HOLMES SAFETY ASSOCIATION

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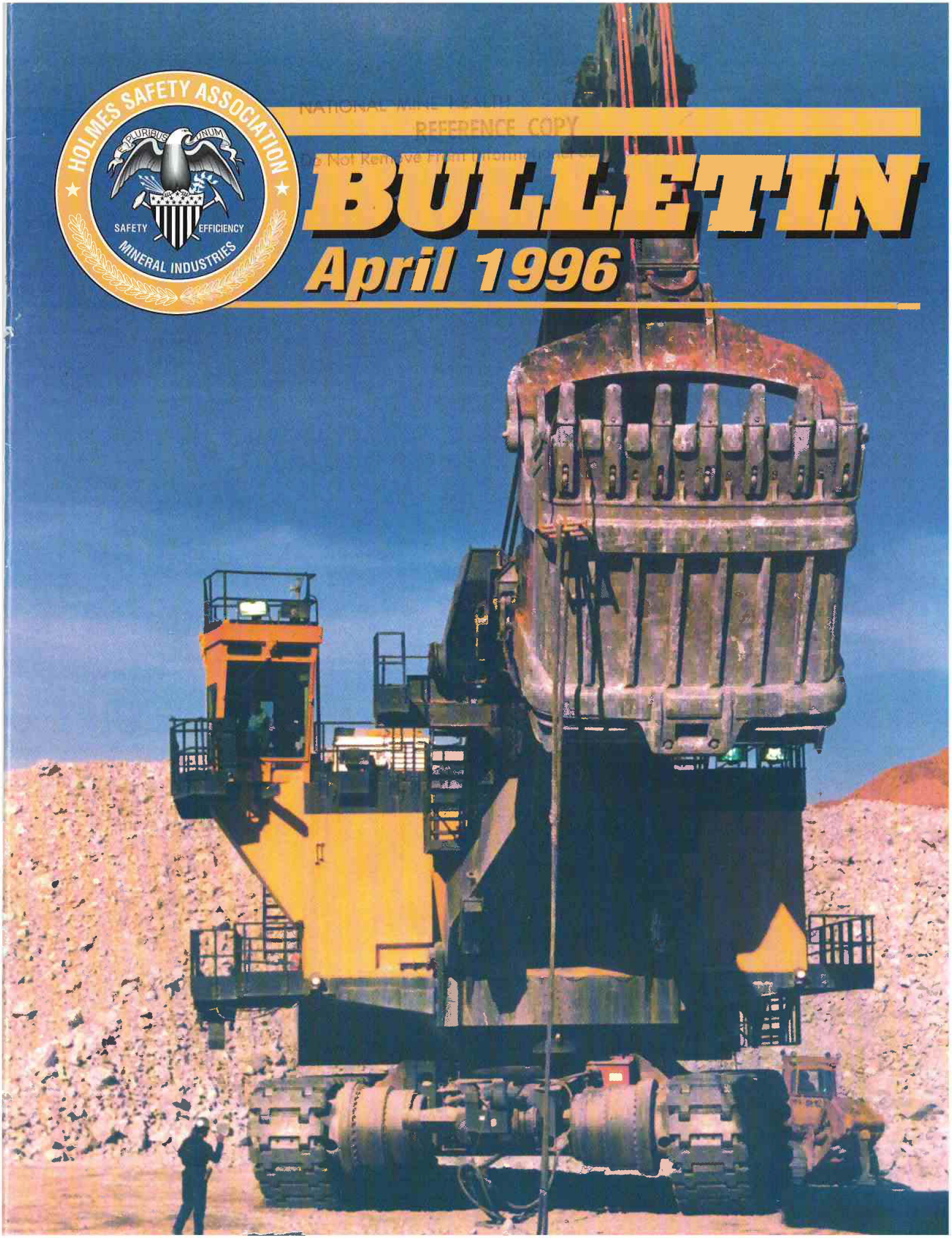
MINERAL INDUSTRIES

BULLETIN

April 1996



HSA Bulletin *April 1996*

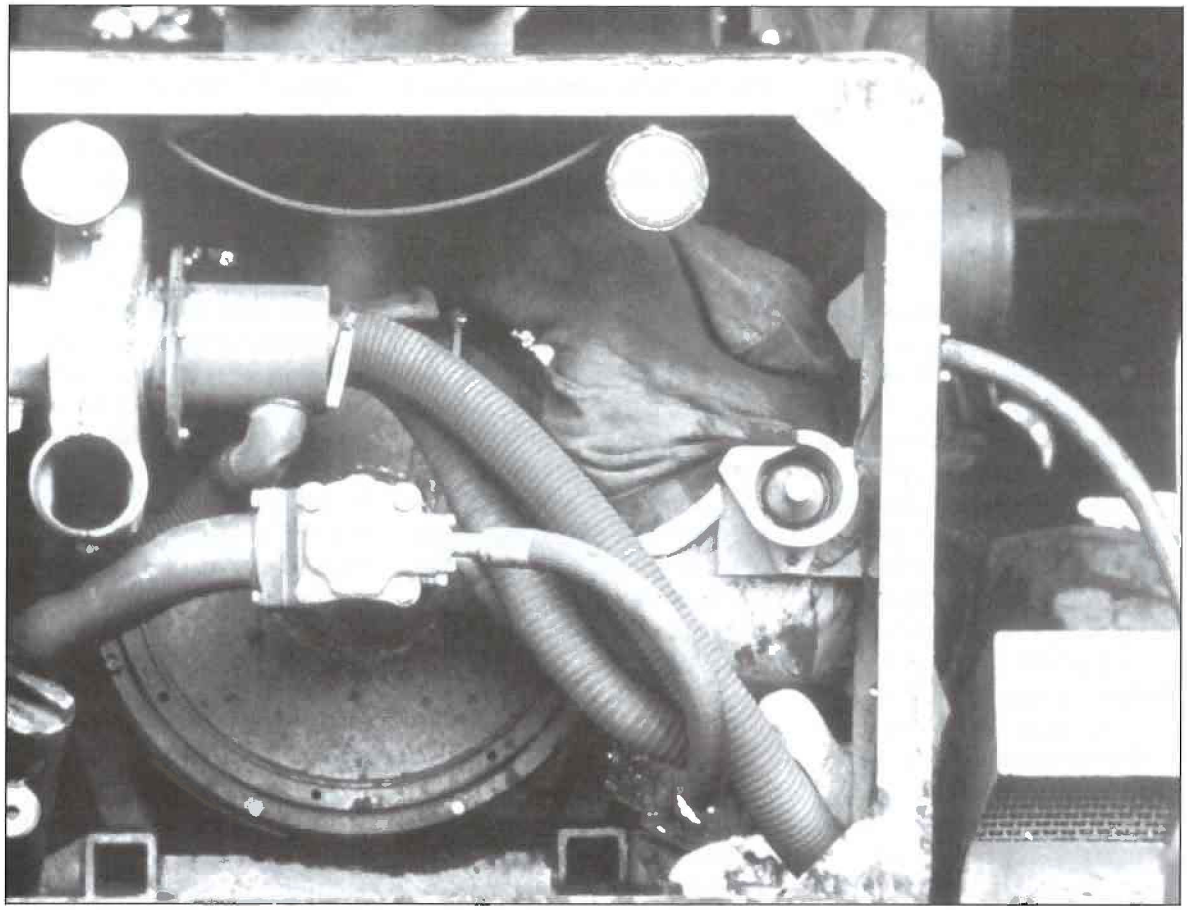
contents:

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.

PLEASE NOTE: The views and conclusions expressed in *Bulletin* articles are those of the authors and should not be interpreted as representing official policy or, in the case of a product, represent endorsement of the Mine Safety and Health Administration.

THIS MONTH'S COVER: Sincere thanks, once again, to Jesus Gomez Gonzalez for this outstanding prize-winning photo (first prize in the 21st National Mining Convention in Acapulco, 1995) of a 40 cubic yard P&H electrical shovel in use at Mexicana de Cananea Mines in Sonora, Mexico.

KEEP US IN CIRCULATION
PASS US ALONG



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Independent contractor service mechanic making repairs to mine equipment

Elements from comprehensive safety programs in general industry could benefit independent contractors working in the mining industry

By E.A. Barrett, Mining engineer, L.L. Rethi, Training research specialist, and B. Fotta, Research methodologist
U.S. Bureau of Mines, Pittsburgh, Penna.

PART II *of 2*

As noted in **Part I**, general industry comprehensive safety programs consist of varying elements that specifically address independent contractor safety. These elements are part of a safety strategy that sets clear lines of responsibility for the safe job performance of all employees. The most common elements include: (1) Commitment to Safety; (2) Pre-Bid Safety Meeting; (3) Selection Criteria; (4) Pre-job Safety Meeting; (5) Employee Safety Orientation; (6) Tracking Safety Performance; (7) Accident Reporting and Investigation; and (8) Maintaining Safety Statistics.

Each of these elements is now discussed in greater detail with particular emphasis on how safety responsibilities are assigned to personnel from both operator companies and contractor companies. Operator, as used here, implies a parent company that employs direct-hire workers as well as contractor workers.

1. Commitment to safety

Effective safety programs require an organizational commitment in order to achieve improvement in the health and safety of all employees. To emphasize this commitment, both operator and contractor companies should have a comprehensive written safety program that includes a policy statement. This policy statement gives the safety program validity. It reflects management and employee commitment to maintaining a safe and healthy working environment. It also helps to provide knowledge of organizational considerations to employees since employee roles regarding safety and the roles of management and supervision may be somewhat different. A company's commitment to safety comes from the top down and is communicated to all intermediate levels of management as well as to on-site supervisors in charge of contractor company operations. This safety policy statement and the specifics of the comprehensive program is communicated to all employees and puts equal emphasis on the safety of operator employees and on the safety of contractor company employees.

Operator company responsibility:

One section of the comprehensive safety program includes a written safety policy statement that documents and commits the company to insuring a safe and healthy work environment for all workers, including independent contractors. The policy statement clearly states upper management's commitment to health and safety and how this commitment will be demonstrated. It requires middle management as well as first line supervisor support.

Contractor company responsibility:

The contractor company also has a written comprehensive safety program that includes a policy statement which documents and commits the contractor company to insuring a safe work environment for all of its workers. The policy clearly states the contractor company's commitment to safety and how this commitment will be demonstrated. It insures management support by informing all levels of supervision that they are accountable for safety within their respective divisions. It may insure employee support by providing an opportunity for participation towards developing safety related polices and procedures.

2. Pre-bid safety meeting

The purpose of this meeting is for the operator company to explain to contractor companies what documentation must be included when submitting their bid proposal. The meeting also provides a format in which the operator has an opportunity to reinforce to the contractor companies that safety is a condition of employment and that the lowest bid is not the sole selection criteria. At this time, the operator informs contractor companies of its safety expectations by outlining safety performance requirements. These are consistent with the requirements established by the operator for its own employees. Bid solicitation documents specify the safety standards that contractor companies are expected to meet. Operators require that contractors include in the proposal all expenses associated with meeting these safety standards in their cost estimates as well as a copy of their written safety program.

