

A mining research contract report

MARCH 1983

U.S. DEPARTMENT OF LABOR MSHA



00031171

PREPARATION OF BASELINE TRAINING MATERIALS FOR ASSISTING COMPLIANCE AND ACCIDENT REDUCTION IN THE METAL AND NONMETAL MINING INDUSTRY

Contract J0308011
The Bendix Corporation

OFR
84-83

U.S. Bureau of Mines
Minneapolis, Minn.

FEB 27 1983

LIBRARY

BUREAU OF MINES
UNITED STATES DEPARTMENT OF THE INTERIOR



DISCLAIMER

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies or recommendations of the Interior Department's Bureau of Mines or of the U.S. Government.

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	3. Recipient's Accession No.
4. Title and Subtitle Preparation of Baseline Training Materials for Assisting Compliance and Accident Reduction in the Metal and Non Metal Mining Industry			5. Report date March, 1983
7. Author(s) J.H. Adkins, P. Krois, M. Hinton, J. Nussbaumer, D. Leonard			8. Performing Organization Rept. No. USBM-BTM-100
9. Performing Organization Name and Address The Bendix Corporation Energy, Environment and Technology Office 2582 South Tejon Street Englewood, Colorado 80110			10. Project/Task/Work Unit No.
			11. Contract (C) or Grant (G) No. (C) JO308011
			(G)
12. Sponsoring Organization Name and Address United States Department of Interior, Bureau of Mines 2401 E. Street N.W. Washington, D.C. 20241			13. Type of Report & Period Covered FINAL (May 1980 - March 1983)
15. Supplementary Notes			14.
16. Abstract (Limit: 200 words)			
<p>The goal of this program was to produce a set of baseline health and safety training materials that could be used by the metal/nonmetal mining industry to reduce injuries and to comply with federal training requirements. The materials developed are arranged in a two level outline format. The first level provides the title, course goals, background and topical outline while the second level provides a detailed outline of the course content.</p> <p>Visuals, designed to portray miners in a positive, attractive fashion, were done in simple line drawing so they would reproduce for handouts without loss of quality.</p> <p>Each of the required units in the Baseline Guides have one or more self-checks. These are designed to be suggestive of evaluation techniques the users can develop for themselves. An instructors guide and a mining terms glossary are included.</p> <p>In a second phase the program developed performance based training guides for Annual Retraining and Experienced New Hires in the Underground Salt Industry.</p>			
17. Document Analysis a. Descriptors			
b. Identifiers/Open-Ended Terms			
Training, Safety, Health Baseline Guides, Performance Training			
c. COSATI Field/Group			
18. Availability Statement	19. Security Class (This Report)	21. No. of Pages 95	
	20. Security Class (This Page)	22. Price	

FOREWORD

This report was prepared by The Bendix Corporation Energy, Environment and Technology Office under USBM Contract Number JO308011. It is being administered under the technical direction of PRC with Mr. Jim TaVoularis as the Technical Project Officer. Mr. Alan G. Bolton, Jr. is the Contracting Administrator for The Bureau of Mines.

This report is a summary of work conducted between May 1980 and March 1983.

This report was submitted by the authors on March 31, 1983.

CONTENTS

	<u>Page</u>
Report Documentation Page	3
Foreword	4
Contents.	5
Acknowledgements	6
1.0 INTRODUCTION	10
1.1 Introduction	10
1.2 Summary	10
2.0 PROGRAM GOALS	12
3.0 BASELINE GUIDES MATERIAL DEVELOPMENT	12
3.1 Definition of Scope	12
3.2 Field Research	12
3.3 Initial Drafts	15
3.4 Review Process	15
4.0 BASELINE GUIDES MATERIALS CONTENT	15
4.1 Instructor's Guides	15
4.2 New Miner Training	16
4.3 Newly Hired Experienced Miner	18
4.4 Annual Refresher Training	18
4.5 Visual	18
4.6 Self Checks	20
5.0 PERFORMANCE BASED TRAINING MATERIALS DEVELOPMENT	21
5.1 First Aid Materials	21
5.2 Materials from Baseline Guides	21
<u>Table</u>	
1 Units for Which Guides Were Developed	13
2 Location and Type of Mine or Educational Institution Visited	14
<u>Appendix</u>	
A Underground Salt Course Plan: Clean-Up and Housekeep- ing	22-25
B Underground Salt Lesson Guide and Materials: Clean-Up and Housekeeping	26-32
C Performance Based Training for Annual Refresher and Experienced New Hire Training	33-95

ACKNOWLEDGEMENTS

From its inception the success of this program depended upon the contributions and support of concerned individuals throughout the mining industry. The level of cooperation and thoughtful input provided by mine health and safety training professionals from government, industry and educational institutions has been outstanding.

The mining industry provided many hours of mine tours, opened on-going training sessions to our field teams, shared internally developed manuals and carefully reviewed the form and content of these materials. Academic, U. S. Bureau of Mines, MSHA and private industry personnel reviewed and made many constructive comments on the guides at all stages of their development.

