including residents of mobile homes) to replace uncertified heat tapes more than three years old. Uncertified heat tapes should be replaced with new heat tapes certified to meet recognized voluntary standards. At the present the following organizations are certifying heat tapes to meet recognized voluntary standards: Underwriters Laboratories (UL), the Canadian Standards Association (CSA), and Factory Mutual Research Corporation (FMRC).

Electric heat tapes are used to keep water pipes from freezing. Heat tapes are usually installed in attics or underneath porches and homes—especially mobile homes. CPSC estimates there are about 2,000 fires, 10 deaths, and 100 injuries each year involving heat tapes. The use of certified heat tapes can help to reduce the frequency of these fires.

CPSC offers these safety tips for purchasing, installing, and maintaining electric heat tapes:

- Replace uncertified heat tapes more than three years old with new heat tapes certified to meet recognized voluntary standards. All new heat tapes will have a three-prong plug.
- Always plug the three-prong plug into a three-prong outlet to make sure the heat tape is grounded.
- Use a ground-fault circuit-interrupter (GFCI) wherever heat tapes are plugged in.
- Do not wrap heat tape over itself unless specifically permitted in the manufacturer's instructions.
- Apply heat tapes directly on the pipe to be protected, never on top of the insulation covering the pipe.
- Do not cover the heat tape with insulation unless advised by the manufacturer. Use nonflammable insulation such as fiberglass. Do not use foam or vinyl insulation that could catch fire from a failing heat tape.
- Keep the end-cap sealed and off the ground to prevent water from getting in. Moisture can lead to a fire.
- Do not use heat tapes designed for water pipes on gutters, driveways, or fuel lines.
- If heat tape has a thermostat, check instructions to see if the thermostat should be placed against the pipe and covered with insulation or if it should be left hanging and uncovered.
- Inspect heat tapes each year and replace them if you notice signs of deterioration. Look for discolored surfaces (especially at the plug), charring, cuts or breaks in the insulation, or bare wires. HSA

Reprinted from the November/December 1993 issue of the International Association of Electrical Inspectors' IAEI News.

REMINDER: Oklahoma mine safety conference

The Fourth Annual Oklahoma Mine Safety and Health Conference will be held on October 18-20 at the Century Center Hotel in Oklahoma City, Oklahoma.

You need to make your own reservations at the hotel by calling 1-800-285-2780 or 405-235-2780.

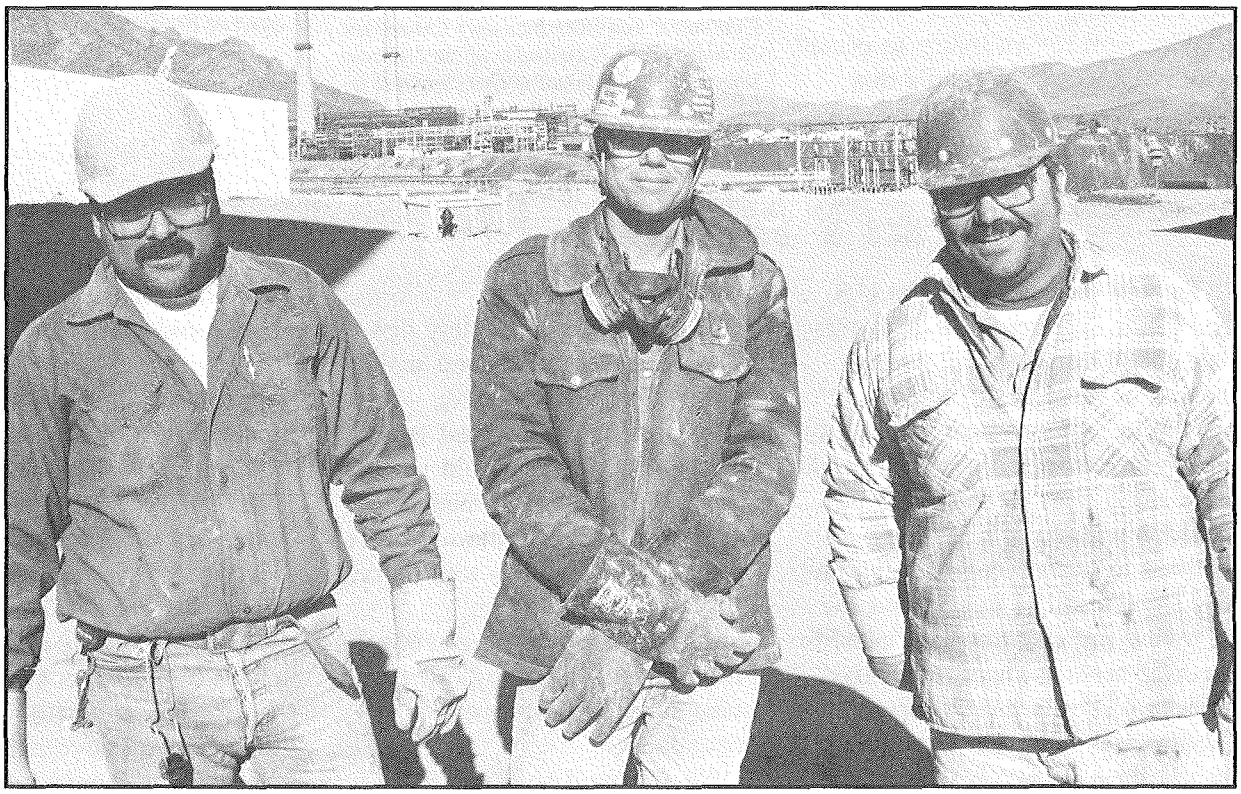
There is a registration fee of $60.00 per person and a $25.00 fee to cover banquet costs.

There is a wide choice of morning and afternoon workshops covering a great variety of subjects.

Call 918-465-2361 for information.

Using synergy to build a safety culture

By David T. Couillard, Executive Committee Member



Synergy is a word that is probably heard more than it is understood. *Webster's* says that its root is the Greek *synergia*, which means "joint work." Therefore, the literal meaning of synergy is "to work together." The word is used in medicine to describe "combined or correlated action of different organs or parts of the body, as in performing complex movements."

Your eye sees a steak, sizzling on a plate. Your nose detects a familiar scent that excites your appetite. Your hands pick up a knife and fork, which you use to cut the meat and lift a piece of it to your mouth. You begin to chew. The steak is delicious! You swallow the meat, and trust your stomach and intestines to continue the complex task of digestion. You are experiencing the synergy of your body as you eat.

Each individual part of you is extraordinary in itself, but when the parts are functioning together, what you can do is truly amazing. Indeed, the totality of who you are—the whole of you—is greater than the sum of your parts. This characteristic is the essence of synergy.

Synergy may also be created when you interact with other people. Suppose you are a violinist in a symphony orchestra. You have studied and practiced your instrument to reach expert proficiency, and can make beautiful sounds all by yourself. But when you join together with the other orchestra members, you are able to create stunning effects that are superior to any you could create alone. You have been guided by the visions of great composers, who could somehow both see and hear orchestras playing in their heads. Your conductor has skillfully interpreted those visions for you and your colleagues, and thus, you have participated in the production of musical synergy.

In *The Farther Reaches of Human Nature*, Abraham Maslow's last book, there is a chapter entitled, "Synergy in the Society and the Individual." Maslow died in 1970, but his influence on the further development of behavioral and organizational theories has extended far beyond the grave. Examining what he had to say about synergy near the end of his life reveals some insights into how synergy has been understood and applied in the succeeding years.

