BULLETIN

HOLMES SAFETY ASSOCIATION

SAFETY EFFICIENCY

MINERAL INDUSTRIES

December 1992

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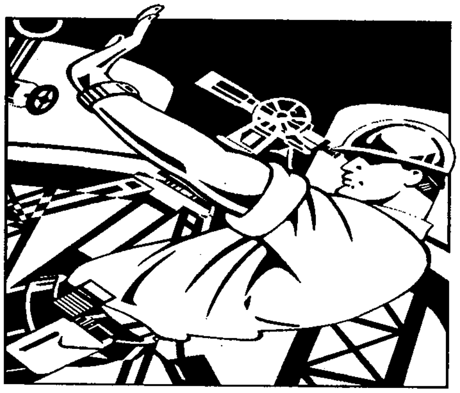

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Please note: The views and conclusions expressed in HSA Bulletin articles are those of the authors and should not be interpreted as representing official policy of the Mine Safety and Health Administration.

KEEP US IN CIRCULATION

The Holmes Safety Association Bulletin contains safety articles on a variety of subjects: fatal accident abstracts, studies, posters and other 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.

Holmes Safety Association Monthly safety topic

Fatal fall of material accident

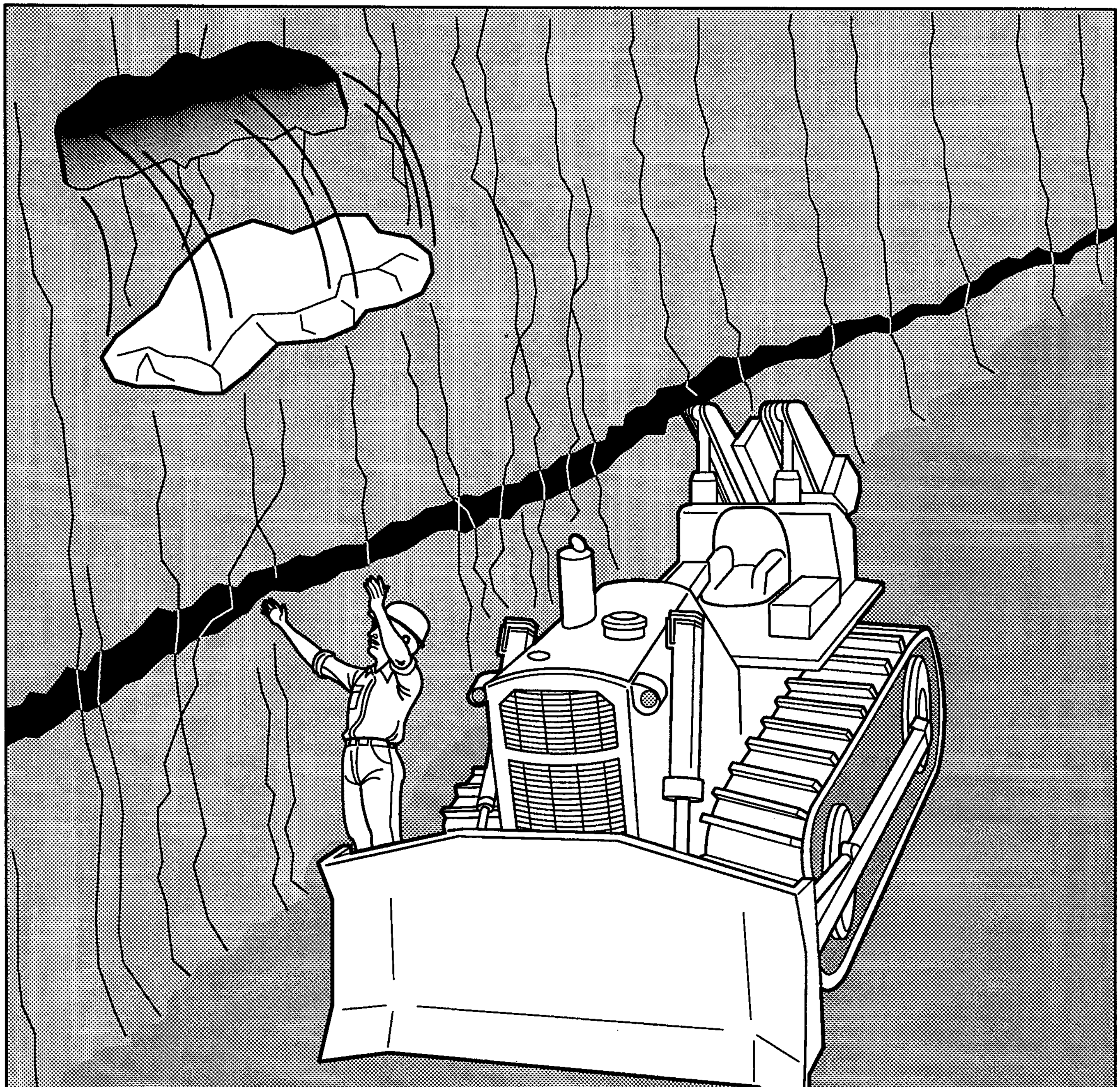
GENERAL INFORMATION: A 40-year-old bulldozer operator with 16 years of experience was fatally injured in a fall of material accident at a surface coal mine. The coal seam—which averages 12 inches in height—is mined from a depth of zero to 65 feet. The mine is normally operated on two production shifts, five days a week. The company employs 47 personnel. Coal is mined via stack-back method using bulldozers, highwall drills, and front-end loaders. The mine is producing approximately 800 tons of coal daily from two active pits.

DESCRIPTION OF ACCIDENT: The victim reported for work at 6:30 a.m. and began his normal duties of stripping overburden in the No. 4 pit. Three dozers were working side-by-side with the victim operating the machine next to the highwall. As the work advanced, the victim noticed a previously unknown 6-inch coal seam in the highwall. The other dozer operators stated that they had heard the victim comment, over the CB radio, that he thought the unknown seam looked like pretty good coal. At about 4:15 p.m., the victim stopped his bulldozer next to the highwall and dismounted to examine the small coal seam.

One witness said he saw a rock 5 by 3 by 2 feet thick fall or "flip" out of the highwall, about 13 feet above the toe, with no prior warning. The highwall in the area of the accident was approximately 62 feet high with a slope of about 15 degrees. No one saw the rock strike the victim who was found later on the ground with the rock on top of him. One of the other dozer operators stated that the victim was trying to attract attention by throwing small rocks into the air. The other two dozer operators, with the assistance of two drill operators, tied a chain around the rock, hooked it to the push arm of the bulldozer, and lifted the rock high enough to pull the victim free. He was transported to the hospital where he died a week later from crushing injuries sustained when the rock fell on him.

CONCLUSION: It was a practice in the pit to scale the highwall as stripping progressed. Examination of the highwall revealed that no loose material was present although the area had sustained several inches of rain in the two-week period just prior to the accident. Records revealed that proper examinations of highwalls had been conducted following periods of rain.

The accident occurred when the victim left the bulldozer compartment to observe a new coal seam. The accident and fatality resulted from the victim's failure to recognize the hazard when he placed himself in a location adjacent to the highwall.



Coal mine fatalities to date — thru 11-16-92

Type	1988		1989		1990		1991		1992	
	UG	S	UG	S	UG	S	UG	S	UG	S
Roof fall	7	—	17	—	18	—	19	—	8	—
Haulage	6	11	2	6	7	6	4	6	6	5
Machinery	6	4	6	6	6	3	2	3	6	3
Electrical	1	1	2	2	5	2	3	—	1	1
Other	3	7	12	9	3	9	5	9	—	8
Total	23	23	39	23	39	20	33	18	21	17

Welcome new members

NAME	CHAPTER NUMBER	LOCATION
B&W Commercial Contractors	9974	Morenci, AZ
Elam Construction, Inc. 1981	9975	Grand Junction, CO
Elam Construction, Inc. 1976	9976	Grand Junction, CO
Mid-Wisconsin Crushing	9977	Madison, WI
Rice 1	9978	Barnesville, OH
Ready Mix Concrete, Inc.	9979	Dillon, MT
Crusher No. 1	9980	Douglas, WY
Dix River Stone, Inc.	9981	Lancaster, KY
Icc Maintenance Shop	9982	Kinderhook, NY
J.A. Riggs	9983	W. Memphis, AR
MSHA Springfield	9984	Chicopee, MA
Gundle Lining System	9985	Houston, TX
M-I	9986	Houston, TX
Georgia Marble Co.	9987	Kennesaw, GA
S&H Education & Trng. Consultants	9988	South Zanesville, OH
S&H Education & Trng. Consultants	9989	Roseville, OH
Dave Keeling	9990	Hearne, TX
Star Enterprises	9991	Valley City, SD
AGC/VT	9992	Montpelier, VT
Barnes County Highway Dept.	9993	Valley City, ND
Monoc Surface Mine #2	9994	Summersville, WV
International Drilling Fields	9995	Houston, TX
El Brousseau Stone Products	9996	Montpelier, VT
Cogan Electric Supply, Inc.	9997	Plattsburgh, NY
U.S. Vanadium	9998	Hot Springs, AR
Apache Aggregates & Paving	9999	Coshocton, OH
Okuniewicz Mining Company	10099	Lonepine, CA
Mkgold Company	10121	Henderson, NV
Mkgold Company	10122	Henderson, NV
Ambrosia	10123	Las Vegas, NV
Airmatic, Inc.	10124	Philadelphia, PA
Blumer Pit & Plant No. 1	10125	Valley City, ND
AA & W Coals, Inc. Elmo No. 1	10126	Pikeville, KY
AA & W Coals, Inc. Elmo No. 5	10127	Pikeville, KY
JT #5 Mine Masteller Coal Co.	10128	Keyser, WV
Unified Purchasing	10129	Plainfield, VT
Green Mountain Retirees	10130	Barre, VT
Washington-Orange Labor Council	10131	Barre, VT
Southern Aggregates	10132	Augusta, GA
Davis Burke & Sons	10133	Brownsville, VT
Telluride Gravel	10134	Naturita, CO
Prime No. 1	10135	Morgantown, WV
Narrouis Branch Coal Co., Inc.	10136	Hardy, KY
Sleeper	10137	Winnemucca, NV
Harlem Valley Material, Inc.	10138	Wassaic, NY
Cosme´ F. Gutierrez	10139	Delta, CO
Central Hauling Co.	10140	Morgantown, WV
Cato Drilling	10141	Fairmont, WV
Webnic Construction Services	10142	Morgantown, WV
Hydro-Engineering & Contracting	10143	Morgantown, WV

TQM—a primer

What is TQM? It stands for Total Quality Management. It is also referred to as Total Quality Improvement, Continuous Improvement, Employee Involvement, Worker Empowerment, High Skill/High Productivity Strategy, World Class Manufacturing, and various combinations of the above. It has been compared to a religion, with its followers worshipping at the altars of gurus such as Deming, Juran, Peters, Crosby, Feigenbaum, etc. But what is it really? Is it merely the management fad of the '90s, as MBO (Management By Objectives) was for the '70s and '80s? Perhaps. But perhaps it is the only thing standing between us and economic stagnation, as many of its supporters claim. Whichever the case, it is gaining influence within North American business and industry, influence which promises only to increase as we approach the year 2000. And it has enormous implications for health and safety; so perhaps we should take a closer look.

North America's interest in TQM arose in response to increased economic competition from Europe, the Third World, and the countries of the Pacific rim, especially Japan. High quality Japanese products, such as cars and electronics equipment, have made serious inroads in the North American market, costing us many jobs. At the same time, newly industrializing Third World nations have taken other jobs with low-cost products in areas such as textiles. In our industry, many exploration and development dollars have been and may continue to be diverted to the low-wage, resource-rich southern hemisphere.

During the current recession, some companies have taken an "if you can't beat 'em, join 'em" approach, packed up shop, and moved to Mexico or some other low-wage part of the world. Other portions of the business community have argued that to remain competitive, Canada also must dramatically lower its costs of production (i.e. wages, taxes, energy costs, etc.) and invest in technological innovation. Others, including the labor movement, argue that the low-wage/low-cost approach is a dangerous downward spiral. Lower corporate taxes and fewer jobs at lower wages will result in lower government revenue which will eventually threaten social programs, health care, and environmental protection. Our standard of living would be forced to more closely resemble that of our Third World competitors. While accepting the need for technological innovation, they argue that Canada should instead emulate Germany or the Scandinavian countries by adopting a high-skill/high-productivity approach; in short, a TQM approach.

Origins of TQM

Let's back up a moment and look at the origins of TQM. In the 1920s, a statistician named Walter Shewhart analyzed variations (i.e., problems) in system performance for Bell Telephone Laboratories. He discovered two types of variations. The first type was composed of obvious causes such as machine malfunctions, untrained operators, or defective materials. They produced the most severe consequences, but fortunately, were far less common (only 6%). These he labeled "special causes." The most "common causes" in system variation, resulting in less severe but more frequent problems, were due to things such as lack of clarity regarding procedures, equipment capability, or variations in operator ability.

Another American statistician, W. Edwards Deming, based his theories of quality largely on Shewhart's work. He realized that if you want to eliminate defects, it is vital to solve the problem of the "common causes" (94%) rather than look at only the "special causes" (6%). In other words, the normally functioning process or system itself must be continuously improved. Quality cannot be "inspected in" at the end of the process, but must be built in from the beginning.

The American government sent Deming to Japan after WWII to advise them on how to reconstruct their manufacturing sector. They listened and the rest is history. While not solely responsible for Japan's amazing turnaround, the top business award in Japan to this day is named after Deming.

Basic principles

Deming's philosophy is described in his famous 14 points. But as it has been modified and added to by many others, what is now known as TQM can be summarized in the five principles (Figure 1). Let's take a quick look at each of them.