Operator company responsibility:

The operator provides a detailed description of the work that needs to be done by the contractor company. The operator informs the contractor company of any environmental or site hazards that may affect the safety of the job; ex. overhead power lines, underground utilities, sink holes, operator processes or other work activities that may affect contractor safety. The operator presents a detailed outline of the safety requirements the contractor company must provide and/or follow. The operator explains what documentation must be included in the bid package. Some of the required documentation includes; employee safety training, certification or special licenses needed for the job and appropriate certificates of insurance required for the contractor company. The latter may include workers' compensation, liability and excess insurance coverage. Other documentation includes safety records and incident rates of the contractor company and a copy of the contractor company's written safety policy. Other items required are the names of representatives responsible for the safety of contractor employees. The pre-bid element also provides an opportunity for the contractor company to visit the work area and ask any questions associated with the scope of the job.

Contractor company responsibility:

In preparation for the pre-bid meeting, the contractor company maintains accurate information relating to employees' qualifications that would allow them to safely perform the work. It documents employee training certificates and past company accident trends. Appropriate lines of insurance coverage are also documented. The contractor company takes this opportunity to visit the job site and ask questions when in doubt of any phase of the project. Any special

Independent contractor blaster filling drill hole with explosive at surface mine

considerations to ensure safety are addressed at this time. This element provides the opportunity for the contractor company to evaluate the scope of the project and to prepare a bid package that will be submitted to the operator. Included with the costs of the services are those costs associated with ensuring the safe performance of the contractor company's employees.

3. Selection

The operator should evaluate a contractor company's safety program by using the information furnished in response to a pre-bid request. Contractor company safety performance should be evaluated as part of the procurement process and may be measured by several different criteria including Workers' Compensation, Experience Modification Rates (EMR), OSHA Incident Rates, and the company's overall safety attitude. The latter is reflected in the quality of safety programs and policies of the contractor company. This quality may be indicated in the contractor company's commitment to safety as well as the completeness of their safety program and its appropriateness for the work site and the safety standards of the operator company. Selecting a contractor company based on past safety performance improves the probability that safety performance will be good while completing the project.

Operator company responsibility:

The operator bases the selection of a contractor company not on cost alone but also on the following safety criteria: (1) citations history, (2) worker's compensation rate, (3) experience modification rate (EMR), (4) OSHA incidence rate, (5) MSHA incidence rate and (6) amount of detail in the written safety program.

Contractor company responsibility:

The contractor company maintains and documents the safety criteria noted above. It provides evidence that safety approaches are "proactive" and that efforts are being made to keep incidence rates and other indicators to their lowest possible level.

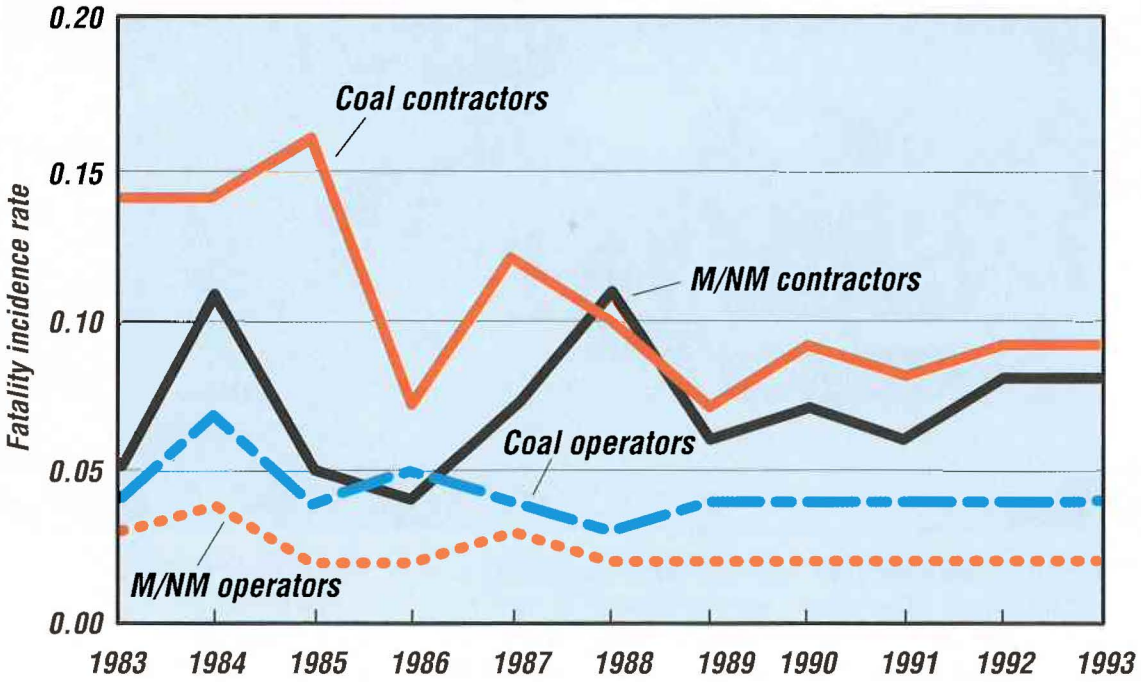
4. Pre-job safety meeting

After the contract has been awarded, a pre-job safety meeting should be held with the contractor's representatives who will be directly responsible for the work. The operator's expectations of safety performance should be discussed at this meeting. The contractor company's safety plan should be reviewed for compliance with these objectives.

Operator company responsibility:

The operator meets with the contractor company who was selected to discuss the scope of the work and to address safety and health issues. Those individuals who are responsible for overseeing the safety of the project are identified. This element includes a schedule of periodic joint safety meetings and individual safety meetings, if appropriate. The operator explains in detail the emergency response and evacuation procedures which the contractor company will follow at the site. The operator defines and explains accident reporting procedures. The operator also outlines the schedule for joint and/or

Figure 1.—Fatality incidence rates for independent contractor and operator employees Coal and metal/nonmetal



independent site safety inspections. Finally, the operator company takes this opportunity to reaffirm safety and health requirements pertaining to any environmental or hazardous conditions unique to this project.

Contractor company responsibility:

It is the responsibility of the contractor company to review and discuss the operator's safety requirements. Individual accountability is established to identify who is responsible and what they are responsible for. The contractor schedules safety training of employees, if necessary. A schedule is also set for periodic joint safety meetings and independent safety meetings, if appropriate. The contractor company acquires a thorough understanding of emergency response and evacuation procedures which may need to be followed. These procedures are communicated to all employees. Safety representatives are identified and their responsibilities are outlined. Accident reporting procedures are defined and explained. A schedule for joint and/or independent safety inspections is established.

5. Employee safety orientation

The orientation should include clarification as to the safety responsibilities of the employer company, the contract employees, service and support personnel and visitors on the site; communication of hazards associated with the work site and emergency action plans; information about company rules and regulations regarding safe work procedures; and documentation of safety orientation activities. This provides the operator with an opportunity to convey to the contractor company's employees a commitment to provide a safe working environment.

Operator company responsibility:

The operator informs its employees that contractor company employees will be performing work on the site. The operator provides site specific (hazard) training to these contractor company employees. They present the site specific emergency action plan to all contractor company employees and provide an overview of the operators' general safety rules and regulations. The operator insures that the contractor company schedules all required training for its employees.

Contractor company responsibility:

The contractor company requires the operator to provide site specific hazard training. They also require the operator to present, in detail, the emergency action plan for the site where the work is being done. The contractor company also insures that all employees have received the appropriate training required to safely complete the job.

6. Tracking safety performance

Independent contractor workers augering into highwall

Work-site safety inspections by both operator and contractor company representatives should occur on a regularly scheduled basis. Conducting periodic reviews of the job site performance helps to maintain good housekeeping and to reveal unsafe work practices or conditions that may require immediate corrective measures. Observations should be conducted by both parties.

Operator company responsibility:

The operator establishes guidelines as to who conducts the inspections, what they inspect for and how often. The operator company also conducts regular inspections and documents all findings. They develop a mechanism for providing feedback to contractor company representatives and recommend procedures for correcting unsafe acts and conditions found during inspections. Finally, they provide details of what actions will be taken should the contractor fail to meet recommended corrective procedures.

Contractor company responsibility:

The contractor company insures that there is an inspection element relating to employee performance on the job and the site. It conducts its own safety inspections and documents the findings. Procedures are established for correcting unsafe acts and unsafe conditions. It is the contractor company's responsibility to provide employees with feedback and an opportunity for them to bring safety concerns to management. The contractor company insures that unsafe acts and conditions are corrected in a timely manner.

7. Accident reporting and investigation

Thorough accident reporting and investigation is a key component of any attempt to improve safety. All accidents and incidents should be documented so that trends may be observed. Equally important is the investigation of each accident and incident. Only when those factors contributing to the event are identified can steps be taken to prevent any future occurrences.

Operator company responsibility:

The operator requires that the contractor companies identify responsible persons in charge and that all accidents and incidents occurring during the scope of the project are reported properly. The operator establishes specific procedures for the reporting of accidents experienced by contractor company employees. Guidelines are prepared, in writing, for the contractor company to follow for investigating accidents. Procedures for implementing corrective measures to prevent future accidents based on the investigation are established by the operator.

Contractor company responsibility:

The contractor company designates responsible persons in charge of reporting all incidents occurring at the job site during the scope of the project. The incidents include accidents, injuries, illnesses and near-misses. It is the contractor company's responsibility to become familiar with incident-reporting procedures set up by the operator and regulatory agencies. They investigate all incidents following guidelines set by the operator or approved by the operator. Corrective actions to prevent future incidents are the responsibility of the contractor company.

8. Maintaining safety statistics

Accident statistics should be compiled regularly. Incidence rates, calculated monthly, for varying job classifications and types of accidents can provide valuable information for improving safety. Accident trends can be identified from the data and measures can then be taken that address specific problem areas.

In photo at right, overburden is being dumped by independent contractor haulage truck

Operator company responsibility:

An operator documents contractor company employee incidence rates for every contractor company who worked on site. They conduct trend analyses on contractor company incident and accident rates and maintain those records. The operator conducts comparisons of those statistics within similar industries. This information allows the operator to gauge the degree of safety each company has exhibited while performing work on site. This is very valuable information when selecting contractor companies for future work.

Contractor company responsibility:

The contractor company documents employee accident and incident rates. It examines these records and identifies trends. Corrective measures are implemented with the objective of reducing similar incidents identified in the trend analyses. The contractor conducts comparisons with other companies who do similar work within the industry. They communicate this information to all employees so they may be alerted to the specific hazards identified in the analysis.

Benefits

General industry safety literature reports that in addition to improved safety on the job, several other benefits have resulted from implementing comprehensive safety programs in which responsibilities are set for all workers. These include: improved quality and productivity because workers are properly trained for their job tasks and familiar with their job requirements; fewer incidents resulting in less need for regulatory action; more direct control over project costs and scheduling; minimized potential for damage to the owner's facility and contractor's equipment; decreased litigation cases and administrative costs; reduced costs associated with worker's compensation; decreased administrative costs; improved public relations; improved communication between operator and contracting company; and increased contractor cost effectiveness.