Maslow credited Ruth Benedict, a professor of anthropology at Columbia University under whom he had studied in the 1930's, with developing the concept of synergy as a means of comparing cultures. In her studies of various American Indian tribes, Benedict found that "societies where non-aggression is conspicuous have social orders in which the individual by the same act and at the same time serves his own advantage and that of the group." Production "is a general benefit and if no manmade institution distorts the fact that every harvest...adds to the village food supply, a man can be a good gardener and also be a social benefactor. He is advantaged and his fellows are advantaged..."

To Benedict, in "societies with high social synergy...their institutions insure mutual advantage from their undertakings." By contrast, in "societies with low social synergy...the advantage of one individual becomes a victory over another, and the majority who are not victorious must shift as they can."

Maslow believed that high synergy societies would "transcend the polarity between selfishness and unselfishness, between self-interest and altruism, in which the person who is simply being selfish necessarily reaps rewards for himself. The society with high synergy is one in which virtue pays."

American society in the late 1960s was to Maslow one of mixed synergy, with both high synergy and low synergy institutions. Interestingly, he anticipated the application of high synergy principles in the popularly perceived dog-eat-dog culture of American industry. As an example, he cited Douglas McGregor's "Theory Y" organization, in which "people...are coordinated with each other and are perforce made into colleagues and teammates rather than into rivals." Maslow also noted Rensis Likert's research, which had revealed that "the good leaders, the ones who would rate high in terms of actual results gave power away more than the others. What could you say about the fact that the

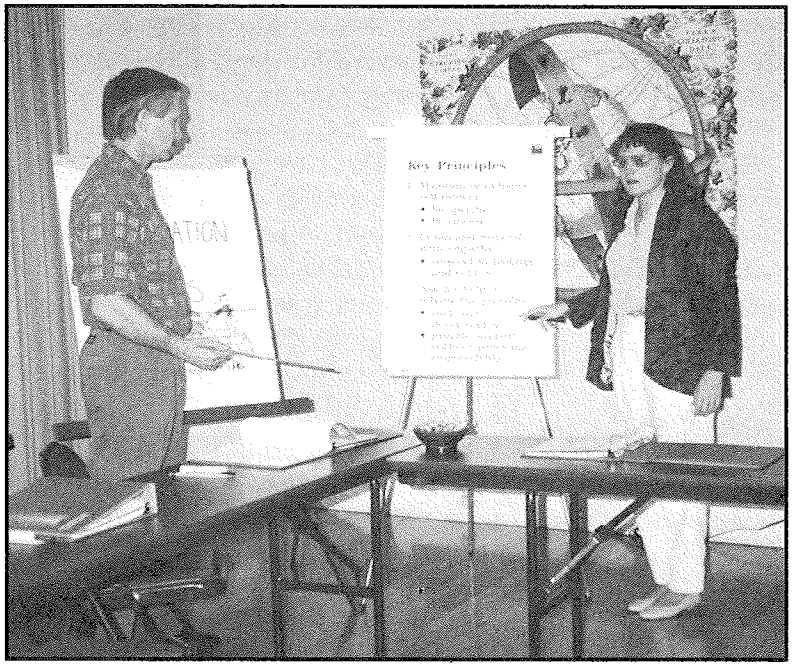
more power you give away the more you have?"

Maslow's idea of synergy was frankly Utopian: a society built upon a solid foundation of high synergy institutions that irresistibly lead individuals, acting in their self interest, to simultaneously serve their society's interest. In the years immediately following Maslow's death, when I started my career, the mining industry hardly seemed fertile ground for synergy. Years of strife, strikes, and struggles had led to a mindset between labor and management that was very much us vs. them, win-lose, look out for number one. In a culture that took for granted that the other guy could not be trusted, concepts like teamwork and bosses giving away power sounded laughable. And then, in 1977, in the heart of Minnesota's iron range, I met Bob, a young safety engineer who was enthusiastically advocating all kinds of touchy-feely stuff at his company. It was from his lips that I first heard the word synergy.

Bob's company had recently opened a new mine, and an outside consultant had been hired to train the supervisors and staff people in techniques to promote organizational effectiveness. One of these techniques was something called "synergistic planning." As Bob explained, to plan synergistically you started by asking such questions as: "What should things be like? What do we want to achieve? If we were doing our best work, what would it be like?" Only after establishing a vision of what should be did you look closely at what was. The agreed upon mission of the organization would then be to close the gap between the actual state and the desired state.

The vision of how things should be would motivate managers and workers at the mine in the same way that each composer's vision motivated the conductor and musicians of your imaginary orchestra. Workers would want to "hit the right notes"; managers would help them, through coaching and teaching, to perform their tasks in harmony with each other. With everyone working together, sweet music would be produced even if the "conductor" was not there.

The various sections of Bob's "orchestra" were divided into functional work teams, each focused on a different part of the total vision. In 1980, an organizational high-point for Bob's mine was reached when the 500-plus employees worked a year with only one lost time injury, after suffering eleven such injuries the previous year. An important factor contributing to this achievement was that safety and health goals were integrated into everyone's shared vision of how things should be.



included—have seized upon the concept of synergy as a means to add value to their products. With technology changing at a dizzying pace, achieving a competitive advantage requires flattened organizations with teams trained and empowered to make timely, informed decisions.

Activities that enhanced these goals were therefore perceived as real work, not as frills or window dressing. The excellent safety record was recognized as an achievement that benefited the entire workforce, not just the people with "safety" in their job titles. In a real sense, every employee was a member of the "safety team."

But not all of Bob's colleagues were as eager as he was to develop a self-managed workforce. He often collided with managers who were reluctant to let go of their traditional prerogatives. The economic collapse of the steel industry, in the early 1980s, further eroded trust between labor and management, and the team approach eroded with it. Frustrated, Bob finally left the company.

Ironically, since Bob's departure participative management has practically become the new orthodoxy throughout American industry. Forced into downsizing and restructuring by foreign competition, mergers, and buyouts, managers at all sorts of companies—mines

A major midwestern aggregate producer has placed Greg, manager of safety and quality, in charge of team building. Greg has been with the company for more than twenty years, and has directed safety for the majority of that time. His leadership has contributed to an impressive record in loss control. His coworkers have long understood that doing the job safely and properly the first time is good both for them and the company. After surviving a management purge following a corporate buyout a few years ago, Greg has realized that *success* in his new assignment has depended a lot on the safety program's credibility. Employees trust Greg because he has been trustworthy.

The buyout and subsequent layoffs have served as wake-up calls for the employees of Greg's company. Accustomed to working for a venerable, family-owned business offering substantial job security, the workers have discovered that guaranteed employment is a thing of the past. To compensate for that loss, Greg has offered them a say in what happens to them by involving them in teams, and a commitment to provide, or pay for, all the training they need to improve their skills. Employees are finding that continuous learning is the best guarantee of their employability—if not with their present employer, then with a future one.

Above all, Greg follows some principles in interpersonal relations that he has learned from Stephen R. Covey, author of *The Seven Habits of Highly Effective People.* Covey offers these ground rules for achieving agreements that are creative and fulfilling for all parties:

1. People are more important than things.
2. Go directly to the person who is the source of a problem and resolve it. Do not engage in backbiting.
3. No person can make his or her point in a meeting until he or she restates the other person's point to that person's satisfaction.
4. Apologize when you make mistakes.

