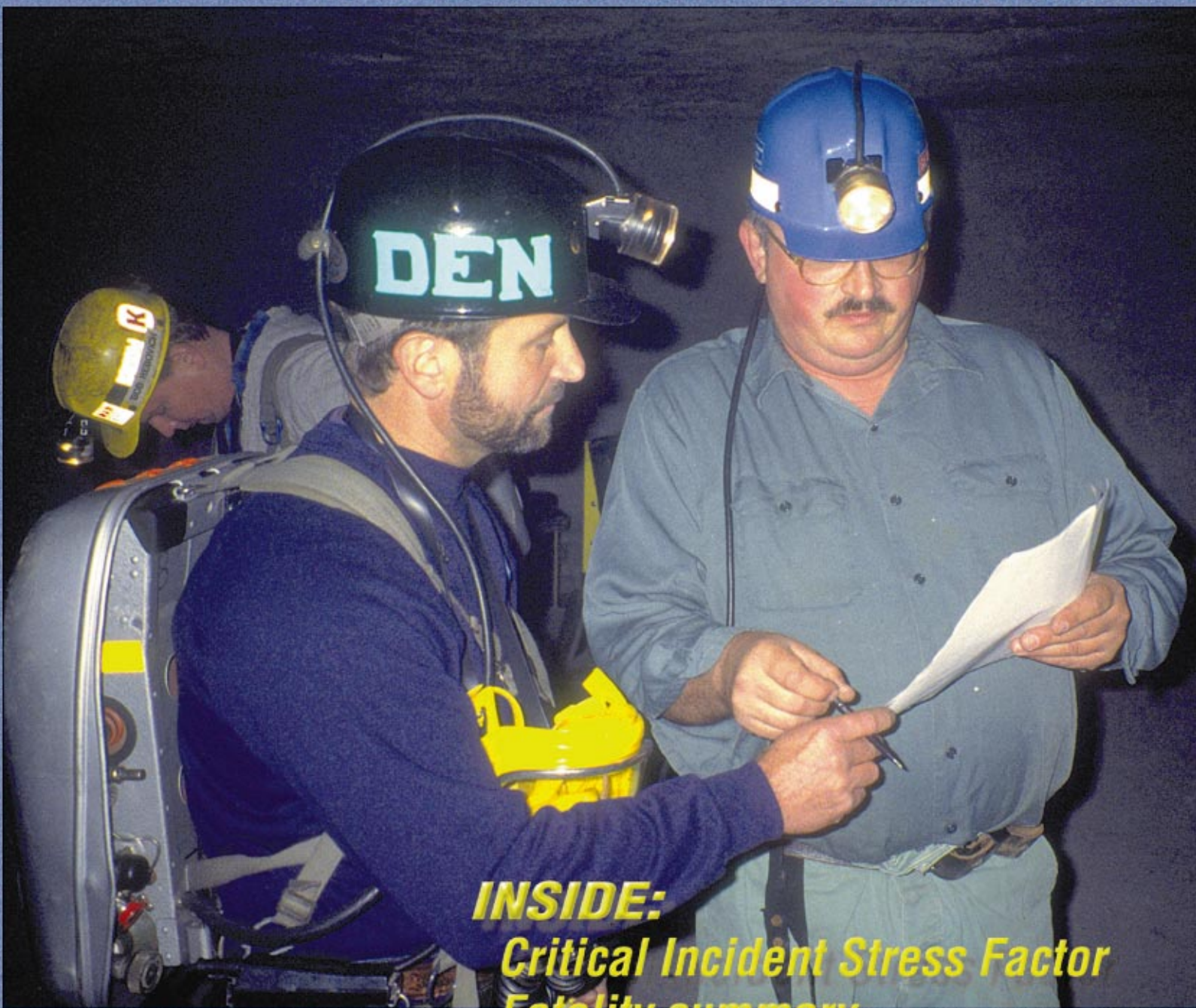


The Holmes Safety Association

BULLETIN

August 1998



INSIDE:

*Critical Incident Stress Factor
Fatality summary
Bats and mining*



HSA Bulletin August 1998

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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. For more information visit the *MSHA Home Page* at www.msha.gov

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 by the Mine Safety and Health Administration.

COVER: This month's cover is from a 35mm slide provided by another MSHA employee and depicts several miners discussing strategy at a mine rescue contest. [If you have a potential cover photo, please send an 8" x 10" print to the editor, Fred Bigio, MSHA, 4015 Wilson Blvd., Arlington, VA 22203-1984]

**KEEP US IN CIRCULATION
PASS US ALONG**

A human component to consider in your emergency management plans: the critical incident stress factor

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In recent years the issue of human stress response in emergency workers has begun to receive attention. This paper presents a rationale for considering human stress as a significant factor in the management of emergencies. It discusses the concept of stress, Critical Incident Stress in emergency responders, and introduces the Critical Incident Stress Debriefing (CISD) process. It is suggested that, in a disaster, the CISD process can improve the effectiveness of response teams on site, their turnaround time on site, and post disaster time off the job. This paper, prepared by a US Bureau of Mines research psychologist, offers some ideas to the mining industry in general, mine rescue trainers, and more universally, to those responsible for developing emergency management plans.

1. Introduction

A main focus in the management of emergencies has been on resources and logistics; in other words, having what and who you need, where and when you need it to meet the crisis within an urgent time frame. The necessary resources include an emergency management plan, trained manpower, appropriate equipment, available communication, plus knowledgeable and decisive leaders. In the mining industry, emergency response planners have concentrated on designing better and safer equipment, producing escape apparatus such as the person-wearable,

self-contained self-rescuers, decreasing response time, increasing training of mine rescue teams, and on developing escape plans that comply with mine safety regulations. Mining operators must develop escape plans that are designed to comply with the United States Code of Federal Regulations for underground and for surface mining.

Immediate and appropriate response to mine disasters is, of course, essential to minimize the severity of accidents, loss of life and the possibility of the loss of the future productivity of the mine. Designing improved equipment along with the application of other new technologies and focused training increases the efficiency of the rescue worker. However, an often overlooked consideration in mine and other disaster training and management programs is the impact of stress on the emergency workers themselves. In addition, increased technology has brought more efficient communication, such that personnel in the command center have the potential for experiencing some of the same stress effects as the front line emergency workers. This paper offers information and suggestions on how the effects of human stress on emergency/rescue workers may be factored into emergency management planning.

2. The stress response

The stress response is a normal human characteristic. Although there is

less than total agreement on the nature of human stress, the following discussion will acquaint the reader with some basic concepts. Hans Selye, an Austrian endocrinologist, described a consistent pattern of mind-body reactions in 1926. He referred to this pattern as the rate of "wear and tear" on the body and coined the term *stress* which refers to the general response of the body to any demand placed upon it. The demand Selye referred to as the stressor. The stressor leads to the *stress response*. The stress response, in turn, leads to stress related disease. It must be noted that not all stress is negative; stress arousal can motivate superior performance. Selye said that there is positive stress, and only when stress moves to dysfunction, he referred to it as *distress*.

A stressor can be either *psychosocial* or *biogenic*. Psychosocial stressors are environmental events wherein the individual's interpretation plays a key role in the onset of the stress response. In fact, recent research with a specific population of accountants suggests that interpretational mechanisms play what may be the primary role in occupational stress and illness (Smith and Everly, 1992). Biogenic stressors are stimulants such as caffeine, nicotine, amphetamines, phenylpropanolamine and theophylline; they initiate the stress response directly. Both psychosocial and biogenic stressors initiate the stress response, but psychosocial stressors

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do not *directly* cause the stress response; only those psychosocial stressors interpreted as threatening by the individual will initiate the stress response. It is not necessarily what happens to us; it is the meaning we give to the experience that makes the difference. Stress may be further categorized as either *cumulative stress* (eroding, i.e., the daily hassles) or *traumatic stress* (sudden, intense). In emergency management the focus is on the consequences of traumatic stress.

The human organism survives because of the maintenance of a normal internal balance referred to as homeostasis. A physical or psychological threat tends to disrupt homeostasis and produce physiological reactions in the body. These physiological reactions in-

volve the nervous and endocrine systems and produce various system, and organ responses. Specifically, stress leads to activation of the autonomic nervous system and to an increase or decrease in secretions of various hormones in the body (Asterita, 1985). The response to a perceived threat or danger is sometimes referred to as the "fight or flight" response. When we are under duress, our hearts beat faster and blood is diverted to the skeletal muscles; one may experience shock; temperature, blood pressure and respiration rate remain high; there is a sudden outpouring of hormones; the throat becomes dry, digestion stops and the eyesight improves (Myers, 1992; Selye, 1993). This response was useful to our early ancestors in their efforts to survive dangerous animals, human

enemies, and other conditions of primitive environments. In today's societies, the dangers may differ but can be equally severe and more complex. Modern humans are besieged with overlapping stressors and the constant response to them creates wear and tear on the mind and body (cumulative stress). In addition, emergency workers may be exposed to sudden intense stressors (traumatic stress). Both interrupt homeostasis and result in consequences for the individual.

3. The rationale for inclusion

The National Institute for Occupational Safety and Health (NIOSH) in the United States identifies occupational stress as one of the principal social and occupational health concerns of the 1990's. In response, NIOSH has developed a multipoint strategy for the control of stress in the workplace and has joined forces with the American Psychological Association to translate the strategy into practical action (Keita and Sauter, 1992). The National Council on Compensation Insurance notes that excessive stress accounts for about 14% of all occupational disease compensation claims (McCarthy, 1989). The number of stress-related worker compensation claims being filed across the United States is skyrocketing. The US Department of Commerce in 1990 reported that claims nearly doubled from \$13.6 billion in 1980 to \$24.7 billion in 1987 and are expected to top \$90 billion by the turn of the century (Keita and Sauter, 1992). Work-related stress claims are the fastest growing and most costly per incident among claims effecting American commerce (Everly and Mitchell, 1992). The total financial cost of extreme stress to business and industry is difficult to document but estimates place it between \$100 and \$150 billion per year; 600,000 workers, moreover, are disabled each year for reasons of

psychological disorders (Keita and Sauter, 1992; Miller et al., 1988).

Some workers, through conditions or choice of occupation, place themselves in stressful situations at a higher frequency rate than other workers (Heltzer et al. 1987). Emergency personnel such as mine rescue teams, firefighters, police, hospital emergency room personnel, paramedics, and workers called on to respond to disasters fall in this category. These workers are at high risk of experiencing disabling occupational stress reactions and, at the extreme, for a diagnosis of Post Traumatic Stress Disorder (PTSD) (Everly and Mitchell, 1992). PTSD is considered to be the most severe and disabling variation of occupational stress. The general public became aware of PTSD after the Vietnam War, when soldiers were reporting symptoms of a duration and intensity that called for medical intervention. PTSD is a medical diagnosis recognized in 1980 by the American Psychiatric Association and described in the 1994 Diagnostic and Statistical Manual of Mental Disorders (DSM IV), the medical diagnostic manual for psychiatric disorders. Symptoms associated with PTSD include flashbacks or nightmares, reliving of events, exaggerated startle responses, sleep disturbances, detachment or avoidance of close, interpersonal relationships, feelings of guilt, high levels of anxiety and depression, and impairment of concentration and memory (Rundell et al., 1989).

By definition, a traumatizing event is one that is outside the normal range of everyday life events. It is experienced by the individual as devastating (Doepel, 1991). Traumatizing events or *critical incidents* are especially frequent among emergency workers. A critical incident is one experienced by personnel that produces an emotional reaction with the potential for inhibiting a worker's ability to

function either at the scene or at a later time. The individual's coping mechanisms are overwhelmed. An example of a critical incident for an individual would be the serious injury or death of a colleague in the line of duty or an incident where the circumstances, the sights, sounds and smells are so distressing as to result in an immediate or delayed reaction. Examples of potentially traumatizing critical incidents for a community would be an earthquake, hurricane, fire, flood, large-scale environmental pollution, multiple injury/fatal accident, terrorism, child related traumatic events or homicides in the community (Mitchell and Everly, 1993).