First, satisfaction of internal and external customers: the basis of TQM is that quality is determined by the extent to which an organization's product or service satisfies the requirements of customers; and not just the final customer who purchases the product, but internal customers as well. For example, the smelter is the customer of the mill, the mill of the mine, and so on down the line right back to the blast crew as the customer of the drill crew. Quality results from each person or team doing the job to the complete satisfaction of the next person or process in the system, doing the job right the first time, every time. Regular feedback from the customer is necessary to measure performance success.

Second, continuous improvement: no

Figure 1

The five principles of Total Quality Management

1. **Satisfaction of customers**—internal and external
2. **Continuous improvement**—thrive and change
3. **Integrated efforts**—teamwork and partnerships
4. **Management by fact**—statistical process control
5. **Maximization of employee potential**—worker participation and training

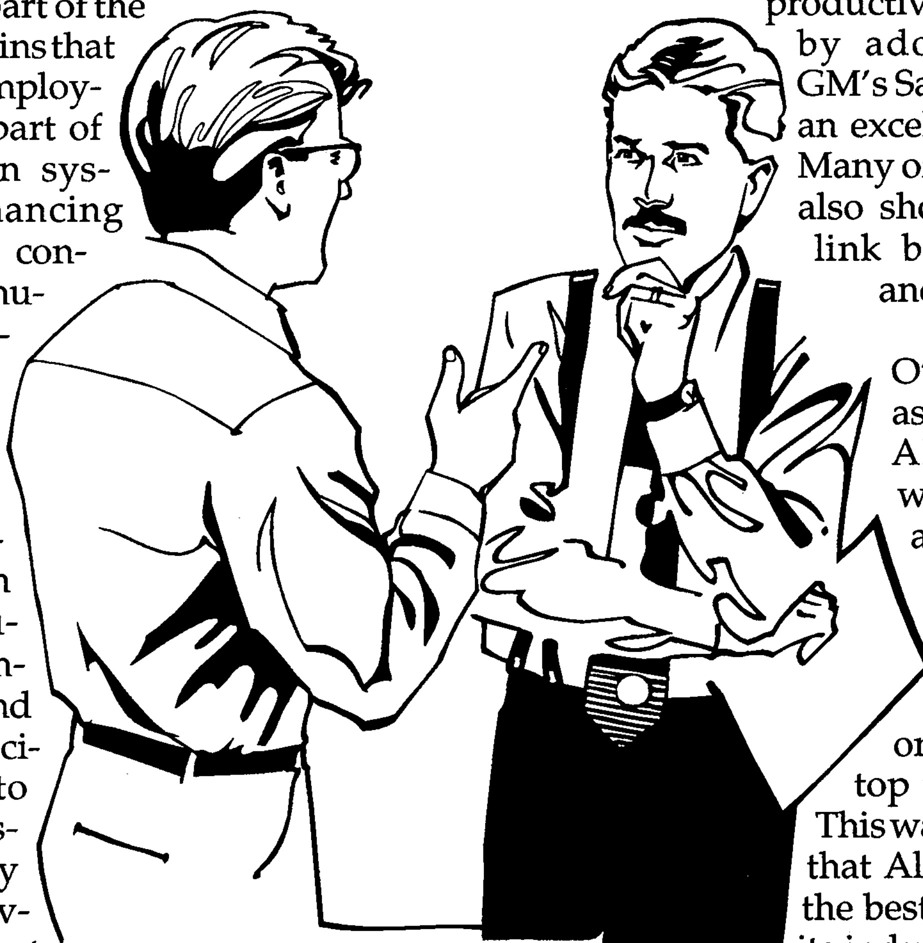
system or process is ever perfect, but can always be made better. TQM totally rejects the old adage "if it ain't broke, don't fix it." It stresses the need to constantly question and challenge the way things are done. Change must become the norm in an organization and must be viewed positively as an opportunity for improvement. One CEO of a TQM company described himself as the Chief of Disorder in that he encouraged everyone in the company to challenge traditional norms and upset bureaucracies. However, this change must be managed effectively; the goal is continuous improvement, not organizational chaos and collapse.

Third, integrated efforts: a TQM company flattens organizational structures and breaks down barriers between departments and job classes. Improvement is achieved through the work of problem-solving teams composed of representatives of a variety of disciplines and perspectives. For example, a team brought together to redesign a piece of equipment might be composed of an engineer, a maintenance mechanic, an operator, and someone from the original supplier of the equipment. Adopting TQM requires a commitment to developing truly collaborative partnerships with suppliers, with labor, with customers, and with other departments in an organization. Most experts on TQM particularly stress the importance of developing a relationship of cooperation and trust between management and workers. Without that, none of the other pieces can fall into placer

Fourth, management by fact: decisions in a TQM company are based on hard data rather than gut instinct, tradition, or textbook solutions. As the product of a statistician, it is not surprising that TQM relies heavily on the gathering and analysis of statistical data. Everyone in a TQM company is often trained in the use of basic statistical charts. They are used to identify problems in the production process and assist in interpreting the data to come up with solutions.

One such chart, the Statistical Process Control chart, is particularly associated with the Deming version of TQM. Experts warn that a common error made by many companies introducing TQM is using this more complicated tool without the guidance of an experienced statistician. Similarly, superimposing statistical techniques onto a system that is traditional in every other way often leads only to frustration and the abandonment of the attempt to introduce TQM. Even Deming, the statistician, warns that "the proliferation of charts without purpose is to be avoided."

Fifth, maximization of employee potential: technological innovation by itself only achieves part of the productivity gains that are available; employees are a key part of the production system, and enhancing their ability to contribute to continuous improvement can pay equally big dividends. TQM companies share information freely, continuously seek employee input, and decentralize decision making to the lowest possible level. They also invest heavily in training, not just in task-specific skills, but in "soft" skills (such as working effectively in teams) so that the quality of each employee's input is enhanced and they are able to make more effective decisions. The role of manager becomes less that of boss and decision-maker and more that of team leader, coach, trainer, and facilitator. Labor-management relationships are collaborative rather than confrontational. The goal is a workplace where everyone is highly motivated and productive because they have a sense of ownership, responsibility, recognition for their ideas, pride of accomplishment, and power over what and how things are done.



TQM and safety

There are many success stories of companies that have dramatically improved productivity and quality by adopting TQM—GM's Saturn car plant is an excellent case study. Many of these examples also show the intimate link between quality and safety.

When Paul O'Neill took over as CEO of Alcoa Aluminum, the world's largest aluminum company, he had a list of goals. Quality was naturally high on that list, but the top item was safety. This was despite the fact that Alcoa already had the best safely record in its industry. By focusing on safety, O'Neill unlocked the whole tool chest associated with TQM. He said, "You can't get safety unless you really understand your processes." Safety and quality have grown so intertwined that Alcoa's vice president for quality says that he can no longer tell where one leaves off and the other begins. For example, workers who take shortcuts, a major cause of accidents, are often also pointing out inefficiencies in processes and procedures.

Safety was also the focus of Occidental

Chemical's efforts to introduce total quality concepts. New CEO Roger Hirl told his management group that "Safety is harder to manage than any other aspect of our business. If we can do it well, we can manage everything else well." Like Alcoa, Occidental expanded training, introduced statistical controls *a la* Deming, and greatly increased employee participation and decision making. The safety record showed steady improvement, but so did quality and productivity. As Occidental's quality director noted, because the safety process exposed employees to the terminology and applications used in quality training, the quality process was much easier to introduce.

TQM in mining

One of the leaders in introducing TQM principles into the Canadian mining industry has been Inco's Manitoba Division. As has been the case in many other industries, it took a change in leadership to get the ball rolling. In 1986, Lorne Ames became president of the Manitoba Division. The nickel industry was emerging from a recession and the challenge, in Ames' view, was to come up with a strategic direction to position the division for continuous improvement as a low cost producer for quality nickel.

"The question for us, and for everyone else in the mining industry, was how to go about it," Ames says. "We began to look at the experiences of other companies, and it wasn't long before we recognized that there was a strong relationship between the pursuit of quality in a corporation and its business success. Once we discovered that link, we knew what had to be done."

They began by attending one of Deming's four-day seminars in Washington, D.C. This was followed by many others and still continues. As a result, the division has implemented many changes in accordance with the five principles of TQM outlined above. Nearly all employees are trained in the techniques of statistical process control and actively participate in improving processes to satisfy internal and external customers.

Ames recognizes that TQM is not the total answer to improved productivity. "We also want to introduce new equipment and new technology," he says, "but we want to do it effectively with employee involvement at all stages of its development and implementation. And we do not want to underestimate the importance of smaller daily incremental improvements that can be made by each of us."

Process improvement teams, using the Deming techniques, have made many significant "incremental improvements." One team found a way to reduce the rock content in the flotation process for $200,000 annual savings in energy costs. Another discovered ways to reduce premature drill bit failure, saving another $200,000 per year.

These and numerous other "small" improvements have added up to big dollars, as well as helped to overcome the initial skepticism that this was just another new management program. As Ames says, "We now know that these principles and statistical techniques work. We've seen so many examples of their success. We also know how to apply them more effectively. It sounds simple, and it is, but it hasn't been easy. We are learning together and the benefits will accrue to all of us."

The safety benefits have also been significant, according to William Scott, Superintendent of Safety and Protection. Many of the process improvements that saved money had safety spinoffs. For example, the establishment of quality maintenance and operating procedures for mill pumps reduced the repair frequency and repair time by 50 percent, with a proportional reduction in hazard exposure. A reduction in the variation in the width of nickel cathode sheets not only saved scrap, it improved the fit of the sheets in the cathode boxes, resulting in less exposure to strains and back injuries while changing damaged boxes. These incremental safety improvements are difficult to measure in dollars on their own. From 1982 to 1986 the Manitoba Division's lost-time accident frequency seemed to plateau at about 3.8 on average. Scott credits Total Quality Improvement (their version of the name) with turning the plateau back into a consistent downward trend, with no end in sight.

According to Scott, the most significant aspect of TQI/TQM is not the statistics or the training, but the people: "Respect for people is a cornerstone of TQI. People respected for their knowledge, talents, and feelings will be effectively involved in decision making. This involvement acknowledges their 'ownership,' of their corner of the business, builds pride, and unleashes their natural instincts for continual improvement." Ames agrees: "Employee pride and satisfaction was placed at the top of our 'commitment to quality' statement because without it everything else needed to make a successful division is compromised.

TQM's future

According to a recent study of TQM in the Canadian mining industry, Inco's Manitoba Division is a rare exception in the degree of its commitment to the principles of TQM. The study was conducted by Michael Legg of the Coopers and Lybrand Consulting Group. He found that most Canadian mines have not yet embraced quality management in any structured way, but that many are using techniques similar to those of quality management often lead by their health and safety efforts. Proactive prevention programs such as Loss Control and System Safety (fail-safe) contain elements of TQM, such as continuous improvement as the goal and the use of statistical tools to assess and control risk. Similarly, well-functioning Joint Health and Safety Committees usually reflect a commitment to teamwork, open communication, and greater employee participation.

Legg concludes that, "Canadian mining companies have the capability to develop Total Quality cultures" and that "health and safety has taken a lead in the drive for excellence." Nevertheless, he finds that most companies lack the "commitment" to promote the corporate structure for Total Quality, where health and safety is no longer an isolated example of the application of TQM principles, but only another aspect of a total quality corporate culture. "This commitment" he says, "must come from the top, from a Champion. Regretfully at present, mining has too few Champions."

Will the principles of TQM play an ever-increasing role in the mining industry's efforts to remain competitive? Only time will tell. But one industry analyst predicts that by the turn of the century there will be no companies around that have not radically restructured the way they do business —they will have all been swept away by the competition! If he is right, then the mining industry had best be on the lookout for some champions—and quickly!

*Reprinted from the Fall 1992 issue of the Mines Accident Prevention Association of Ontario's **safety news**.*

Happy workers mean fewer injuries

A happy, healthy workforce can lower compensation claims.

By Harvey J. Wolf and R. John C. Pearson

We recently participated in a major three-year research project funded by the National Institute for Handicapped and Disability Research. The research indicated that a strong negative relationship exists between worker satisfaction and workers' compensation claims.

Subsequently, we demonstrated that carefully developed organizational intervention and management training can greatly reduce workers' compensation claims. As a result, we have developed a program that we believe will greatly reduce injury costs for a very low cost.

Recent literature verifies that this approach has merit. When job satisfaction is low, absenteeism is increased. When management is poor and out of touch with worker needs, the quality of goods produced is poor, the volume of work produced is low, and employee turnover is high. When management training is given and relationships with employees improve, worker satisfaction increases, absenteeism is reduced, productivity increases, the quality of the product improves, and worker turnover decreases.

In theory, if employers must compensate work-related injuries and diseases at increasing cost levels, they should be motivated to engage in accident prevention. Yet, they have so far made little progress in using preventive strategies to contain workers' compensation costs, or even in conducting research as to how incentives for prevention or preventive activities themselves affect profit.

Dissatisfaction disrupts work

This study focuses on prevention at the organizational level and factors related to filing compensation claims. Dissatisfied workers tend to disrupt the work flow in many ways. In the past, researchers have looked at the most apparent manifestation of this dissatisfaction— sabotage—but, in this study, we have looked at a more common impact on productivity, industrial injury, and accidents.

This study looked at the relationship between worker satisfaction and measures of work-related injury. Job satisfaction was defined in accordance with workers' feelings toward specific aspects of work situations: job satisfaction, working conditions, fair pay, benefits, promotion fairness, supervision, and management behavior.