Changing a culture is not an easy, overnight task, but one that requires a great many individual transformations to ultimately transform the group's values. Following Covey's ground rules "synergizes" an organization from the inside out. All sorts of organizations, from the federal government to small companies, are currently trying to "reinvent" themselves in the same general way. If enough of them succeed, you may be getting closer than you think to the high synergy society envisioned by Ruth Benedict and Abraham Maslow. In time, your self-interest may be indistinguishable from the public interest, and you really may do well by doing good. Let the concert begin... HSA

October 9-15, 1994

Fire Prevention Week

Reprinted from the October 1991 issue of Ontario, Canada's Mines Accident Prevention Association's Safety Alert

Back facts

A program for the prevention of back injury and maintenance of a healthy back

Eight out of ten Americans will experience a painful back episode at some time during their life. One hundred million Americans have serious back problems and over 250,000 will have back surgery each year.

Back pain is the number one "pain-related" cause of missed work days and ranks second only to upper respiratory infections in terms of overall missed work time due to illness.

Surprisingly, disc disorders occur most frequently in the 30-40 year age group when your back muscles are stronger and healthier. It is therefore very important that you know how to protect and use your back properly.

SPINE

Your spine is composed of 24 bones called vertebra, most of which are separated by a shock absorber called a disc. The upper seven vertebrae are called the cervical spine, the next twelve are the thoracic spine, and the lower five the lumbar spine. These vertebrae rest on a base called the sacrum which has several bones attached to it called the coccyx or tailbone.

The curves of your spine are normal and should be maintained at all times by correct posture.

VERTEBRA

How is it made?

A vertebra is one of the bones which comprise your spine. The large portion is called the body and the portion that sticks out the back is called the spine. You can feel the spines by running your finger tips up the middle of your back. The bodies of the vertebra in the lumbar spine are large because they carry the weight of your body.

What does it do?

The vertebra is like a building block. Attached to it are muscles, ligaments, and the disc, all of which support the spine. The vertebra houses and protects your spinal cord.

How is it injured?

Your vertebra may be fractured when strong enough forces are applied to it as in a fall. Physical stress over a prolonged period of time may cause the shape of your vertebra to change or certain diseases may weaken it.

JOINTS

How is it made?

These joints are formed by the overlapping of two vertebrae. The facet joints are held together by a specialized ligament called a joint capsule.

What does it do?

The purpose of the facet joint is to help guide the movement of your spine.

How is it injured?

Your joint can be strained like ligaments and muscles, by over-stretching, either slowly or suddenly.

DISCS

How is it made?

Commonly called "the disc" located between the vertebrae, it is a series of gristle-like ligaments around a jelly-like center. The front wall, which is toward your belly, is generally thicker and stronger than the back wall, which is toward your back. The disc is firmly attached to the vertebrae and cannot move.

What does it do?

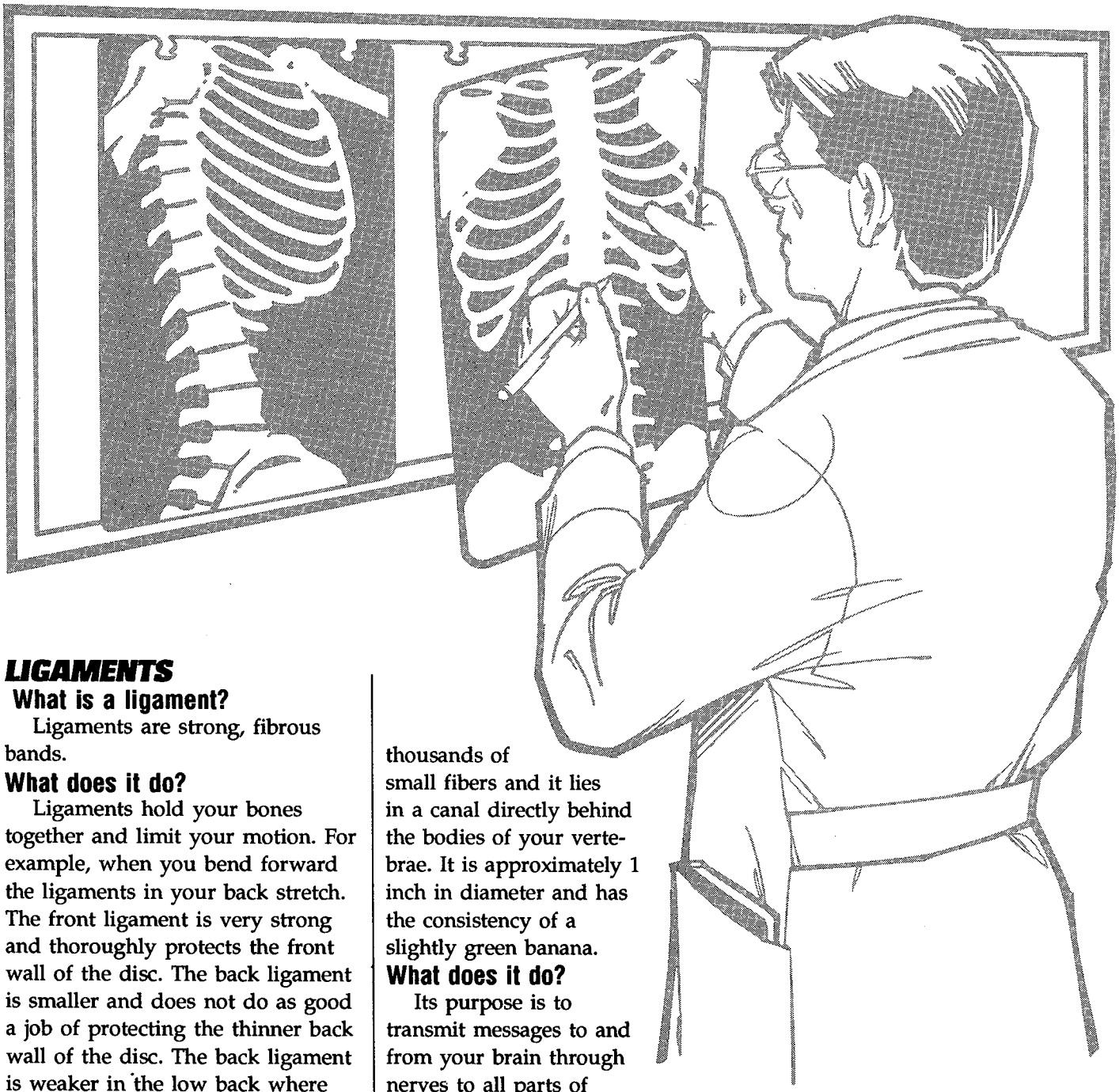
It acts like a hydraulic shock absorber and allows movement of your spine.

How is it injured?

Abnormal forces applied to your disc can cause it to tear, for example, while bending too far forward or twisting.

Through wear and tear or injury to your disc, cracks develop in the layers. The jelly flows into these cracks and causes the disc to be over-balanced to one side. If enough injuries occur to your disc, and all of the layers tear, the jelly will flow to the outside and cause a condition commonly called "the slipped disc." However, the disc does not actually slip, it herniates or ruptures.

Tears within the ligament rings are called "herniated discs" and tears through the ligament rings are called "ruptured discs." In most cases, the symptoms and disability from the herniated disc may subside with the passage of time and proper treatment. However, when symptoms persist and the diagnosis is well established, surgery may be indicated.