Researchers have identified both immediate and long range symptomatic reactions to trauma (Doepel, 1991). Initially, individuals will report numbness, denial, avoidance of places or things that remind them of the trauma, withdrawal from social interaction, depression, difficulty with concentration and relationships. Long range, more acute symptoms include fearfulness, irritability, sleep disturbance, and flashbacks. These responses can fluctuate within an individual and be confusing and disturbing to the individual, his family, and co-workers. Although researchers and psychologists who specialize in job stress generally agree that persons attracted to emergency work are, as a group, basically more emotionally stable than the general population, emergency workers are, however, subject to an increased incidence of stress-related diseases (Dunning and Silva, 1988). Post trauma reactions are natural—though not necessarily healthy—responses to trauma, and they can be resolved. There is consensus among clinicians and researchers that the presence of a supportive environment is crucial to a positive resolution for the traumatized worker (Doepel, 1991). Successful resolution of the crisis experience not only allows for the worker's return to

productive work but can help him or her better understand a normal response to an atypical situation. Emergency Service personnel generally are normal individuals responding to abnormal situations. Critical Incident Stress Debriefing is an organized approach to the management of the stress reaction.

4. Background

Throughout history there are references to human stress in traumatic situations. It has been suggested that Critical Incident Stress Debriefing intervention evolved from four major influences: military experiences, police psychology, emergency medical services and disasters. Stress reactions during war have been reported by historians since 603 BC (Mitchell, 1988). Thousands of combat stress victims were reported during the American Civil War and among American service personnel in the two World Wars. Police psychologists entered the emergency services in the mid 1960's and they have contributed knowledge about the personality profile of the emergency worker and recommendations concerning the provision of psychological support services. Emergency medical service agencies began developing support services in 1972; the first programs were in trauma centers and large hospitals. In 1983, after nine years of ground work, Mitchell (1985, 1988, 1993) introduced Critical Incident Stress Debriefing (CISD). He formed CISD teams made up of trained mental health professionals and specially trained peer support personnel drawn from the ranks of the emergency services. In a 1985 survey of 360 emergency workers from four states, 87% of the emergency responders stated that they had been emotionally and physically stressed by their work; 93% felt that the debriefings were helpful.

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5. Intervention

A Critical Incident Stress Debriefing team is peer-driven and guided by a mental health professional. Its work is confidential. CISD teams function in three areas: pre-incident, incident, and post-incident.

5.1. CISD pre-incident

The pre-incident functions are mainly educational. Included are instruction on stress recognition and stress reduction and the differences between non-emergency stress and critical incident stress. Instruction is provided to both the workers and the management/ command staff. Emergency managers need to be included in the instruction and become informed about the capabilities and the limitations of CISD Teams and how to initiate services. Stress management protocols for use during an incident can be invaluable. They provide guidelines for optimal length of work time, frequency of rest periods, maximum time at the scene, food, shelter and use of a CISD team. In addition, the provision for spouse and family education programs can provide significant support to the emergency worker. This first phase of the program, focused on education, is a key component of the intervention. The more information people have about stress, the better they can recognize it in themselves and others, and seek

help. Pre-incident programs provide emergency workers with information to help prepare for their own responses during an incident and understand that the intensity of their feeling is normal in an abnormal circumstance, and will resolve with time. Pre-incident education can lessen the need for post-incident allocation of resources for rehabilitation.

5.2. CISD during an incident

CISD "during a critical incident" is defined as the time surrounding the emergency and includes activities within twelve hours after an emergency worker leaves the scene. During the incident a debriefing team provides on-scene assistance to personnel who are obviously distressed. The team also may provide *defusings* which are shorter, unstructured debriefings that encourage a brief discussion of the events. These can significantly reduce acute stress. Defusings are done one to three hours following the event and may last up to one hour. If a defusing is not achieved within twelve hours, a full formal debriefing within three days of the incident is recommended. In large disasters, where many people are involved, after an emergency team disengages from the scene, participants meet with mental health professionals and are given information on the typical effects of critical incident stress and the symptoms which may or may not appear. They are given practical suggestions for stress management and allowed time to comment or ask questions. This intervention is referred to as a *demobilization*. An example of the information and behavioral stress reduction suggestions offered at a demobilization might include the fact that a cup of coffee contains 150 mg of caffeine (tea contains 50-60 mg). Caffeine is a biogenic stressor known to cause stress arousal. It is believed that dosages in the 200-300 mg over several hours (3-6 hr) can be ex-

cessive for certain individuals and can contribute to anxiety and stress-related symptoms (Girdano et al., 1993). Thus, a recommendation to avoid caffeine (coffee, tea, colas, chocolate, etc.) might be presented by the CISD team.

5.3. Post-incident CISD

For about 24 hours after an incident, when defusings or demobilizations are complete, emergency personnel typically prefer not to discuss the event with outsiders. Emergency personnel may focus on reports and procedure, not being ready to deal with their feelings about the event (Mitchell, 1985). As stated earlier, CISD is a psychological and educational support group discussion that utilizes a specially trained team composed of a mental health professional and peer support personnel. A CISD team after a mining disaster would be composed of a mental health professional and mine rescue team members who have been trained in CISD. The CISD is a carefully designed, structured process that progresses through seven phases and provides stress-reduction information. Participants are encouraged, but not required, to speak; the process is confidential. The overall objective of the debriefing process "is to mitigate the impact of stress and restore the personnel to normal functions as quickly as possible" (Mitchell and Everly, 1993, p.85).

Responders to emergencies are not always trained or experienced personnel. Sometimes they are individuals who simply are "there" and enlisted to perform a task. In a mine fire, rank and file miners from other areas may be called upon to execute emergency assignments and consequently be exposed to critical incidents. An example of this assumption of roles in an emergency, is found in a US Bureau



of Mine's case study of workers' escape from an underground mine fire (Kowalski et al., 1993). The fire was discovered by the "fire boss" (mine examiner) who disengaged the trolley power and called to warn the shift foreman and the miners working in the three sections which were affected by the fire. The fire boss, joined by the mine foreman and the general assistant foreman, fought the fire and extinguished it about an hour after discovery. Meanwhile, twenty-some miners escaped under smoke. There was no time for a mine rescue team to organize and respond. The individuals on the scene reacted to fight the fire and to execute the escape. All individuals called upon to fulfill emergency roles should be included in debriefings.

5.4. Follow-up

All defusings, demobilizations and debriefings are followed up in some manner ranging from a phone call to a follow-up meeting. The form of the follow-up is dependent on individual and group needs as discerned by the CISD team during the intervention. CISD formal training is essential for the peer support personnel and the team leaders. Team leaders are mental health personnel or members of the clergy. It takes a special task force six months to a year to organize a CISD team which is generally a volunteer group and needs to be carefully recruited, trained, and committed to the process. Appropriate follow-up after a critical incident

allows closure of the event for the emergency responder.

6. Conclusion

Critical Incident Stress Debriefing teams have grown remarkably in the past ten years. The Third World Congress on Stress Trauma and Coping in the Emergency Services Professions, held in 1994 in Baltimore, MD attracted attendees from all over the United States and abroad. In November of 1994 there were approximately 350 CISD teams worldwide. The studies cited here suggest that those responsible for the development and implementation of crisis management plans need to be aware of the importance of including resources for meeting the critical incident stress needs for their rescue workers. They emphasize the importance of the intentional creation of pre-incident education programs and a post-trauma workplace milieu that is conducive to healthy resolution of the trauma.

Management personnel are not exempt from critical incident stress syndrome. As suggested earlier, in the present information age, technology can provide almost instant details of the emergency scene to the command personnel. Doepel (1991) has reported that managers are vulnerable to traumatic stress reactions and need to be offered training and information with the rest of the emergency personnel. His experience suggests that management, whenever possible be involved in the group process. He concludes that a good emergency plan "is enhanced by the inclusion of components designed to mitigate the effects of post-traumatic stress reactions among managers and employees" (p. 186).

The following are steps for incorporating the human stress factor in emergency/rescue work into an emergency plan:

1. Develop a collaboration between mental health personnel and

emergency service personnel. Mental Health personnel should be included in emergency planning (Hartsough and Garaventa-Meyers, 1985).

2. Develop an educational program for workers and their families including information on critical incident stress and interventions (Mitchell, 1988). Include workers and managers in your program (Doepel, 1991).

3. Allocate resources, time and space for a debriefing process to be conducted by trained personnel (Mitchell, 1988).

4. Provide for follow-up and support after the event.

This paper has considered the human stress factor in the work of emergency personnel and discussed Critical Incident Stress Debriefing as an intervention. Quarantelli (1985) noted in the disaster research, that we are far from certain how much any of us understands about the nature of disasters, the nature of mental health, and the relationship between the two. The initial step is to recognize how significant that relationship may be.

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A Message from J. Davitt McAteer, Assistant Secretary for Mine Safety and Health

Members of the Mining Community:

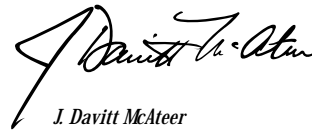
Recently, the Mine Safety and Health Administration reorganized its education and training (E&T) function to transfer field training specialists from Coal Mine Safety and Health and Metal and Nonmetal Mine Safety and Health to its Directorate of Educational Policy and Development (EPD). The purpose of this change is to optimize the use of the Agency's resources in order to improve the quality of training assistance provided to the mining industry.

During the course of our review of the E&T function, we carefully considered the recommendations made by man-

agement and labor in both the coal and metal and nonmetal mining industries. The reorganization resulted in a new division under EPD—Educational Field Services. This new division consists of eastern and western field operations and reports to the Director of EPD.

Training plays a critical role in preventing deaths, injuries and illnesses on the job. Only with effective training can miners recognize possible hazards and know the safe procedures to follow. Safety and health training needs to be a top concern for all of us in the mining community—today and tomorrow.

Recognizing that training and education are critically important to making progress, we are adding emphasis to our overall education and training program with new materials, new outreach efforts, and this new structure. We would like to invite you to join us in making these efforts a success.



J. Davitt McAteer

To accomplish the above, educational field services will:

• Share information.

Provide to the mining industry safety and health training materials available from the National Mine Health and Safety Academy.

• Assist in the implementation of Accident Prevention Programs.

Provide guidance and assistance in developing educational programs designed to reduce accidents and injuries by sharing accident data and on-site observations.

• Assist in the development and promotion of new programs and materials.

In cooperation with the National Mine Health and Safety Academy, assist the mining industry in the development of special emphasis pro-

grams and educational materials to address safety and health concerns, including respirable dust issues.

• Assist mining instructors.

In cooperation with the National Mine Health and Safety Academy, provide courses to assist mining instructors in meeting educational needs of the mining industry, including instructor approval.

• Process training plans.

Assist in the development of training plans tailored to meet the needs of individual mines. To accommodate the mining industry, MSHA will accept training plans transmitted by mail, Internet, or fax.

• Assist in Qualification/Certification (Coal).

Provide assistance in qualification/certification programs, such as dust, noise, impoundments, electrical, etc.

• Recognize outstanding safety and health practices.

Support the Holmes Safety Association and similar mining organizations in recognizing miners, operators, companies, and others involved in the mining industry who have accomplished outstanding safety and health records.

Assist in Mine Emergency Readiness. In cooperation with the National Mine Health and Safety Academy, assist mines in maintaining mine emergency response readiness.

Develop partnerships. Continue to develop partnerships with mining associations, labor organizations, trade associations, academia, state and federal agencies, and others interested in mining.

Reprinted, in part, from the July 1998 MSHA publication: Educational Field Services—A new focus in MSHA.

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MSHA automates enforcement with laptop computers

What began as a pilot project nearly four years ago has evolved into a program that will put laptop computers in the hands of all federal mine inspectors by year's end. The Mine Safety and Health Administration (MSHA) is arming its enforcement staff with portable computers to help them do their jobs more effectively and efficiently.