Jim TaVoularis, the Technical Project Officer, and William Wiehagen, both from USBM's Bruceton Research Center, contributed much to the success of the program. They devoted the time and attention necessary to first formulate and articulate the intent and expectations of USBM/MSHA and then stayed close enough to our effort to assist us in overcoming the inevitable barriers to meeting those expectations. Jim Usry served as the special liaison officer from MSHA. He contributed not only his own persistent attention to detail but also very ably organized, synthesized and fed back to us critiques on the form and content of the draft documents from a wide variety of governmental and industry reviewers.

A special acknowledgement is directed to Betsy James who created most of the original art work. Her family ties with the mining industry equipped her with a sensitivity to the type of situations to be portrayed and her talent and devotion to the project resulted in an excellent product.

Dr. Paul Krois created the great preponderance of the materials themselves, pulling together reams of documents, pamphlets, field notes, booklets and other material. With determined patience Paul would evaluate, synthesize and incorporate each iteration of input from reviewers.

John Nussbaumer developed the annual retraining and the experienced new miner segments of the guides. Mary Hinton was responsible for co-ordinating and developing the visual package and self-checks that accompany each unit.

The Bendix office administrator James Stumpo and his word processing staff, Diana Roth, Joyce Bears, Marty Padilla and Jeanne Becker provided long suffering and essential support as they contended with the continual iterations of rewriting, additions and deletions that occurred each time the materials were reviewed.

While one hesitates to try to identify all the individuals who provided support for the program lest someone be missed inadvertently, I none-the-less wish to call attention to the following people and acknowledge their involvement in the program. By providing critiques, suggestions, materials, tours of their mines, invitations to training sessions, time for phone consultation and sometimes simply words of encouragement and support they made essential contributions to the project.

Lane Adrian
Morton Salt Company

Tom Bailey
Lone Star Industries

Robert Baldeck
International Salt Co.

Ron Bear
Lone Star Industries

Raymond L. Beeler
Wilsonville, Oregon

Jim Bennett
Penn State

Douglas Boyd
USBM

James R. Branden
North Carolina Dept. of Labor

Kim Bradshaw
ASARCO

Billy W. Chastain
Cities Services Company

David Cichelli
International Salt Co.

Bob Cobaugh
Colorado State University

Ed Cotter
Bendix Field Engineering

Mike Critelli
Lone Star Industries

Val Cullen
USBM

Richard Duran
MSHA

Tom Edwards
ASARCO

Tim Eriksen
Idaho State University

Dave Ferris
Pfizer, Inc.

Richard Fischer
MSHA

Lawrence Fletcher
USBM

Morris Friberg, P.E.
American Mine Services, Inc.

Daryl Fry
International Salt Co.

Pepsi Garcia
United Mine Workers

Anita Goodman
MSHA

Wayne Grames
MSHA

Oscar Gruefeld
Colorado Safety Assoc.

Rick Harker
Pathfinder Mine

Robert Harner
Gulf Medical and Health Resource

Gram Harvey
MSHA

Ron Hawley
Comtrac

Bill Holsopple
Anaconda

Jack R. Hoskins
University of Idaho

Hubert Humphreys
International Salt Co.

Richard Ingells
Morton Salt Co.

Laurence James, Ph.D.
Mortz Mining Co.

Ronny Jones
MSHA

Ken Kannegaard
Lone Star Industries

Ben Kilgore
Union Carbide Corp.

Orland Killin
Eastern Washington University

Robert King
Colorado School of Mines

Robert Koenig
MSHA

Kimm La Moureaux
MSHA

Marla Lane
Inverness Mining

Marilyn K. Lipecky
Gulf Medical and Health Resources

John W. Lomas
ASARCO

Tom MacLeod
MSHA

Bob Manners
Mobile Premix Concrete Co.

Ben McArthur
Kaiser Cement

Michael McQuiston
Westcoast Oil & Gas Company

Charles Marshall
Climax Molybdenum

Joe Martin
MSHA

Phil Morton
Gulf Medical and Health Resources

Darrell Pettijohn
Schwartzwalder Mine

Doren Pottorff
Ura Mine

Clause Reich
MSHA

Stan Reno
NIOSH

Gil Ritter
Bendix Field Engineering

Tom Robinson
Elbertson Granite Assoc.

R. Mark Runyan
Midwest Pre-Cote, Inc.

Bobby Ryder
Vulcan Materials Co.

Leonard Schutz
MSHA

Frank Schwamberger
MSHA

Sam Soriano
Phelps-Dodge Company

Wally Schell
MSHA

Bob Shiely
MSHA Academy

Jimmy Shumatie
MSHA Academy

Al Smale
Colorado Mt. College

Otis Smither
Thiele Kaolin Co.

Ted Stone
Cotter Corporation

Chet Talbert
King Solomon Mine

James TaVoulareis
USBM

James Usry
MSHA

Fred Vierthaler
Safford, Arizona

Carol Vierra
Central Valley Rock, Sand &
Gravel Assoc. Inc.

J. Wells-Warner
Kaiser Cement Corp.

Wynn Westmoreland
Snow College, Ephrain, Utah

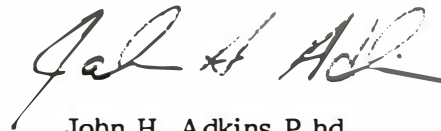
James C. Windorski
Assistant State Mine Inspector (Arizona)

William Wiehagen
USBM

Frank Wood
Salt Institute

Norm Young
St. Joe Zinc. Co.