LIGAMENTS

What is a ligament?

Ligaments are strong, fibrous bands.

What does it do?

Ligaments hold your bones together and limit your motion. For example, when you bend forward the ligaments in your back stretch. The front ligament is very strong and thoroughly protects the front wall of the disc. The back ligament is smaller and does not do as good a job of protecting the thinner back wall of the disc. The back ligament is weaker in the low back where you need the most support.

How is it injured?

The most common injuries are sprains. These are caused by too much stress as in bending and lifting or by prolonged stretching as in slouched sitting

SPINAL CORD

How is it made?

Your spinal cord is composed of thousands of small fibers and it lies in a canal directly behind the bodies of your vertebrae. It is approximately 1 inch in diameter and has the consistency of a slightly green banana.

What does it do?

Its purpose is to transmit messages to and from your brain through nerves to all parts of your body.

How is it injured?

Your spinal cord can be injured by a fractured vertebra, a slipped disc, and bone spurs.

SPINAL NERVES

What is it?

Your spinal nerve is a bundle of nerve fibers which branch off your spinal cord.

What does it do?

Your nerves leave the spinal cord through holes between the vertebrae and carry messages to all parts of the body. For example, if you want to bend your elbow, the thought process starts in the brain, travels down your spinal cord, through a nerve and to the muscle in your arm which moves your elbow.

How is it injured?

Your spinal nerve can be pinched by a slipped disc, muscle spasms and bone spurs. They can also be injured by direct blows or stretching.

MUSCLES

How is it made?

Your muscle is made of specialized fibers which move the bones and joints. It is the only part of your body which can do this. It is attached to your bone by a tendon.

What does it do?

The function of your muscle is to move the parts of your body. Some muscles are made to hold you in an erect position against the pull of gravity. They do not tire easily, and can protect you from injury if used properly.

How is it injured?

Muscle and tendon injuries are called strains. Strains occur by over stretching as in lifting improperly or poor sitting posture for prolonged periods. They may also occur by suddenly moving as in jerking and twisting.

Muscles have a built-in mechanism which helps protect them from pulling hard enough to cause a strain. This protective mechanism does not work as well with sudden movements. Proper use of the back muscles will protect the muscles, ligaments and discs from being injured.

RISK FACTORS

Listed below are the most common risk factors associated with back trouble. Identification of these factors is the key to successful back injury prevention.

• **Lifting improperly:** Lifting improperly is the leading cause of back injuries. Olympic weight lifters have known for years that it is necessary to maintain the normal curve of the back and keep the back locked in while lifting in order to prevent injury. Using the techniques of Olympic Model lifting can be a vital part of your back injury prevention program.

• **Sitting:** Sitting for prolonged periods of time without supporting the lower back causes your back muscles to work harder to keep you upright. As the muscles become uncomfortable, you tend to slouch to such a degree that your back is rounded out and may be strained. Use of a low back support will maintain normal posture and should be used for 30 minutes out of every hour you sit. Also, change positions every 20-30 minutes to avoid fatigue and prevent stress.

• **Smoking:** A recent published study indicates cigarette smokers were found to require back surgery 2-3 times more frequently than nonsmokers. Smoking costs the United States 65 billion dollars a year in lost productivity and 500,000 deaths annually.

• **Poor nutrition:** A well planned and executed program of sound nutrition plays a big role in your general well being. Consult your health care practitioner about a nutritionally sound program that will help you shed any unnecessary pounds and improve your health.

• **Stress:** Stress and worry will affect our health and well being. And, although authorities say 95% of all our worries never come to pass, it's still hard to break a worry habit. Here are a few tips to help: exercise regularly, limit TV watching, read a good book, plan regular weekend and vacation breaks and learn how to manage your time.

• **Lack of Exercise/Fitness Program:** You don't have to be an exercise nut to be fit. Thirty minutes of aerobic exercise 3-4 times a week will lead to conditioning and fitness. Keep in mind that drugs and alcohol can be detrimental to a sound fitness program.

Awareness of these risk factors should be an integral part of your back injury prevention program!

KEYS TO PREVENTION

1—Posture The reason for most common strains and sprains to your back is over stretching of the supportive structures. Stretching occurs when the lower back is bowed out. In order to prevent strain, your lower back must maintain its normal position or posture at all times.

2—Lifting Most back injuries occur while lifting. Mastering the proper techniques will prevent this type of injury.

3—Body Mechanics Reaching and staying in one position for a long time is also very dangerous for your spine. Learning how to hold your spine properly will reduce the danger of these activities.

4—Rest Proper rest is vital to the maintenance and function of a healthy back.

Exercise

Proper exercise is an important part of the prevention of back injury. It should be your goal to maintain good mobility and strength in your back. Exercise should be a daily routine activity for the rest of your life.

POSTURE

Proper posture in the standing position is achieved by lifting your chest. This causes your shoulders to relax backwards and the curves of your spine to remain normal.

When standing, one can retain the curve in the lower back and still be in a stressed position by letting your shoulders slouch. You must keep your shoulders high and not let them slouch forward. This

retains good posture and will help rest your back while standing.

When you sit, you should try to maintain the normal curve of your lower back. However, your back muscles usually do not work when you are sitting and it is necessary to use a low back support to keep you upright. Without the lower back being supported, within 5-10 minutes you are slouching to such a degree your lower back is rounded out and may become strained. You can use a towel roll if back supports are not available through your company. However, there are many fine lumbar supports on the market.

Try sitting slumped, on the edge of the seat, and with your back perfectly straight. You will find out you cannot sit in this position for long because your muscles tire quickly.

Using a low back support will help maintain normal posture. The support should be used approximately 30 minutes out of every hour you sit, but after becoming accustomed to using the back support, your preferred usage may vary. Sitting straight relieves the stretching of back muscles caused by slouching and may reduce the pain. However, it is not the best way to sit. Another tip is to move frequently. Anytime you sit in a position for long periods of time, you will become fatigued and place stress on some portion of your back. Change positions every 20-30 minutes.

LIFTING

Most back injuries occur while lifting. Mastering the proper techniques will prevent this type of injury.

Proper Lifting

Proper lifting includes:

1. Keep your low back bowed in while bending over.
2. Keep the weight as close as possible.
3. Bow your back in, and raise up with your head first.
4. If you must turn, turn with your feet, not your body.
5. Never jerk or twist.
6. Put the weight down by keeping your low back bowed in.

A 180 pound person lifting a 70 pound weight causes a pressure of over 1,000 pounds in the lower back discs. A 200 pound weight will cause a pressure of over 2,000 pounds

With your back bowed out, the muscles and ligaments are stretched.

It is necessary then to lift with your low back bowed in, as weight lifters do.

Reaching and staying in one position for a long time is very dangerous for your spine. Learning how to hold your spine properly will reduce the danger of these activities.

BODY MECHANICS

It is necessary to keep your low back bowed in while doing all activities, for reasons described under "Putting It Together." Study the various activities in this section and apply them to your situation.

REST

Proper rest is vital to the maintenance and function of a healthy back.

Your lower back is at rest when it is in its normal inward curve. This curve should not be lost, nor exaggerated. The following are excellent rest positions for your lower back.