Through the use of laptop computers, mine inspectors will replace handwritten forms with electronic ones when issuing a safety or health citation. In addition, they will have at their fingertips a variety of reference materials and applications, including agency regulations, the Federal Mine Safety and Health Act, the Program Policy Manual, historical inspection results, and accident and injury rates. Currently, seventy-five percent of the agency's nearly 850 inspectors have been equipped with laptops. Two-hundred more machines are on order and slated for delivery by August 31, 1998.

"This is an exciting endeavor for MSHA," said J. Davitt McAteer, assistant secretary for mine safety and health. "Using laptop computers will enable our inspectors to spend more time in the mines and less time filling out paperwork. Ultimately, that serves to benefit the men and women who work in our nation's mines.

"Inspectors can compose notes, observations or reports while ideas are still fresh in their minds, and can

then transfer these notes into the narrative section of a citation," said McAteer.

Development of MSHA's pilot program began in five MSHA field offices in 1994. Despite some initial shortcomings with regard to applications and training, the software and hardware have

• A comprehensive training course at the Mine Health and Safety Academy in Beckley, West Virginia.

• The Laptop Steering Committee, established in March 1998, is made up of inspectors, supervisors and computer programmers who recommend priorities for software modification, training and future application development based on members' input.

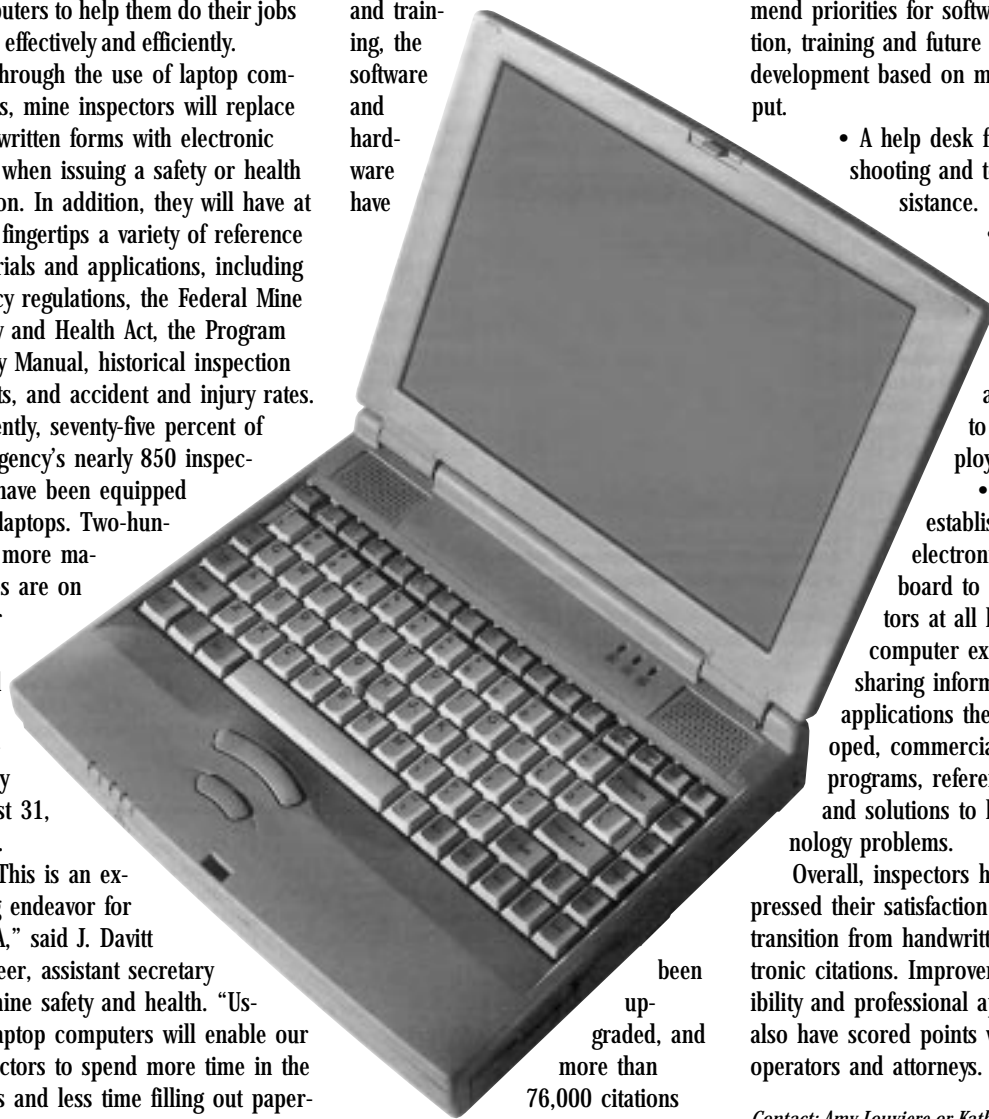
• A help desk for troubleshooting and technical assistance.

• A quarterly newsletter that communicates information about laptops to MSHA employees.

• The future establishment of an electronic bulletin board to aid inspectors at all levels of computer expertise in sharing information about applications they have developed, commercial software programs, reference materials and solutions to laptop technology problems.

Overall, inspectors have expressed their satisfaction with the transition from handwritten to electronic citations. Improvements in legibility and professional appearance also have scored points with mine operators and attorneys.

Contact: Amy Louviere or Katharine Snyder
Phone: (703) 235-1452



been upgraded, and more than 76,000 citations have been issued electronically since December 1995.

MSHA has developed a number of resources to assist mine inspectors in becoming proficient with their laptop computers:

Coal accident summary

Fatal machinery accident (coal refuse facility)

General information

The operation is a coal processing plant. The facility currently processes coal from six of the company's mining operations, using jigs and froth flotation recovery methods. A total of 27 people are employed at the plant, which normally operates one and one-half production shifts per day, five days a week. The remainder of the second shift is used for maintenance. The plant processes about 10,000 tons of raw coal daily which generates 4,500 tons of clean coal and 5,500 tons of refuse daily.

The refuse is disposed of at the coal refuse impoundment site—MSHA had previously approved this site. The facility consists of two areas, the West Hollow and the East Hollow. The fine refuse (slurry) is now pumped from the preparation plant into the West Hollow pool area for disposal. The coarse refuse is transported from the preparation plant to the East Hollow via two haul trucks. The East Hollow is in the abandonment phase and is being capped with coarse refuse. The cap is formed as the coarse refuse is pushed, by a bulldozer, into the slurry pool to form a consolidated layer over the slurry, capable of supporting the weight of the equipment.

Description of accident

On February 20, 1998 at about 5:40 am, the victim, a bulldozer operator, with 25 years of experience (four at this site) arrived for his shift which began at 6:00 am. The victim had a brief conversation at the preparation plant with the truck driver. The victim then drove his personal vehicle to the coal refuse facility (slurry impoundment), to begin his shift.

At about 6:40 am, the truck driver arrived at the East Hollow area with the first load of coarse refuse. The area was still dark at this time of the morning and the truck driver did

not see the victim or any sign of the bulldozer. When the truck driver arrived with his third load of the day, at about 7:40 am, and still did not see the victim he became worried. Enough daylight was present for him to visually scan the area. The other truck driver also did not see the victim but thought that he may have gone to the West Hollow area of the impoundment. There were no bulldozer tracks leading away from the East Hollow area. While the truck driver returned to the preparation plant, the other truck driver drove around the East Hollow impoundment looking for the victim.

At about 8:00 am, the truck driver returned to the plant and told the plant foreman that they could not find the victim. The plant superintendent and two mechanics immediately went to the impoundment. Upon their arrival, they discovered a location where it appeared that a bulldozer had backed into the slurry with the blade down. Emergency personnel along with state and federal authorities were notified.

An examination of this area indicated that the victim had apparently made several pushes of coarse refuse toward the slurry pool at the head of East Hollow. The impressions left by the bulldozer blade indicated that he started to back-drag the haulroad on his way out. The bulldozer then made a half circle, with a radius of about 30 feet. The half circle started where the impoundment and the hillside met and continued around to the right until it disappeared into the slurry.

About 10:00 am the bulldozer was located 12-15 feet below the surface of slurry. The company called for a long boomed excavator and an attempt was made to remove the slurry using the excavator. The slurry was too fluid to allow only the mate-

rial from around the submerged bulldozer to be removed and the impoundment was too large to allow removal of all slurry down to the level of the bulldozer.

A decision was made by company officials along with state and MSHA representatives to construct a dike across the slurry impoundment to limit the amount of material requiring removal. The dike was completed on February 21, 1998 at about 10:35 am. Once the slurry was removed it was placed in the holding area or into the impoundment, on the up-stream side of the dike.

The first visual contact with the bulldozer was made at 10:00 pm on February 21, 1998. On February 22, 1998 at about 5:40 am an outside contractor attached winch lines to the bulldozer and two retrievers and two track mounted front end loaders with winches were used to recover the bulldozer. At 7:55 am the bulldozer was recovered from the impoundment with the victim's body located in the operator's compartment. The victim was pronounced dead by the county coroner at 8:00 am.

Subsequent examination of the dozer revealed no mechanical defects which might have contributed to the accident and all lights on the bulldozer were found to be functional.

Conclusion

For undetermined reasons the bulldozer backed into the slurry impoundment asphyxiating the entrapped operator. There is no physical evidence to indicate why the bulldozer went into the slurry impoundment. However, insufficient illumination in the area may have contributed to the accident.

Edited by Fred Bigio from an MSHA Accident Report

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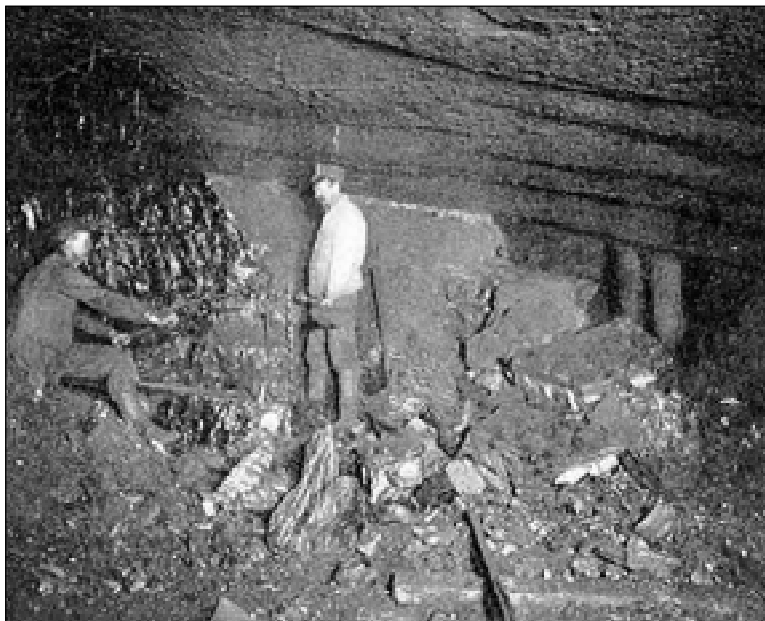
A LOOK BACK— Anthracite coal mines and mining

By Rosamond D. Rhone

Three ink blots on the eastern end of the map of Pennsylvania, between the Delaware and the Susquehanna rivers, represent all the anthracite coal in the United States. They cover an area of 488 square miles, and produced last year 53,500,000 tons,—truly infinite riches in a little room. They are popularly known as the Wyoming, Lehigh, and Schuylkill regions. Their limits are so sharply defined that one can pass in five minutes through one of the notches in the surrounding mountain wall and find himself as much out of the “coal regions” as if he were a hundred miles away. The coal measures lie on a floor of conglomerate rock, which rises about them on all sides like the sides of a basin, and is exposed on the slopes and summits of the mountains surrounding the coal regions.