For your assistance in this program may I extend to all of you my sincere gratitude.



John H. Adkins P.hd.
Training Materials
Program Manager
The Bendix Corporation

1.0 INTRODUCTION & SUMMARY

1.1 Introduction - This report describes the activities of the Bendix Corporation in performing work on contract JO308011 "Preparation of Baseline Training Materials for Assisting Compliance/Accident Reduction in the Non-Coal Mining Industry". During the first phase of this contract training guides were developed for deep metal/nonmetal, surface, uranium surface, sand and gravel and underground salt mines. For each of these mining environments, guides were developed to meet the requirements for new miners, newly hired experienced miners and for annual refresher training. Materials were generated for all required training units except first aid, self rescuer, and the statutory rights of miners which were being developed by USBM/MSHA in other efforts. Work on this contract began in May of 1980. Final drafts of the guides were submitted to USBM/MSHA in December of 1981. During the second phase of this program work was begun on training guides designed to allow mining companies to train employees against performance standards rather than on the basis of hours in training sessions. This effort, entitled "Performance Based Training for Annual Retraining and Experienced New Hires", focused on the underground salt industry. The rationale was to work with that limited number of relatively homogeneous mines in order to more easily develop a consensus on what the performance criteria should be.

1.2 Summary - In order to assist mining companies in their efforts to reduce injuries and to comply with federally mandated training requirements USBM/MSHA undertook a research and development effort that had as its immediate purpose the creation of baseline guides for required health and safety training. Guides were developed for five (5) different types of metal/nonmetal mines. The five types are Deep Metal/Nonmetal, Surface, Surface Uranium, Sand and Gravel and Underground Salt. Baseline Guide units were developed for all required New Miner, Experienced Miner and Annual Refresher courses except First Aid, Self Rescuer and Statutory Rights of Miners. These units were developed by MSHA in separate efforts. However, First Aid Units were developed for the Performance Based Training materials.

The program began with a series of field visits to metal/nonmetal mines educational institutions and seminars in 17 states throughout the country. From these visits field teams collected existing materials shared by the host company, made first hand observations of mine hazards and training environments, discussed training needs and possible approaches to the guides with local training personnel and regional, State and Federal mine inspectors. In addition local educational and mining association personnel were consulted and asked to assist in the development of the guides.

The second step in the program was the development of initial drafts of the new miner units. These were distributed for review and comment to some of the contacts made during the site visits. In addition review copies were submitted to regional MSHA Centers. Each center involved assigned one or more reviewers who carefully and thoroughly critiqued the documents at that point in their

development. From that time through the end of the program a more or less continuing process of review and revision was carried out between Bendix and private industry and governmental reviewers. A special review meeting attended by both industry and government was held in Denver in July of 1981. This meeting established the final format and the preponderance of the content of the guide.

From the beginning of the program the visuals were deemed to be an important element of the guides. The visuals were designed so they could be reproduced at most mine sites on common office copy machines without a loss of quality. A concerted effort was made to depict the miners in an attractive and positive fashion thus encouraging identification with the characters in the visuals. Ethnic variations were included as were images of both male and female miners. The use of comic or caricature images was rejected even though that type of artistic talent was more readily available.

For each unit one or more self checks were developed. The purpose was to give the instructors some guides for developing their own evaluation techniques. The self checks are designed to be used for both testing and for reinforcement of content and can be given to individual trainees or to small groups thus helping to overcome problems with literacy levels that do exist in some mines.

The second phase of the program developed the concept of performance based training. The purpose of this second phase was to provide guidelines for allowing mines to train against specified performance criteria rather than simply put their employees through a given number of training hours. Working with underground salt mines through the help and cooperation of the Salt Institute, a series of topic areas needed for annual retraining and the training of experienced new hires were specified. First aid topics were included in the performance criteria.

The format for the Performance Based Training was somewhat simpler than the basic content guides. Each unit of the performance training has a unit title, a goal statement, one or more trainer objective(s) one or more trainee performance standards followed by a series of criteria by which the performance can be judged and a brief suggestion for an evaluation and training technique that might be employed. The volume concluded with several "Skills Checks" which are brief descriptions of situations in which the miners might find themselves. That would require them to make an appropriate response. The trainer is encouraged to make up other similar situations pertinent to the local mine and to use the scenarios to check the response of the miner.

2.0 PROGRAM GOALS

The purpose of this program was to create baseline training guides to assist mining companies in their efforts to reduce accidents and to comply with federal health and safety training requirements. Since the greatest need was to help smaller mining companies, those who did not have their own training facilities or staff, the materials were developed with their needs, limitations and capabilities in mind.

The second assumption that impacted the format of the materials was that each mine would need to modify the materials by deleting from, changing, or adding to the basic package. Early field trips and discussions with mine safety trainers indicated the great variety of situations, equipment, processes, mine specific hazards, training skill and trainee capabilities with which the materials would have to contend. Hence the format was developed to facilitate modifications. The outline format allows trainers to take out sections that do not pertain to their mines, to modify concepts that are somewhat different in their mines than depicted in the guides or to insert additional information peculiar to their operations.