Rest positions

When you work extremely hard and are tired, you need to take the stress off your back. Use these rest positions between 15 and 30 minutes at a time. Remember, these are not sleeping positions. When you are sleeping, you should never sleep in one position. By changing positions, it reduces pressure in any particular area of your body.

Lying on back: You may use a soft, low back support to help maintain your spine in its normal position. This is placed in the curve of your back. You may also add pillows underneath your legs for added comfort or place legs upon a couch or chair while lying down. Most people find this very relaxing.

Lying on side: Place a pillow underneath your waist to keep your spine in a normal position and a couple of pillows between your legs to keep your hips in normal alignment.

Lying on stomach: You may want to use pillows under your stomach. However, we suggest you don't lay on your stomach because this causes severe neck problems and chronic heart and lung trouble.

EXERCISE

Proper exercise is an important part of the prevention of back injury. It should be your goal to maintain good mobility and strength in your back. Exercise should be a daily routine activity for the rest of your life.

When you allow your lower back to "bow out" or become rounded, the muscles and ligaments can be injured by stretching. The back of the disc may also be stretched in this position and the disc pressure higher, increasing the risk of back injury.

When you "bow in" your lower back, all of the bones, muscles, ligaments and discs are held in their normal position. This is the best method of decreasing stress on your back during all your daily activities. HSA

Reprinted from ***Back Facts****, a publication of the American Back School, P.O. Box 1193, Ashland, KY 41105-1193*
Telephone: 1-800-637-2225 or 606-324-5084

Holmes Safety Association monthly safety topic

Fatal electrical accident

GENERAL INFORMATION: A 39-year old plant operator, with a total of 4 years of mining experience, was electrocuted when the crane he was setting the outriggers for came in contact with an overhead 12,470 volt high voltage transmission line.

The operation was a coal stripping operation with one producing pit, working two production shifts per day, while the rock crushing plant operates one production shift per day. Twenty persons are employed at this mine.

DESCRIPTION OF ACCIDENT: The day shift, consisting of eleven employees, began their regular work duties at 7 am. The victim and another plant operator/laborer, were assigned their work duties for the day by the president/foreman. The rock crushing plant was idle due to scheduled maintenance. The equipment operator was operating the Model 540-TC P & H crane as assigned. The victim assisted in the setup of the crane and hooking of equipment to be lifted. Prior to the accident, the equipment operator and the victim had lifted a double deck vibrating screen from the plant area with the crane and transported it by truck to the equipment storage area. At about 12:40 p.m., the president/foreman met the equipment operator and the victim at the equipment storage area and instructed them on the location to drop the double deck vibrating screen. The crane was positioned at the storage area and the vibrating screen was unloaded. The president/foreman then traveled to the strip pit area where he remained until being notified at about 1:05 p.m. via mobile phone that an accident had occurred at the garage area. The equipment operator had driven the crane carrier to the garage area and positioned the crane alongside an 8' x 20' triple deck vibrating screen. The boom was raised to about 80 degrees and all four outriggers were extended. The two manually operated outrigger jacks on the operator's side were set by the victim. The equipment operator swung the boom around toward the overhead high voltage line to shift the weight of the crane so the remaining two outrigger jacks could be set. The equipment operator stated that the victim motioned to stop the swing, and the victim proceeded to lower the right rear manually operated outrigger jack. The equipment operator was aware of the high voltage lines and was watching the boom position in relation to the wires. He stated the following:

1. The boom was at least 10 feet from the overhead powerline.
2. At no time did he observe the hoist cable/block swinging or contacting the powerline.
3. He did not see a flash or hear an arcing noise.
4. When he glanced down, the victim was lying on the ground.

The equipment operator swung the boom away from the high voltage line, jumped from the crane and assisted in administering CPR to the victim. A mechanic, who had been working in the garage when electrical power was disrupted, went to check why power was off, and saw the victim on the ground. He found him unconscious and started CPR. An ambulance was promptly summoned. Upon arrival, paramedics continued CPR and transported the victim to the regional medical center. The victim was pronounced dead at 1:25 p.m. The equipment operator appeared to be disoriented and emotionally distraught. He was transported to the medical center as a precautionary measure. An examination indicated the equipment operator was not injured.

CONCLUSION: The accident and resulting fatality occurred because of the following conditions or combinations thereof:

1. The crane was being operated in an area adjacent to a 12,470 volt overhead transmission line, which is about 35 feet above ground level.
2. The crane operator's visibility was impaired by the broken overhead windshield.
3. Warning signs or devices to alert equipment operators of high voltage overhead transmission lines adjacent to the garage were not posted.
4. During the investigation, events of the accident were reconstructed. The crane boom was swung to simulate the same motion that occurred during the accident. When the boom was stopped, the hoist cable/block continued to swing.

HSA

Awesome destructive power

You awake at 2:00 in the morning to the screeching of a smoke detector. You and everyone else in the house may have less than two minutes to get out alive. No time to collect valuables. No time to save the family pet. No time even to call the fire department (call from a neighbor's). Only time to get outside.

An article in *Safety and Health* magazine paints a frightening picture of the awesome destructive power of fire. In less than 30 seconds a small flame in a wastebasket can turn into a fire that's burning out of control. A minute and a half later, the entire room can explode into flames. In another three minutes the entire house is ablaze, with flames shooting through the roof and second floor windows.

To make matters worse, there are many obstacles to getting out safely. First of all, despite the fact that we think of fire as bright, you may not be able to see your hand in front of your face. Within two minutes, a combination of sooty black smoke and acrid fumes that tear the eyes can render you unable to find your way around a house you've lived in for years.

Secondly, poisonous gases such as carbon monoxide and hydrogen cyanide can cause you to lose consciousness even when you are hundreds of feet from the fire. In fact, without a smoke detector you might have died in your sleep.

Gases also cause the third obstacle to escape—heat. Combustible materials near the source of the fire give off gases that are not burned because the fire has consumed the oxygen. They rise and fill the room. When they finally ignite, they create even more super-heated gases which surge out of the room, igniting when they mix with oxygen in hallways and other rooms. This is known as flashover. It produces temperatures that will fuse your clothing to your skin, melt glass, and soften steel. One breath of this superheated air can scorch your lungs and cause them to collapse.

Smoke detectors increase your chances of surviving a fire by 50%. At the very least they provide you with some time for escape. That time may be wasted, however, if your family does not have (and practice) a fire escape plan. Better still is prevention. The second week in October is Fire Prevention Week. Contact your local fire department for more information on how to protect your family from the awesome destruction of a fire. And test your smoke detectors—*today!* HSA

Reprinted from the Mines Accident Prevention Association of Ontario [Canada's] October 1993 issue of Safety Reminder.

October is a good time to make the annual change of batteries in your smoke detectors—it's also "National Fire Prevention Month"

Prompt diagnosis, treatment critical in workplace burn emergency response

By Tom Scully and Bud Proctor

While transferring hot asphalt from a tanker to a holding tank, "James" experienced something he had not expected. James had become impatient with the slow flow-speed of the asphalt and had increased the temperature setting to the product in the tanker to get the job done faster. He then climbed on top of the tanker to check on the tank level. When he opened the tank cover, an explosion covered him with hot asphalt and knocked him to the ground.

The young man suffered thermal burns caused by his exposure to the super-heated asphalt and steam. The extent of damage to his body was estimated using the "Rule of Nines."

The seriousness of the burn depends upon the degree of the burn (depth of the skin injured) and the amount of the body surface involved. The "Rule of Nines" divides the body into sections that each composes approximately nine percent of the body area. A single arm burned would be nine percent, an arm and the front of one leg would be two times nine percent or eighteen percent.