The coal measures which lie in this basin are composed of alternate layers of rock and coal piled upon each other like the layers of a jelly cake, in which the thick layers of cake represent the rock strata and the thin layers of jelly the coal beds. The thickness of the coal beds varies from 1 foot to 32 feet, and that of the rock from a few feet to 200. The coal beds are pretty regularly distributed throughout the coal measures, and their presence in a certain place can generally be calculated upon, so that each bed bears its own name. The theory of the vegetable origin of coal has many advocates, but the last word has not been said. The fossil plants in the coal measures, upon which so much has been built, are not found in the coal beds, but in the slate overlying them which is not a species of coal, nor of vegetable substance in the process of changing into coal, but rock.

Figure 1.—At right: Cutting coal—robbing a pillar; props on the right.



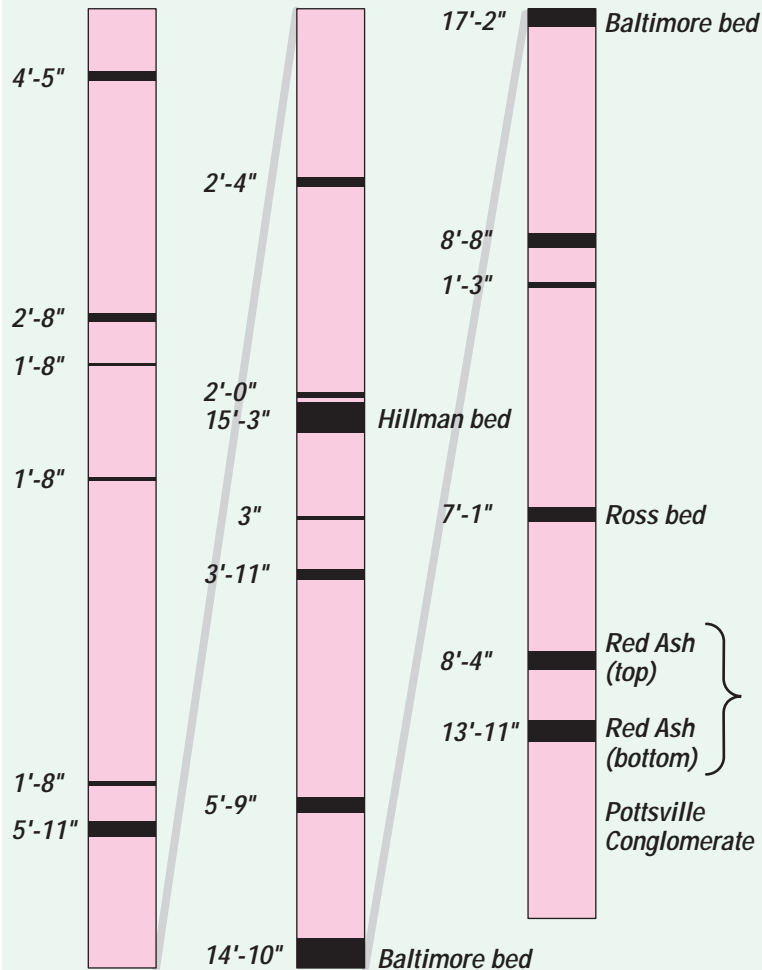
The inside of a coal mine.

The term colliery includes the coal mine, with its buildings and appurtenances; the mine proper is underground. The entrance to it is by a drift, a slope, or a shaft. “Stripping,”—which is quarrying, and not mining at all,—is only possible where there is an outcrop of a thick bed of coal. The strippings are in the Lehigh and Schuylkill regions, where the coal is in the mountain tops. A drift is a horizontal tunnel in the face of an outcrop. It is the cheapest and was the earliest method of opening a mine, but the drifts have long since been worked out. A slope is a tunnel which follows down the dip of a coal bed from the surface. It is largely used in the Lehigh and Schuylkill regions, where the pitch of the beds is steep and outcrops frequent. In the Wyoming region the upper beds were formerly mined by drift and by slope; but these have been pretty generally exhausted, and access to the creep-lying beds is only possible by shaft. A shaft is a well-like excavation, opened vertically from the surface to the bed of coal which it is desired to work.

Its width is the length of a mine car, from 9 to 10.5 feet, and its length is governed by the number of compartments and area of airway needed. A shaft 10 feet wide and 24 feet long is common, while some are 13 feet wide and 53 feet in length. Its mouth, as far as the soil extends, is lined with cribbing or masonry, below which the rock forms its walls. Its purpose is to hoist coal, to let the workmen up and down, and to pump and ventilate the mine. Over or near its mouth is built the hoisting and pumping apparatus, and it is divided by timbering into carriage-ways, pumpways, and airways. A shaft is usually located so that its foot shall be in the bottom of a synclinal valley, in order that as the mine is opened up the slope it will drain itself into a sump, and the coal will be sent down the grade to the shaft. The lowest place in a mine is the usually near the foot of the shaft,—from which the water is pumped to the surface by powerful engines. From the foot of the shaft a tunnel called a “gangway” is opened at the right and left in the coal bed along the bottom of the synclinal valley, and parallel with this and above it runs another

Figure 2.—Columnar section showing coal beds and rock strata

(1,272 feet of rock, 117 feet of coal = 1,389' total thickness above the conglomerate)



tunnel called an "airway." These are connected by short tunnels called "cross-headings." The gangway is the highway of the mine; it is permanent, and is heavily timbered on the sides and roof; in it are the mine car tracks, single or double, over which the coal is hauled to the shaft; it is the traveling way through which the men reach their working places, and it is also a part of the ventilation system.

The mining of coal is by the "pillar and breast" system. When the gangway and airway have been driven two or three hundred feet chambers are opened at right angles to the airway,—these are called "breasts." A narrow

tunnel, just wide enough to admit a mine-car track, is driven about fifteen feet, beyond which the breast is opened to its full width of from twenty-four to thirty-six feet, depending upon the safety of the roof. The inner end, which continually advances as the coal is taken out, is called the "working face," or simply the "face;" the side is called the "rib." Several breasts are worked together, and at intervals are connected by openings called "cross headings." The walls between the breasts are thus cut into "pillars," whose thickness depends upon the roof. In a dangerous mine the pillars are as thick as the width of the breast,—that is, only 50

percent of the coal is taken out. Up the breast, as soon as it is opened sufficiently, is laid a track called a "buggy road" upon which runs a small mine car, or "buggy." The track follows the development of the breast, and when that is worked out it is taken up. The process of mining is simple, and the tools are of the rudest. They are pick and shovel, bar, hand and machine drills,—the latter an auger, turned by a crank,—and powder and squibs. The coal is loosened or "cut" from the face by blasting; the pick is only used to knock down loosened pieces from the roof and sides, to break up the largest pieces, and to separate the slate from the coal. The general plan of a mine is that of a vast hall with pillars of coal, and roof and floor of the black slate which lies next to the coal; but its floor is seldom level, and the gangways are far from straight. The breasts may pitch so much that the coal is slid down to the gangway in chutes, instead of being hauled over buggy roads. We have seen that a mine is usually worked up the side of an anticlinal, as the surface of a hillside, while preserving in the main a uniform slope, yet drops into ravines and rises into ridges, so the coal beds bend and wind, and their course is followed by the gangways and the accompanying breasts. The distance that a breast can be worked depends on the vein of coal it follows. It may run to a boundary line; to an outcrop; to an anticlinal, when the bed begins to pitch down and the breasts to fill with water; it may thin out until the rock-roof and rock-floor come together; or it may strike a "fault," which is such a disturbance of the strata that the coal bed is altogether lost.

The mine described is the simplest form, in which only one bed is worked; several beds are often worked at one time, with entrance at different levels to a common shaft, or they may be connected by slopes and shafts within the mine. The coal region is a vast network of mines, so connected with each other that one may travel many miles underground; and lying above each other,

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like the floors of a broodingnagian apartment house.

The last thing done is to “rob the pillars.” This, notwithstanding its sinister sound, is a legitimate process. While a mine is being worked as much coal is taken out as is considered safe, leaving the pillars, supplemented by props, to support the roof. When a mine, or a portion of one, is worked out, the miners are sent in to take yet more coal from the pillars,—that is, to pare them to the last limit of safety. This work is begun at the farther end, and progresses toward the shaft.

The ventilation of mines

The modern system of mine ventilation is perfect; and while simple in method, it is extremely complicated in its ramifications. The air is exhausted at the air-shaft by a fan, and fresh air rushes down the main shaft to take its place. The law requires that not less than two hundred cubic feet per minute be furnished to each person in a mine. The fan,—which is a huge wheel without a rim, and with broad blades like those of a side-wheel steamboat,—revolves day and night. During a strike, when everything else comes to a standstill, two things do not cease to move,—the fan and the pumps, for the

stoppage of either would work irreparable injury. (See plan of ventilation.) As the air is drawn out at B and fresh air rushes in through the gangway, its simplest course would be through the cross heading A into the airway, as indicated by the arrows. To prevent this partitions are built at A and C, compelling it to go to the end of the gangway and enter the airway at F. As long as the breasts 1, 2, and 3 have been worked only a short distance, the strong current of air rushing past their entrance ventilates them sufficiently, especially as the miners are in the habit of “brushing” out the powder smoke and gas by swinging their coats, over their heads; but as they advance, and new cross-headings are opened at G and H, partitions are built at F and D to compel the air to pass through G and H. If a breast is very gaseous, a brattice of boards or “brattice cloth” is built, to force the air to pass close to the “face.” The partitions are built of “gob,” which consists of rock and dirt, the waste of the mine. When a partition is built across a traveling way it has a door, which is opened and closed by a boy. It is often necessary for one air current to cross another, when it is conducted in an air-tight box called an “air-bridge.” Each current of air is called a “split,” and the

law forbids more than 75 men working in one air-split.

Mine gases

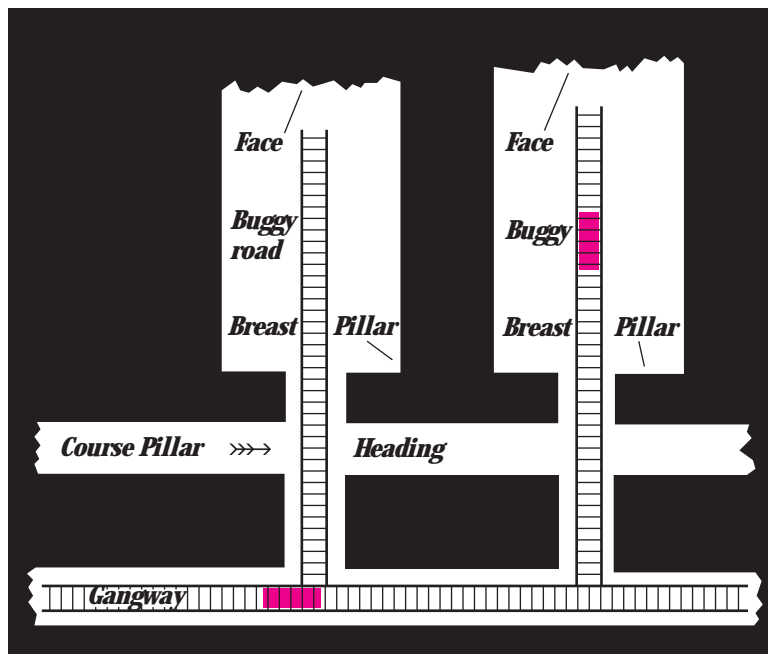
In addition to the smoke of blasting powder and the exhalations of the men and mules which foul the air, there are several dangerous gases. “Fire damp” is a light, explosive gas, which sometimes burns with a quick flash; sometimes explodes with terrific force, blowing down walls and doors, and destroying the elaborate ventilation system in a moment. It often occurs as a “blower” or “feeder,” which is a jet issuing from a fissure in the coal; it is apt to be ignited by a miner’s lamp, and is usually put out by a blow of his cap, although mines have been set on fire by a blower. “After damp,” “black damp,” and, “choke damp,”—loose names for different compounds of carbonic acid gas,—and “white damp,” which is carbonic oxide, are all non-inflammable and non-explosive, but deadly to inhale.