For this project, we randomly selected approximately 1,200 manufacturing companies in West Virginia. To help ensure a representative sample, the companies were stratified by both size and risk level. The companies listed in the *West Virginia Directory of Manufacturers* were separated into thirds by the number of employees. The groupings turned out to be 1-15 employees, 16-49 employees, and 50+ employees. The risk levels were assessed within occupational groupings into those assessed higher or lower than the group averages by at least half a standard deviation. We then separated the companies into groups for high risk based on few claims, and high risk based on many claims. The sampling matrix therefore contained nine cells—three for size and three for risk. One matrix was for the experimental companies that would receive both the questionnaire and the training; the other was for the control companies that would receive only the questionnaire (Table 1).

Three dependent variables (days lost, total medical benefits paid, and total disability benefits paid) were tested, using two independent variables (management training conducted and no management training conducted).

Definite relationships were found between job satisfaction and workers' compensation claims. These relationships consistently indicated that as satisfaction levels rose, values of the corresponding dependent variables decreased. The critical relationship between enjoyment of work and days lost had a probability error of less than 10 percent.

Table 1.—Sampling matrix **risk**

Experimental control	Low	High	
		Few claims	Many claims
Small	6/3	6/3	6/3
Medium	6/3	6/3	6/3
Large	6/3	6/3	6/3

Table 2.—Changes in sick days, medical payments and disability payments per employee, all experimental (N=19) and control (N=18) companies*

		Pre-study	Post study	Wilcoxon	Percent reduction
Sick days	E	43.95	11.92	0.0060	73‡
	C	42.79	12.18	0.2648	72
Medical payments	E	$1083.08	$300.27	0.0004	72‡
	C	$1142.55	$280.97	0.0012	75‡
Disability payments	E	$1414.99	$511.39	0.0835	61†
	C	$1220.64	$407.39	0.4341	67

‡$p < 0.05$ †$p < 0.10$
*West Virginia, 1986-1988

High risk vs. low risk

A secondary hypothesis tested the relationships between high-risk companies in which the risk was based on many claims and those in which the risk was based on few claims. The rationale for this investigation was based on the prediction that high-risk companies with fewer claims would (1) have accidents that were more serious and more likely to occur by chance, and (2) have a basically satisfied work force. On the other hand, the high-risk companies with many claims would probably continue to have claims that were more indicative of worker dissatisfaction within workplace conditions.

Based on worker satisfaction data analysis for each company, a management training program was designed and administered to management personnel of the experimental group companies only.

During the third year of the study with the experimental group, there were striking reductions in the number of sick days and in medical costs per employee, with no reduction in disability payments per employee. Similar reductions, but at a lower level of significance, were found for the control group (Table 2). These reductions were not mirrored in the overall workers' compensation fund experience with either medical or disability costs, both of which climbed during the study years.

The samples were too small to conduct a complete statistical analysis by cell, but the row and column totals were analyzed.

The number of days lost per employee per year fell sharply for companies in all categories of size and claims experience, except for the large companies in the control group (Table 3). The Wilcoxon scores were lower for the experimental companies than for the control companies for all except

Table 3.—Days lost from work per employee by size of company and claims experience*

		N	Pre	Post	Wilcoxon
All	E	19	43.95	11.92	0.0060
	C	18	42.79	12.18	0.2648
Low	E	6	68.13	4.42	0.1581
	C	6	8.35	3.94	0.7976
High few	E	8	27.27	12.67	0.0406
	C	5	25.64	19.19	0.9160
High many	E	5	41.63	19.71	0.2101
	C	7	84.56	14.58	0.0741
Small	E	5	64.74	14.76	0.1612
	C	6	64.12	16.46	0.5503
Medium	E	6	64.47	19.13	0.0306
	C	7	49.27	8.82	0.0636
Large	E	8	15.56	4.73	0.1412
	C	5	8.13	12.60	0.6761

*West Virginia, 1986-1988

Table 4.—Medical costs per employee by size of company and claims experience*

		N	Pre	Post	Wilcoxon
All	E	19	1093.08	300.27	0.0004
	C	18	1142.55	280.97	0.0012
Low	E	6	1762.21	195.42	0.0082
	C	6	717.21	717.29	0.0202
High few	E	8	478.61	228.71	0.1893
	C	5	778.90	395.88	0.2101
High many	E	5	1235.28	540.58	0.0947
	C	7	1766.81	337.65	0.0383
Small	E	5	1901.06	215.40	0.0947
	C	6	1939.73	335.07	0.0358
Medium	E	6	951.98	548.61	0.0656
	C	7	1023.87	242.13	0.0298
Large	E	8	670.17	167.06	0.0239
	C	5	352.09	281.25	0.2963

*West Virginia, 1986-1988

Table 5.—Disability costs per employee by size of company and claims experience*

		N	Pre	Post	Wilcoxon
All	E	19	1314.99	511.30	0.0835
	C1	18	1220.64	407.39	0.4341
Low	E	6	2193.23	152.45	0.1581
	C1	6	206.56	130.53	0.5497
High few	E	8	825.93	568.59	0.7130
	C1	5	560.57	477.95	0.9166
High many	E	5	1043.59	850.60	0.0210
	C1	7	2561.33	625.46	0.0538
Small	E	5	1827.32	744.15	0.5038
	C1	6	1528.18	400.92	0.5503
Medium	E	6	1931.32	787.05	0.2980
	C1	7	1600.91	300.42	0.1413
Large	E	8	532.31	159.17	0.2072
	C1	5	319.22	563.62	0.4032

*West Virginia, 1986-1988

Table 6.—Percentage reduction by size of company and claims experience*

		Days lost	Disability costs	Medical costs
All	E	72.88†	61.11†	72.28†
	C	71.90	66.60	75.40†
Low	E	93.51	93.05	88.91‡
	C	52.80	36.80	83.50
High few	E	53.54†	31.16	52.21
	C	25.30	14.70	49.00
High many	E	52.65	18.49	56.24‡
	C	82.80‡	75.60‡	78.60†
Small	E	77.20	59.28	88.87‡
	C	74.30	73.80	81.70†
Medium	E	70.33†	59.25	42.37‡
	C	82.10	81.10	76.40†
Large	E	69.60	70.10	75.07†
	C	–55	–76.6	20.1

* West Virginia, 1986-1988
† Significant at the 0.05 level
‡ Significant at the 0.10 level

the high-risk, many claim group.

Medical costs per employee per year fell sharply for all categories of size and claims experience (Table 4).

The disability-payment costs per employee per year also fell, but not as dramatically, for all groups except the large control companies (Table 5).

The results are clear. One of the most expensive hidden costs to organizations—injury—can be greatly reduced by attention to worker satisfaction and the use of a carefully tailored management training program to improve it. This training must deal with the reality of the subject organization, taking into consideration the nature of the workforce, the attitude of the workers, the style of lower and middle managers, and the philosophy of senior management.

The percentage reductions were statistically significant at the 0.05 level for days lost in the high-risk, few claims and high-risk medium-claims experimental companies; for medical costs in the large experimental companies and in the high-risk, many-claims, small- and medium-control companies, but for none of the disability-payment costs (Table 6). With this program, significant savings can be achieved with little effort and at very small cost. Savings of this size cannot be achieved through generalized management programs.

While not statistically significant, the control groups also demonstrated a decrease in injuries. This study also seems to indicate that perceived management interest in worker satisfaction will result in some reduction in injury—a worthy objective for any company, and one that is long overdue.

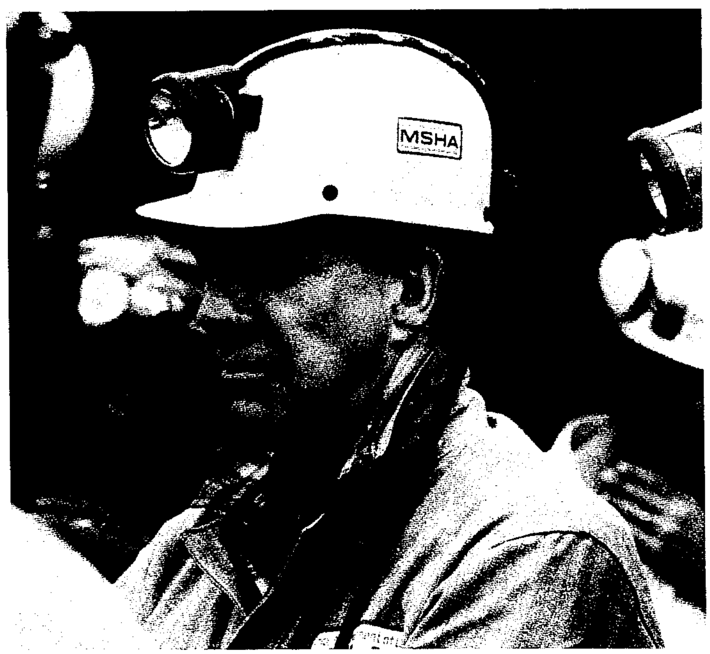
*Reprinted from the June 1992 issue of **Safety & Health.***
A publication of the National Safety Council, 1121 Spring Lake Drive, Itasca, Illinois 60143-3201

Industry, government cooperation equals safer, healthier mines

By William Tattersall, Assistant Secretary of Labor for Mine Safety and Health

I believe that the Nation's mining laws undoubtedly are more effective because of viewpoints on mine safety and health addressed by organizations such as the AMC.

The Mine Safety and Health Administration (MSHA) carries out its responsibilities to enforce the 1977 Mine Act fairly but firmly. I'm aware from my experience as a company official and head of MSHA that the use of the enforcement mechanism can never be the sole means of improving mine safety.



Because preventing deaths, injuries and illnesses depends on the combined efforts of individual mine operators, miners, miners' representatives, and government, cooperation and communication among members of the American mining community is essential. Considerable improvement in the industry's safety record has been achieved over the years because of the mining industry's contributions.

Strong participation in this process by organizations such as the American Mining Congress, companies, governmental agencies, manufacturers, labor, and academia have served ably the best interests of the whole mining community.

Reasonable people, of course, can—and often do—disagree about how best to protect miners. For example, there's always a vast array of opinions offered on any proposed regulation, followed usually by a consensus before a regulation becomes final. The process has slowed, but it is still very important that viewpoints of all parties receive full consideration.

What benefits has the industry gained from increased cooperation and communication over the years? One is the dramatic improvement of the industry's safety record.

The industry has made a great leap forward in the past dozen years during which fatalities were cut in half. In 1980, 236 miners lost their lives while working in the Nation's mines compared with 115 deaths in 1991.

To gain perspective on how far we have come, let's look back to 1907, which recorded 18 coal mine disasters plus two more in the metal and nonmetal industry. I don't think those tragedies would have occurred if the American Mining Congress, the Mine Safety and Health Administration, and other present-day mining organizations had been in place and actively addressing the control of mine hazards.

While one mining death or one serious injury is one too many, I feel that the mining industry has done an incredible job in improving its safety record in a relatively short time and that there is reason for optimism about the future.

Today, I'm excited about the prospect that the Nation's coal and noncoal industries could establish 1992 as the safest year ever recorded if the current nationwide pace holds true for the rest of the year.

During my tenure at MSHA, I have advocated a goal of zero fatalities by the year 2000.

I have always been optimistic about reaching the objective of zero fatalities because I have seen that a great many of the Nation's 16,000 mines go year after year without a single mine death or even a serious injury. We can make the goal, and I believe we will with a strong continuing safety commitment by all segments of the mining community.

I'm convinced that cooperative safety programs such as the cosponsorship by MSHA and the American Mining Congress of the Sentinels of Safety program over many years has been a great inspiration to the mining industry and a big plus for safety.

There's no question that the awards competition has stimulated greater interest in safety and fostered the development of many effective accident-prevention programs at both coal and metal and nonmetal mines.

In another area, the American Mining Congress has been similarly cooperative in explaining to its member companies the many benefits of a Job Safety Analysis (JSA) program. I believe that the JSA technique is one of the major safety and task training methods that can eliminate serious injuries. The JSA technique, I'm convinced, will bring us close to the goal of zero fatalities.

Another program involving the American Mining Congress and MSHA was the establishment of a substance abuse committee composed of representatives from mining management, labor and government. The Mining Industry Committee on Substance Abuse was formed in 1985 and has been going strong ever since.

There was little national interest in the problems of alcohol and drug addiction at the time. The American Mining Congress among others recognized the extent of the problem in the mining industry and contributed it's resources and technical assistance to help build the committee into a productive working group.

Since its inception, the committee has produced numerous creative materials to build awareness of alcohol and drug problems at the mining workplace. Thousands of videotapes, resource manuals, and other materials have been ordered from MSHA's National Mine Health and Safety Academy.

The American Mining Congress and the Mine Safety and Health Administration have had a fruitful relationship over many years. As we move into an increasingly competitive global economy, the need for cooperative efforts in developing effective safety programs will become more evident. I am confident that together we can forge the strong bonds that will help the mining industry grow and prosper in the 1990s and the next century.

*Reprinted from the September 1992 issue of the **AMC Journal**, a publication of the American Mining Congress, 1920 N Street, N.W., Washington, D.C. 20036*

Seat belts

The North Carolina Occupant Restraint Law began January 1, 1987, with, according to the University of North Carolina's Highway Safety Research Center, a **high of 78 percent belt usage.** Before the law was enacted, seat belt usage was only 25 percent. Currently it has leveled off to **62 percent.**

Highest seat belt usage

- Urban areas
- Female drivers
- Passenger vehicles
- During commuting

Seat belts:

- Prevent you from slamming into the dashboard and windshield of the vehicle.

- Spread the crash forces over the strongest parts of the body.
- Keep you from hitting other passengers.
- Help keep you in place to maintain control of the vehicle.
- Keep you from being ejected from the vehicle.

The force of an impact in a crash can be measured by the weight of the person times the speed of the vehicle. For example, a ten pound baby in a 30 m.p.h. crash would hit the windshield, door, or dashboard with a 300 pound force. This force is the same as if the baby fell from the bottom edge of a fourth floor balcony.