In the case above, James received burns to both arms (18 percent) and to his face (9 percent), which totals about 27 percent.

At the accident scene you can estimate the approximate depth and extent of the burn, relay the information to the receiving hospital and help them prepare for the patient's arrival.

Burns to the skin are almost always catastrophic and are classified according to the mechanism of thermal injury: fire or steam; chemical (acids and alkalis); electrical; and radiation.

DEGREES. Burns are also classified in degrees—one through three.

- ***First-degree burns***—These cases involve only the epidermis (the outer layer of skin), reddened in appearance and blanched with pressure. There are no blisters or breaks in the skin, although there may be edema (swelling) such as with sunburn.
- ***Second-degree burns***—The range of these burns can be superficial to deep and involving the dermis (lower layers of skin not usually exposed to the elements). The area appears reddened with blisters, feels soft and moist to touch, and the severity of pain will depend upon depth.
- ***Third-degree burns***—These burns destroy the dermis and epidermis. Some areas may be darkened or pearly white. The burned surface will be lower than the surrounding tissue giving a crater-like appearance. The protein of the tissue has been denatured (destroyed), and a hard dry leathery look and feel is apparent.

SEVERITY. James had raised his arms up in front of his face to protect it and suffered second-

degree thermal burns to his face and third-degree thermal burns to his arms which were uncovered. He was wearing a heavy shirt and pants which protected the rest of his body from severe burning.

The severity of the burns are categorized as:

- ***Critical***— Any burn of any degree complicated by respiratory tract involvement or other major injuries or third-degree burns involving the critical areas of face, hands or feet, and more than 10 percent of the body.
- ***Moderate***— Third degree burns of less than 2 percent involving no critical areas, second-degree burns of less than 15 percent, or first-degree burns less than 20 percent.
- ***Minor***— No third-degree burns, less than 2 percent second degree and less than 5 percent first degree.

TREATMENT. James was treated at the scene with a product that combines the cooling effects of water and the benefits of a sterile dressing in one package. His arms were wrapped in the Water-Jel™ Sterile Burn dressings, and his face was covered with a mask offering similar benefits. He was administered oxygen, treated for shock, and transported immediately to a regional burn treatment center nearby.

Burn treatment in general depends on the percentage of body surface and whether first-degree or second-degree burns are involved. The first step is to cool the affected part by immersion (if possible) in cool water for two to five minutes, removing clothing from the affected area. Secondly, cover the burned area with a sterile dressing and apply cool, wet (sterile, if possible) compresses to relieve pain. Finally, transport the victim to medical care.

Treatment of extensive first, second, and all third-degree burns requires additional considerations. First, assess and treat respiratory distress. Be alert for respiratory problems with facial burns or exposure to smoke or hot gases. Secondly, remove clothing, but do not forcibly remove it. Be alert for signs and symptoms of shock during preparation for transport to an appropriate facility.

The first aid responder should also remember that burned tissue secretes a substance that depresses heart muscle. This can mean potentially life-threatening cardiac dysrhythmias. Carefully monitor pulse and continuously observe the patient.

Respiratory burns can occur inside the nose, mouth, throat, and lungs. Pulmonary function and airway assessment must be a top priority. Anyone with facial burns or sustaining the burn in an enclosed space where smoke or gases could have been inhaled are at high risk. Look for singed nasal hairs, difficulty breathing, rapid respiration, or a decreased level of consciousness. High-flow, humidified oxygen or cool moist soaks to the face and neck might be done prior to further assessment. Remember all tissues swell after being burned, *including* airway tissue.

Every business location should have access to training in burn care and to adequate burn treatment supplies.

A fully-stocked first-aid bag is advisable with the inclusion of at least a couple of the Water-Jel type dressings.

CHEMICAL BURNS. Chemicals are another source of burns in the workplace and differ in their treatment from the thermal burns.

Chemical burns may be subdivided into acids and alkalis. Strong acids or alkalis can burn any area of the body but most often affect the skin, mouth, and eyes. Strong chemicals burn rapidly and should be flushed copiously and immediately prior to even removal of clothing. Most of these burns occur in industry, and most industrial locations have a large water shower on the premises for this purpose.

All clothing should be removed as soon as possible so that residual chemicals in the folds do not make skin contact. The burned area should be copiously flushed with water—usually not less than five minutes.

Chemical burns to the eyes are another special case that need immediate attention because much permanent damage can result in a short time. The flushing action of the water should be at least 20 minutes. You should take care to hold the patient's eyelids open under a gently running stream of tepid water flushing from the nose to the side to prevent chemicals from washing from one eye into the other. A sterile dry-padded dressing should be applied to both eyes after the flushing even if only one eye was affected.

Burn emergency care, like any other injury treatment, requires prior planning. When the actual emergency occurs there is precious little time, in many cases, to call for help, make your decisions, gather the proper equipment and render the proper aid while keeping your senses. HSA

A 21-year fire service veteran, Tom Scully is a fire captain of the San Jose City Fire Department and owner of Experiences Safety Educators, which has been providing industrial and business safety education classes for 15 years. Bud Proctor is owner of Emergency Response Systems in Calif. The company specializes in first response medical products.

THINGS TO KNOW... Tetanus shots

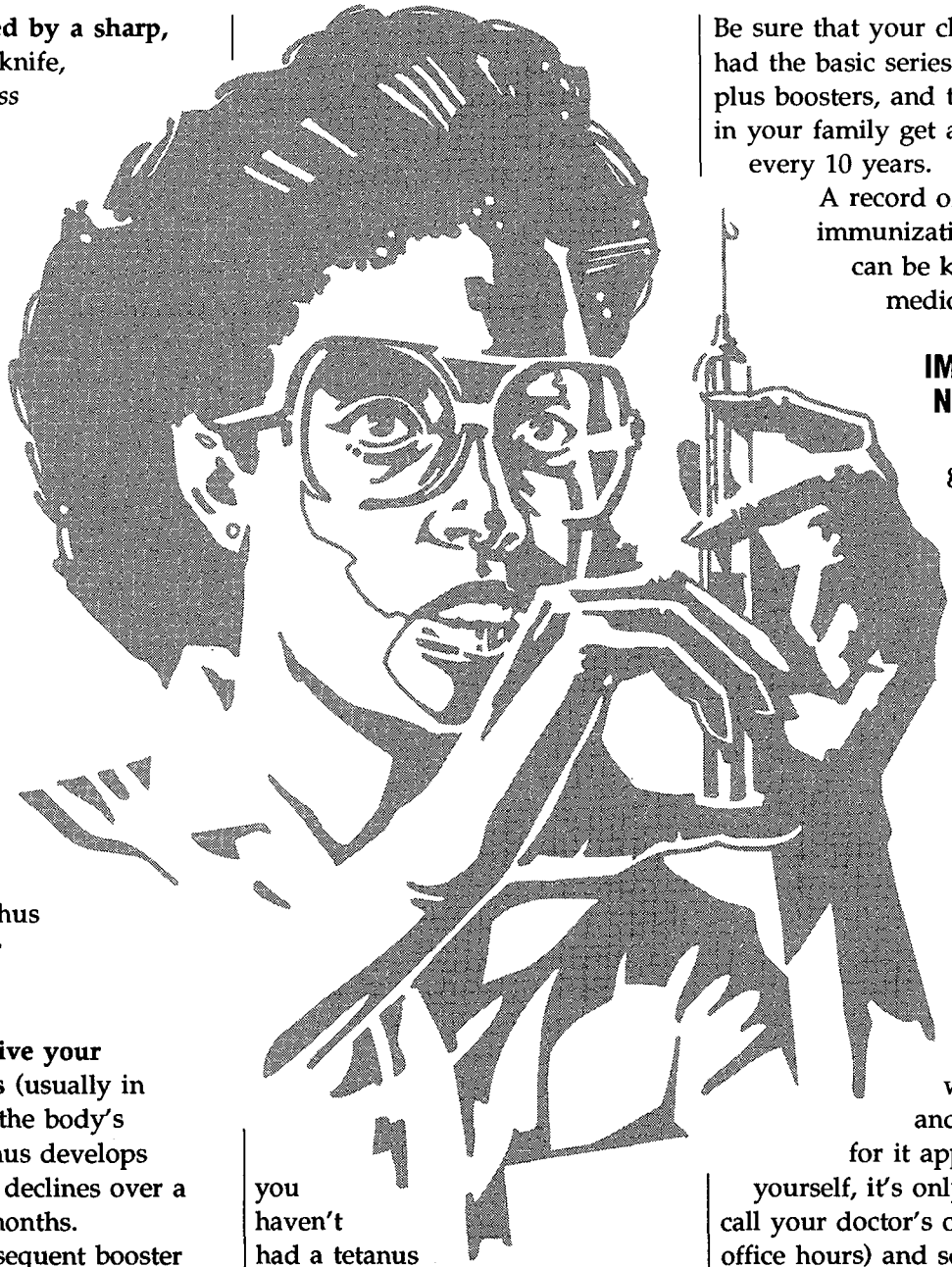
■ **A wound caused by a sharp, clean object** (e.g., knife, razor blade) has *less* of a chance of becoming infected with the tetanus germ than a wound caused by a dirty object (e.g., rusty nail, ice pick).