3.0 BASELINE GUIDES MATERIAL DEVELOPMENT

3.1 Definition of Scope - The first step in the program was to define the scope of the guides to be developed. From the outset units for First Aid, the Statutory Rights of Miners and Self Rescuers were eliminated because they were being handled in other efforts. The types of mining for which guides were to be developed are Deep Metal/Nonmetal, Surface, Underground Salt, Surface Uranium and Sand and Gravel. Originally Underground Limestone operations were included with Underground Salt but the mining environments and the administrative organization of the two industries indicated that separating out salt mines and assuming limestone under the metal/nonmetal guides was advisable. For each of the five types of mining environments and for all the remaining required courses, units were developed. Table 1 is the matrix of individual courses and the mining environments for which units were prepared.

3.2 Field Research - The purposes of the field research were to locate any existing content material, to determine what materials mines were currently using for training guides, to assess the training environments in which the guides would be used, to listen to training personnel describe the type of material that would be useful for them and to familiarize our staff with those aspects of metal/nonmetal mining with which they may not have had previous contact. Given the variety of mining environments for which guides were hereby developed in this program a great deal of time and effort was spent on the field research task. Table 2 list the 17 states in which one or more site visits were made. Calls were not limited to mines, often the most productive time was spent with personnel from local educational institutions or private consultants who provide training for mine companies in their area. Regional MSHA offices were also very helpful throughout the field visits.

Table 1. Units for Which Guides Were Developed

COURSE	UNDERGROUND						SURFACE								
	METAL/NON-METAL			SALT			SURFACE			SAND AND GRAVEL			URANIUM SURFACE		
	NEW MINER	EXP. NEW HIRE	ANNUAL REFRESHER	NEW MINER	EXP. NEW HIRE	ANNUAL REFRESHER	NEW MINER	EXP. NEW HIRE	ANNUAL REFRESHER	NEW MINER	EXP. NEW HIRE	ANNUAL REFRESHER	NEW MINER	EXP. NEW HIRE	ANNUAL REFRESHER
ENTER/LEAVE MINE TRANS. & COMM.	X	X		X	X										
INTRODUCTION TO THE WORK ENVIRONMENT	X	X		X	X		X	X		X	X		X	X	
MINE MAP, EMERG. EVAC., BARRICADING	X	X		X	X										
BARRICADING			X			X									
GROUND CONTROL AND VENTILATION PLANS	X	X	X	X	X	X									
HEALTH	X		X	X		X	X		X	X		X	X		X
CLEANUP AND HOUSEKEEPING	X			X											
HAZARD RECOGNITION	X	X		X	X		X	X		X	X		X	X	
ELECTRICAL HAZARDS	X		X	X		X	X		X	X		X	X		X
MINE GASES	X		X	X		X									
HEALTH/SAFETY ASPECTS OF ASSIGNED TASKS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PREVENTION OF ACCIDENTS			X			X			X			X			X
EXPLOSIVES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ESCAPE/EVACUATION PLANS; FIRE FIGHTING							X	X	X	X	X	X	X	X	X
GROUND CONTROL; HIGHWALLS; ILLUM.							X	X	X	X	X	X	X	X	X
TRANSPORTATION CONTROLS/ COMMUNICATIONS SYSTEMS			X			X	X	X	X	X	X	X	X	X	X

Table 2. Location and Type of Mine or Educational Institution Visited

<u>State</u>	<u>Mine or Institution</u>
Arizona	- Underground Copper - Surface Copper - Private Consultant - State Mine Inspector
California	- Surface Limestone - Sand and Gravel
Colorado	- Surface Uranium - Underground Uranium - Surface Molybdenum - Underground Molybdenum - Underground Gold/Silver - Sand and Gravel - MSHA Regional Office
Georgia	- Surface Kolin
Idaho	- Underground Lead/Silver - Educational Institutions
Illinois	- Underground Fluorspar - State Mine Inspector
Kansas	- Underground Limestone
Louisiana	- Underground Salt
Missouri	- Underground Iron
New York	- Underground Salt
North Carolina	- Educational Institution - State Department of Labor
Ohio	- Underground Salt - International Salt Association
Oregon	- Sand and Gravel Association - MSHA Regional Office
Pennsylvania	- Educational Institutions
Tennessee	- Underground Copper
Utah	- Surface Uranium
Virginia	- Private Consultant

3.3 Initial Drafts - During the summer of 1980 initial drafts of the guides were prepared. These drafts used a three level format, the first being a course title and a statement of the course goals. The second level was a topical outline and the third a detailed content outline. The reviewers generally felt the three levels were too cumbersome and repetitive. Consequently, the second iteration of the materials used a two level format derived by combining the first two levels into one that gives the course title, course goals, a brief background statement or rationale for the course, a topic outline and a list of supporting materials. The second level contains the detailed content outline, the self-checks and the visuals for the unit.

3.4 Review Process - The two level format was given a formal review during the summer of 1981. At that time most of the content of the materials, terms, visuals content and form were finalized. Prior to this review however, the materials had undergone extensive and repeated revision. The review meeting held in Denver in July of 1981 was an attempt to finalize the content so that a final draft could be prepared for printing.

During the review process copies of the various units were sent to several private companies and to MSHA regional personnel. These people frequently pass the modules along to others for review and would then return the documents to us with their comments and suggested modifications. While this process provided a thorough review it made it difficult to determine when the revision process should be terminated and printing of the final product begun. Because some of the suggestions that came in very late were also very constructive and helpful the cut off dates were slid back to accommodate the additional input and yet additional iterations of the modules were produced. While this resulted in an improved product it did delay the printing and added to the cost of the program.