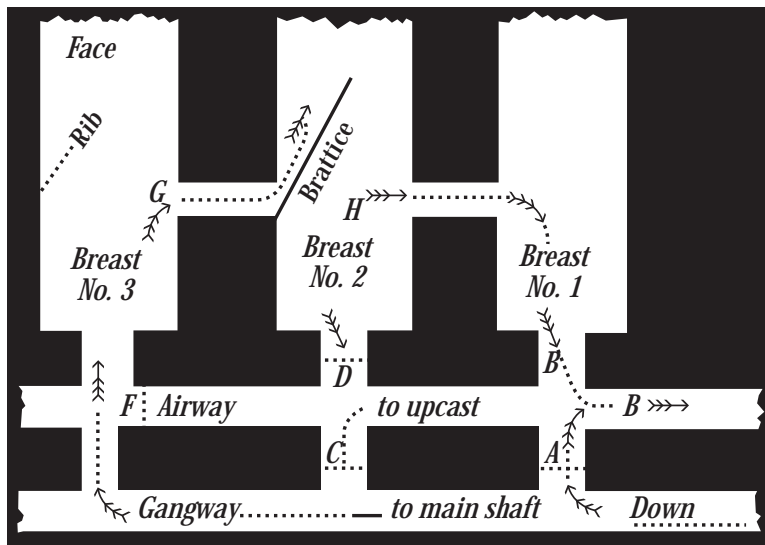
It is the duty of the “fire boss” to examine the mine every morning before the entrance of the men to see that the air currents are traveling in the proper courses, and that there are no dangerous accumulations of gases. Dangerous places are barred across and the word “Fire” written over them.

Mining accidents

There are two classes of accidents,—those which damage the mine, and those which injure the workmen. The disasters to the mine are the great explosions and extended falls, which bury the workings in a mass of rock and coal, and render them difficult to reopen; for when the roof is destroyed by the breaking up of the rock strata, it is only possible to hold it up by timbering. Mines are flooded by an inrush of water from abandoned workings in upper beds, and, in the Wyoming Valley, they are often lolled with quicksand and gravel from pot holes; but the most serious of all disasters is a fire. There is much woodwork within a mine, and when this is set on fire it ignites the coal. There two ways of extinguishing a fire, by sealing from the air, and by flood-

Figure 3.—
Ground plan of
mine showing
breasts,
gangway,
airway, buggy
roads, etc.





ing with water. The former is a tedious and uncertain process, as the coal may smolder for months and burst out afresh on the admission of air. To fill a large mine with water, pump it out, and repair the damage to gangways takes from ten months to a year and a half, and the expense incurred is enormous. There are two classes of fatalities; the great disasters, in which a large number of men lose their lives; and the minor accidents, which occur day after day, of which the public takes no notice, but whose aggregate number is far greater than the former. In the 32 years since the anthracite mine law was passed more than ten thousand persons have lost their lives in and about the mines; but there have been few great disasters,—the men simply fell out one by one or two and three in a group; and if, as was frequently the case, the victim was a Slav, with no relatives in America, the boarding boss refused to receive his body, saying “Dead Hungarian no good,” and the corpse was sent to a medical college for the dissecting table.

There lies before me a fat volume, of almost a thousand octavo pages, which might be called the “Book of Accidents.” It is the report of the Bureau of Mines of the state of Pennsylvania for the year 1900, and is made up of the reports of the inspectors of the eight anthracite and ten bituminous districts. The inspectors give detailed reports of each accident, and say that in from 50-

70% of the cases the victims lost their lives by their own carelessness. Last year in the anthracite mines there were 411 lives lost and 1,057 persons injured. This loss of life made 230 widows and 525 orphans.

Mine accidents are caused by the explosion or inhalation of gas, by blasting, by fall of roof, or by miscellaneous causes, such as being crushed between cars, falling down shafts, and being kicked by mules. During last year half of the fatal accidents occurred in the “breasts” by the fall of rock or coal.

Here will arise a natural inquiry,—Why, since so much damage results from fire and explosion, are not safety lamps used instead of naked lamps? There is a wide misapprehension concerning a safety lamp. It is not an illuminating lamp, but a test lamp. The principle of the “Davy” is in every school book of physics. It is that a flame enclosed in wire gauze will not ignite the gas outside of the lamp; but the gas will burn within the gauze, thus disclosing its presence. The light furnished by it is dim; and if the flame is strong enough to heat the wire to a red heat, it will in turn ignite the gas outside, thus becoming an element of danger.

Electric lighting has been tried, and does well in mines free from gas; but in gaseous mines there is too much danger, as a mine is such a rude place

that the wire is apt to be broken, letting loose the electric sparks.

Mine laws

The body of mine law in the statute books of Pennsylvania may be said to be a monument to the Avondale victims. The Avondale disaster, which occurred in 1869, was the first of those accidents resulting in a large loss of life with which the country has unfortunately become familiar. The Avondale mine was, compared with the great operations of today, a small affair. It was ventilated by a furnace at the bottom of the shaft, the shaft itself, with a tall chimney stack at its mouth, forming the ventilating flue. Over the mouth of the shaft was the breaker, and the mine had no other opening. One morning the furnace draft ignited the timbers which separated the flue from the carriage way, the flames caught in a load of hay which was descending by the carriage, and leaped to the top, where they set fire to the breaker, which burned fiercely for several hours, the mass of ruins covering the top of the shaft. In the mine were one hundred and eight men. It was two days before the imprisoned miners could be reached, the first of the rescuing party falling dead as they plunged into the body of “white damp” which filled the mine. When they were finally found, behind barriers which they had built in a vain attempt to keep out the gas, they were all dead,—not by fire, nor yet by explosion, but by suffocation.

The mine laws provide that no breaker shall be built nearer than 200 feet from the mouth of the shaft; that every mine shall have a second opening for the escape of the men in case anything happens to the main shaft, and that mines shall be ventilated by fan instead of the inadequate and dangerous furnace. In addition to these radical measures, there are laws regulating to a minute degree the entire management of the mines with reference to the health and safety of the workmen,—such as rules limiting the amount of powder which may be stored in a mine; the distance which a miner’s lamp must be kept from the powder,

Figure 4.—At left: Ground plan of mine showing system of ventilation.

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Figure 5.—Far right: A coal breaker.

and the kind of oil used in the lamps; rules regulating the working of the breaker, and all other machinery; requiring the operators to furnish props, to fit up wash-houses for the miners' use, to provide stretchers and ambulances, and to use all possible effort to take out entombed bodies. The enforcement of all the regulations is under the supervision of State inspectors.

The latest laws are those abolishing company stores, requiring the operators to pay the men every two weeks on demand, and requiring miners to have certificates. The last law was aimed at the immigrants from Austria and Poland.

The outside of a colliery

The external works of a mine are but a fraction of the mine itself. A colliery externally is a hole in the ground, with an unimpressive building over it containing the hoisting and pumping machinery, and near by the breaker, with its attendant culm pile. The breaker is a feature of the landscape,—its size, its uniform black color, softened to gray by distance; its peculiar shape, unlike any other building in the world, and the long hill of refuse called the culm pile, make it an object that challenges attention. A roar of machinery emanates from it; and a cloud of black dust, pouring from a multitude of broken windows' envelopes it and blackens everything in its neighborhood. Its shape follows architectural principles, in that it strictly conforms to its uses. The coal is hoisted to the top of the breaker tower, where it is crushed between powerful toothed rollers; after which it falls into screens graded from fine to coarse; thence it travels through chutes, where the slate is picked out by boys; and, finally, falls into pockets at the bottom of the breaker, and thence into cars ready for the trip to the seaboard.

A breaker is often 100 or 150 feet high, has a capacity of from 1,200-1,500 tons daily, and costs from \$90,000 to \$125,000 to build. The culm pile, which is as high or higher, is composed of the dirt and coal too fine for use, and is shaped like a pro-



longed "A" tent. Upon the top is a track on which runs a mine -car pulled by a mule, a small locomotive, or often running by gravity. The culm pile is originally a high trestle with a track upon its top. Through the trestle the culm is dropped until it is filled to the top and spreads out in a long slope on either side. The tracks are extended upon this hill until the culm covers many acres, sometimes so encroaching upon a mining village that houses must be removed to make way for it. The culm piles contain much coal which escaped the scrutiny of the slate pickers, as well as the fine sizes which passed through the screens. It is the habit of the women and children to pick coal from those shining black slopes, and in time of a strike the miners themselves seek the culm piles with bags and baskets. These hills are frequently on fire, and burn for years. At night a burning culm pile is a mass of blue, orange, and red embers, which forms a beautiful spectacle that may be seen for miles. It not infrequently oc-

curs that tramps, seduced by the pleasant warmth of one of these smoldering hills, lie down to sleep upon the culm, and are suffocated by carbonic acid gas.

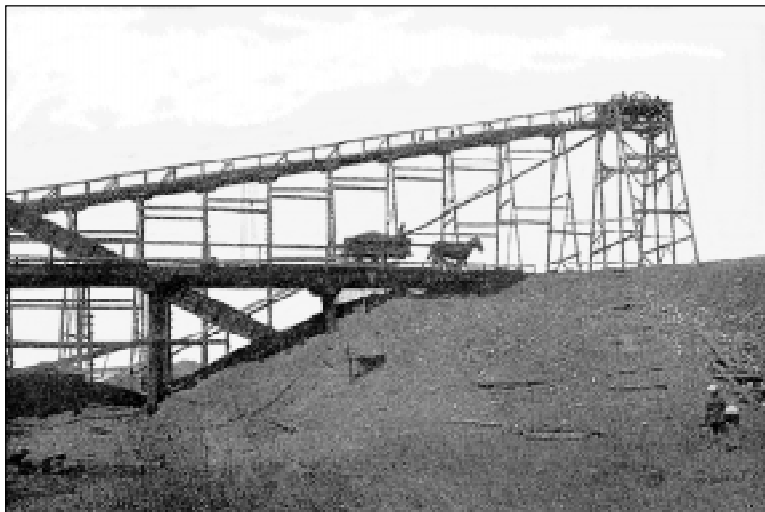
In the early days of mining, "chestnut" was the smallest marketable size of coal; everything smaller was dumped upon the culm pile. Now since what are called the "junior sizes, —pea, buckwheat," and even "rice" and "bird's-eye,"—are largely used, it has become the practice to work over the old culm piles by the "washers," where the culm is screened and cleaned by water, so that a large percentage of coal is obtained, although it is of inferior quality, some of it having been mined twenty or even thirty years ago, and having suffered from exposure to the air.

Culm is also beginning to be used for flushing back into the mines,—that is, it is mixed with water and poured into the mines, when it immediately fills the worked-out chambers. After it has become settled, and the water is pumped out, it forms a solid mass, which supports the roof, so that the pillars can be taken out.

Mine employees

The employees in the 363 collieries of the anthracite coal region in the year 1900 numbered 143,826. This is according to the latest report of the Bureau of Mines. The newspaper are somewhat in excess.

Figure 6.—At right: Culm pile in the process of building.



A breast is generally worked by four men,—two miners and two laborers; each miner calls his partner his “buddy,” the laborers are also “buddies” to each other. The miners have a contract with the operator to work the breast at a certain price per car, the miners to furnish tools and powder, and to pay the laborers. It is their business to cut the coal, to direct the opening and advance of the breast, and to prop the roof. No miner can be employed who has not a certificate; in order to obtain which he must have had two years’ experience as a laborer in the mines of the State, and must be able to answer, before the mine examining board, at least twelve questions in the English language pertaining to the requirements of a practical miner.

A miner’s day’s work is done when he has cut enough coal to fill the cars assigned him by the mine boss. He may do this in three or four hours, when he goes home to smoke his pipe and talk politics, leaving the laborers to load the cars and clean up the breast ready for the next day’s work. The miner likes

work falls, and he receives little more than half as much as the miner.