■ Because tetanus **cannot grow in the presence of air,** the skin must be punctured or cut somewhat deeply for the tetanus germ to take hold. Skin abrasions (scrapes) and minor burns are thus not candidates for tetanus.

■ **After you receive your first tetanus shots** (usually in early childhood), the body's immunity to tetanus develops rapidly, and then declines over a period of many months.

With each subsequent booster shot, immunity develops more rapidly and lasts longer. After the initial series of five tetanus injections, immunity lasts about 10 years after each booster shot.

■ **If you sustain a significant cut or puncture wound,** however, and you haven't had a tetanus shot within the past *five* years, you should have a tetanus booster to be sure you're fully protected.



■ **The tetanus germ is very common,** and the disease it causes—lockjaw—is very severe. Be sure that your children have had the basic series of three shots plus boosters, and that the adults in your family get a booster shot every 10 years.

A record of your family's immunizations (with dates) can be kept in a family medical file.

IMPORTANT NOTE

People often go to hospital emergency rooms simply to get a tetanus shot—which is like going to the Pentagon for a fly swatter.

If you have uncontrollable bleeding or some other true emergency, an emergency room visit makes sense.

But if your wound is minor, and you can care for it appropriately yourself, it's only necessary to call your doctor's office (during office hours) and schedule a time when a nurse can give you a tetanus shot.

It is *not* necessary to see your doctor face-to-face. HSA

Adapted with permission from "Take Care of Yourself" by Donald M. Vickery, MD, and James F. Fries, MD, and the September 1993 issue of the Arch of West Virginia ***Health Letter.***

Southeastern District Holmes Safety award winners

The following operation in the Southeast received a Certificate of Honor from the Holmes Safety Association for working Without a Lost Time Injury:

MISSISSIPPI

Williams Gravel Co., Inc.; Crown Zellerbach Pit; Hattiesburg; 103,071 hours; June 17, 1981-June 15, 1993

No fatals or permanently disabling injuries

The following operations received Certificates of Honor from the Holmes Safety Association for working without incurring a fatal accident or permanent total disability:

FLORIDA

Florida Rock Industries, Inc.; Gulf Hammock Quarry; Gulf Hammock; 1,179,961 hours; October 2, 1981-December 31, 1993
Florida Rock Industries, Inc.; Miami Quarry; Miami; 832,353 hours; July 19, 1986-December 31, 1993
Florida Rock Industries, Inc.; Clermont Sand Plant; Clermont; 403,025 hours; July 1, 1977-December 31, 1993
Florida Rock Industries, Inc.; Naples Quarry; Naples; 332,499 hours; May 1, 1988-December 31, 1993
Florida Rock Industries, Inc.; Caloosa Sand Plant; LaBelle; 297,778 hours; March 8, 1973-December 31, 1993
Florida Rock Industries, Inc.; Marion Sand Plant; Umatilla; 279,129 hours; February 1, 1981-December 31, 1993
Florida Rock Industries, Inc.; Geology Dep.; Jacksonville; 203,904 hours; December 19, 1980-December 31, 1993
Florida Rock Industries, Inc.; Industrial Electric; Bushnell; 195,187 hours; December 19, 1985-December 31, 1993
Florida Rock Industries, Inc.; Lake Wales Sand Plant; Lake Wales; 173,330 hours; June 13, 1985-December 31, 1993
Florida Rock Industries, Inc.; Keystone Sand Plant; Keystone Hgts.; 164,138 hours; January 29, 1987-December 31, 1993
Florida Rock Industries, Inc.; Grandin Sand Plant; Grandin; 154,797 hours; September 1, 1987-December 31, 1993
Florida Rock Industries, Inc.; Astatula Sand Plant; Astatula; 153,292 hours; June 1, 1986-December 31, 1993
Florida Rock Industries, Inc.; Keuka Sand Plant; Interlachen; 141,971 hours; April 11, 1989-December 31, 1993
Florida Rock Industries, Inc.; Smith Support; Grandin; 96,867 hours; April 1, 1983-December 31, 1993
Florida Rock Industries, Inc.; Sunniland Quarry; Sunniland; 75,081 hours; April 1, 1974-December 31, 1993
Florida Rock Industries, Inc.; Fort Pierce Quarry; Fort Pierce; 74,214 hours; October 21, 1991-December 31, 1993

GEORGIA

Florida Rock Industries, Inc.; Macon Quarry; Macon; 1,070,941 hours; February 10, 1984-December 31, 1993
Florida Rock Industries, Inc.; Forest Park Quarry; Forest Park; 650,580 hours; February 26, 1985-December 31, 1993
Florida Rock Industries, Inc.; Griffin Quarry; Griffin; 563,602 hours; May 22, 1980-December 31, 1993
Florida Rock Industries, Inc.; Tyrone Quarry; Tyrone; 386,182 hours; September 18, 1987-December 31, 1993
Florida Rock Industries, Inc.; GA Central Shop; Macon; 246,134 hours; June 22, 1988-December 31, 1993

MISSISSIPPI

Williams Gravel Co., Inc.; Crown Zellerbach Pit; Hattiesburg; 103,071 hours; June 17, 1981-June 15, 1993

NORTH CAROLINA

Vulcan Materials Co.; Gold Hill Quarry; Winston-Salem; 58,561 hours; April 1, 1991-March 31, 1992

Recipients of the Certificate of Achievement in Safety

The following operations received a letter and certificate of recognition from the Southeastern District Manager for outstanding achievements in safety:

ALABAMA

ECC Sylacauga Quarry; ECC International for working four years with a total of 408,630 hours from April 18, 1990 to April 18, 1994 without a lost-time accident or injury.