Summary

The eight comprehensive safety program elements offer a possible direction for improving safety in the mining industry, a direction that has a demonstrated track record in general industry. As the number of independent contractor employees working on mine property continues to increase, their potential for injuries also increases. By implementing safety strategies similar to those used in general industry, it is difficult to imagine that safety performance would not improve. The principles appear to be sound, and if applied, an overall improvement in mine safety could become a reality.

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Equipment failure

By Douglas K Martin, Arizona State Mine Inspector

Eventually, any piece of equipment will stop running. The time it takes for that eventuality to become a reality can be determined by five factors: manufacturer; application; maintenance; operator; and safety program.

Manufacturer

"It is possible for manufacturers to design and build equipment that could last years longer and be safer than the machines we currently buy," says Greg Sitek, Editorial Director of Equipment World. "The problem is, no one could afford them."

Application

Application-related failures are of major concern. This type of failure is a result of pushing a machine beyond its design parameters. Working a machine in a "hostile" environment or exposing it to unusual and excessive stresses will result in shortened machine or component life.

Application-related failures are usually the result of a calculated risk by uninformed management or non-safety conscious employees. In many instances, a machine is "forced" to do more than it was designed to do. Overloading is probably responsible for more application-related damage than any other factor. Remember, when a machine is overloaded, all related elements are also overloaded—systems, components, and operators.

Maintenance

Maintenance-related failures can usually be attributed to an overall lack of proper maintenance programs or practices; the use of incorrect or inadequate parts, components, or supplies; or inexperienced or unskilled service personnel. Cutting corners, purchasing the cheapest parts or equipment, and giving inadequate time to perform the job imparts a negative impression, i.e., the company does not care. A skilled professional can only do what his tools and supplies will allow.

Operator

Operator-related failures are usually the result of misuse, lack of experience or skill, ignoring warning signs, or a poor safety program. Misuse can also be deliberate. An operator might vent frustrations or anger by abusing machinery or equipment. This is unforgivable. Such behavior can not only damage equipment, but can also endanger the safety of other workers.

There is no substitute for real experience and proper attitude. If failures are the result of an operator's lack of experience or poor attitude, then more training and practice becomes necessary. A poor attitude may demand a change in the employee's placement or job responsibilities. It can be hazardous to have an employee in the wrong profession or operating the wrong machine. It is a mistake to presume because an operator can handle one piece of equipment, the necessary skill to operate other machines is inherent. Different machines require different skills.

Failures that stem from ignoring warning signs can be deliberate. Such disregard may indicate the operator does not care, or is more concerned with going home on time than ensuring long machine life. This may also indicate a lack of respect for the company.

In essence, most operator-related failures are really management failures. If this is a consistent problem, a review of hiring practices, safety programs, and overall impressions given the employee may be in order.

Five Failure Factors

1. Manufacturer
2. Application
3. Maintenance
4. Operator
5. Safety program

Safety Program

A company can successfully operate equipment without catastrophic failures for an extended period. It has been done, and is being accomplished today.

Getting there is the tough job, and staying there can even be tougher. Appropriate machine application, well-trained operators, and effective maintenance programs performed by properly-trained service technicians, and safety programs that say, "We Care For You," will result in an operation that can go on for years without a catastrophic failure, unscheduled downtime, or a lost-time accident.

Reprinted from the Volume 4; Number 1, January-March 1996 issue of Arizona's ***Miner Details,*** *Bottom line process*

Bottom line process

History/philosophy

The Bottom-Line Process (BLP) is a strategic planning structure which incorporates various aspects of strategic planning, process management and employee involvement. The primary purpose of the BLP is to improve organizational effectiveness by identifying organizational problems and opportunities to improve performances. The BLP is an ongoing process that focuses on continuous improvement.

The BLP started at Central Ohio Coal Co. (COCCo) in 1989 and has evolved over the past seven years. Initially the BLP was basically a management controlled program where supervisors were divided into teams to identify safety related projects. Union participation was encouraged, but the response from union members was minimal. Several circumstances were responsible for the lack of participation including resistance to change, reluctance to try something new, and past history of ideas either being ignored or someone else receiving all the credit for those ideas. During the same time period COCCo was faced with downsizing its operations and the union viewed the BLP as nothing more than another management tactic to eliminate jobs and reduce the workforce.

As lines of communication between union and management improved and results from some early Bottom Line projects began to produce results in both improved safety and easier ways to accomplish some tasks, acceptance of the BLP began to increase. The BLP has progressed from primarily safety-related projects to include projects directed at improving costs, quality, and efficiency.

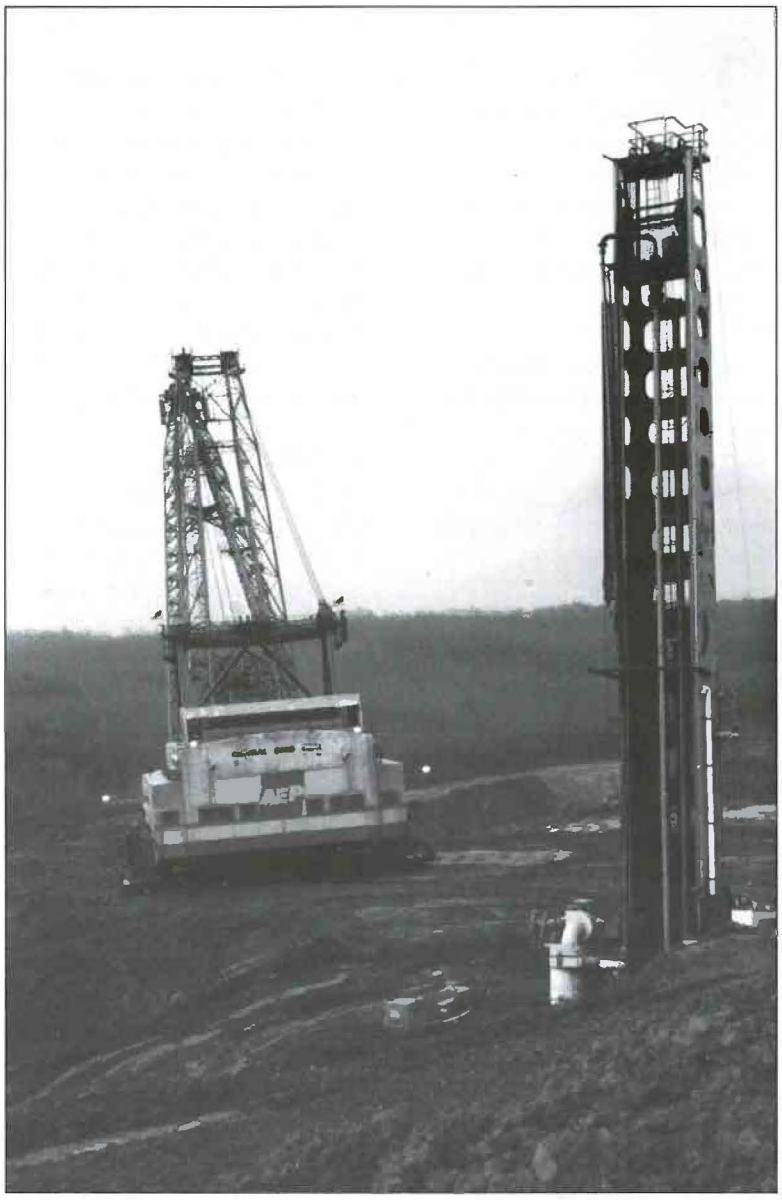


Photo courtesy of Central Ohio Coal Co.

The photo at right depicts a rock drill that was retro-fitted with a clean air pressurization system to create a slightly positive pressure in the cab that causes air to flow from the interior of the cab out-ward not allowing dust to flow into the cab and settle out.

Expansion

The expansion of the BLP started in April 1994. During the first quarter of 1994, COCCo incurred four lost-time incidents. Therefore COCCo's management and UMWA Safety Committee realized that changes had to be made to improve COCCo's safety performance. But what were these changes? After a very detailed brainstorming session between COCCo's management and the UMWA Safety Committee. COCCo developed a plan for safety improvement. The key ingredients of this plan were: 1) employee involvement;
2) BLP;
3) teamwork; 4) empowerment of employees to formulate safety-related projects; and 5) the

allocation of resources to complete these safety-related projects.

Five teams were created and each team had one or two team leaders. The team leaders were primarily department heads who had a number of group leaders, consisting of supervisors, reporting to them. Prior to April 1994, the BLP focused primarily on these two groups of supervisory personnel, who set the goals and objectives for their respective work groups. The expansion of the BLP was the inclusion of the UMWA employees who played an integral role in setting the goals and objectives for their respective work groups. Each group leader had a team comprised of both Company and UMWA employees. The goal was to get each and every employee involved in identifying safety-related objectives and projects. After the projects were identified and evaluated. the necessary resources were allocated to the Bottom Line Teams to complete the projects. Each group had meetings among its group members to discuss the group's objectives, strategies. responsibilities, and desired results. Progress meetings were held to update group members. Through teamwork the groups were able to complete many of their projects. Union members became more active and enthusiastic participants in COCCO's BLP as they saw projects come to completion. Employee involvement increased to its highest level ever at COCCo and safety was re-emphasized as everyone's top priority.

A complete database was established to track the progress on all projects. Each project was numbered by team, by group, and by project. The database also tracked completed projects as well as new projects added to the system. This computerized record-keeping system of the projects enabled COCCo to monitor its performance to insure that its objectives were being achieved. A status report is generated on a monthly basis and distributed to Senior Staff as well as to team leaders. The team leaders discuss this information with the group leaders and team members. Also, all supervisors report on their project's status at each monthly supervisor's safety meeting.

Example of BLP project:

In a surface mine, rock drills are used to drill overburden in preparation for blasting.

Drilling rock and sandstone can be very dusty. The process of drilling uses machines that have cabs that are air-conditioned and heated, but dust still gets in.

The objective for Bottom Line Team 4 was to provide a clean slightly positive air pressurization system in drill cabs.

First, a vertical duct was installed on the side of the mast, about 25 feet above the drill. A snorkel was installed on top to keep the weather out, and a slide valve at the bottom to regulate the air flow. This duct was connected to the return air duct on the existing air conditioning unit, thus providing a source of clean air that can be regulated. With this outside source of clean air, a slightly positive pressure is present in the cab and the dust control has been greatly improved.

The positive pressure will cause the air to flow from the interior of the cab outward, thus not allowing dust around the machine to flow or migrate into the drill control cab.

Results

A key ingredient of COCCo's safety plan during 1995 was employee involvement. Each and every employee increased his/her daily safety intensity and made safety a top priority. Employees worked together as a team to improve safety performance.