4.0 BASELINE GUIDES MATERIALS CONTENT

4.1 Instructor's Guides - Two similar Instructor's Guides were developed to assist trainers in designing their programs around the training materials. One guide was for the forty hour and annual refresher training programs required of underground mines, and the second was for the twenty-four hour and annual refresher programs for surface mines. Preparations of these Instructor's Guides followed a twofold objective: (1) to provide a manual on how the guides may be used in building or tailoring a mine training program; and, (2) to provide a general discussion of instructional techniques that may assist the trainer in developing those skills necessary for delivering a good program.

The Instructor's Guides begin with an introduction to the training materials, which includes a description of the level one Course Plan and the level two Lesson Guide and Materials. This is followed by several techniques useful in implementing courses, such as special presentations by key management personnel and the use of slides and movies. Next, there is a short discussion accompanied with several worksheets on methods of tailoring the materials to the mine to produce the most relevant and thorough training system possible.

Also included is a brief statement on the nature and use of the self checks. The guide concludes with a thorough introduction to the annual refresher training program which includes a discussion of group discussion facilitation techniques and job safety analysis.

Accompanying each Instructor's Guide is a list of film sources through whom specific movies and slide presentations may be obtained. A glossary of mining terms has also been prepared as a reference document for use by trainers and by miners themselves. The words deal with the mining techniques and mineral processing found within the five mineral industries for which these materials have been prepared. Most of the definitions were excerpted from A Dictionary of Mining, Mineral, and Related Terms, compiled and edited by Paul W. Thrush and the staff of The Bureau of Mines (U.S. Government Printing Office, 1968). On several trips to the field we observed trainers using short glossaries which had been distributed to the miners for review and study. It is anticipated that the glossary developed for delivery with these guides could be used in a similar manner.

4.2 New Miner Training - The content of the new miner training guides was derived through an integration of current mine training programs, field observations/interviews, and a wide variety of published literature ranging from MSHA safety booklets to published safety text books. In writing these guides the authors deemed it important to consider the target level of knowledge that miners would be expected to have of the range of hazards to be found in the mining environment. Trainees must be aware of those hazards they may encounter routinely in the mine, e.g., electrical hazards and roof or ground hazards, as well as those to which exposure may be erratic and unpredictable, e.g., certain gases and explosives. The goal of the training is to make the trainees conscious of the hazards and able to take precautions.

The first level of the guides, called the Course Plan, contains the fundamental goal and objectives, evaluation techniques, materials and resources and topic outline from which a presentation can be built. As an example, Appendix A is the Course Plan for the course on cleanup and housekeeping as prepared for underground salt mines. The objectives are divided between those for the trainer and those for the trainees and all are behaviorally based. This emphasis on observable performance is believed to be critical for assuring that miners can translate what they learn about safety into demonstrable acts of hazard recognition and avoidance. In support of this emphasis the Course Plan contains a set of specific activities the group may undertake that will allow the miners to demonstrate their abilities. The evaluation section also provides for demonstrations and descriptions of particular issues of concern.

At this point in the Course Plan the trainer is equipped to prepare a good training course on each topic identified in Part 48. However, the Course Plan goes one step further in providing a topic outline that thoroughly organizes the presentation into an orderly sequence that comprehensively covers all major and secondary issues. In most cases the trainer is very knowledgeable about the

demands and hazards of working in the mine, this topic outline facilitates a presentation that avoids too much repetition of certain points and helps avoid the mistake of accidentally omitting other points. With the outline in front of him, the trainer can use it as a cue to guide him successively through the range of issues that must be covered.

The second level of the guides is referred to as the Lesson Guide and Materials. Appendix B is a representative example for cleanup and housekeeping in underground salt mines. This is a very detailed lecture outline that goes substantially beyond the skeletal topic outline found in the Course Plan. Each major and secondary safety issue is explained in depth supplemented with specific facts and notes that fully clarify the nature of that issue. Of course, the ordering of issues in the topic outline corresponds to the sequence in the Lesson Guide for quick reference. Because it is so detailed the Lesson Guide can provide the trainer with more confidence in assuring complete coverage of relevant topics in his presentation.

At various points in the Lesson Guide are special notes which may reference the instructor to other guides or training activities; suggest the use of a demonstration of a piece of equipment; call out the use of a visual illustration; or, identify where a self check might be appropriate to assess comprehension of a reasonable set of content. Visual illustrations and self checks are located at the end of each Lesson Guide.

The preparation of the guides for each of the five mineral types took advantage of certain common threads within particular courses. For example, transportation systems are roughly similar between deep metal/nonmetal mines and underground salt mines. Also, methods of fire protection and fire fighting are universal and pertain to all types of mines (short of Type D fires, of course). It was for this reason that, where these common threads exist between mineral types, the same material content was used in those guides. However, appropriate safeguards including internal reviews were used to prevent errors in content from occurring within these topics when there were variations in mining environments.