ECC Calcium Products; ECC International for working 741,066 hours, from February 13, 1993 to March 31, 1994 without a lost-time accident or injury.

FLORIDA

Center Hill Mine; Florida Crushed Stone Co. for working 677,535 hours, from January 1, 1987-December 31, 1993 without a lost-time accident or injury.

Center Hill Mine; Florida Crushed Stone Co. for working 67,538 hours without a lost-time accident or injury in 1993.

Tulley Sand Mine; Florida Crushed Stone Co. for working 33,747 hours without a lost-time accident or injury from January 1, 1990-December 31, 1993.

Tulley Sand Mine; Florida Crushed Stone Co. for working 7,221 hours without a lost-time accident or injury in 1993.

Electrical Division; Florida Crushed Stone Co. for working 29,219 hours without a lost-time accident or injury from January 1, 1989-December 31, 1993.

Electrical Division; Florida Crushed Stone Co. for working 10,329 hours without a lost-time accident or injury in 1993.

Fabrication Division; Florida Crushed Stone Co. for working 53,578 hours without a lost-time accident or injury from January 1, 1989-December 31, 1993.

Fabrication Division; Florida Crushed Stone Co. for working 14,416 hours without a lost-time accident or injury in 1993.

PUERTO RICO

Florida Lime Corporation for working 88,637 hours without a reportable accident or injury in 1993. HSA

What you don't know could hurt you

Pre-startup inspections and good housekeeping are areas of increased concern of the Dallas-based MSHA inspectors. In an informal discussion with the inspectors, there appears to be a general consensus among the eight inspectors who were present that poor housekeeping has been a major cause of an increase in accidents from slips, trips, and falls. As a result, all operators should be aware that this may be an area that could receive increased attention during upcoming visits by inspectors. In other words, make sure everyone is picking up, sweeping up, and mopping up in areas where others may be walking.

The inspectors also indicated that many of the equipment citations they are writing could have been avoided if the operators had done a better job checking out their equipment prior to start-up. One inspector summed it up by saying that while most equipment operators have no problem checking the obvious things, such as fluid levels, some employees don't always do such a conscientious job of checking the other items that make the equipment safe to operate. These items include back-up alarms, lights, and cracks and leaks, which might eventually result in serious accidents, as well as expensive citations, if they're left to the inspector to find.

Several of the inspectors believed that some of the equipment operators had not been properly trained to do a pre-startup inspection; therefore, it would be a good idea for all supervisors and persons responsible for training to be sure that their people do, in fact, know what must be checked and how to do it before putting a piece of equipment into service. In the words of the adage: "To be forewarned is to be forearmed." Consider yourself forewarned. HSA

Medal of Honor recipients

Some recent case studies

On November 30, 1993, Cary Rhoades was operating a large Komatsu tracked backhoe in a sump area in a pit looking for a lost drainage pump. The Komatsu was above a small deep pond that was full of ice and water. After digging a short time in the cold dark early morning hours, the backhoe slid into the sump pond, submerging and trapping Cary in the cab. Tony Mattielli was at the site and radioed a "Mayday." Grabbing a shovel from a nearby dozer, Tony waded into the ice and water in an attempt to get Cary out. Jeff Cizmowski and Alan McCaleb arrived moments later and Jeff went out into the water to help Tony while Alan stayed on the ramp to relay equipment and get more help. A large chunk of ice on the top of the cab prevented the hatch from opening and only a corner was pried up. Jeff and Tony jumped over the side and smashed out the submerged window to get Cary out of the cab.

It was felt that the quick response by his fellow employees was responsible for the saving of Cary's life. In the extreme cold and dark, Jeff and Tony exposed themselves to a dangerous situation for the benefit of their fellow employee. The Komatsu was unstable and sinking, large chunks of ground were falling nearby, and the mass of ice in the pond represented significant hazards to the rescuers. We strongly feel that Tony and Jeff met the "risk of one's own life criteria." HSA

Jerry Fillingim, CSP
Mine Safety Director, Usibelli Coal Mine, Inc.
P.O. Box 1000, Healy, Alaska

February 15, 1991, started as most work days do, as people prepared to get ready to go to work. As it was, it was going to turn out to be a very eventful day in the life of Danny Bayliss and Willie Thompson, both hourly workers at the Apex plant. Danny and Willie had been trimming and cleaning out a coal bin on the #3 kiln at Apex for several days. On this day they approached their task with Danny going inside the tank and Willie staying out on top as the second man.

With airlines, lights, and safety ropes they proceeded to try and finish cleaning out the tank. Danny was on the bottom of the tank, standing on the vibrating baffle that was located across the opening at the bottom of the coal bin. Using a double jack, he hit the bin about ten times in the cone area. The coal started to sluff on the side he was on so he went over to the other side just as a large amount of coal came down completely covering him, including his head, and pinning his arms to his side and pushing his legs under the vibrating baffle. He was able to free his head enough to get a breath of air and to call for help. Willie was also calling down to him.

Willie ran over to the side of the bin and called for help and then went down inside of the bin. In the meantime, a second rush of coal again covered Danny's head and he was unable to get out from under the coal by himself. When Willie arrived, he stuck one foot under Danny's body and one across the coal so that he wouldn't fall into the coal and started to clear Danny's head so he could breath. He continued to try to dig Danny out. In 10 or 15 minutes, additional help arrived and worked until Danny was able to be removed.

Well drilled safety procedures were carried out by those on the scene. Many were on the tank for additional help with oxygen and other life ropes available. An ambulance had arrived and the Flight For Life helicopter was also available.

As the men came out of the bin, Danny and Willie embraced as they stood on top of the bin. Consequently, a life had been saved and a fatality averted. Neither one of the men was injured other than a sprained wrist and an aching back.

There was no question in Danny's mind that if Willie Thompson, a 50-year old transfer from our Richmond plant, had not been there that day he would have lost his life. All the men at this location felt very close to the incident that had occurred that day because they knew that a tragedy had been averted by one employee concerned with his fellow worker.

On February 23 the Company recognized Willie for saving a fellow worker's life by giving him a plaque and a check for $1,000.

Everyone in the company is now working toward making sure that this type of accident never happens again. There is no question about it—Willie Thompson saved a fellow man's life and is a hero because of it. HSA

By Garrold Atkin
Manufacturing Personnel Manager
Chemstar Lime, 2800 N. 44th Street, Suite 400, Phoenix, AZ

THE LAST WORD...

"Life's an everlasting struggle to keep money coming in and teeth and hair from coming out."

"Remember when 'withholding' only meant Pop was opening his pay envelope before he got home?"

"What some people don't know about driving fills the hospitals."

"Be dissatisfied enough to improve, but satisfied enough to be happy."

"One thing worse than being on the wrong side of an argument is to be in the middle of it."

"When everything else fails, read the instructions."

"Those who criticize the younger generation seem to forget who raised it."

"There's a significant difference between stupidity and genius. That is, genius has its limits."

"Times haven't changed much. It took Noah 40 days to find a parking place."

"Every time you turn green with envy, you are ripe for trouble."

"Ulcers are caused not so much by what you eat as what's eating you."

"The difference between failure and success is doing a thing nearly right and doing it exactly right."

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