During 1995 COCCo's Bottom Line Teams identified 70 new projects. Of these 70 new projects, 51 were completed during 1995 and the remaining projects are still in active status. COCCo also completed 25 projects during 1995 that were started in 1994 for a grand total of 76 completed projects for 1995. Since the BLP is a continuous, never ending process, additional projects will be selected for 1996. COCCo's ultimate goal is to get each and every UMWA employee involved with one or more projects. Over 97% of the UMWA workforce was involved in one or more projects during 1995; which was the highest level of employee involvement ever achieved at COCCo. This type of employee involvement was a key element in COCCo's safety performance during 1995. Since its implementation in 1989, the BLP has produced meaningful results in the areas of safety, performance, worker compensation costs, grievance activity, and productivity. Increased employee involvement is having a positive impact on both COCCo's safety performance and COCCo's bottom line.

Reprinted from a manuscript provided by ***Central Ohio Coal Co.*** *and includes an excerpt from their project no. 428:* ***"Clean air pressurization in drill cabs."***

Putting the "operator" into shovel/loader design

By Dorothy Y. Kosich

Equipment manufacturers and designers are bringing the human element into new designs of hydraulic and rope mining shovels and front-end loaders.

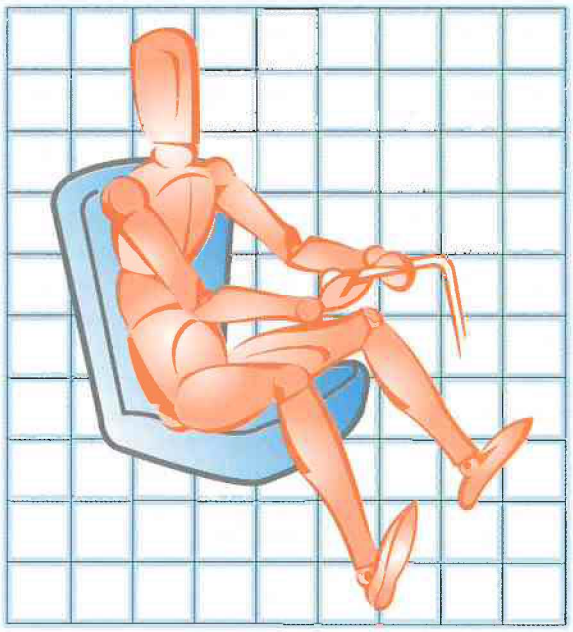
A heavy equipment operator, accustomed to running a mine shovel or front-end loader by the feeling in his hands and the seat of his pants, wants less vibration, a safe cab, a climate-controlled environment, music, and other innovations which improve his health and morale. In turn, a mining company will get an efficient and experienced operator who is less likely to suffer from physical complaints or injuries during his long career.

Caterpillar Training Coordinator Bill Nelan, aka Dr. Dirt, is convinced a smooth equipment operator is critical to the success of a good mining operation. Kevin Ingall, a Caterpillar marketing representative, said his goal is to "help the operator get more out of the machine." Their concerns are shared by other manufacturers, such as Mannesmann Demag, Hitachi, and Harnischfeger.

A recent article published by Harnischfeger noted, "Operator skills, a major factor in mining shovel productivity, don't take too well to strain or fatigue in the cab. ...In operating skills alone, a single second trimmed off the cycle time can mean huge savings in increased productivity over time."

"We consider operator comfort and training to be of the highest priority," said Ruediger Kunz, product manager for hydraulic mining shovels for Mannesmann Demag, "If the operator is happy, he produces more."

A mine maintenance superintendent said improvements in operator comfort and safety may reduce the health problems or stress which are normally suffered by long-time heavy equipment operators.



All the comforts of home plus...

The steering wheel and transmission shift levers are now giving way to joysticks, which are appealing to a newer generation raised on video games. Joysticks reduce operator muscle fatigue brought on by steering wheels and maneuvering between furnace crank controllers and foot pedals. Kunz said electronically controlled joysticks found on Demag shovels provide a fast response, using only two levers which provide full control for a hydraulic shovel operator. Another example of this technology is Caterpillar's STIC Control System which allows the operator to control forward-reverse, steering and transmission with the left hand.

Improvement in the design of operator seats is an innovation cited by all the companies contacted for this story. Harnischfeger developed a seat which is positioned somewhat higher and can be advanced forward close enough to a cab's front window to improve visibility. The seat features a mechanical bellows suspension with "back angle positioning, four-way lumbar adaptation, vertical height selection, seat cushion rake angles [inclined from the perpendicular], and a footrest. Adjustable armrests have been added to relieve the strain of straight shoulder-to-hand joystick operation," a company brochure said. The seat can be tilted back or forward on its base and swiveled to either side. Hitachi has also redesigned its operator seat for improved comfort and reliability. The seat can also be adjusted fore and aft. Kunz said Mannesmann's seat offers an

ergonomic design adjustable to weight and height, armrests which reduce fatigue and a safety belt which does not hinder the operator. Caterpillar offers the Cat Contour Series Seat which features "adjustable lumbar support to cradle the lower back and relieve pressure on the spine," according to a brochure. Adjustments for back angle, seat angle, height and damping [restraining] are also offered.

A design problem now being tackled by shovel and loader manufacturers is accommodating the shorter height and weight for male operators in nations such as Japan, and the women who operate mining shovels and front-end loaders.

Other operator-oriented amenities offered by all the manufacturers interviewed include AM/FM radio and cassette, window shades or blinds, tinted glass, adjustable visors, and temperature controls. Hitachi has begun adding a 12-V power outlet in the cab to power devices such as company or CB radios. Single and dual air-conditioning systems are gaining in importance due to the need to maintain a climate-controlled cab environment which reduces the dust and noise an operator must endure during a shift. Kunz noted that Australian miners prefer dual air-conditioning systems which work independently to reduce the possibility of a breakdown of an air-conditioning system in a mining shovel.

Health and safety

Pressurized operator cabs to keep out dust are a standard feature on loaders and shovels, along with other extensive noise and vibration reduction measures.

Access to the cab is another top safety priority of manufacturers. Ingall said CAT is replacing ladders with rear access stairs on heavy equipment to enhance safety. On its largest models, Hitachi offers hold-in type ladders with spring-type balancers. When pulled down, the swing is disabled for safety so that the operator cannot swing the cab while someone is boarding the machine, said Eric Berkhimer, Hitachi sales application engineer. Dual access features are becoming common. Emergency ladders are provided by some manufacturers in case of power failure in the shovel or loader. Handrails along machine catwalks are also a mandatory feature.

Visibility is another important operator safety concern. Harnischfeger's latest operator co-op "is designed to maximize operator visibility to the sides and front, with emphasis on its canted facing and foot windows," said Terry Sheehan, director of electric shovel products for Harnischfeger. Kunz said Mannesmann Demag offers 360-degree visibility in its hydraulic shovels. Hitachi provides floor glass for downward visibility. Manufacturers also use mirrors to enhance the operator's visibility and safety.

Other safety features offer emergency engine stop systems, electronic monitoring and alarm systems which give operators warnings of machine problems well in advance of breakdown, and numerous other advances. Fire suppression systems now work automatically by monitoring in-cab temperatures or through a button pushed by the operator.

Training

Spokesmen for Caterpillar, Harnischfeger, and Mannesmann Demag all agreed that training is probably the most critical safety factor in the operation of shovels and loaders. Caterpillar trains equipment operators at the Edwards Training Center outside of Peoria, Illinois, and the Tinaja Hills Training Center near Tucson, Arizona. Harnischfeger offers the Harnischfeger Institute in Milwaukee, Wisconsin, for operator and maintenance training. All the manufacturers contacted offer minesite operator training. "There's no substitute for on-the-job training on their own machines at their own mine sites," Kunz said.

Some manufacturers are urging operators, mine superintendents or other managers to attend the same classes and training to enhance the manager's understanding of the operation of the shovel or loader. Nelan's goal is to develop a smooth equipment operator who does not jerk around his equipment and who will convince the mine superintendent to fix haul roads and keep pit areas clean. In Nelan's opinion, the loader operator should have considerable input into the running of the mine pit and help train truck drivers to work with him for maximum efficiency. CAT also trains supervisors to recognize when their operators have abused equipment which could create safety hazards and reduce productivity.

In a recently published brochure, Fred Moss, Harnischfeger director of mining training said, "Every minute, every penny invested in training has a measurable return in greater machine efficiency, reduced downtime, and increased productivity."

Ingall said a Caterpillar dealer advisory committee provides the company with information gleaned from operators to determine future operator comfort and safety R&D research.

Reprinted from the Sep/Oct 1993, Volume 5, Number 5 issue of ***Mining World News.***

JAHSA/HSA hold National Council Meeting

Radisson North Hotel, Columbus, Ohio, June 4-6, 1996

The Joseph A. Holmes Safety Association and the Holmes Safety Association will hold their annual business meeting at the Radisson North Hotel in Columbus, Ohio, on June 4-6, 1996. The agenda includes safety and health topics which we feel will be of great interest to participants. Mark your calendar and make your reservations today.

Lodging at the Radisson will be $69 single—$79 double. Make your reservations directly with the Radisson by calling 614-846-0300 or 1-800-333-3333. It is recommended that all reservations be guaranteed either by advanced deposit of one night's lodging or by credit card. We have reserved a block of 150 rooms which will be held until May 14, 1996—be sure to indicate you are attending the HSA Meeting. The hotel has free limo service from the airport.

A meeting registration fee of $75 per person will be required. **Registrations are due by April 30, 1996. After April 30, registration fees will be $90.** Guests and spouses not attending the meeting but attending the Wednesday dinner and the Thursday banquet will be required to pay $60 to cover costs.