As previously indicated, guide development was based on research from several sources. Moreover, for some specific courses additional steps were necessary to assure that the development of those guides was properly focused. The course on explosives was one that received extra attention. Initial drafts proved to lack adequate focus and tended to be more oriented toward task training on certain explosives rather than general hazard recognition. Reviews and recommendations from the staff at the USBM and MSHA, as well as from the mining industry itself, directed the revamping of the entire course into its present form.

As another example attempting to train to an appropriate level, the materials on electrical hazards were prepared to give the miners enough knowledge of the uses and hazards of electricity in the mine but kept purposely short of being a course on the principles of electricity. Although some mine programs go into considerable detail on these principles, including, for example a discussion of Ohm's Law, the present guides focus primarily on the imminent hazards from working with or near electrical equipment.

The guides for new miner training contain a set of materials which offer the broadest flexibility to the trainer in their use while still supporting a comprehensive health and safety training system. Because new hires are unfamiliar with the numerous hazards to which they will be exposed, the use of the guides by mine trainers should foster a safer group of new employees.

4.3 Newly Hired Experienced Miner - These modules were taken from the new miner modules with emphasis placed on the more generic items that are applicable throughout most mine types. The content material is somewhat more lengthy than an instructor may need but with the use of the self checks as a preassessment tool, portions of the material may be omitted to fit a particular program.

A note was placed within each module to remind the instructor that a newly hired experienced miner's prior experience may not be totally applicable to the present job or task. However, it is hoped that the trainer will take advantage of the trainees previous experience and draw upon that experience to aid in stimulating class discussion.

4.4 Annual Refresher Training - Refresher training, as found during field research mine tours, tends to become repetitious as the trainer confronts constraints in both preparation time and training aids availability. Watching the same film or hearing the same talk can be monotonous after the second, third, or fourth iteration and the Bendix materials have included concepts, activities and resources that should promote new and engaging approaches to certain segments of refresher training. An example of those activities is that of providing additional self checks for all of the modules in the refresher training which can be used on an alternating basis. One recommendation from these materials is that additional efforts be undertaken to develop stimulating and effective aids suitable for both safety talks and refresher training which will renew miners' concerns for recognizing hazards in their area.

4.5 Visual - Visual aids have long been recognized as effective tools in the training process. Many mine trainers are good supervisors or managers but inexperienced and/or unschooled in training techniques. Illustrations will aid

these trainers in communicating necessary safety information. Therefore, in designing the health and safety guides for the metal/nonmetal mining industry, Bendix Corporation sought to develop as many illustrations and suggestions for visual aids to training as possible for this project.

The philosophy behind the visuals developed for this program includes several points. First, most drawings were to convey an idea with few or no words necessary since some trainees were not good readers. Second, short and simple titles were needed in an attempt to coordinate with the drawing to create a visual image which could be retained by the trainee and brought to mind when necessary or under emergency situations. Third, each visual was to convey only one main idea. Fourth, drawings were to be multi-ethnic and non-sexist. Fifth, in order to reinforce the practice of recognizing hazards, drawings needed to show miners in hazardous situations with preventable accidents about to happen. Sixth, it was our desire to depict miners as intelligent workers who sometimes chose careless work habits. Seventh, the more visuals the better, as long as the quality remained high, and finally the drawings should be done so they would not lose quality and visual impact when reproduced on inexpensive copy machines.

Many resources were tapped as we began creating our visuals. Most often the written materials would call for an illustration and we would consult one of the following for ideas and technical advice: MSHA fatalgrams, NIOSH safety bulletins, National Safety Council pamphlets, Colorado Safety Association booklets, private industrial publications, mining college instructional guides, World Book Encyclopedia, and Bendix engineering personnel. A title was decided upon, resources collected, and materials sent to the illustrator. Questions and/or problems were usually resolved by phone calls after which a draft drawing was sent to Denver. If technical inaccuracies were detected the drawing was returned for alterations. In addition, Ms. James spent several days in our Denver office and visited an underground mine in the Denver area in order to increase her sensitivity toward and awareness of, the mining environment she was conceptualizing on paper.

To satisfy government requirements for visuals each one was bordered with a 7 x 9 black line and drawn horizontally. Both slides and overhead transparencies could thus be created from the visuals since some mine trainers might prefer one over the other, or have equipment for only one media. We usually presented one concept per visual, although some contained several related ideas. Lettering on most visuals was one quarter inch or higher. And all the drawings were designed to be easily and clearly reproduceable on even the smallest copier.

The drawings were numbered consecutively and grouped by mining environment as they were produced. Drawings numbered 1 - 56 indicated underground situations and those from 70 - 97 accompanied the surface materials. An instructor could readily add his own drawings by continuing this numbering system or inserting a 26a or 17a, 17b etc. and adding his own VISUAL NOTE in the written materials in the appropriate position. Visuals needed for each separate module were included at the back of those modules. Thus for the unit

entitled "Ground Control" in the Deep Metal/Nonmetal notebook for annual refresher, visuals 21 and 22 are to be found at the end. Visual notes usually give titles as well as the numbers of appropriate illustrations for that moment in the training. Numbers referenced in the visual notes may or may not be ordered consecutively. This system allowed for flexibility both in the development stage and for instructors building their programs.

The visuals are numerous and general enough to be quite useful for the small mine operator who may train 3 - 5 miners a year or the classroom instructor responsible for 15 - 20 per week. The new miner visuals were designed to give helpful introductory information, while visuals designed for annual refresher and newly hired experienced modules provide more appropriate information for those sections.