Of the employees about one-fourth are boys. The law forbids the employment of boys under the age of 14 inside or under 12 outside a mine. The boys inside drive and tend the mules which pull the coal cars, and open and shut the many doors in the dark labyrinths. Outside they work in the breaker as slate pickers. A person of humane instincts cannot contemplate with calmness these children kept out of school and forced to such grim and tedious work. In the great labor parades of 1900 large companies of these children marched through the streets; it was a holiday for them, and, with the exuberance of childhood, which even the hard conditions of their lives could not crush, they were shouting and whistling. They carried banners on which were inscribed sentiments like these:

“What our fathers were we will be also.”

“Give our fathers justice and we can go to school.”

“We need schooling but must work.”

“Abolishment of the young slaves.”

“Our mothers are up at 5 am to get our scanty meals.”

Those poor little banners, with their badly-spelled legends, were not ridiculous but touching, for they revealed a state of affairs that even dwellers in the coal regions are not accustomed to consider. The miner is the unit of the mine labor question. The wage scale, fixed by the car, is the basis of payment. The other labor of a mine,—the opening and timbering of gang ways, the laying of tracks, the cutting of tunnels through rock,—is known as “dead work,” and is paid for on a different basis,—by the day or by the yard. It is not considered mining at all.

Nationality of employees.

There has been a great change in the personnel of the anthracite mine employees within twenty years. Formerly Ireland, England, and Wales furnished the sinew

which produced the coal. Many of the men had worked in mines in their native land, lying upon their backs as they plied their picks in the thin seams of the English and Welsh collieries.

After the great strike of 1877 the coal operators, who looked abroad for relief from the power of the labor unions, found a new race of workmen in the peasants of the Austrian-Hungarian monarchy, and the Poles and Lithuanians of the neighboring Russian provinces. To-day the Irishman, Welshman, and Englishman, if he is in the mines at all, occupies a clerical position or that of a boss. Most of them have gone into of other businesses. Many of the clergymen, judges, lawyers and business men of Pennsylvania have come from the coal mines. A candidate for governor at the present time was a slate picker in his boyhood. There is no better chance of promotion anywhere than in the mining business,—from slate picker to laborer, to miner, to mine boss, to mining engineer or State inspector to superintendent of collieries, to operator,—all positions are open to intelligence and industry. The miners and laborers of to-day, brutish and uncouth as they appear, with their old-world customs and their unpronounceable names, are already on the upward trend. They have learned English; they have learned mining; they have become naturalized. The city reporters who swarm into the mining region during strikes, taking snapshot pictures and writing snapshot opinions utterly fail to comprehend the conditions of these foreigners. They see rude unpainted shanties, barefooted women with gay kerchiefs on their heads exchanging greetings with their neighbors in six languages; they see men and women gleaning their coal from the culm piles; or they peep into bare rooms, whose one adornment is an Icon or picture of a Russian saint or martyr, and cry, “Behold the poverty of the coal miner!” They mistake these mining villages for “slums.” Now, in fact, this apparent destitute condition is a thing of choice, for these people live



his job,—his place is cool in summer and warm in winter, the hours are short, the labor light, and the element of danger is never calculated upon. It is upon the mine laborer that the hardest

Figure 7.—Far left: Miners in carriage descending a shaft.

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scantly in order to put their wages into the savings banks, and at present hundreds of them are drawing their money from the banks and going to the old country to live in comfort the balance of their lives. In the old times "pay day" in a mining town was a synonym for a rush of business in the stores; to-day the merchants complain that it brings them little increase of trade from the Slav miners. But not only the Slav villages, but the thousands of comfortable houses in the coal regions, are miners' homes, and the thousands of well-dressed people who throng the streets are miners' families. The present difficulty about hours and wages arises from the fact that there are too many men in the business,—that is, the cost of production is divided among too many employees, and the same is true of the hours necessary to keep up the supply of coal demanded by the market.

The separation of the title of the surface from that of the coal beds.

In most of the world a man who buys a piece of land buys from the "top of the sky to the center of the earth." In the coal regions, as a rule, he buys the surface only, the coal is "reserved,"—that is, it has long ago been sold or leased. The exceptions are those lands which have been kept for higher prices. The owner of a small lot has no object in refusing to sell the coal beneath it, for he knows that the coal operator will mine around it, leaving it as a pillar. Not long ago warrants were taken out for the coal beneath the Susquehanna River and the public roads. The city of Wilkes-Barre owns a park the coal beneath which is unsold, and there is occasional agitation about selling the coal to improve the surface. The question will arise, "Is it not unsafe to live above a coal mine,—does not the earth open and swallow up houses and people?" We answer, Yes and no. On the outcrop, along the foot of the mountains which enclose Wyoming Valley, are many "caves" or "cave holes" 50 or 60 feet in diameter and 20 or 30 feet deep. They

have been caused by the break in the roof of a mine in the upper coal bed, when the earth rushed down to fill the hole like sand rushing out of an hourglass. The upper bed has long ago been worked out, the falls have already taken place, and the surface settled permanently, so that at the present time there is rarely a fall. It is a well-established belief that the land is much safer after a cave than before. There are strange and gruesome tales connected with the time when these caves were made. A boy was riding a mule on a canter from the mine to the stable when the mule stumbled and the boy flew over his head. He picked himself up and turned around to find himself on the brink of a cave which had opened behind him, and into which the mule had fallen and perished in the crumbling, sliding earth. People have fallen into these caves and escaped through mine gangways into which they opened, and not long since a woman going out in the morning to milk the cow found that a section of the pasture had fallen and the cow was quietly chewing her cud at the bottom of a cave hole. Except at the outcrop, the surface is seldom disturbed. The coal beds lie so deep that entire mines might fall in, and long before the surface would be affected the rock strata would have become fixed in new positions.

Controlling the output

The mines are so vast and the number of employees so great that the possible production of coal is far beyond the demand at the ordinary prices. It is therefore considered necessary to control the output, which is arranged by the presidents of the coal-carrying companies, who own or sell on commission 72 per cent. of the coal and transport it all. They mutually agree to furnish a certain percentage each year as their quota. At the meeting held in January, 1896, whereat an agreement was reached, on the basis of which the output of anthracite was to be divided as per certain allotments, the percentage were:

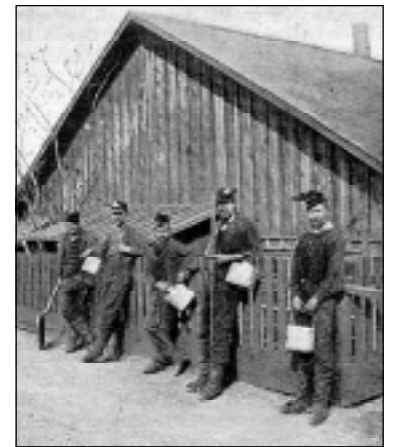
Philadelphia & Reading	20.50
Lehigh Valley.....	15.65
Delaware, Lackawanna & Western ...	13.35

Central Railroad of New Jersey ...	11.70
Pennsylvania Railroad.....	11.40
Delaware & Hudson Canal Co.	9.00
Erie Railroad	4.00
Pennsylvania Coal Co.	4.00
Delaware, Susquehanna & Schuylkill ..	3.50
New York, Susquehanna & Western ...	3.20
New York, Ontario & Western	3.10

The basis of the present combination of operators and carriers is not made known to the public.

The result of this policy is that the mines, instead of working up to their fullest capacity, work on half or three-quarter time. It would seem to be more business-like to increase the production and reduce the price, especially in view of the competition of the bituminous region, but here arises another consideration.

The business of mining coal is peculiar, in that every pound sold reduces the capital of the operator. The coal beds have a limit, which is already in sight. The coal operator resembles a farmer who should first sell the grass from his meadows, then the sod, and finally the soil. The coal operator has



already sold the outcrop, which is equivalent to the grass; and has largely exhausted the upper coal beds, which is equivalent to the sod. He is now working the lower beds; and when they are gone, all will be gone. The time at which the coal fields will be exhausted is estimated at about fifty years. To carry out the agricultural figure, we

Figure 8.—Far right: A group of miners.

may call the utilizing of the culm banks by washers and the reopening of abandoned mines as a sort of aftermath. The policy of controlling the output results in strikes and other disasters, while mining to the fullest capacity would hasten the exhaustion of the coal. These are the Scylla and Charybdis of the operators. The foundation of the coal trust was laid in the years between 1860 and 1871, when nearly all of the three hundred thousand acres of coal lands were bought or leased by the great companies. Coal land is now worth from \$2,000-3,000 dollars an acre. As the price rose, the companies leased the coal instead of buying the land. Coal leases are drawn on the basis of a royalty per ton of mined coal, which varies from ten to fifty cents. There is also in every case a minimum clause,—that is, the operators obligate themselves to pay a stated sum per year whether any coal is mined or not. It will thus be seen what an enormous investment the great corporations have in lands, some of which have lain idle for forty years, and will not be mined for fifty years longer, while the minimum royalty sticks to the lessees like the “old man of the sea.” A recent decision of the Supreme Court of the State obliges them to pay the minimum as long as they occupy the land, although they pay for the coal many times over. In addition to this great investment is the expense of opening and keeping in repair the mines, the building of breakers and other machinery, the expenses of cars, mules, and the wages of the men. The item of repairs may mean the rebuilding of a burned breaker or the reopening of a flooded mine, either of which will take the earnings of several years. The profits of five years were spent by one company in draining a “drowned mine;” while another spent three years, at an outlay of \$100,000 in over coming a “fault.”

The coal monopoly failed in so far as controlling the coal market

was concerned on account of the competition of bituminous coal, whose field is practically unlimited, which is more cheaply mined, does not need to be broken, and bears a universal royalty of only ten cents a ton when mined.

The coal-carrying companies look for relief from the burden of their stupendous investments in the mining business to their tolls as carriers, notwithstanding which some of them have been for a long time on the verge of bankruptcy. To show what the coal-carrying companies earn in their business I annex the following schedule of dividends paid by them for the past ten years:

The Coal Barons

There are two classes of coal operators,—the coal-carrying companies, which we have just been considering, and the private operators. The latter are at the disadvantage which a small business always meets in competition with a great monopoly. The carrying companies charge them extortionate rates and deny them cars until they are willing to allow them a commission of 65 percent of the price at tide for transporting and selling their coal.

In view of all these difficulties in the coal business, it may be pertinent to inquire, “Who are the coal barons?”

The term is one of those mischievous titles which arise nobody knows how and are carelessly applied. The popular image of a coal baron is a lord of the manor who lives in splendor while his serfs dig a miserable living out of the dark and dangerous mines. Such a person does not exist; he is a creature of the yellow journals. The persons who come nearest to the popular idea of coal barons are the private operators,—whose workmen, however, have the fewest grievances, and many of whom have paternal relations with their men in the way of maintaining hospitals, schools, libraries, and model tenements.

The officials of the coal-carrying companies are so far away, and their stock is distributed so widely both here and abroad,—much of it in the hands of widows and orphans who do not know what a dividend means,—that they can hardly be termed coal barons. There remain only the landlords of the coal lands. These are the true barons. They lie behind and beneath the coal business; their names are scarcely known to the public; they have no part in the strikes, for whether business is good or bad, the coal royalties go on. Personally they are of the gentlest; widows, children, old men; some of them already straitened in purse by the working out of their coal land; some of them of great fortune, liberal in public enterprises and in public and private charities. Their benefactions are not limited to their own town or state, and their investments have helped to develop the remote parts of the country.

Acknowledgments are due to A. D. W. Smith, State geologist of the anthracite region, for maps and sections; to Prof. C. O. Thurston of Wyoming Seminary, for photographs; and to Seward's Coal Journal for statistics.

From The American Monthly Review of Reviews, November, 1902.

URL: <http://www.history.ohio-state.edu/projects/coal/AnthraciteDescription/AnthraciteRhône.htm> [Accessed 29 May 1998].