Concurrent workshops—3 tracks

1. **Safety management rights and responsibilities**
2. **Using technology to manage change**
3. **Safety and health basics**

AGENDA

TUESDAY, JUNE 4, 1996

Time	Title
12:00-5:00 pm	Registration
1:00 pm	Building a Safety Culture
3:00 pm	HSA and JAHSA Executive Board Meetings

WEDNESDAY, JUNE 5, 1996

Time	Trk	Title
7:30 am		Registration and refreshments
8:30 am		Welcome—J. Davitt McAteer, Assistant Secretary, MSHA
9:00 am		Break
9:15 am	1	Excellence in Safety Through Leadership
	2	Managing Multi-plant Operations
	3	Emergency Preparedness
10:45 am	1	Legal Responsibilities for Supervisors
	2	How Technology is Changing the Mining Industry
	3	On/Off Road Haulage
12:00 pm		Lunch (on your own)
1:30 pm	1	Participation in an MSHA Inspection
	2	Behavioral-Based Safety Program
	3	Blasting
3:00 pm	1	Innovative Training Techniques
	2	Ergonomics
	3	Conveyor Safety
6:00 pm		Social—Cash Bar
6:30 pm		Dinner at Hotel (Awards and Prizes)

THURSDAY, JUNE 6, 1996

Time	Trk	Title
7:00 am		Golf Outing–Those interested should contact Jim Asbury, 614-669-2883
8:00 am	2	Internet
	3	Oxygen/Acetylene Safety
9:45 am	2	Back Safety
	3	Confined Spaces
10:00 am		Various Tours
1:00 pm		Lunch (on your own)
3:00 pm		HSA and JAHSA General Meetings
6:00 pm		Social—Cash Bar
6:30 pm		Banquet (Awards, scholarships, prizes, and entertainment)

REGISTRATION FORM

Name: _____ Telephone (include area code): _____

Company: _____ Address: _____

City: _____ State: _____ Zip Code: _____

Meeting Registration Fee of $ _____ is enclosed for _____ persons (at $75.00 per person)
(LATE REGISTRATION FEE—AFTER APRIL 30, 1996—$90.00)
Guest Fee of $_____ is enclosed for _____ additional person(s) (at $60.00 per person)
Write the total number of people attending each session in box below track number *(to help us estimate space needed)*:

TRACK 1

1 Excellence in safety thru leadership
1 Legal responsibilities of supervisors
1 Innovative trng techniques
1 Participation in an MSHA inspection

TRACK 2

1 Managing multi-plant opns
1 How technology is changing the mining industry
1 Behavior-based safety prog
1 Internet
1 Ergonomics
1 Back safety

TRACK 3

1 Emergency preparedness
1 Confined spaces
1 Oxygen/acetylene safety
1 Conveyor safety
1 Blasting
1 On/off road haulage

Golf outing

1 Cost: $55 per person
Callaway system to be used
Lunch at golf course included in cost. Contact: Jim Asbury at (614) 669-2883 to make arrangements for playing

Return registration and payment to: ATTN: Bonnie Grover, Mine Safety and Health Administration, 50985 National Road, St. Clairsville, OH 43950

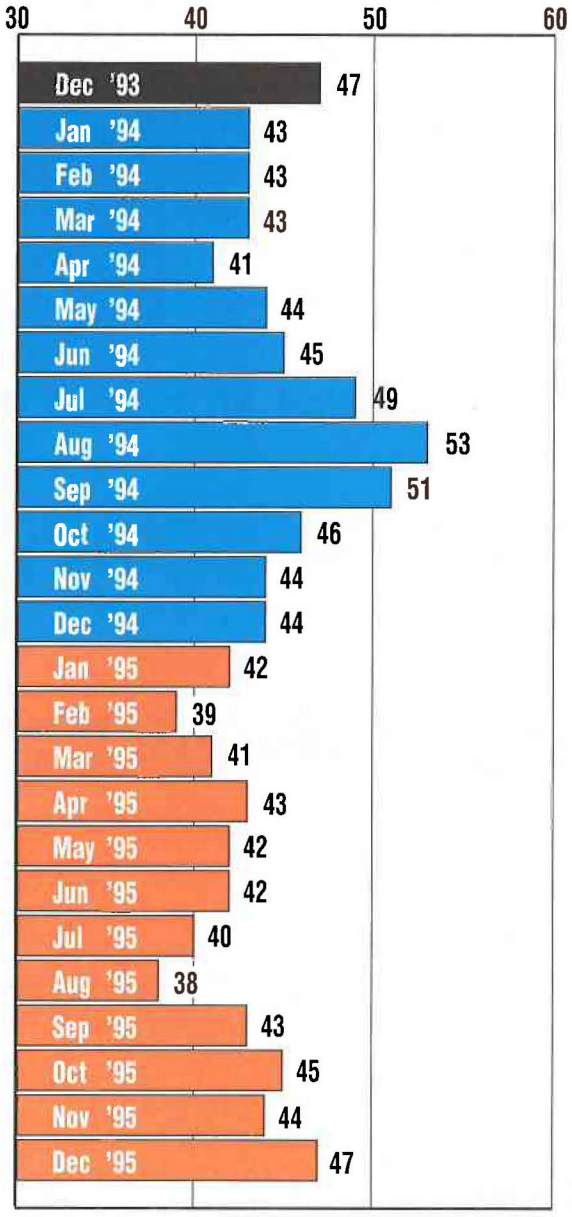
Checks for Registration and the Golf Outing must be made **payable to: Holmes Safety Association**

1995 coal mining fatalities reviewed

MSHA, Coal Mine Safety and Health, Accident Investigation Program Group

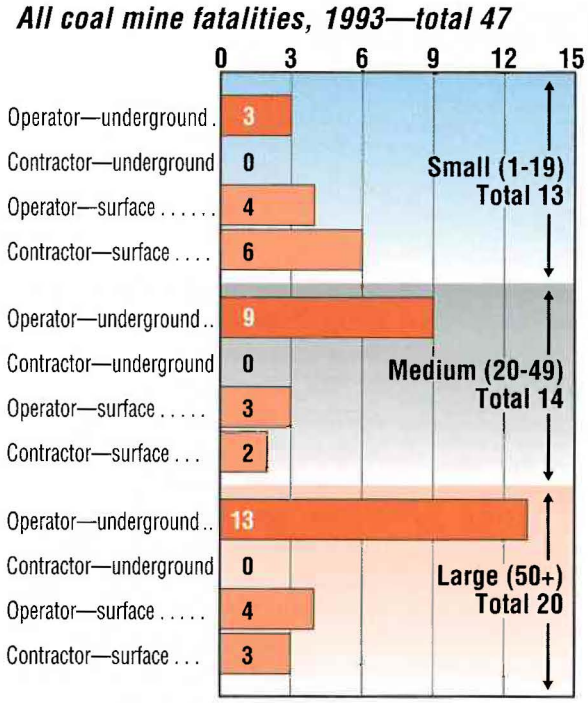
The year 1995 witnessed an end to the annual decline of fatal accidents in coal mines in this country. Deaths rose 7% from a record low of 44 in 1994 to 47 in 1995. The last third of 1995 was a period in which the pace of fatal accidents increased. The accident trends are shown in the 12 month running totals. The 12 month running totals for fatal accidents from December, 1993 through December 1995 show an increasing number of fatal accidents through August 1994, when the 12-month running total reached 53. Over the next year, the 12-month running total declined to a record low of 38 in August 1995. In the last 4 months of 1995 the 12-month running total climbed to 47.

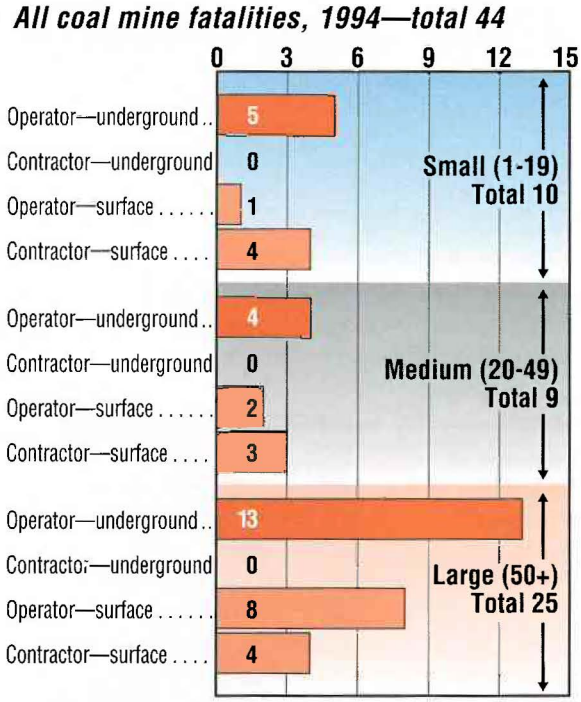
12-MONTH TOTALS
Coal fatal accidents, Dec. 1993-Dec. 1995



Although the total number of fatalities suffered in 1995 is identical to calendar year 1993, the number of deaths at surface areas of large coal mines witnessed a significant increase. In 1993, 4 employees of mine operators were killed on the surface of mines but in 1995 this number doubled to 8. Contractor employees working on the surface of coal mines also suffered a 100% increase in the number of fatal accidents, rising from 3 killed in 1993 to 6 in 1995. A significant portion of all surface fatalities in 1995 occurred during the initial or final phases of the mining process. Three miners, 2 in West Virginia and 1 in Pennsylvania, died while clearing trees in advance of surface mining. Another three miners died while performing work related to the demolition or deactivation of surface facilities.

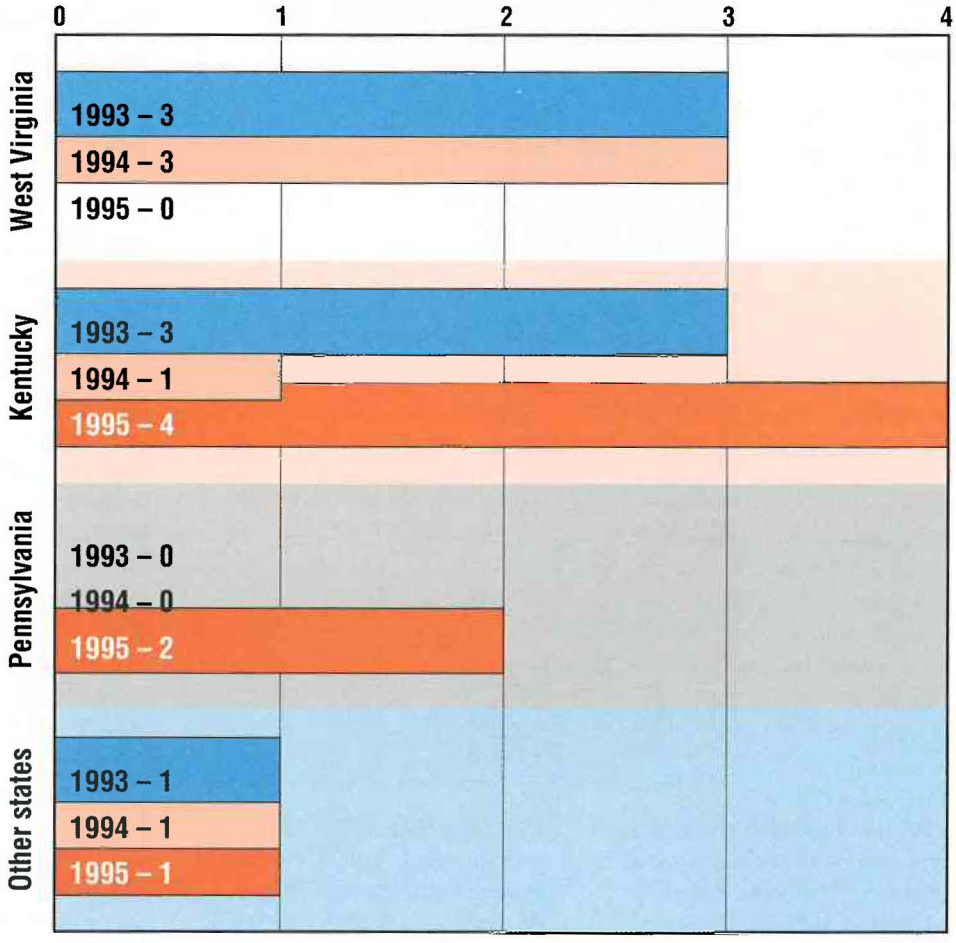
Two states accounted for almost 60% of all coal mining deaths in 1995. West Virginia had 16 fatalities and Kentucky had 12. Pennsylvania ranked third accounting for 17% of all coal mine fatalities last year. An analysis of the location of fatalities in 1995 by county shows a deviation from the proceeding 10 year average. Mingo County, West Virginia, had 7 fatalities in 1995 as compared to an average of less than 2. The number of fatalities in Schulykill County, Pennsylvania, was more than 100% larger than the ten-year average. Buchanan County, Virginia, and Harlan County, Kentucky, both experienced no fatalities in