Responses from reviewers have been positive and the many reviews have minimized technical inaccuracies although the great variety in mining environment, equipment and techniques employed means that not all visuals will be exactly representative of all situations. Again the type of art work used will allow the local trainer to modify and add to the visuals without degrading their quality. Used correctly the visuals are a strong part of this mine safety and health training program. Samples of the visuals can be seen in the units presented in Appendices A and B.

4.6 Self Checks - The self checks in each module were designed to fulfill the requirements specified in part 48.5-14c CFR. The purpose behind them was to provide feedback to the instructor on his/her classroom effectiveness, reinforce newly gained knowledge for trainees, promote discussion of unclear issues, and aid trainees in measuring their own progress.

Several response techniques were used: true/false, column matching, crossword puzzles, fill in the blank, multiple choice, picture identification, and sentence completion. The intent was to assure instructors that variety & fun hold definite value in the training environment, and that they are responsible for adding that element to their classes.

Due to the general nature of the entire program, instructors were expected to tailor these evaluations not only to their individual mine situations, but to each class group they trained. They should feel free to use any questions they could from the self check and eliminate others that are not appropriate for their mine.

For instructor convenience, solutions were printed at the end of each lesson guide. Self checks then followed on individual pages with instructions to trainees on how to complete that self check. Instructors could simply run them through a copier and hand them out.

The self checks, while only a small part of this training package, should be taken seriously. They are not to be used in grading trainees, but instructors are

advised to look at the self checks in assessing trainee knowledge regarding mine safety and to determine how well the training material is being learned.

The glossary grew out of a two to three page list of mining terms found locally. As the weeks and months of the projects passed, terms were added and definitions found. Mine operators, government officials and private industrial personnel continued to suggest additions, and so, two pages became twenty five.

Due to the colloquial nature of mining, perhaps more than many industries, this glossary ran the risk of being judged by some to contain inaccurate definitions or terminology. Regional differences alone threatened the credibility of the materials for some reviewers. The authors used definitions from the 1968 book, A Dictionary of Mining, Mineral, and Related Terms, published by the U.S. Bureau of Mines as a reference to check on the accuracy of terms collected in the field.

As the glossary now stands it is intended to be a handy aid for mining safety and health trainers, and by no means a complete or comprehensive glossary. Trainers are advised to use this as a basic guide to add onto and from which to build their own list of terms.

5.0 PERFORMANCE BASED TRAINING MATERIALS DEVELOPMENT

5.1 First Aid Materials - Since first aid materials were not included in the Baseline Guides new materials had to be developed for these units. The content for the first aid topics suggested by the Salt Institute Health and Safety Committee was readily available from a number of sources. The major development effort was one of organizing the content into the format described earlier and in modifying and/or creating the additional visuals needed.

5.2 Materials from Baseline Guides - In addition to the first-aid units six other topics were recommended for Performance Based Annual Retraining. These units taken from the Baseline Guides are:

- Emergency Evacuations and Use of Transportation and Communications Systems in an Emergency
- Electrical Hazards
- Personal Protective Equipment
- Routine Use of Transportation and Communication Equipment
- Accident Prevention

The actual Performance Based Training Guide is presented in Appendix C of this report.

UNDERGROUND SALT

COURSE PLAN: CLEAN-UP AND HOUSEKEEPING

- I. **GOAL:** The goal of this module is to explain the importance of maintaining a clean and orderly workplace and to encourage the miner to do so on his or her job.

- II. **BACKGROUND:** In 1979 there were a total of 144 accidents in nonmetal mines which include salt and limestone operations involving slips and falls, striking and bumping, and stepping or kneeling on objects. 76% of these accidents resulted in days lost from the job. The costs of personal adjustment to injury as well as the loss of production from days lost make close attention to good housekeeping habits a necessity to the health and safety of today's miner. Review and present data on poor housekeeping related injuries at your mine. Note that this is a type of injury that can be reduced through the attention of individual miners.

- III. **OBJECTIVES**
 - A. The trainer will do the following:
 1. Describe the effects of disorderly work places and travelways including their potential for accidents.
 2. Present Federal regulations concerning maintenance of clean work places and disposal of toxic materials.
 3. Explain housekeeping procedures used at the mine for maintaining clean work places.
 4. Discuss hazards from spillage at loading, haulage transfer points, and any other locations.
 5. Demonstrate clean-up procedures that are necessary for the thorough removal of spillage.

 - B. Trainees will be able to do the following:
 1. Answer questions about hazards associated with disorderly work places and travelways.
 2. Recognize hazards when shown a messy workplace.
 3. Summarize Federal regulations regarding the maintenance of clean workplaces.
 4. Name housekeeping procedures used at the mine and practices for good housekeeping.
 5. Point out hazards resulting from spillage during the mine tour and where such hazards are most likely to be encountered.
 6. Clean up spillage of oil or salt showing correct procedures to be followed in your mine.