*Cutting coal- robbing a pillar. Props on the right
Ground plan of mine- showing breasts, gangway, airway, buggy roads, etc.
Ground plan of mine- showing system of ventilation
Culm pile
A coal breaker
Culm pile in process of building
Miners in carriage descending a shaft
A group of miners.
The Pennsylvania Company capital stock is only \$5,000,000*

Komatsu, Liebherr, Unit-Rig, Euclid, and Vista create a safety video for electric drive haul trucks used in surface mines

(February 1998) Increased activity in surface mine operations, both in North America and overseas, has been accompanied by an increase in serious and fatal accidents. This situation has alarmed the United States Department of Labor, Mine Safety and Health Administration (MSHA). MSHA sent mine safety inspectors to every registered surface mine in the U.S. in the last quarter of the year.

A letter dated September 9, 1997 and sent to all U. S. mines from J. Davitt McAteer, Assistant Secretary for Mine Safety and Health, states: "In the coming weeks Mine Safety and Health Administration Inspectors will be present at metal and non-metal mines nationwide to speak directly with mine workers, their supervisors and mine managers. Our inspectors will highlight the alarming number of fatal accidents in the industry, the causes of these accidents, and the safe work practices necessary to prevent them." Accompanying statistics show that "Most fatality victims (60%) received inadequate training or no training at all."

The greatest number of fatal accidents occurring in U. S. mines in 1997 was attributed to "Powered Haulage." This category includes off-road haul trucks, bucket loaders, conveyors and on-highway trucks.

VISTA in partnership with Komatsu, Euclid, Liebherr and Terex (Unit Rig) created a new video on safe operation of Electric

Drive Haul Truck Safety. This latest video is one more addition to the numerous other videos VISTA provides to the surface mining industry.

The new video focuses on defensive driving techniques and how to respond to emergency situations. With complete cooperation from the four U. S. manufacturers of this type of mine truck, along with the generous support of major mining companies across America, the video is able to reflect real work situations faced every day and night by equipment operators.

After refining the script to be sure it represented real world situations, video taping was completed in Arizona, New Mexico, Wyoming and Pennsylvania. Mine management went out of their way to provide equipment, shooting locations, safety experts and operators to help VISTA bring this video to the people who can get the most out of it. Special arrangements were made to videotape scenes in a wide variety of working situations, environments and weather conditions.

Response to slippery roads, brake failure, tire failure, on-board fire, stockpile collapse, and several other recognized emergency situations are addressed. Defensive driving techniques created to avoid emergency situations are the centerpiece of this training video. Effective use of the common safety features designed into electric drive heavy haul trucks are discussed and demonstrated. This video is a mine

safety instructor's dream come true. A training tool that several safety classes can be built around. Ray Peterson, President of VISTA, said, "We are gratified with the level of enthusiastic support received from mine owners and manufacturers alike. The obvious awareness by all parties, competitors included, for the need to have a video of this nature was overwhelming. The supervisors, equipment operators, safety specialists, manufacturers, and mine owners could not have been more helpful. All of these people have a stake in safe efficient operation of this valuable and expensive equipment, as well as the people who operate it. Everyone viewed this as a chance to make a positive contribution."

VISTA, headquartered at 810 Krift Ave., Burlington, Wisconsin is dedicated to the development of safety and correct machine operation videos for the construction and mining industries. For additional information about this and other VISTA safety videos or operator training classes call 1-800-942-2886.

You may reach VISTA at the following:
Video Information System Training
Associates, Inc. (VISTA)
P. O. Box 247
Burlington, WI 53105-0247
(800) 942-2886 Voice
(414) 767-2119 Fax
E-mail: info@vista-start-smart.com

Metal and Nonmetal accident summary

Fatal dredge accident

General information

A 50 year-old dredge operator died at about 3:00 pm on October 27, 1997, while traveling from a dredge to shore in a work boat. The victim had a total of 16 years mining experience, all at this mine, the past 10 years as a dredge operator.

The facility was a sand and gravel mine that normally operated two, 8-hour shifts a day, 5 days a week. A total of 20 persons was employed.

Sand and gravel was extracted by dredging from ponds. Three dredges extracted and pumped the material to the processing plant on shore where it was screened, sized, and stock-piled. The finished products were used at the company-owned concrete plants and sold for use as aggregate.

Description of accident

On the day of the accident the victim reported for work about 6:50 am, his regular starting time. He was instructed by the plant manager to operate the No. 2 dredge. The victim drove his personal truck to the boat landing, and took the work boat to the dredge. He operated the dredge without any unusual incident until shortly before the end of his work shift at 3:00 pm.

The plant operator was assigned to relieve the victim and drove his truck to the boat landing. The plant operator parked next to the victim's truck and observed the victim walk down the stairway from the dredge's pilot house, then to the pump house for a moment, he then walked toward the front of the dredge. The plant operator did not see the victim after that, as his view of the boarding platform and the boat the victim used was blocked. After a few minutes, when the victim failed to reappear, the plant operator decided to motor out to the dredge in another jon boat.

The plant operator came around the stern of the dredge and saw the victim's boat slowly going around in circles about 10 to 12 feet from the dredge. The motor was running and there was no sign of the victim. His lunch box was floating in the water near the boat, which contained about 6 inches of water inside. The motor was turned 90 degrees sideways, which caused the boat to circle. Reportedly, a free tiller would soon turn the motor sideways from the prop torque and the boat would begin to circle. The plant operator stated that upon subsequent examination, the throttle was in the "start" position, and the manual choke was in the open (run) position.

The plant operator pushed the victim's boat against the dredge and reached over and shut the motor off. After quickly searching, he radioed to shore that the victim was missing. He then climbed back into his boat and continued searching. A few minutes later, the plant operator picked up another worker in his boat and they returned to the dredge to continue searching for the victim.

The plant manager was on the No. 1 dredge when he heard the plant operator's call and sent the No. 1 dredge operator to help search for the victim. The plant manager then went to the plant office, picked up the aggregate manager, and drove to the pond. Several rescue teams arrived with boats and divers a short time later.

The victim weighed about 260 pounds, and reportedly, was a poor swimmer, but not afraid of the water. His body was found about 7:00 pm by divers in water about 50 feet deep, and 20 to 30 feet from the dredge, just forward of its boarding

platform. The victim was not wearing a life jacket.

Weather conditions at the time of the accident were fair, about 60° F, with a light breeze. The water temperature was estimated to be in the low 50° F range.

The county medical examiner listed the immediate cause of death as "cardiac arrhythmia due to hypertensive cardiovascular disease(?)," question mark included. It also listed under "other significant conditions - contributing to the death but not related to the underlying cause" as: "Blunt force trauma to the head with facial contusions." Although the medical examiner did not find water in the victim's lungs and did not list drowning as either an "immediate" or "other" cause, he stated that he could not completely rule out death by drowning as the immediate cause.

Conclusions

As stated above, the county medical examiner was not able to conclusively determine the cause of the victim's death. However, the small size and light construction of the boat and the direct-drive characteristic of the motor may have caused the boat to move as soon as it was started, causing the victim to lose his balance and fall into the water. Several company employees who had used the boats reported that they were "skittish" when getting in or out, and that large men had to be extra careful not to upset them. Contusions found on the victim's head may have been caused by his striking the side of the boat or dredge when he fell. The failure to wear a life jacket contributed to the severity of the accident.

Edited by Fred Bigio from an MSHA Accident Report

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Clockwise from upper left: Conference Co-Chairperson, Julie Wilson, welcomes Ky. Governor Patton and the Commissioner of the Department of Mines, John Franklin; attendees at the Kentucky Mine Safety Conference (KMSC); Kentucky Utilities electrical demonstration conducted during the safety seminar; and Kentucky Governor Paul Patton delivers the keynote speech at the banquet for the KMSC



First annual Kentucky Mine Safety Conference held in eastern Kentucky State and Holmes Safety Awards/ Mine Examiners Contest

The Kentucky Mine Safety Conference was held April 22-24, 1998, at the Mark III Convention Center in Pikeville, Ky. This event was co-sponsored by Holmes Safety Association Local Councils, Big Sandy Mining Institute, Coal Operators and Associates, and State and Federal Agencies.

A Preshift Examination Contest was held on Wednesday in the Pikeville College Gymnasium. The contestants demonstrated skills necessary to examine underground areas for hazardous conditions. Marvin Hoskins,

James River Coal Corp., was presented the first place award. The 2nd place award was presented to

Vernus Sturgill, James River Coal Corp., with Mack Wright, Lone Mt. Processing, receiving the 3rd place award.

On Thursday, Governor Paul E. Patton was the keynote speaker at the awards banquet attended by approximately 300 people. Following Gov. Patton's speech was the presentation of State Safety Awards and Holmes Safety Awards to coal companies with outstanding safety records.

The seminar on Friday began with a presentation by J. Davitt McAteer, Assistant Secretary of Labor for Mine Safety and Health, on initiatives to combat fatalities and black lung in the mining industry. Other presenta-

tions covered various safety and training topics and were well received by those attending.

Throughout the conference, attendees had the opportunity to visit 21 vendor displays situated around the conference facilities.

Thanks to the numerous sponsors and supporters, this conference was a huge success in bringing current safety issues to a large number of mining personnel.

Submitted by Ronnie Deaton, Ky State Holmes Sec./Treas., Kentucky Steering Committee, HC 66, Box 1762, Barbourville, KY 40906

Fatality summary through June 30

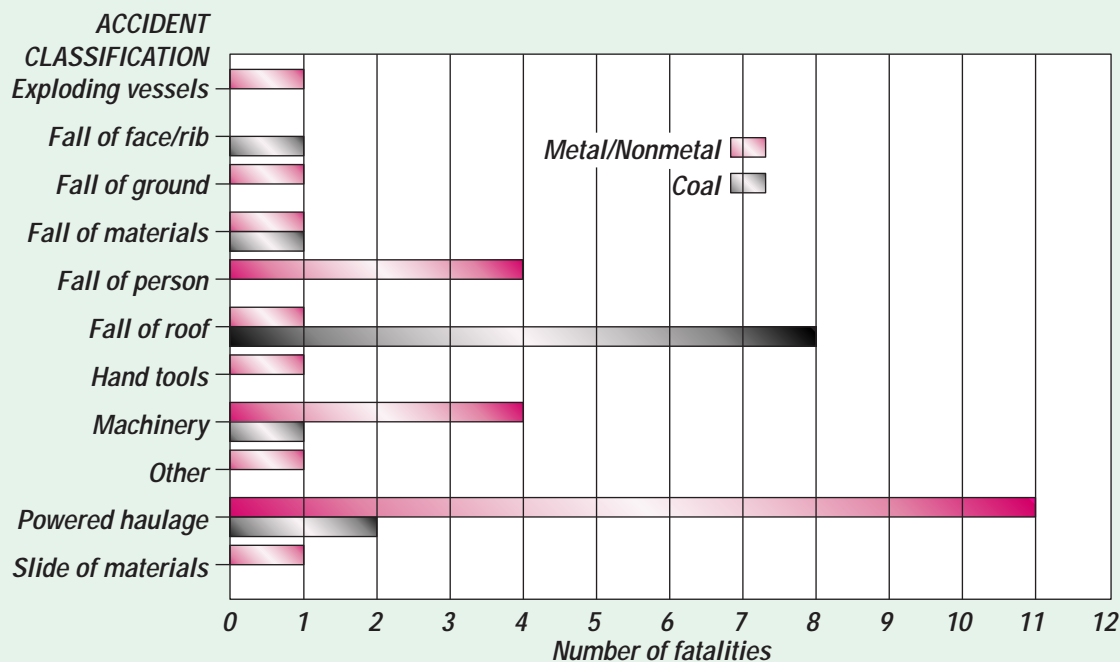
This article updates the status of fatalities occurring in both coal and metal/nonmetal mines from January through June of 1998. Based on preliminary accident reports, as of June 30, 1998, forty fatalities have occurred at coal

and metal/nonmetal mining operations. During this period, fourteen fatalities occurred at coal operations and twenty-six fatalities occurred at metal/nonmetal operations. Fall of roof fatalities in coal was the most frequent acci-

dent classification, causing 57 percent of the fatal injuries. Powered haulage was the most frequent accident classification in metal/nonmetal, causing 42 percent of the fatal injuries.