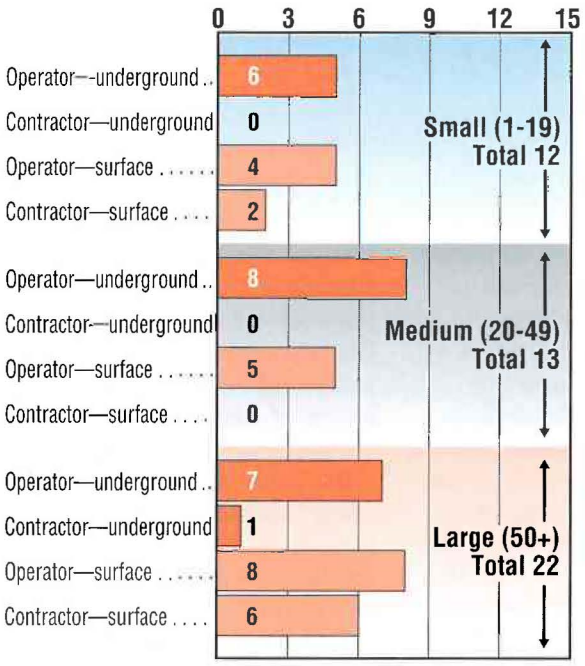


1995, a decline from their ten-year average of more than 2 fatalities a year.

West Virginia's 16 fatalities included 5 employees of independent contractors. Among them was a security guard poisoned by CO in a private vehicle. Although, 1995's record tied the national historical low of 6 fatalities for coal roof fall accidents, four of West Virginia's fatal accidents involved roof falls. In 3 of these accidents the victim was positioned inby the last row of roof supports.



All coal mine fatalities, 1995—total 47



Overall, haulage fatalities are trending upward with surface haulage accidents being highlighted in 1995. While there were no fatalities in West Virginia in 1995 which involved haulage trucks, Kentucky and Pennsylvania recorded an increase. Kentucky had 4 such accidents and Pennsylvania 2. The national haulage program, which received extensive cooperation from the state in West Virginia, is believed to have caused a positive effect on surface haulage accidents there.

Five of the 8 fatalities (62%) recorded in Pennsylvania occurred on the surface in 1995. All 3 of the underground fatalities occurred in anthracite mines, including a pillar run in Schuykill County in July which claimed 2 lives. Kentucky's 12 fatalities included 4 haulage truck fatalities and 3 electrical fatalities but no fatalities due to roof falls.

Electrical accidents continued to account for a significant portion of coal mining fatalities with a total of 6 in 1995. MSHA found that poor maintenance of electrical equipment, failure to lock and tag circuits out, and misunderstandings or missed communications about the status of energized electrical equipment continue to be involved in these type of fatal accidents.

Summary of 1996 coal and metal/nonmetal statistics (as of 3/31/96)

This article is first in a series of quarterly articles updating the status of fatalities occurring in both coal and metal/nonmetal mines.

Based on preliminary accident reports as of March 31, 1996, 19 fatalities have occurred at coal and metal/nonmetal mining operations. During this period, coal experienced 10 fatal injuries and metal/nonmetal had 9 fatalities. Powered haulage fatalities, in both coal and metal/nonmetal were the most frequent accident classification, causing 42 percent of the fatal injuries. Handling materials and machinery classifications each accounted for 16 percent of the fatalities.

Coal mining

Three of the fatalities were classifed as powered haulage and 2 were caused by machinery and 2 were classified as "other". Five coal fatalities occurred in Kentucky and 4 occurred in West Virginia. Six of the fatalities occurred underground; the remaining 4 occurred on the surface.

Metal/Nonmetal mining

Five of the fatalities were classified as powered haulage and 3 were handling materials. Three fatalities occurred at limestone operations and two each occurred at copper and sand and gravel operations. Two fatalities each occurred in Arizona, California, and Texas. Seven of the fatalities occurred at surface operations, the remaining two fatalities occurred at mill/preparation plant facilities.

Submitted by John V. Forte, MSHA Academy, Beckley, WV

Case studies in small mines accident analysis: Kentucky, Virginia, and West Virginia

By Doris Ann Cash, Mining Engineer, Technical Support, February 7, 1996.

This article is the second of a 3-part series that will cover Ky., Va., and W. Va.

Background

As part of the initiative to accurately identify safety and health problems in small mines, an analysis was made of the accident and injury data for each of three states: Kentucky, Virginia, and West Virginia, for the size group 1-19 employees, for underground coal mines including the surface areas. The final Part 50 data for calendar years 1990-1993 and the preliminary Part 50 data for 1994 were used. Accident classifications were grouped into categories as follows:

Category	Classification
Roof falls	Entrapment
	Falling, rolling, or sliding rock or material
	Fall of face, rib, side, or highwall
	Fall of roof
Haulage	Nonpowered haulage
	Powered haulage
	Hoisting
	Unstable condition of impoundment, refuse pile, culm bank
Machinery	Machinery
Materials	Handling material

These four categories had been previously identified as having the highest incidence rates and/or frequency of occurrence. Contractor injuries were included with operator injuries. The specialists in the Small Mines Unit tallied the degree 2 through 5 injuries by the occupation of the injured employee, the activity at the time of injury, and the location at which the injury occurred in underground mines for the five year period in all four accident categories. Degree 2 through 5 injuries are usually referred to as Non-Fatal, Days Lost (NFDL) injuries, or "disabling injuries." The accident tallies were used to create an accident profile for the size group 1-19 employees for each state examined. In this series of articles, some of the findings for each state will be discussed.

Virginia:

During the five years examined, less than 15% of the disabling injuries occurred in a category other than the four selected for analysis. The disabling injuries in those four accident categories—haulage, machinery, handling materials, and roof falls—also comprised over 70% of the total number of injuries. There were eight fatalities in the 1-19 employees size group during that time. Composites of the fatalities and disabling injuries show that although roof falls comprise 75% of the fatalities, they account for less than 10% of the non-fatal, days lost (NFDL) injuries. More than a third of the disabling injuries occurred in handling materials, but no fatalities. Haulage and machinery each accounted for about a fifth of the injuries. There was one haulage fatality and one electrical fatality.

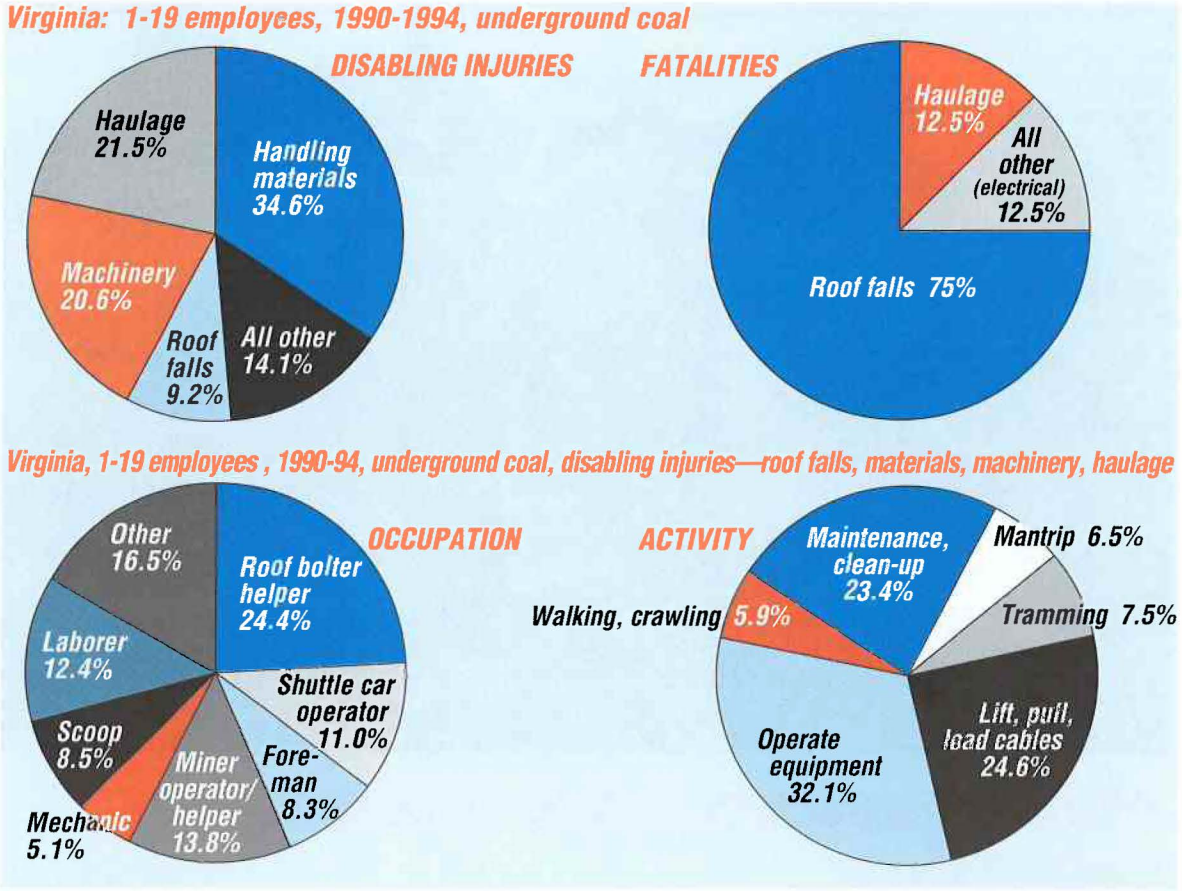
Composites of the four accident categories show the occupations and activities at the times of injuries. The roof bolter or helper was injured in about a quarter of the NFDL injuries. That is more than 10% higher than the next most frequently cited single occupation. Continuous miner operators or helpers had the next highest number of disabling injuries and account for about 14% of the disabling injuries. The category "other" includes electricians, beltmen, shotfirers and all other occupations not named elsewhere on the chart.

Nearly a third of the disabling injuries occurred while the employee was operating equipment. About a fourth of the disabling injuries were attributed to cable handling, lifting, pulling, or loading. Maintenance and clean-up activities were cited almost as frequently. A composite of the locations the accidents occurred revealed that 42.3% of the NFDL injuries took place at the face and 24.5% outby. Only 10% of the disabling injuries occurred on the surface areas of underground mines.