Tips for correct use

- Review owners manual to understand how your seat belts work.
- Tighten lap belts snugly on the hips.
- Wear shoulder belts across shoulder and chest.
- Use a shoulder belt comfort cover.
- Check with your car dealer about installing back seat shoulder straps.
- Ask your dealer for a seat belt extender if yours is too short to fit around you.

If worn properly, seat belts generally reduce your chance of death by about 60 percent and chance of severity of injury by 50 percent in a car crash.

Reprinted from the North Carolina Department of Labor, Mine and Quarry Division's ***"Danger in and Around Mines."***

Stay on top of ladder safety

Don't be left hanging when you climb to the top—properly select, inspect, maintain and use ladders according to the task on hand and ladder specifications. Keep an up-to-date record of ladder type, purchase information, inspection, defects, and repairs. Store ladders away from heat sources and exposure to the elements. If you plan to hang ladders horizontally, make sure they are properly supported to prevent weakening of the joints and distortion of the rails.

Frequently inspect wood and metal ladders. Look for cracks or splits on side rails; loose rungs, steps, rails, braces or hardware; damaged connection points; rough burrs and sharp edges on metal ladders; a "blooming" condition on fiberglass ladders, where exposed glass fibers start to deteriorate; and dampness on wood ladders that may impair their nonconductivity.

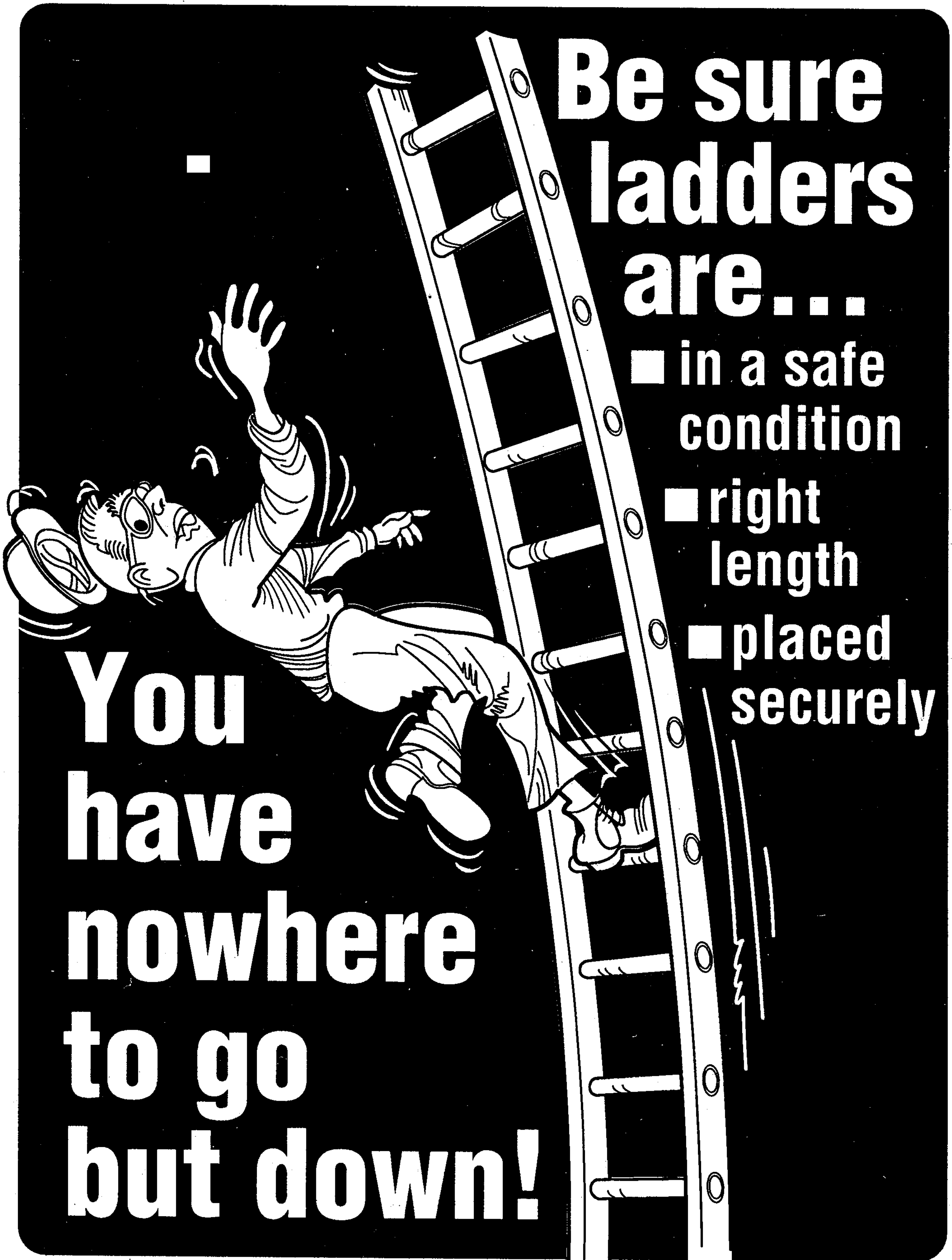
Immediately discard unsafe ladders. Cut them into pieces and/or tag them as "Dangerous—do not use." Do not try to repair ladders with major structural damage.

Before you select a ladder, always read all its labels. Check the weight capacity of the new ladder; then remember to include the weight of your tools and other materials when figuring total poundage.

Follow these precautions before you climb:

- Make sure your hands, shoes, and ladder rungs are clean and dry.
- Allow only one person on the ladder at a time.
- Firmly secure the ladder at top and bottom; keep the area at its base uncluttered.
- Set the ladder's base on a firm, level surface; use a board under it if you are working on soft ground. Never add height to your ladder with boxes or other materials, or build up one leg of the ladder.
- Do not use ladders in a strong wind.
- Follow the 4:1 ratio for extension ladders: for every four feet of height between the ladder's base and top point of support, move the base one foot away from the wall.
- Face the ladder when you climb up or down. Hold onto side rails or rungs with both hands.
- Always keep your body centered between the rails. Do not overreach; instead, climb down and move the ladder.
- Wear a tool belt and raise heavier tools by a hoist.
- Keep one hand on the ladder while you work.
- Use extra caution when you work near entrances, gangways, or in other traffic areas. Barricade or lock the area, or post a lookout.
- Do not lean the ladder against any unstable surface, window pane, or sash.
- Do not fasten or lash short ladders together to make longer ones.
- Use nonconductive ladders when working with or near electrical equipment.
- Position a stepladder as close to the work area as possible. Never use a step-ladder as a straight ladder.
- If you will use the ladder to mount a roof or platform, the top should extend at least three feet above the roof edge. Never climb higher than the third rung from the top.
- Use caution when placing fiberglass extension ladders against a suspension strand; they are likely to slide.

Reprinted from the Mines Accident Prevention Association of Ontario, Canada


Be sure ladders are...
in a safe condition
right length
placed securely
You have nowhere to go but down!

Free workers from confined-space hazards

Specialized training combined with good work procedures means working safely in tight places.

By Jan Bone

Hundreds of times each year, a worker's life ends in a storage tank, bin, furnace, boiler, silo, or tunnel.

Confined spaces like these can be deadly, not only to workers but also to those who attempt to rescue them. Single accidents often turn into multiple-death catastrophes. Sixty percent of the victims in confined-space incidents were coworkers or others who attempted to rescue the initial victim, according to the National Institute for Occupational Safety and Health (NIOSH).

One such accident killed a 22-year-old worker who was cleaning a toluene storage tank 10 feet in diameter and 20 feet high, according to NIOSH *"Alert."* He'd entered the tank through the 16-inch diameter top and used a half-inch rope to descend. But he didn't wear a self-contained breathing apparatus, even though it was there at the work site.

Overcome by fumes, he collapsed on the tank floor. When fire department personnel rushed to the scene and began cutting an opening into the side of the tank to rescue him, the tank exploded. A 32-year-old firefighter was killed, and 15 others were injured.

In another accident, also reported in *"Alert,"* a 27-year-old sewer worker climbed down a fixed ladder inside a shaft three feet in diameter to enter a pump station 50 feet underground. Because the work crew didn't know about procedures to isolate the work area and make sure the pump had been bypassed, the transfer line was still under pressure.

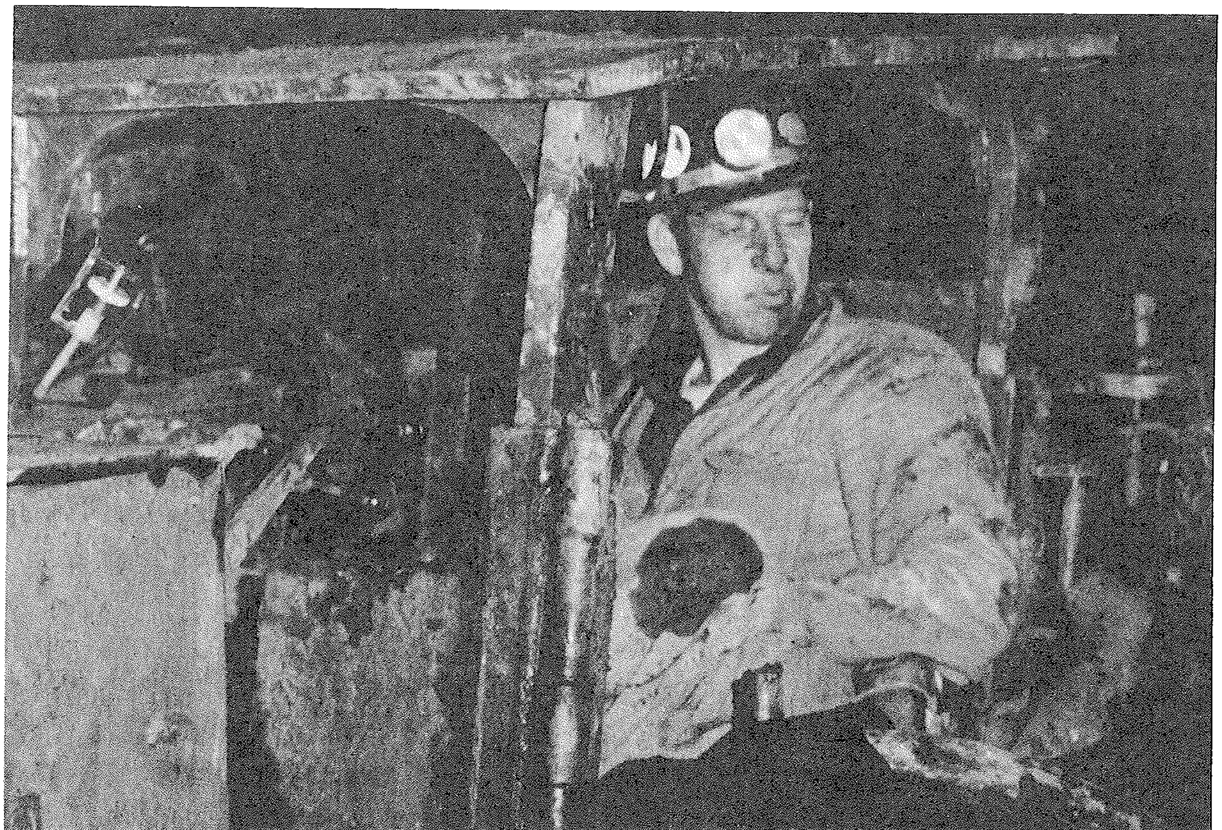
When the crew removed the bolts from an inspection plate that covered a check valve, the waste water's force blew off the inspection plate. Raw sewage flooded the chamber and trapped one of the workers. A coworker, a supervisor, and a policeman attempted to rescue him. All four died.

What is a confined space?

NIOSH calls a work site a confined space if it has any one of the following characteristics:

- Limited openings for entry and exit. Small openings or those hard to reach are difficult for workers to move through easily. It's hard to get equipment that's needed (like respirators or life-saving equipment) in or out of the opening.
- Unfavorable natural ventilation. Air usually can't move freely in and out of confined spaces. Deadly gases can be trapped inside the space. There may be insufficient oxygen inside the confined space to support life. Or the air may be so oxygen-rich that it's likely to explode or burn if an ignition source is present.
- Not designed for continuous worker occupancy. Most confined spaces are designed to store a product, enclose materials and processes, or transport products. That's why workers who need to inspect, maintain, repair, or clean them often face dangerous chemical or physical hazards.

The Occupational Safety and Health Administration (OSHA) doesn't have a comprehensive, industry-wide standard to protect workers at risk in confined spaces, though the agency has been working on one since 1975. This year, however, OSHA hopes to get its proposed permanent standard up and running.



One key component of OSHA's proposal is a regulation that establishes "permit-required confined spaces." Permits tell employees what hazards workers face, what controls are necessary and—specifically—what each worker's responsibilities are.

When the standard is finally implemented, employers will need to:

- Identify "permit-required" confined spaces
- Restrict access to these spaces
- Use engineering and work practices to control confined-space hazards
- Test, monitor and inspect confined spaces
- Train rescuers

The Mine Safety and Health Administration (MSHA) is developing its own comprehensive regulation for confined-space hazards in mining—hazards that include engulfment, entrapment, and electrical and mechanical hazards.

"We've had bits and pieces, but we don't have a single confined-space entry rule," says Margie Zalesak, industrial hygienist who's project coordinator for the proposed MSHA rule. "In metal mining, workers have to wear safety belts, but not in coal. We've had people trying to unplug machinery and getting sucked into it. In another case, people painting the inside of a tank were seriously burned when a spark ignited."

MSHA's review of accident investigation reports from 1980 through 1991 reveal that 45 metal and nonmetal mine fatalities and 33 coal mine fatalities involved confined spaces. "We also reviewed a year's worth of nonfatal accidents, and found over 100 near-misses," Zalesak says.