Fatality summary—Jan–Jun 1998

Based on preliminary accident reports as of 6/30/98



Below is a summary of coal and metal/nonmetal statistics:

Coal Mining

Eight of the fatalities were classified as fall of roof. Of the fourteen fatalities, five each occurred in Kentucky and West Virginia, three occurred in Virginia, and one occurred in Alabama. Twelve fatalities occurred underground and two occurred on the surface.

Metal/Nonmetal mining

Eleven of the fatalities were classified as powered haulage and three each were fall of person and machinery. Seven fatalities each occurred at limestone and sand and gravel operations, and two each occurred at copper and traprock operations. Four fatalities occurred in Texas, three occurred in

Michigan, and two each occurred in California, Idaho, Oregon, Pennsylvania and Utah. Twenty-two fatalities occurred at surface operations and four fatalities occurred underground.

Submitted by:
John V. Forte
National Mine Academy

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Southern regional mine rescue contest May 8/9, 1998, New Iberia, La.

1st place: Westinghouse WIPP
WIPP Silver Team
Team Capt.: Robert Rhoades

2nd place: Westinghouse WIPP
WIPP Blue Team
Team Capt.: Gary Kessler

3rd place: Univ. of Missouri at Rolla
UMR # 1 Team
Team Capt.: Nicholas Schupp

4th place: Morton Salt Company
Blue Team
Team Capt.: Henry Charpentier

5th place: Morton Salt Company
Gold Team
Team Capt.: Robert Kincaid

6th place: IMC Global Salt
Blue Team
Team Capt.: Kevin Nero

Cargill Salt
Salty Cajuns Team
Team Capt.: Lynn Bayard

Benchman's Contest

1st place: Westinghouse Wipp-Blue
Team
Bench Person: Joe Baca

2nd place: Westinghouse Wipp-Silver
Team
Bench Person: Richard West

3rd place: Morton Salt-Grand Saline
Team
Bench Person: Walt Bryant, Jr.

4th place: United Salt-United Salt
Team
Bench Person: Mike Nigh

5th place: Morton Salt-Blue Team
Bench Person: Stoney Hotard

3rd place: IMC
Blue Team
First-aid Captain: Wendell Broussard

4th place: Westinghouse Wipp
Silver Team
First-aid Captain: Mike Proctor

5th place: Univ. of Missouri at Rolla
UMR #1
First-aid Captain: Seth Puls

United Salt
United Salt
First-aid Captain: Alan Simon

Morton Salt
Blue Team
First-aid Captain: Gerold Oubre

Morton Salt
Gold Team
First-aid Captain: Chad Derouen

Cargill Salt
Team #1
First-aid Captain: Wade Broussard

IMC
Red Team
First-aid Captain: Randy Boutin

Morton Salt
Grand Saline
First-aid Captain: Doug Lovette

Morton Grand Sa-
line
Morton Salt Team
Team Capt.: Randy
Rogers

United Salt Corpo-
ration
United Salt Team
Team Capt.: Keith
Schurmann

IMC Global Salt
Red Team
Team Capt.: Dean
Dupre

Morton Salt Com-
pany
Team #1
Team Capt.: Gil
Elrod

Cargill-Team #1
Bench Person: Rayward Segura

Cargill-Salty Cajuns Team
Bench Person: Clayton Pellerin

IMC-Blue Team
Bench Person: Gary Crockett

Morton Salt-Gold Team
Bench Person: Chad Derouen

IMC-Red Team

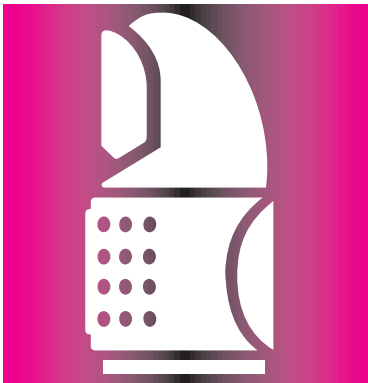
University of Missouri at Rolla-UMR #1

First Aid Contest

1st place: Westinghouse Wipp
Wipp Blue
First-aid Captain: Tony Alston

2nd place: Cargill Salt
Salty Cajuns
First Aid Captain: Ward Broussard





FIRST AID

Heat exhaustion

Heat exhaustion occurs when your heart and vascular system do not respond properly to high temperatures. The symptoms of heat exhaustion resemble shock and include faintness, rapid heartbeat, low blood pressure, an ashen appearance, cold clammy skin, and nausea. If you suspect heat exhaustion, get the person out of the sun and into a cool spot. Lay the person down and elevate his or her feet slightly. Loosen or remove most or all of the person's clothing. Give the person cold (not iced) water to drink, with a teaspoon of salt added per quart.

Heat stroke

The main indication of heat stroke is a fever of 105 degrees Fahrenheit with hot, dry skin. Other signs include rapid heartbeat, rapid and shallow breathing, either elevated or lowered blood pressure, and confusion or unconsciousness. If you suspect heat stroke, get the person out of the sun and into a cool spot. Cool the person by covering him or her with damp sheets or spraying with water. Direct air onto the person with a fan or a newspaper, and monitor the person's temperature with a thermometer. Stop cooling the person when his or her temperature returns to normal. If breathing ceases, start mouth-to-mouth resuscitation. Heat stroke is an emergency that needs immediate medical attention.

Reprinted from a 1997 Mayo Foundation for Medical Education and Research publication.

Utah protects bats in old mines

Utah State University has teamed with the state's abandoned mine lands (AML) office over the past three years to survey 1,000 abandoned mine sites across the state for critical bat habitat.

According to AML officials, the technical assistance from the university has enabled the state to carry out a plan to protect the bats while closing 200 mine openings to human intrusion.

"This represents more closure of this type than anywhere else in the country," said Mark Mesch, head of the AML program. Mesch said protecting the habitat may keep the bats from being listed as a threatened or endangered species.

Mesch's office has had the assistance of a Utah State biologist, who works with the state to identify mines used by the bats. Based on the biologist's recommendations, the state installed special gates that resemble horizontal jail cell bars. The gates keep out intruders and allow bats to come and go at will.

Reprinted from the July 13, 1998 issue of Mine Regulation Reporter.

Texas-based BCI is helping miners develop bat-friendly 'roosts'

Mining operations are more and more often providing habitat for endangered or threatened bat species when regular hangouts are disturbed by new projects or threatened by mine closures.

Reclamation plans frequently include measures to gate mine tunnels for bats-only access for hibernation of colonies in winter and for rearing young in summer.

Since 1987 Bat Conservation International (BCI) has been providing expertise to California mines in planning bat habitat.

The organization counters [the] bats' bad press with education and information programs and continuing research supporting scientific evidence of the importance of bats to the environment.

Sheryl Ducummon, bats and mines project director of the Austin, Texas-based BCI, wants to dispel the notion that bats are "flying mice." A single bat can eat 600 mosquito-sized insects an hour.

BCI reports that bats help keep vast numbers of unpleasant night-flying insects in balance, pollinate flowers, and disperse seeds. In some tropical forest areas, bats are responsible for up to 98 percent of early reforestation on cleared land, BCI says.

The association between BCI and some California Mining Assoc. member companies dates from 1987 when the McLaughlin Mine's environmental manager, Ray Krauss, initiated a program to locate bat habitat outside the pit.

The habitat was to provide an alternate maternity roost site for the Townsend's big-eared bat colony which was then using an old underground mercury working within the active pit. With the assistance of biologist Dixie Pierson, a home was found. In the process industry-wide awareness of bat habitat was born.

More recently, the discovery of Townsend's big-eared bats in old mine workings at the Briggs project in Inyo County led to significant commitments by the mining company.

The bats were using mining adits in the proposed open pit as a maternity roost. Canyon Resources' response was to construct alternate bat habitat, monitor bat populations in the area, and install bat gates at other old mines that would not be affected by the proposed project.

So far, Ducummon says, more than 200 mines have installed the bat gates. For more information contact Sheryl Ducummon at BCI, 512/327-9721.

Reprinted from the September 1997 issue of California Mining Vol. 22, No. 7.

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THE LAST WORD...

One day a space shuttle crashed to the ground in the yard of a pre school. When he finally struggled out of the wreckage, the astronaut shouted, "I'm free! I'm free!!!" At this point, one of the little children surrounding him shouted back, "Big deal, I'm four!"

A heavy snowstorm closed the schools in one town. When the children returned to school a few days later, one grade school teacher asked her students whether they had used the time away from school constructively. "I sure did, teacher," one little girl replied. "I just prayed for more snow."

A mother told her young son to go to bed and be sure to say his prayers and ask for help to make him a good boy. The boy's father, passing by the bedroom, overheard his son praying: "And make me a good boy if You can; and if You can't, don't worry about it, 'cause I'm having fun the way I am."

A Sunday School teacher asked her class, "Does anyone here know what we mean by sins of omission?" A small girl replied: "Aren't those the sins we should have committed, but didn't?"

A little boy went to the store with his grandmother and on the way home, he was looking at the things she had purchased. He found a package of panty hose and began to sound out the words "QUEEN SIZE." He then turned to his grandmother and exclaimed, "Look Grandma, You wear the same size as our waterbed!"

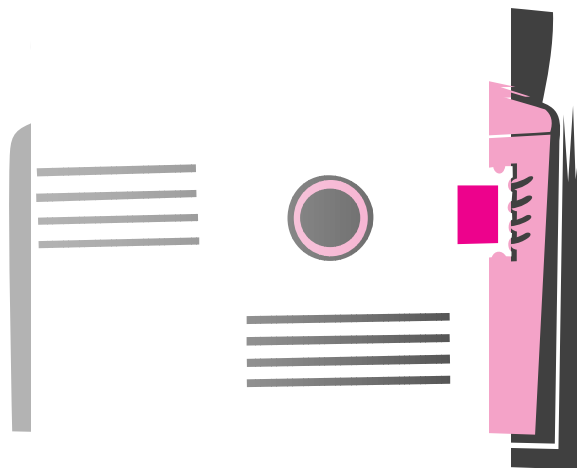
NOTICE: We welcome any materials that you submit to the Holmes Safety Association Bulletin. For more information visit the MSHA Home Page at www.msha.gov. We **DESPERATELY** need color photographs suitable for use on the front cover of the **Bulletin**. We cannot guarantee that they will be published, 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 1998 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 any comments to the editor, Fred Bigio, at the above address or at: MSHA—US DOL, 5th floor—EPD #535A, 4015 Wilson Blvd., Arlington, VA 22203-1984.

Please phone us at (703-235-1400).



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H.L. Boling	Mgmt.	AZ	Doug Conaway	State	WV	Harry Thompson	Emeritus	PA

*We are short of articles on metal/quarry safety and welcome **any** materials that you submit to the Holmes Safety Association Bulletin. We **DESPERATELY NEED** color photographs (8" x 10" glossy prints are preferred however, color negatives are acceptable—we will make the enlargements) for our covers. We **ALSO NEED** color or black and white photographs of general mining operations—underground or surface. We cannot guarantee that they will be published. If they are, we will credit the contributor(s) within the magazine. All submissions will be returned unless indicated.*

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Upcoming events:

- ***Aug. 23-25, CoalOps '98, Marriott Griffin Gate Resort, Lexington, KY***
- ***Sep. 7-11, 4th International Conference on Land Reclamation, E. Midlands Conference Center, Nottingham, England***
- ***Sep. 22-24, Safety, Health, and Environmental Conf., Charleston Civic Center, Charleston, WV***
- ***Sep. 24-25, Illinois Mining Institute 106th Annual Meeting/Exhibit, Gateway Convention Center, Collinsville, IL***
- ***Oct. 8-10, Kentucky Coal Assoc. Annual Meeting, Marriott Griffin Gate Resort, Lexington, KY***