The remainder of the injuries, 23.1%, occurred on a track, road, belt, or face haul.

The number of NFDL injuries was cut almost in half over the five years examined. The decline has not been steady in any given occupation. For example, in four out of five years, roof bolter/ helper was the occupation with the most numerous disabling injuries, but by 1994, NFDL injuries to roof bolters/ helpers were a third of the number of injured in 1990.

Year by year and composite charts of each of the accident categories were also constructed by occupation, activity, and location. In the accident category "materials



handling," where over a third of the disabling injuries occurred, laborer and other each accounted for a fifth of the NFDL materials injuries. Mechanic, an occupation usually included in "other," was the occupation cited in more than 12% of the disabling injuries. Lifting, pulling, and cable handling activities accounted for half the NFDL injuries in materials handling. Maintenance activities were involved in another quarter of the disabling materials handling injuries. About half the disabling materials handling injuries happened outby, and more than a third happened at the face.

In four out of five years, the greatest number of disabling haulage injuries occurred while operating equipment. The next most frequently cited activity was riding a scoop or mantrip.

More than a fifth of the disabling injuries were experienced by shuttle operators. The percentage of scoop operators injured was almost as high. Disabling haulage injuries decreased from 41 in 1990 to 15 in 1994.

Machinery accidents showed a similar trend and declined by about 55% over the five year period. In every year, the roof bolters/helpers received at least half of the disabling machinery injuries. Miner operators/helpers were the next most frequently injured. Three fourths of the disabling machinery injuries occurred while the employee was operating equipment. The remaining quarter is split between maintenance activities and actions moving from one place to another, either tramming or walking/crawling. In every year examined, the majority of disabling machinery injuries took place at the face.

Although progress was not steady, the number of NFDL injuries due to roof falls declined by 80% over the five year period. In four out of five years, the largest number of disabling roof fall injuries occurred while the employee was tramming. In every year, the majority of disabling roof fall injuries occurred while the employee was moving from one place to another, either by walking or crawling or by tramming equipment. About 30% of the disabling roof fall injuries are in the miner operator/helper classification. Roof bolter/helper and "other" each account for about a fourth of the disabling roof fall injuries. The remainder of the disabling injuries in this category were to scoop or shuttle car operators.

Production decreased by about 37% and the hours by 35% over the five year period in the 1-19 employees size group. This corresponds to the decrease of about 33% in the number of employees. In the state as a whole, the hours decreased by 22.7%, the number of employees by 15.3%, and the production by 16.7%.

Mine rescuers were blocked at every turn

By Brian Maffly, staff writer

Jan. 18, 1996—From the moment Jeremiah Etherington plunged down the abandoned Honorine Mine on Saturday, [Jan. 13,] his would-be rescuers faced potentially lethal pitfalls at every step.

The three-quarter-mile entrance tunnel to the Tooele County shaft was a minefield of decaying sticks of dynamite. Debris jams hanging on the shaft walls were poised to collapse on anyone rappelling into the depths of the shaft, which once disgorged a bounty of silver, lead and zinc.

"It's a very high-risk operation," said Dave Lauriski, a mine-safety expert. "It reached a point in the descent when that risk became no longer acceptable."

After two days of probing to a depth of 450 feet, Tooele County Sheriff Frank Scharmann late Monday called an end to the search for Etherington, an adventurous teen believed buried under debris at the bottom.

Scharmann decided it was not worth putting more lives at risk in retrieving the 18-year-old Magna man, who most likely died after plunging 600 to 1,000 feet.

"None of us was pleased with making this decision," Scharmann said. "We're not pleased with the outcome of this operation."

The victim's parents, Dan and Connie Etherington accepted the sheriff's decision.

"As a mother, I wish so much that they could have gotten him," Connie said. "While we understand, it was very disappointing. I cannot thank rescue workers enough. They did everything that they felt they could do in a safe manner. They felt very frustrated."

Sheriff's search-and-rescue volunteers broke down their encampment at the mouth of the mine Tuesday morning and left after locking up the entrance gate.

Saturday, Etherington and a buddy found the gate broken open. With two other teens they explored the Honorine, one of about 70 abandoned mine shafts perforating the western foothills of the Oquirrh Mountains a few miles south of Tooele.

Corey Burningham, 19, lowered Etherington into the shaft when vibrations set off a debris slide that swept down [upon] the victim. Rescuers fear the same fate awaits anyone who ventures down the 100-year-old shaft.

Lauriski, the general manager of Energy West, Pacific Corp.'s

central Utah mining subsidiary, joined rope teams from Millard and Tooele sheriff's offices to devise a rappelling system at the top of the shaft.

They extended roof jacks to stabilize the tunnel above the shaft "collar" and spanned the opening with catwalks. The crew suspended rappelling gear from this scaffolding to keep the rope away from the unstable shaft walls.

Better options were nixed due to the 4,290-foot entrance tunnel, making it impossible to get gear and power supplies to the shaft.

"We threw around a bunch of ideas," said Lauriski. "One plan was to install bolts into the walls. That wasn't practical because we didn't have compressed air and the equipment necessary to drill bolts."

Partway down, the mine divided into two separate shafts, one that was used to haul ore and the other to transport miners to the mine's various levels, Lauriski said.

Monday evening, search-and-rescue commanders dispatched volunteer John Shields with a video camera to make the rescuers' third and final descent into the shaft believed to contain Etherington's body.

The camera didn't work, but Shields' eyes told him a trip to the bottom would be suicide.

The walls were unstable and fallen debris was hung up at two key places, waiting to send timbers and pipes plummeting onto anyone below.

At the 210-foot level, 30 tons of debris snagged on a ledge formed by rail tracks at a cross tunnel, Lauriski said. About 200 feet farther down was another debris pile where the shaft curved, and more debris clogged the shaft farther down. Shields returned to the top because descending into the bend would bring his rope into contact with the debris piled overhead.

Armed with maps and the knowledge of old-timers, searchers hoped to reach the bottom of the shaft through one of the many side tunnels that were bored through the hills. The oxygen-poor air in the shaft, however, was an indication that these tunnels were no longer intact, Lauriski said.

"We explored every lead," he said. "We were looking at maps that were 1935 vintage. They don't show every nook and cranny. The tunnels were either caved or backfilled or faced off. We were blocked everywhere we went."

The only safe way to get to Etherington would be to clear the shaft of debris with hoists, in effect restoring it as an operating mine, Lauriski said.

Officials hope Etherington's disappearance will teach others to resist the mysterious allure of Utah's mining legacy. Permanently sealing all 20,000 abandoned mine openings, however, is beyond the state's financial resources.

Simply bulldozing dirt over an entrance or erecting gates has proven ineffective at keeping out adventure seekers, Scharmann said.

"If they want to get in, they'll get in," the sheriff said. "These kids felt they were pretty much experts going into mines, but they didn't have the right equipment and experience."

Before last weekend, no one had died in an abandoned mine in Utah since 1985, when three people were killed in separate accidents.

Reprinted via Nexus data retrieval from the January 17, 1996 edition of ***The Salt Lake Tribune****, Section: Utah; Page B1.*

Two die at abandoned mine sites

Two more episodes of people venturing onto abandoned mine sites ended in tragedy.

Year after year, MSHA and state mining agencies admonish hikers and curiosity seekers to stay away from old mines.* But unfortunately, the message does not always get through. Two people already have died in 1996 from abandoned mine mishaps.

- In Colorado, three young hikers entered the old Gearhart underground coal mine in Mesa County on Jan. 13 and one hiker failed to make it out. A man who the *Denver Post* identified as Michael Betts, 20, died after apparently becoming overcome by gas.
- In Utah, an 18-year-old plunged to his death also on Jan. 13 while he was exploring a shaft near Salt Lake City, Jeremiah Effington, fell more than 600 feet to his death.

Utah and Colorado are targeting school children with education programs about geology, mining history and abandoned mine dangers. Utah reaches 40,000 fourth graders each year with a workbook and a video entitled "Utah's Abandoned Mines; Stay Out and Stay Alive!"

** (Mine Regulation Reporter, 6/30/95, page 328)*

Reprinted from the January 26, 1996 issue of ***Mine Regulation Reporter*** *Vol. 9, No. 2, by Pasha Publications Inc.*

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Lack of sleep a major cause of accidents

By Bob Zache, Training Officer, Arizona State Mine Inspector's Office

It is impossible to control employee behavior off the job, yet off the job behavior can sometimes create conditions that result in accidents on the job.

A condition hard to detect—but suspected of being a major cause of many accidents—is lack of sleep.

Although researchers have been studying sleep for the last twenty or thirty years, why we sleep remains a mystery. We spend about a third of our lives at this activity and about the only thing we can say for sure is that we don't feel well if we don't get enough of it. One sleep factor that has been studied is the circadian rhythm—the internal body clock that we all live by.

Since our evolution, we have gone about our daily chores during daylight hours. Our biological clocks have adjusted to a cycle of activity during the day and rest at night, and not until relatively recently—in the last century or two since the Industrial Revolution—have significant numbers of us been up through the night.

About 20 million Americans now have work schedules that require them to put in shifts when their bodies tell them they should be in bed—and surveys indicate that over half of them doze-off at least once a week on the job. When in control of a large piece of machinery, the result can be disastrous.

In March of 1980, a haulage truck driver at an Arizona copper mine drove his 170-ton truck loaded with rock over a fifty-foot bench at 5:00 a.m.—the tenth hour of his twelve-hour shift. He died four days later from the injuries he sustained.

According to one sleep study report: "We are abusing sleep: Studies of body rhythms pinpoint shift work and long working hours as factors that cause diminished performance, physical ailments, and sleeping on-the-job. Sleep abuse may be a hidden cause of industrial accidents that occur with increasing frequency at night."

Another researcher states that, "In addition to damaging an individual's psychological and physical well-being, sleep deprivation costs the United States $70 billion a year in lost productivity and medical costs. Nearly half of all Americans short themselves of one to two hours of sleep per night. By week's end, it's as if they'd missed a full night."

Shift workers are generally rotated backward to earlier hours, opposite the body's biological clock, and they are switched back and forth too frequently to allow them to adjust. Researchers have found that on a rotating-shift schedule (like those implemented at many of Arizona's mining operations), accidents increased significantly during the final two hours of a shift and were 40 percent greater at night than in the daytime. "We should be as concerned about our sleeping patterns as we are about our diet and exercise."

Our body temperature lowers slightly during the night when it is normally at rest and rises during the day. Laboratory studies have found increases in efficiency throughout the day which approximately paralleled body temperature changes (the circadian rhythm). The body can adjust to changes, but permanent night work for those employees who would accept it is not the answer because over the weekend or other days off, they revert to their normal rhythm of living with the rest of their family and community. When the temperature rhythm presumably reverts back to normal on these days off, the employee has to start adapting all over again when work is resumed.

Ergonomic research, the study of man's behavior in relation to his work, continues. The night shift allows more flexibility for employee sleep strategies, and it has been suggested that it may be more biocompatible to sleep closer to the trough of the circadian rhythm; others have suggested a more "normal" pattern of putting off sleep until just before going to work—like the day shift. Still others say that their best approach is to split their sleep into two segments.