Comments on MSHA's advanced notice of proposed rulemaking, issued December 30, 1991, have been coming in all spring.

MSHA wants to hear what the mining industry thinks should be included in the proposed MSHA standard, and what specific elements of OSHA's proposed rule should be included or excluded.

The new OSHA standard won't cover everyone. Federal, state and local government workers won't be included. Neither will workers in agriculture, the maritime and construction industries, and companies with 10 or fewer employees.

One industry that's not wholeheartedly buying into OSHA's proposed standard is telecommunications, whose workers have been covered under OSHA's industry-specific standard since 1975.

Some of this industry's executives cite their zero-fatality record. Many of them don't want to be part of OSHA's new generic rule. They say the telecommunications standard adequately covers telecommunications manholes and cable vaults.

Last summer, OSHA decided to exempt the telecommunications industry for entry into their below-ground vaults. But the industry expects to follow the new OSHA standard for other confined situations, such as pits, boilers, and storage tanks.

For telecommunications workers, the manhole is the confined space they're most likely to encounter.

Manholes permit access to telephone cables that run through underground ducts. Workers test the cables, replace damaged sections, splice cables together, or install new cables.

But telephone companies try to reduce hazards by limiting the conditions for confined-space work whenever possible.

"You'll virtually never see our people out doing their job while wearing respirators or air packs," says James Degen, occupational safety director for the Telesector Resources Group of New England Telephone and New York Telephone. "We don't often send them into a hazardous situation."

Both Telesector Resources Group of New England Telephone and New York Telephone companies provide network services to customers in Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont, and parts of southern Connecticut.

But, Degen admits, there occasionally are special problems. "Once in a while, especially in the metropolitan areas, gasoline- or oil-storage tanks have rusted out and leaked into the soil. The petroleum product travels through the ground and suddenly appears in the manhole.

"That's potentially dangerous," he says. "We try to put off telephone work until the whole area is cleaned up environmentally."

Game plan pays off

If work can't be delayed, Degen says, the problem is handled as a special case. The safety staff develops a customized game plan.

"Typically, we'll work closely with local authorities. The police are there. The environmental protection department is there. Our safety staff is on site, supervising the work directly. We'll do extra monitoring...special setups...maybe borrow equipment, if something special is needed.

"In the very few cases in which people have had to work, wearing air packs, they've had to be specially trained before they do the job," he explains. "They need to be medically certified."

Far more usual, Degen says, are routinely required procedures that workers follow before entering manholes. Those procedures start with job assignments. "Our job control center knows—before workers leave—where they're being sent and what they will be doing," he explains.

Barricades, gates, and warning signs are set up on the street to warn traffic. "Manhattan requires a person to be at the top of the manhole all the time when work is going on underground," Degen says. "Other cities usually don't. Sometimes you'll need extra people just to direct traffic."

After the manhole has been opened, workers use a gas-testing instrument to be sure no combustible gas has accumulated in the manhole. Then the air in the manhole is purged with mechanical ventilation .

Next, the air is retested. Workers must make sure no gas has accumulated in pockets or corners. A ventilator runs constantly while workers are in the manhole. "That's our insurance policy against changing conditions," he explains.

Safety professionals claim there's a major problem with confined-space work—although the safety principles apply across-the-board, each confined-space entry requires its own specialized procedures, depending on the situation and conditions.

That's why Kennecott Corp., which currently produces more than 15 percent of the United States' copper, has a written confined-space entry policy that specifically identifies the step-by-step requirements for entering a confined space. This procedure is part of a comprehensive safety manual that addresses many such issues.

Kennecott's facilities located in Salt Lake County, Utah, include the Bingham Canyon Mine, a terraced bowl that extends two-and-a-half miles wide and a half-mile deep; two ore-processing plants; and a copper smelter and a copper refinery. MSHA regulates the mine and concentrator plants; OSHA regulates the smelter and refinery.

Most confined-space entries involve workers performing maintenance, says Vaughn Baird, manager of safety and health at Kennecott. "For instance, Kennecott workers may be required to enter chemical storage tanks to repair leaks inside the tanks or inside process-gas flue systems to clean and repair the ducts.

"Before anyone enters one of our confined spaces, that space must be inspected by qualified personnel," he says. "Usually safety-and-health professionals or industrial hygiene engineers perform the inspection, always considering the type of work that must be done. They look at the entry location: How does a worker get inside? How difficult are entrance and exit? Are there hazards inside the vessel? They test the atmosphere.

"As a result of the inspection we determine—ahead of time—all of the personal-protective equipment required, including such specialized items as a self-contained breathing air-supplied respirator. We also specify what kind of forced-ventilation equipment must be used to make the space safe before entry. In addition, the atmosphere inside the confined space is monitored for air quality and flammable gases. In essence, we develop a complete plan for the work to be accomplished safely.

"The safety-and-health professional and the immediate supervisor responsible for the work to be done identify and record the special requirements on the entry permit, including the requirement for backup employees equipped with rescue equipment. The permit is then signed and must be attached to the entry point and stay there until the procedure is completed," Baird says.

Training Is refreshing

The confined-spaces entry procedure is included in workers' annual refresher training, Baird says. In addition, just before the actual entry, the supervisor holds another comprehensive training session with the workers who will enter the space, to make sure they know and understand the potential exposures and procedures for that particular job.

If the job takes longer and involves a second shift, workers from that shift also go through orientation and training just before they enter the confined space. The same pre-entry evaluation, permitting, and testing procedure is repeated before the second crew enters.

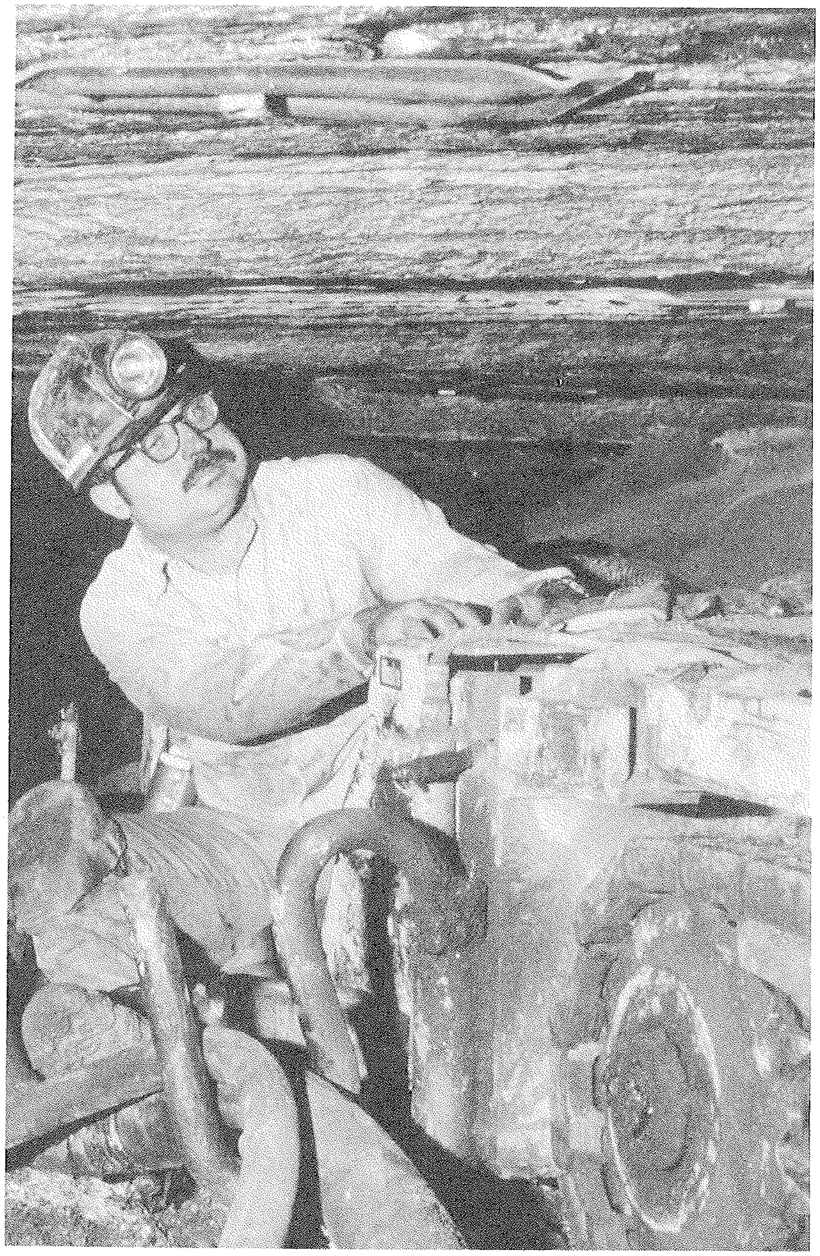
When workers are using an oxygen acetylene torch inside a tank, the cylinders of gas are secured outside and away from the entrance to the confined space When workers aren't actually inside the confined space, hoses and torch are also taken outside.

"'Lockout/tagout and try' are standard procedures before workers enter confined spaces at Occidental Petroleum Corp.," says Grover Vos director of safety, environmental health and assessment programs.

Vos says many of the company's 24,700 employees who work in oil and gas exploration and production, coal mining, gas transmission, and basic and petrochemicals production are required to enter confined spaces.

The company often uses a "paper exercise" of getting information together, categorizing different types of confined spaces. "You can't always drop a person into a confined space," he points out. "Sometimes they have to enter the spaces laterally. Other times, workers have to crawl up into them.

"The configuration of a particular confined space dictates the specific equipment required. You may not be able to use the traditional harness if you're repairing or maintaining a distillation column, where there are different baffles. You may need another type of equipment if you're working in a sump, fixing heat exchangers or pumps."



Occidental often uses the two-permit system: one for the entry, Vos says, and a second one for the hazardous work, especially if the task involves welding, burning, cutting or electrical work in a potentially explosive or flammable area.

"One of the major points of failure in the permitting process can happen when you change from one work crew to another on the following shift," he warns.

Occidental requires the first crew to "hand over communication."

"We go through the process of confirming that all permit requirements have been met...that when people have left the confined space, you don't have a change in atmosphere. The second set of people going in must be as safe as when the first set entered," he says.

"On lockout/tagout and try, we have a custodian concept. After the confined space entry and maintenance have been completed, the unit is actually handed back over to the operations people."

No room for complacency

Safety and health professionals know that companies—and workers—can't be complacent about confined spaces if they want to prevent accidents and fatalities. Testing for air hazards, monitoring, cleaning, ventilation, lockout/tagout, and wearing personal protective equipment (including appropriate respiratory protection) are all "must do" steps for confined-spaces safety. But training and rescue are equally crucial.

Many companies use the team approach to training. They crosstrain all team members in four functions:

- Authorizing permits
- Entering the confined space and doing the work
- Being an attendant—a standby person on the outside, who sees or hears the person on the inside at all times
- Rescue operations

Because more than half of confined-space fatalities happen during emergency rescues, rescue procedures should be set up before confined-spaces work is done. They need to be practiced frequently

The new OSHA regulation requires either a trained in-plant rescue team or an arrangement with an outside rescue team for the emergency services.

Confined-spaces training and good work practices save lives. But employee involvement is the real key to safety. Management can't just dictate what must be done. All the way down the line—from the top, right down to the worker who enters the confined space—everyone has to buy into the safety concept. Every time people work in confined spaces, lives are on the line.

*Reprinted from the June 1992 issue of **Safety & Health** magazine—a publication of the National Safety Council, 1121 Spring Lake Drive, Itasca, Illinois 60143-3201.*

Freak tragedy claims five lives

They were a close-knit family. They liked working together. They were proud of their dairy farm...

Like many livestock farms, this one had a manure pit system to expedite cleaning of the dairy barn. Manure was stored underground in the 10-foot-deep pit to ferment and form fertilizer.

On that hot July day, the dairy farmer's 28-year-old son entered the pit to replace a shear pin on an agitator shaft. He wasn't expecting danger. He'd gone into the pit many times. But that day, he was overcome by the gases from the decomposing manure and fell to the bottom.

The farmer's 15-year-old grandson saw the accident. He tried a rescue, but he, too, was overcome and collapsed.

One at a time, the farmer's 63-year-old nephew, the farmer's 37-year-old son and the 65-year-old farmer himself entered the pit, trying to get the others out. Each was overcome and collapsed in turn.

A carpet installer working at the farmhouse then entered the pit, attempting a rescue. He also was overcome, but was pulled to safety by his assistant.

Finally, the owner of a local farm-implement business arrived on the scene with two of his workers. Using a rope, he was able to get the five victims out of the pit.

Twenty minutes after the first victim had collapsed, the local rescue squad arrived. They immediately started CPR.

The nephew was pronounced dead at the scene. The farmer and his younger son were pronounced dead on arrival at the local hospital. The older son died an hour after reaching the emergency room. The grandson was transferred by helicopter to a major trauma center, but died six hours after he was removed from the pit.

Medical examiners' reports listed methane asphyxiation as the cause *of* death for all victims.

That accident—and a second one, in 1989, in which two brothers died in a 4-1/2-foot-deep manure pit on their farm—prompted NIOSH to issue a special alert to farmers and farm workers. An additional 16 deaths resulted when workers suffocated in manure pits or similar waste facilities.

Many farmers may not realize that manure pits are confined spaces—spaces in which methane, hydrogen sulfide, carbon dioxide and ammonia are produced by the decomposing waste. The gases are toxic. More importantly, they can displace oxygen. In addition, methane and hydrogen sulfide may present an explosion hazard.

NIOSH wants the word out on safety precautions. It's asked farm owners and equipment manufacturers to help disseminate the safety information in the NIOSH *"Alert."*

That's the good news. The bad news is that even when the proposed OSHA standard for confined spaces becomes effective, it won't be enforced on farms with 10 or fewer workers.

Holmes Safety Association Monthly safety topic

Fatal handtool accident

GENERAL INFORMATION: A 41-year-old crusher operator with 11 months of experience was fatally injured at a surface limestone operation when he was struck and killed by a piece of pipe.

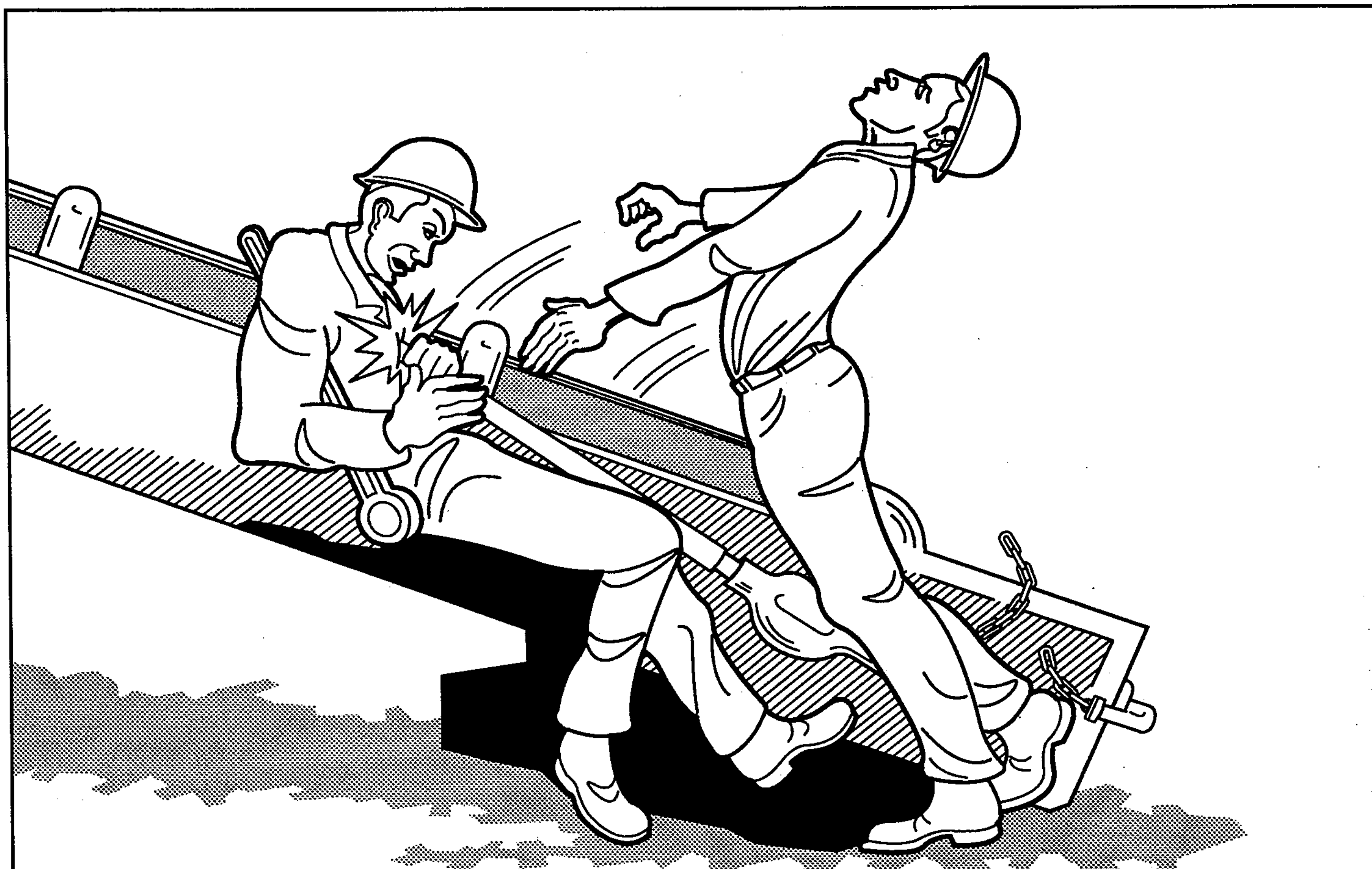
The limestone mining operation employed 28 persons on two 12-hour shifts a day, five days a week. Both shifts produced crushed stone which was mixed from multiple benches. The materials were crushed, screened, and stockpiled to be used for road stone and tile-fill.

DESCRIPTION OF ACCIDENT: The victim reported for work at his usual starting time of 6:00 p.m. The foreman assigned the victim and another employee to finish repairs to a plant conveyor and to align the feeder drive motor prior to plant startup. Work progressed normally and production began at about 7:30 p.m.

The plant ran for approximately 10 minutes until the No. 4 conveyor bottom belt stone scraper came loose, wedged in the tail pulley, and stopped the conveyor. The No. 4 conveyor was a 90-foot radial stacking conveyor equipped with a 30-inch-wide belt. It had screw-type adjustors on each side of the tail pulley to adjust belt tension and alignment. The adjustor threads on the left side were stripped and the lock nut seized when the left takeup was loosened. Belt clamps had to be installed on the top and bottom sections of the conveyor before enough slack was gained to remove the scraper.

At about 11:00 p.m., the foreman returned and told the two men to tighten the takeups. As the left side takeup was stripped, the foreman told the victim to cut the locking nut from the takeup rod and pull back that side. The foreman then left the area. The victim used a cutting torch to try to burn away the top portion of the nut but was unsuccessful. He and his partner attached a chain come-along from the back brace of the conveyor to the adjusting rod but could not move the tail pulley or the adjusting rod far enough with the come-along to gain the proper tension.

They decided to slip a 40-inch-long piece of 3-inch pipe over the handle of the come-along to gain additional leverage. The victim was pulling from beside the conveyor belt and his partner was pushing from the tail of the conveyor when the chain on the come-along broke. The pipe struck the victim in the chest and he fell back onto a 3/4-inch drive ratchet that were positioned behind him—preventing him from falling to the ground after receiving the fatal blow. The victim's partner laid him beside the conveyor and then went to tell the foreman. First aid was administered until the ambulance arrived. The victim was taken to the



Metal and Nonmetal mine fatalities to date — thru 11-13-92

Type	1988		1989		1990		1991		1992	
	UG	S	UG	S	UG	S	UG	S	UG	S
Electrical	2	2	1	3	2	2	—	7	—	3
Fall of roof/back	2	—	3	—	2	—	1	—	4	—
Haulage	2	17	1	9	—	17	—	16	2	15
Machinery	1	7	1	6	—	10	1	3	—	5
Other	4	10	4	16	4	14	6	10	—	8
Total	11	36	10	34	8	43	8	36	6	31

hospital where he died from fatal chest injuries the following morning.

CONCLUSION: The direct cause of the accident was the use of equipment beyond its rated capacity—the use of cheater pipes on come-alongs.

Failure to observe that the adjusting bolt had not been freed after cutting, with an acetylene torch on the locking nut, contributed to the accident.

The location of the 3/4-inch drive ratchet behind the victim may have contributed to the severity of the injuries.

Southeast Metal and Nonmetal mine award winners are listed on pgs. 29-33. Additional winners to be announced in future Bulletin publications

Winners of a certificate of achievement in safety

The following operations have received Sentinels of Safety Certificates of Achievements in Safety for working 30,000 hours or more without a lost-time accident or injury in 1991 in the extractive industry;

ALABAMA

DREDGE GROUP

Pit #1; Baldwin Sand and Gravel; Pickensville; 39,226 hours

QUARRY GROUP

Sylacauga Quarry; ECC International; Sylacauga; 99,347 hours
Tarrant Quarry SRM; Southern Ready Mix; Tarrant 52,777 hours
Roberta Quarry; Blue Circle Inc.; Calera; 46,450 hours
Alabama Calcium Products Division; Georgia Marble Company; Sylacauga; 51,360 hours;

FLORIDA

DREDGE GROUP

474 Sand Mine; Rinker Materials Corporation; Clermont; 31,275 hours

OPEN PIT GROUP

DuPont Florida Mine and Plant; E.I. DuPont de Nemours and Co.; Starke; 339,717 hours
Four Corners Mine; IMC Fertilizer, Inc.; Bartow; 317,914 hours
Big Four Mine; Mobil Mining and Minerals Co.; Nichols; 279,831 hours
Payne Creek; Agrico Chemical Company; Mulberry; 172,006 hours
Nichols Mine; Mobil Mining and Minerals Co.; Nichols; 162,770 hours
Gadsden County Mines; Floridin Co.; Quincy; 104,712 hours
Hopewell Mine; IMC Fertilizer, Inc.; Plant City; 79,459 hours
Haynsworth Mine; IMC Fertilizer, Inc.; Bartow; 35,424 hours

QUARRY GROUP

Brooksville Gregg Mine; Florida Crushed Stone Co.; Brooksville; 140,054 hours
Brooksville Rock Operations; Vulcan/ICA Distribution Co.; Brooksville; 118,226 hours
Diamond Hill Quarry; Florida Rock Industries, Inc.; Brooksville; 90,728 hours
Ft. Myers Quarry; Florida Rock Industries, Inc.; Ft. Myers; 84,169 hours
Miramar Rock Quarry; Miramar Lakes, Inc.; Miramar; 74,146 hours
Newberry Mine; Limestone Products, Inc. Newberry; 49,800 hours
Gulf Hammock Quarry; Florida Rock Industries, Inc.; Gulf Hammock; 41,920 hours
Sumterville Quarry; Dixie Lime and Stone Co.; Sumterville; 32,468 hours
Coral Aggregates; Tarmac Florida, Inc.; Miami; 31,505 hours

GEORGIA

QUARRY GROUP

Georgia Silica Division; The Morie Company; Junction City; 79,037 hours
Hartwell Sand Plant; The Mearl Corp. SFM Div.; Hartwell; 32,876 hours

OPEN PIT GROUP

Scott Mine; Engelhard Kaolin Corp.; Gordon; 129,720 hours
Klondyke Mine and Mill; Engelhard Corp; McIntyre; 88,836 hours
Palmer Mine; J. M. Huber Corp.; Wrens; 77,839 hours
Washington Co. Mine and Mill; Engelhard Corp.; McIntyre; 75,664 hours
Amsterdam Mine; Engelhard Corp.; Attapulgus; 61,871 hours

QUARRY GROUP

Camak Quarry; Martin Marietta; Camak; 59,995 hours
Kennesaw Quarry; Vulcan Materials Co.; Kennesaw; 41,054 hours
Clinchfield Mine; Medusa Cement Company; Clinchfield; 38,521 hours
Wellborn Mountain Quarry; Colwell Construction Co., Inc.; Blairsville; 33,320 hours

KENTUCKY

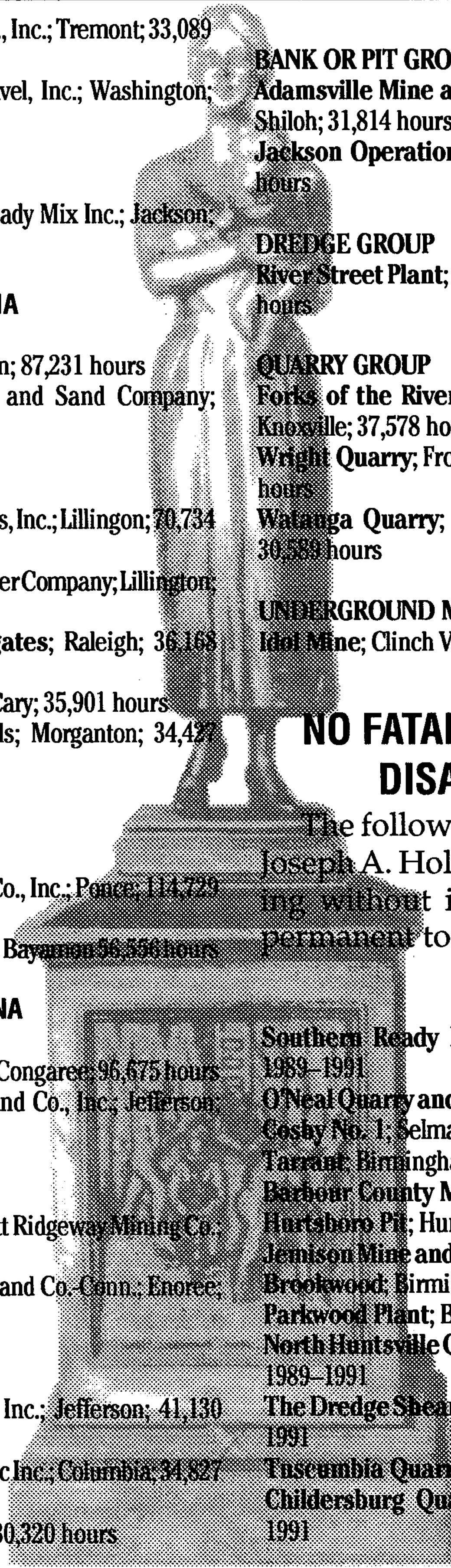
UNDERGROUND NONMETAL GROUP

Central Quarry; Vulcan Materials Co.; Lexington; 55,795 hours
Mount Vernon Mine and Mill; Kentucky Stone Co.; Mt. Vernon; 36,300 hours
Grayson County Quarry; Scotty's Contracting and Stone Co.; Leitchfield; 30,241 hours

MISSISSIPPI

BANK OR PIT GROUP

Highway 27 Gravel Pit; W. J. Runyon and Son, Inc.; Vicksburg; 49,237 hours



Tremont Plant; R & S Haulers and Dist., Inc.; Tremont; 33,089 hours
Cedar Grove Pit; Blain Sand and Gravel, Inc.; Washington; 30,632 hours