The fact remains that when anyone tries to sleep during the day, the sleep is lessened both quantitatively and qualitatively since the body is warming up for normal daytime activity. Studies show that at least a week may be needed for these bodily rhythms to synchronize with the new schedule. What's the answer? It depends on the specific circumstance. Training and education of the employee at present are the only tools; the employee must understand the importance of getting enough sleep.

Reprinted from the Volume 4; Number 1, January-March 1996 issue of Arizona's ***Miner Details****, Douglas K. Martin, Arizona State Mine Inspector*

13th Annual UMR\Missouri Mine Rescue Contest

The photos at left are of students at UMR who composed the first all-womens' mine rescue team to enter a competition.

The 13th Annual Mine Rescue and First Aid contest was held by the University of Missouri–Rolla (UMR)\Missouri Mine Rescue Association on October 5-6, 1995, at Rolla. The Association, with Dave Brown from the Doe Run Co. of Viburnam, Missouri, sponsored the event.

A novice all-womens' team, composed of women attending the UMR, participated for the first time this year.

The contest included: a field problem which was conducted in the UMR experimental underground mine, 25-question written test, 10-question written gas test, a separate bench test and written examination, a 10-question written first aid test, and a separate first aid contest. All team participants, except the Benchmen, were required to take all of the written examinations.

The first aid contest was sponsored by the Missouri Dept. of Labor Stds., Mine & Cave Div., with the aid of Desi Apodaca and Gilbert Miera, New Mexico state mine inspectors.

Apodoca and Miera wrote the first aid problem and written examination and conducted the first aid contest along with the Missouri state inspectors.

The National Mine Service Co. (NMSC) conducted the Draeger Benchman contest. Wayne Barber, Duke Snyder, and Darin Sargent of Mt. Vernon, Ind., conducted the field problem and were aided in judging by the Metal and Nonmetal (MNM) National Mine Rescue Team and state inspectors with the aid of Joel Gehard, Product Mgr. from NMSC.

The MSHA South Central District Office, the MNM National Mine Rescue team members, and the state inspectors from Missouri, New Mexico, and Arizona judged the contest.

The awards ceremony was held the evening of May 6th. Dave Park and Doyle Fink, District Manager of the South Central District, presented trophies to the winning teams.

Overall first place went to the Westinghouse WIPP Blue Team of Carlsbad, N.M., Clem Quintana team captain; 2nd place to Doe Run Co., from Viburnam, Mo., Mark Nations team captain; and 3rd place to Asarco, Inc., West Fork Mine, Kenneth McCabe team captain.

Dean John Wilson of UMR presented the "Dean's Award Trophies" for teams winning the underground portion of the contest—1 in- and 1 out-of-state—to Asarco Inc., West Fork Regulators and Westinghouse WIPP Blue Team, respectively.

The First Aid Contest was won by the Westinghouse WIPP Team from Carlsbad, N.M., Tim Jacks team captain; 2nd place went to the team from Western Ag-Minerals, Chris Onsurez team captain; and 3rd place was won by Mississippi Potash, Jon Mendes team captain.

The Benchman's contest was won by Westinghouse WIPP Blue, Benchman: Joe Baca; in 2nd place was Kerry Lear of Greens Creek Mining Co.; and the 3rd place winner was Kevin Cummins of IMC Globas Operations, Inc., of Carlsbad, N.M.

Whitey Jacobson, E&T Specialist, MSHA, South Central District Office, Dallas, TX

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Cement tanker truck and railroad car fall protection

Fall protection is necessary to help protect personnel from falling when on top of a rail car or a cement tanker. Recently there have been numerous accidents of this kind, some even fatalities. At North Texas Cement Company the fall potential is as great as anywhere. In this regard we have taken steps to reduce personnel exposure.

Our most difficult challenge was on the rail side cement load out where we have a retractable cement loading spout that also swivels. We load several different height and width cement tanker trucks and rail cars. In the past we had a pivoting stairway down to the top of the truck with no protection beyond this point Every truck driver opens his own dome lid, collects a sample after loading and then closes his dome lid. Our personnel load the taller rail cars and we used the stairway for access to the top of rail car with difficulty since the rail car is much higher than the cement tanker truck.

Our first attempt to solve the problem involved installing an overhead cable with a retractalock and safety belt system. This proved to be heavily resisted by the truck drivers resulting in poor compliance.

Next we installed a 10' x 11' x 3'-6" aluminum frame walkway assembly that could be raised and lowered with a hand winch. At each corner was a support that would telescope out and in. This device proved to be too bulky and slow to move up and down and, after being hit by a rail car, became inoperative. The device was then removed. Finally we solved the problem by providing a separate access to the rail car, and to the top of the trucks. The rail car platform is several feet higher and permanently mounted. The truck stairway pivots so that it can be lowered to the top of the truck or retracted out of the way for loading rail cars. Aluminum handrails are attached to the stairway so

The photos at right and on page 23 indicate the effort exerted by North Texas Cement Co. to ensure maximum safety for its workers.

that when it is lowered it is in the proper position to protect a truck driver walking across the top of his truck to access his dome lid for opening and closing. The stairway is raised and lowered by the use of an electric hoist. When the truck stairway is fully retracted, it serves as a small portion of a permanent handrail that encompasses the perimeter of the rail car such that when you access the top of the rail car you have fall protection.

The engineering and mechanical installation work was performed by North Texas Cement Company personnel and by an outside contractor, M-K Specialty Metal Fabricators. Installation work had to be performed at night and on weekends since shipping continued throughout.

Falls from elevated locations will always pose a serious risk. But in regards to our cement rail side load out facility, North Texas Cement Company has greatly reduced the risk of an accidental fall during the loading of rail cars or cement tanker trucks.

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Results from annual SW mine rescue contest

The 14th Annual Mine Rescue and First Aid contest was held by the Southwestern Mine Rescue Association on June 1-2, 1995, at Carlsbad, New Mexico. The Association with Buddy Webb, President, sponsored the program for the metal and nonmetal mining industry.

The contest included a field problem, separate first aid contest, bench test, 25-question written test, and 10-question written gas test. The first aid problem was written and sponsored by the New Mexico State Mine Inspector's Office.

Desi Apodaca and Gilbert Miera, New Mexico state mine inspectors, wrote the first aid problem, written examination, and conducted the first aid contest.

The National Mine Service Company (NMSC) conducted the Draeger Benchman's contest. Steve Lipe of Scottsdale, Ariz., and John Bennington of Rock Springs, Wyo., set the program up and were assisted in judging by the NMSC's rescue team members.

Dave Park and Bud Narramore, of the Mine Safety and Health Administration, presented trophies to the winning teams.

First place went to the White team from Rhone Poulenc, Dave Butler, team captain out of Green River, Wyoming; second place to WIPP Silver, Danny Kessler, team captain; and third place to, Mississippi Potash, Robert Baldridge, team captain.

The First Aid Contest was won by IMC Global, Tim Jacks, team captain; second place to the team from Western Ag Minerals, Chris Onsurez, team captain; and third place to Mississippi Potash, Jon Mendes team captain.

The Benchman's contest was won by WIPP-Blue, Benchman Joe Baca; with second place to Kerry Lear of Greens Creek Mining Co.; and the third place winner was George Hamrick from Recco test site in Nevada.

Submitted by Whitey Jacobson, E&T Specialist, MSHA, South Central District Office, Dallas, Texas.

THE LAST WORD...

Allison's Advice. It doesn't do any good to put the brakes on when you're upside down.—*Race-car driver Bobby Allison*

Anon's Dietary Law. The fat you eat is the fat you wear.—*Bob Norris*

The Apotheosis Assumption. The boss already has the right answers.—*Sidney I. Riskin*

Arden's Rules. (1) A new driver's license means you will move. (2) Transferring the stuff from your old dilapidated address book into a neat, legible, new address book means all your friends will move.—*Lynne Arden*

Breider's Rules. (1) Inertia has its own momentum. (2) Bodies age; emotions don't. (3) Bad weather lasts; good weather doesn't.—*Alice Breider*

Bryant's Rule. When a stranger identifies you from a friend's description, it's just as well you didn't hear the description.—*Larry Bryant, in the* ***Phoenix Newsletter***

Burnham's Discovery. There are two types of drivers: Those who slow down to merge and those who speed up to merge. The latter will always be behind the former.—*Sharon Burnham*

Fischer's First Law of Marine Engineering. On any job requiring the removal of four bolts, three will come easily.—*John Fischer, from Bill O'Neill*

Fisherman's Tip. The best day of the week to catch fish is yesterday.—*Ione Goodman*

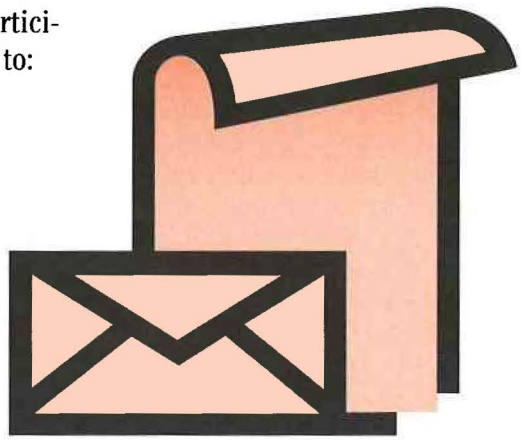
NOTICE: We welcome any materials that you submit to the Holmes Safety Association Bulletin. We cannot guarantee that they will be published, but if they are, we will credit the contributor(s). Please let us know what you would like to see more of, or less of, in the Bulletin.

We **DESPERATELY** need color photographs suitable for use on the front cover of the ***Bulletin.***

REMINDER: The District Council Safety Competition for 1995 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

Please address all editorial comments to the editor, Fred Bigio, at the above address. Phone: (703) 235-1400



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This month's cover: A JOY 4LS longwall shearer, courtesy of Joy Technologies, Inc. We welcome ***any*** *materials that you submit to the Holmes Safety Association* ***Bulletin****. We especially need color photographs (8" x 10" or larger—color negatives are acceptable) for our covers. We cannot guarantee that they will be published, but if they are, we will list the contributor(s).*

Because of the recent federal shutdown, we did not publish the January issue of the Bulletin. We regret any inconvenience.

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Upcoming events:

- *May 1-5, Women in Mining 1996 National Convention, Valencia, CA*
- *May 9-11, Joint Annual Meeting WV Mining Institute/WV Coal Association, Glade Spring Resort, Daniels, WV*
- *May 29-31, PACE Coal Show, Pikeville College Gym/Fairgrounds, Pikeville, KY*
- *Jun. 4-6, Longwall USA '96, Lawrence Convention Center, Pittsburgh, PA*
- *Jun. 4-6, JAHSA/HSA National Council Meeting, Radisson North Hotel, Columbus, OH*
- *Jun. 5-7, Elko Expo '96, Elko Convention Center, Elko, NV*