OPEN PIT GROUP
Cynthia Quarry and Mill; Jackson Ready Mix Inc.; Jackson; 44,935 hours

NORTH CAROLINA

BANK OR PIT GROUP
Senter; Becker Minerals, Inc.; Lillington; 87,231 hours
Grove Stone Quarry; Grove Stone and Sand Company; Swannanoa; 75,181 hours

QUARRY GROUP
Leon Gardner Quarry; Becker Minerals, Inc.; Lillingon; 70,734 hours
Cape Fear Sand and Gravel; Nello L. Teer Company; Lillington; 45,396 hours
Arrowood Martin Marietta Aggregates; Raleigh; 36,168 hours
Triangle Quarry; Wake Stone Corp.; Cary; 35,901 hours
Morganton Quarry; Vulcan Materials; Morganton; 34,427 hours

PUERTO RICO

QUARRY GROUP
Cantera Cana; Puerto Rican Cement Co., Inc.; Ponce; 114,729 hours
Cantera Dorado; Cantera Dorado, Inc.; Bayamon 56,556 hours

SOUTH CAROLINA

BANK OR PIT GROUP
Columbia Plant; U.S. Silica Co.; South Congaree; 96,675 hours
Pageland Mine and Mill; Brewer Sand Co., Inc.; Jefferson; 38,345 hours

OPEN PIT GROUP
Kennecott Ridgeway Mine; Kennecott Ridgeway Mining Co.; Ridgeway; 154, 520 hours
Enoree Mine and Shop; W. R. Grace and Co.-Conn.; Enoree; 59,034 hours

QUARRY GROUP
Jefferson Quarry; Becker Minerals Inc.; Jefferson; 41,130 hours
Columbia Quarry; Tarmac Mid Atlantic Inc.; Columbia; 34,827 hours
Giant; Giant Cement Co.; Harleyville; 30,320 hours

TENNESSEE

BANK OR PIT GROUP
Adamsville Mine and Mill; Adamsville Sand and Garvel Co.; Shiloh; 31,814 hours
Jackson Operations; Nicks Silica Co., Inc.; Jackson; 30,127 hours

DREDGE GROUP
River Street Plant; Vulcan Materials Co.; Chattanooga; 68,699 hours

QUARRY GROUP
Forks of the River Quarry; American Limestone Co., Inc.; Knoxville; 37,578 hours
Wright Quarry; Frogge and Williams Inc.; Jamestown; 31,938 hours
Watauga Quarry; American Limestone Co., Inc.; Watauga; 30,589 hours

UNDERGROUND METAL GROUP
Idol Mine; Clinch Valley Mining; Thorn Hill; 41,342 hours

NO FATALS OR PERMANENTLY DISABLING INJURIES

The following operations have received Joseph A. Holmes Safety Awards for working without incurring a fatal accident or permanent total disabling injury:

ALABAMA

Southern Ready Mix Rock Plant; Calera; 109,943 hours; 1989–1991
O'Neal Quarry and Mill; Alabaster; 108,433 hours; 1989–1991
Cosby No. 1; Selma; 107,098 hours; 1989–1991
Tarrant; Birmingham; 105,496 hours; 1987–1991
Barbour County Mines; Eufaula; 105,034 hours; 1987–1991
Hurtsboro Pit; Hurtsboro; 105,016 hours; 1987–1991
Jemison Mine and Plant; Jemison; 104,415 hours; 1989–1991
Brookwood; Birmingham; 103,485 hours; 1986–1991
Parkwood Plant; Birmingham; 102,708 hours; 1987–1991
North Huntsville Quarry and Mill; Huntsville; 102,401 hours; 1989–1991
The Dredge Shearwater; Montgomery; 101,863 hours; 1989–1991
Tuscumbia Quarry; Tuscumbia; 101,792 hours; 1987–1991
Childersburg Quarry; Birmingham; 101,371 hours; 1988–1991

Landmark Quarry and Mill; Siluria 101,183 hours; 1990–1991
Summit; Guntersville; 100,360 hours; 1987–1991
Beers Pit; Selma; 100,072 hours; 1983–1991

FLORIDA

Suwanee River Mine; White Springs; 4,045,218 hours; 1987–1991
Charlotte County Rock Plant; North Ft. Myers; 114,802 hours; 1989–1991
A Tower; Davenport; 105,350 hours; 1989–1991
St. Catherine Quarry; Bushnell; 103,591 hours; 1989–1991
Dredge Norman; Chattahoochee; 103,462 hours; 1987–1991
Chattahoochee River Plant; Chattahoochee; 103,144 hours; 1987–1991
Keystone Sand Plant; Keystone Heights; 101,691 hours; 1987–1991
Lake Sand Plant; Clermont; 101,380 hours; 1987–1991
Caloosa Sand Mine; Labelle; 100,721 hours; 1980–1991
Desoto Shell Pit; Arcadia; 100,552 hours; 1984–1991

GEORGIA

Athens Quarry; Athens; 110,626 hours; 1987–1991
Ball Ground Plant; Lithonia; 109,934 hours; 1988–1991
Keystone Blue Quarry; Elberton; 106,386 hours; 1987–1991
Lithonia Quarry; Conyers; 105,330 hours; 1990–1991
Eagle Blue Quarry; Elberton; 105,123 hours; 1987–1991
Augusta Mines; Augusta; 104,402 hours; 1987–1991
Dalton Plant; Dalton; 104,330 hours; 1989–1991
Andersonville Mines and Plant; Andersonville; 104,116 hours; 1989–1991
White Path Quarry and Plant; Blairsville; 104,049 hours; 1989–1991
Berkeley Quarry; Elberton; 103,988 hours; 1988–1991
Huber Wilkinson County Mine; Macon; 103,634 hours; 1987–1991
Junction City Quarry; Talbotton; 103,460 hours; 1988–1991
Albany Quarry; Leesburg; 102,811 hours; 1987–1991
Georgia Central Maintenance Shop; Macon 102,757 hours; 1989–1991
Georgia-Carolina Quarry; Sandy Cross; 102,660 hours; 1987–1991
Tyrone Quarry; Tyrone; 102,029 hours; 1990–1991
Warrenton Quarry; Warrenton; 101,851 hours; 1988–1991
Fendley Enterprises, Inc; Elberton; 101,849 hours; 1987–1991
Habersham Quarry; Demorest; 101,802 hours; 1989–1991
McIntyre Mill and Mine; McIntyre; 101,585 hours; 1989–1991
Mill No. 1 Whitestone Division; Whitestone; 101,305 hours; 1987–1991
Howard Mine; Howard; 101,264 hours; 1980–1991
Oglethorpe Quarry; Carlton; 101,244 hours; 1980–1991
Cyprus Industrial Minerals; Cartersville; 100,019 hours; 1990–1991

KENTUCKY

Tyrone Mine; Lawrenceburg; 109,308 hours; 1990–1991
Glen's Creek Mine and Mill; Frankfort; 107,139 hours; 1989–1991
Louisville Plant; Louisville; 105,421 hours; 1987–1991
Joe Clark Mine and Mill; Crestwood; 104,015 hours; 1987–1991
#1 Quarry; Greenville; 100,793 hours; 1989–1991
Natural Bridge Stone Co.; Bowen; 100,221 hours; 1989–1991

MISSISSIPPI

Highway 27 Gravel Pit; Vicksburg; 107,817 hours; 1989–1991
Jones Pit and Plant; Natchez; 107,585 hours; 1989–1991
Aberdeen Mine; Aberdeen; 107,185 hours; 1987–1991
Hammett Mine and Plant No. 2; Lexigton; 106,049 hours; 1987–1991
Cedar Grove Gravel Pit; Natchez; 105,965 hours; 1987
Twelve Oaks Pit; Picayune; 105,323 hours; 1982–1991
Plant No. 1; McComb; 104,986 hours; 1987–1991
Amory No. 1; Amory; 102,078 hours; 1990–1991
Love Pit; Oxford; 101,289 hours; 1980–1991
Day River Pit; Bigbee Valley; 100,927 hours; 1987–1991
Traxler Gravel Division; Jackson; 100,527 hours; 1989–1991
Grenada Pit and Plant; Grenada; 100,267 hours; 1987–1991
Gravel Gertie Dredge; Cleveland; 100,094 hours; 1986–1991

PUERTO RICO

Agregados Monte Claro; Bayamon; 106,500 hours; 1987–1991
Gravero Coto Laurel; Ponce; 104,532 hours; 1987–1991
Quikrete; Toa Baja; 104,324 hours; 1987–1991
Cantera Monsegur; Sabana Grande; 101,591 hours; 1980–1991
Jocarlrick Quarry; Vega Baja; 100,679 hours; 1980–1991

TENNESSEE

Gallatin Quarry and Mill; Gallatin; 193,321 hours; 1989–1991
Dickson Mine and Mill; Dickson; 170,016 hours; 1989–1991
Murfreesboro Mine and Mill; Murfreesboro; 132,420 hours; 1989–1991
Hermitage Quarry; Hermitage; 119,664 hours; 1989–1991
Frank Road Gravel Pit; Collierville; 115,411 hours; 1989–1991
Eller and Olsen Mine and Mill; Nashville; 112,809 hours; 1990–1991
River Road; Nashville; 109,250 hours; 1989–1991

Hurst Construction Plant #4; Readyville; 107,394 hours; 1988–1991
Nicks Silica Co., Inc.; Jackson; 106,835 hours; 1986–1991
Gleason Mill; Gleason; 104,790 hours; 1990–1991
Adamsville Mine and Mill; Adamsville; 104,141 hours; 1989–1991
Carroll County Operations; Leach; 101,595 hours; 1980–1991
Sumner County Rock; Gallatin; 100,848 hours; 1983–1991
Malone Pit; Memphis; 100,590 hours; 1980–1991
Camden Mine and Mill; Camden; 100,331 hours; 1987–1991

NO LOST WORKDAYS

The following operations have received recognition from the Joseph A. Holmes Safety Association for working the qualifying number of hours without incurring a lost workday injury:

ALABAMA

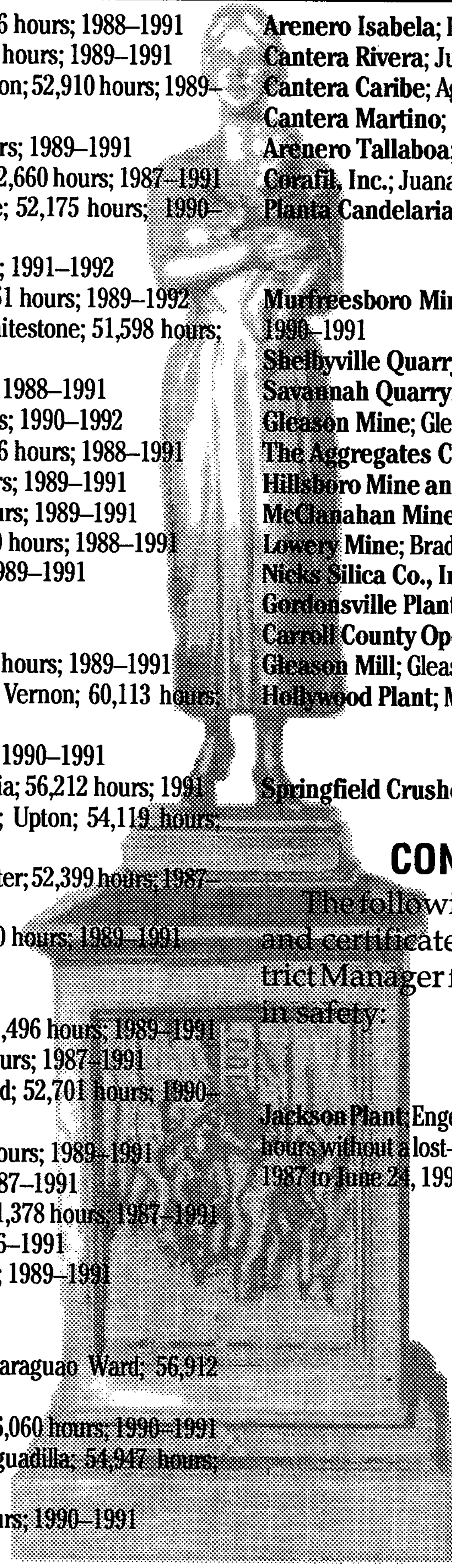
E.C.C. America Calcium; Sylacauga; 1,007,658 hours; 1990–1992
Gants Quarry and Mill; Sylacauga; 653,978 hours; 1989–1991
Trinity Quarry; Birmingham; 64,580 hours; 1990–1991
Tarrant; Birmingham; 61,069 hours; 1989–1991
Cherokee Plant and Quarry; Mobile; 59,193 hours; 1990–1991
Franklin Pit; Tuskegee; 58,579 hours; 1990–1991
Glenco Quarry; Birmingham; 58,274 hours; 1989–1991
Baldwin Pit; Pickensville; 56,790 hours; 1989–1991
Lacon Plant; Birmingham; 56,508 hours; 1990–1991
Langford Mine and Mill; Guntersville; 56,453 hours; 1988–1991
Citadel Cement; Birmingham; 56,405 hours; 1989–1991
Tuscumbia Quarry; Birmingham; 55,981 hours; 1989–1991
Eufaula Plant; Eufaula; 55,668 hours; 1986–1991
Mclemore Pit; Mt. Meigs; 54,869 hours; 1988–1991
Childersburg Quarry; Birmingham; 55,490 hours; 1990–1991
Tuscumbia Quarry; Tuscumbia; 54,032 hours; 1989–1991
Barbour County Mines; Eufaula; 53,931 hours; 1989–1991
Mt. Meigs; Mobile; 53,810 hours; 1980–1991
Madison Quarry; Birmingham; 52,703 hours; 1989–1991
Y S Quarry; Guntersville; 52,650 hours; 1990–1991
Uchee Creek Plant; Ft. Mitchell; 52,329 hours; 1987–1991
Ohatchee Quarry; Birmingham; 51,801 hours; 1990–1991
Oakmulgee Pit; Montgomery; 51,482 hours; 1989–1991
O'Neal Quarry and Mill; Alabaster; 51,427 hours; 1990–1991
Eufaula Plant; Eufaula; 51,199 hours; 1991
Lenox Pit; Bay Minette; 51,171 hours; 1986–1991
Jackson Pit; Jackson; 51,038 hours; 1989–1991
Shaver Sand and Gravel Pit; Montgomery; 50,867 hours; 1987–1991
Cypress Pit; Tuscaloosa; 50,835 hours; 1987–1991
Oyster Shell Products; Mobile; 50,462 hours; 1991
Summit; Guntersville; 50,360 hours; 1990–1991
Aliceville Pit; Aliceville; 50,075 hours; 1986–1991

FLORIDA

Fort Green; Mulberry; 652,677 hours; 1989–1991
Kingsford Mine and Mill; Bartow; 641,445 hours; 1990–1991
DuPont Florida Mine and Plant; Stark; 634,450 hours; 1990–1991
Nichols Mine; Nichols; 625,580 hours; 1988–1991
Diamond Hill Quarry; Brooksville; 605,701 hours; 1989–1991
Golden Gate Quarry; Naples; 602,839 hours; 1980–1991
Beco Pit; Parkland; 59,965 hours; 1990–1991
Lake Sand Plant; Clermont; 52,957 hours; 1989–1991
St. Lucie Mine; Fort Pierce; 52,343 hours; 1989–1991
Norfleet Mine; Tallahassee; 51,631 hours; 1987–1991
Gadsden County Mine; Quincy; 51,572 hours; 1988–1991
Rock Pit #l; Copeland; 51,314 hours; 1985–1991
Caloosa Sand Plant; Labelle; 51,240 hours; 1987–1991
Perry Mine and Mill; Perry; 51,236 hours; 1989–1991
Tampa Bay Shell Pit; Tampa; 51,069 hours; 1983–1991
Sunshine Rock; Hialeah Gardens; 50,968 hours; 1990–1991
Mulberry Mill; Bartow; 50,632 hours; 1989–1991
Desoto Shell Pit; Arcadia; 50,522 hours; 1989–1991
Union Pit; Port St. Luci; 50,240 hours; 1988–1991

GEORGIA

Lagrange Quarry; Lagrange; 58,294 hours; 1990–1991
Grayson Quarry; Atlanta; 57,517 hours; 1990–1992
Georgia Central Maintenance Shop; Macon; 57,344 hours; 1990–1991
Bellwood Quarry; Marietta; 56,779 hours; 1990–1991
White Path Quarry and Plant; Blairsville; 56,394 hours; 1990–1991
Hobbs Clay Mine; Wrens; 55,603 hours; 1989–1991
Lithonia Quarry; Conyers; 55,330 hours; 1991–1992
Junction City Quarry; Talbotton; 55,203 hours; 1988–1991
Newton County Plant; Lithonia; 55,150 hours; 1990–1991
Service Quarry; Elberton; 54,810 hours; 1990–1992
Rabun Quarry; Rabun Gap; 54,618 hours; 1990–1991
Andersonville Mines and Plant; Andersonville; 54,582 hours; 1990–1991
Ballground Plant; Lithonia; 54,270 hours; 1990–1991
Griffin Quarry; Williamson; 54,077 hours; 1990–1992
ECCI Wrens Plant; Sandersville; 53,831 hours; 1990–1991
Forest Park Quarry; Riverdale; 53,310 hours; 1991



Crystal Blue Quarry; Elberton; 53,226 hours; 1988–1991
Gainsville Quarry; Gainsville; 53,157 hours; 1989–1991
Bennie and Harvey Quarries; Elberton; 52,910 hours; 1989–1991
Albany Quarry; Leesburg; 52,907 hours; 1989–1991
Everlasting Pink Quarry; Elberton; 52,660 hours; 1987–1991
Macon County Mines; Andersonville; 52,175 hours; 1990–1991
Tyrone Quarry; Tyrone; 52,029 hours; 1991–1992
Warrenton Quarry; Warrenton; 51,851 hours; 1989–1992
Mill No. 3 Whitestone Division; Whitestone; 51,598 hours; 1990–1991
Howard Mine; Howard; 51,178 hours; 1988–1991
Madras Quarry; Madras; 51,032 hours; 1990–1992
H & S Industries, Inc.; Dalton; 50,966 hours; 1988–1991
Augusta Mines; Augusta; 50,888 hours; 1989–1991
Columbus Plant; Lithonia; 50,861 hours; 1989–1991
Veribest Quarry; Sandy Cross; 50,820 hours; 1988–1991
Dalton Plant; Dalton; 50,068 hours; 1989–1991

KENTUCKY

US 41 A Quarry; Hopkinsville; 97,974 hours; 1989–1991
Mount Vernon Mine and Mill; Mt. Vernon; 60,113 hours; 1990–1991
Bardstown; Bardstown; 57,114 hours; 1990–1991
Fredonia Quarries and Mill; Fredonia; 56,212 hours; 1991
Kentucky Stone Co., Upton Quarry; Upton; 54,119 hours; 1987–1991
Camp Nelson Stone Co., Inc.; Lancaster; 52,399 hours; 1987–1991
Gary Brothers; Bowling Green; 51,910 hours; 1989–1991

MISSISSIPPI

Highway 27 Gravel Pit; Vicksburg; 61,496 hours; 1989–1991
Twelve Oaks Pit; Picayune; 55,323 hours; 1987–1991
Blackhawk Pit and Plant; Greenwood; 52,701 hours; 1990–1991
Day River Pit; Bigbee Valley; 52,245 hours; 1989–1991
Amory No. 1; Amory; 52,078 hours; 1987–1991
Mitchell Pit and Plant; Greenwood; 51,378 hours; 1987–1991
Loflin Pit; Florence; 51,345 hours; 1986–1991
Plant No. 1; Brookhaven; 50,843 hours; 1989–1991

PUERTO RICO

Terrassa Aggregates, Inc. #3; Guaraguao Ward; 56,912 hours; 1989–1991
Carbonato Calizo—Ciales; Ciales; 56,060 hours; 1990–1991
Arenero Forrestier—Aguadilla; Aguadilla; 54,947 hours; 1980–1991
Cantera Bravo; Cabo Rojo; 52,946 hours; 1990–1991
Arenero Isabela; Isabela; 52,064 hours; 1989–1991
Cantera Rivera; Juana Diaz; 51,955 hours; 1989–1991
Cantera Caribe; Aguadilla; 51,856 hours; 1989–1991
Cantera Martino; Ponce; 51,282 hours; 1989–1991
Arenero Tallaboa; Penuelas; 50,791 hours; 1980–1991
Corafil, Inc.; Juana Diaz; 50,660 hours; 1989–1991
Planta Candelaria; Bayamon; 50,156 hours; 1980–1991

TENNESSEE

Murfreesboro Mine and Mill; Murfreesboro; 94,509 hours; 1990–1991
Shelbyville Quarry; Shelbyville; 93,479 hours; 1989–1992
Savannah Quarry; Savannah; 89,499 hours; 1989–1991
Gleason Mine; Gleason; 86,131 hours; 1989–1991
The Aggregates Co.; Munford; 77,377 hours; 1989–1991
Hillsboro Mine and Mill; Hillsboro; 76,440 hours; 1989–1991
McClanahan Mine and Mill; Parsons; 59,686 hours; 1991
Lowery Mine; Bradford; 57,784 hours; 1987–1991
Nicks Silica Co., Inc.; Jackson; 55,181 hours; 1990–1991
Gordonsville Plant; Gordonsville; 51,873 hours; 1989–1991
Carroll County Operations; Leach; 51,784 hours; 1987–1991
Gleason Mill; Gleason; 51,704 hours; 1991
Hollywood Plant; Memphis; 51,175 hours; 1980–1991

VIRGIN ISLANDS

Springfield Crusher; St. Croix; 52,075 hours; 1990–1991

CONGRATULATIONS

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

MISSISSIPPI

Jackson Plant; Engelhard Corp.; Jackson; for working 1,427,025 hours without a lost-time accident or injury from December 12, 1987 to June 24, 1992.

Fighting fires at home

Smoke alarms and sprinkler systems

By Robyn Berry

One autumn night in Suitland, Maryland, at about 9 o'clock, Russell "Speedy" Irving took off his plaid, gold and black flannel shirt, tossed it carelessly on a lit desk lamp and went to sleep.

He woke to the scream of a smoke detector and the stench of smoke rising from his shirt. As the home sprinkler system began to spray his room with water, the 12-year-old ran out of the doorway and down to the townhouse's basement, where his parents were inspecting a recent repair job.

Speedy's mother, Alva Irving, remembers meeting him on the stairs that night in 1989. Speedy pointed to the bedroom next to his, where his little sister Jennifer lay sleeping, but said nothing. "When he woke up and saw the blaze, it frightened him so much he couldn't talk," Alva Irving says.

The Irvings left the house safely, and the sprinkler extinguished the blaze before firefighters arrived minutes later. But each year, more than a thousand parents are not as lucky as Gregory and Alva Irving.

Residential fires each year kill 1,200 children under the age of 15 and injure another 11,400, according to the United States Fire Administration, a branch of the Federal Emergency Management Agency. Children under 5 and the elderly face the highest risk of being killed in a fire. Black children are at least three times more likely to die in a residential fire than white children because they are more likely to live in homes without working smoke alarms.

Nine out of 10 of the children killed have one thing in common: They live in homes without working smoke detectors, according to the National Safe Kids Campaign, a nonprofit public safety group run by Children's Hospital in Washington, D.C.

"Ninety percent of homes in the Washington area have smoke detectors—the problem is with people maintaining them," says Jim Coyle, assistant administrator of the Fire Administration. "It is tragic," he says. "We have example upon example where people had smoke detectors there but they weren't working.

Two common problems, says Coyle, are smoke detectors with dead batteries or no batteries at all—people often remove the batteries to stop nuisance alarms caused when detectors are installed too close to the stove

Those who do not have smoke detectors can get them easily, often for free. "Many fire departments around the nation have programs to get smoke detectors into the homes of people who cannot afford them," Coyle says. "If you want one, you can get one."

Installing and maintaining smoke detectors helps but by itself is not enough to save many youngsters' lives. They also need training. Children frightened by the noise and sights of fire often make the fatal decision to hide in a closet or under a bed. Rescuers can look like monsters to many children who are terrified by the sight of firefighters walking through their homes wearing protective suits and masks.

Speedy Irving's residence and all other townhouses built in Prince George's County, Maryland, since 1989 are required to have sprinklers and smoke detectors. The Fire Administration says this made it 4 to 10 times less likely he would perish in the fire.

Sprinkler systems are very effective in putting out fires. Some new homes are built with them, but they are more costly to install in existing buildings. For example, it "typically costs $1-$1.50 per square foot of floor space to equip a new building with sprinklers, but $2.50-$3 per square foot to retrofit an existing building," Coyle says. "Even for an existing house, a sprinkler system may be no more costly than installing a Jacuzzi," Coyle points out.

The Irvings did everything right: About a month before the fire, a firefighter talked to Jennifer Irving's class at Overlook Elementary School in Suitland, Maryland, and told the students what to do if a fire broke out at home. The Irving family used the firefighter's folders, which Jennifer brought home, to map out three exit routes and an overall plan in case of a fire in their house. They practiced it twice.

Alva Irving says the fire, nearly three years ago, was "a good experience—to be able to have the home saved and nothing really happen to us, it was amazing." But she has some advice for others: "You never know if a fire is going to break out. It can happen to anybody. You should have a plan."

Secretary's Message

Members throughout the country have submitted entries in our *'93 Slogan Contest.* The contestant who submits the winning slogan will appear in the January Bulletin. Also, the first winning entry in our calendar contest appears in the January Bulletin.

We have formed a Program Committee responsible for putting together our annual HSA Conference that will take place in San Antonio, Texas, on June 1-3, 1993. The Committee's meetings have been concerned with developing and completing the program agenda for the upcoming conference. Further details about the conference will be printed in future issues of the *Bulletin.* I want to thank the Committee for their efforts in developing our upcoming conference. Special recognition belongs to the Chairperson, Gary Moore, from Pittsburg and Midway Coal Company of Gallup, New Mexico. Gary has devoted much time and effort in coordinating and guiding the Committee in creating an outstanding program.

Robert Glatter, National Secretary, Holmes Safety Association

The last word...

"If you think it's hard to meet new people, pick up the wrong golf ball."

"Memory is what tells a man his wedding anniversary was yesterday."

"The quickest way to get people interested in a project is to tell them it's none of their business."

"The nicest thing about new friends is they haven't heard your old stories."

"You're never too old to become younger."

"The reason why worry kills more people than work is that more people worry than work."

"We are confronted with insurmountable opportunities."

"There's no heavier burden than a great potential."

"If you wish your merit to be known, acknowledge that of other people."

"It is never safe to look into the future with the eyes of fear."

"If doctors fail you, let these be your doctors: a cheerful mind, rest, and a moderate diet."

"All problems become smaller if you don't dodge them, but confront them."

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

REMINDER: The District Council Safety Competition for 1992 is underway – please remember that if you are participating this year, you need to mail your quarterly report to:

Mine Safety & Health Administration
Educational Policy and Development
Holmes Safety Association Bulletin
P.O. Box 4187
Falls Church, Virginia 22044-0187

Phone: (703) 235-1400