IV. VISUAL AIDS

A. Visual aids

- A. Slides or pictures of various locations in the mine where spillage occurs.**
- B. Slides or pictures of clean work areas in the mine.**

V. EVALUATION

A. Describe, demonstrate, or identify:

- 1. Effects of unclean workplaces.**
- 2. Procedures for clean-up and disposal of toxic materials.**

B. Self Check

- 1. Anytime hands on evaluation such as operation equipment or walking prescribed routes is possible it should be used.**
- 2. Eliminate the use of self-checks if too difficult for your class.**
- 3. Change written self-check items where necessary to fit your local mine situation.**

VI. RESOURCES

A. Training Standards - Part 48.5 (6) 8 Cleanup.

B. Health and Safety Standards - Part 57.4-50 and Part 57.20-3, 11, 12 and 13

C. Films

- 1. National Coal Board - "Tidy Why."**
- 2. Salenger Educational Media - "Good Housekeeping Prevents Accidents."**

D. Applicable MSHA fatalgrams.

TOPICS COVERED

I. IMPORTANCE OF CLEAN-UP AND GOOD HOUSEKEEPING

A. Unsafe conditions contributing to accidents.

B. Slows down work.

C. Fire protection.

II. APPLICABLE FEDERAL REGULATIONS

A. Maintenance of clean work places.

1. Part 57.20-3. General clean-up of mine areas.
2. Part 57.20-11. Warning signs of hazards ahead.

B. Disposal of toxic materials

1. Part 57.4-50. Fire hazards of flammable wastes
2. Part 57.20-9. Testing of potentially dangerous gases
3. Part 57.20-12. Labeling of toxic materials
4. Part 57.20-13. Covers provided for scrap/waste barrels

III. HOUSEKEEPING PROCEDURES

A. Useful organization of work procedures.

B. Storing work and scrap/waste materials.

C. Handling tools, supplies, and equipment.

IV. SPILLAGE HAZARDS

A. Locations of spillage in mine

1. Loading areas
2. Along pillars or the sides of drifts
3. Feeder-breaker or crusher
4. Haulageways
5. At transfer points from passes or loaders to haulage trucks, train cars, or skips
6. Along belt lines and their transfer points

B. Hazards associated with spillage

1. Safety hazards to miners and equipment
2. Increased resistance to ventilation

C. Clean-up of spillage

APPENDIX B
UNDERGROUND SALT
LESSON GUIDE AND MATERIALS: CLEAN-UP AND HOUSEKEEPING

UNDERGROUND SALT

LESSON GUIDE AND MATERIALS: CLEAN-UP AND HOUSEKEEPING

I. IMPORTANCE OF CLEAN-UP AND GOOD HOUSEKEEPING

- A. Reduces the number of unsafe conditions which contribute to accidents.**
 - 1. Oily rags, empty or uncovered grease and oil containers, tangled hoses, and discarded trash are examples of such hazards.
 - 2. If glass containers or cups are taken into the mine they should be stored in such a way to prevent breakage.
 - 3. Because of high foot traffic the cage, collar, lunchrooms and maintenance shops should be kept clean and orderly.
- B. A messy workplace slows down work. If tools are lying about unorganized, more time is required to find them.**
- C. Cleaning-up during work is a good fire prevention technique. Areas around fuel and explosive supplies should be kept free of any flammable materials and trash.**

VISUALS NOTE: SHOW VISUAL 44 ENTITLED "KEEP WORK AREAS CLEAN".

II. APPLICABLE FEDERAL REGULATION

- A. Maintenance of clean work places.**
 - 1. The law states that workplaces, passageways, storerooms, and service rooms must be kept clean and orderly, and water drainage must be provided where practicable (Part 57.20-3)
 - 2. The law states that any health and safety hazard that is not immediately obvious must be labeled with a warning sign. This sign must "be readily visibly, legible, display the nature of the hazard, and any protective action required" (Part 57.20-11).
- B. Disposal of toxic materials.**
 - 1. The law states that flammable and combustible wastes should not accumulate and become a fire hazard. (Part 57.4-50).
 - 2. The law states that potentially dangerous gases should be tested, and control measures taken as appropriate. (Part 57.20-9).

3. The law states that toxic materials should be clearly labeled and safe handling procedures identified. (Part 57.30-12).

III. HOUSEKEEPING PROCEDURES

- A. Organize your work ahead of time so you have all the equipment you need where you need it. Make cleaning-up part of your work.
- B. Clean up spills whenever and wherever they occur.
- C. After you are finished with equipment and no longer plan on using it for awhile, put it away such as in a supply room or other designated area. Park vehicles properly. Keep oily rags in closed containers and remove them from the mine daily.

VISUALS NOTE: SHOW AND DISCUSS VISUAL 45 ENTITLED "CLEAN UP ALL SPILLS".

- D. When handling tools, supplies, or equipment, use caution in how you handle them. Avoid hurting yourself, others, or the equipment itself. If a piece of equipment or a tool is broken, get it fixed or serviced rather than leaving it and letting another miner discover its condition. The next time the tool could be needed in an emergency and you could be the victim.

IV. SPILLAGE HAZARDS

- A. Spillage is found to varying degrees at a number of locations in the mine.
 1. Loading areas
 2. Along the sides of pillars
 3. Feeder-breaker or crusher
 4. Haulageways
 5. At transfer points from passes or loaders to haulage trucks, train car, or skips.
 6. Along belt lines and their transfer points.
- B. Hazards associated with spillage.
 1. Spillage poses safety hazards to miners and equipment. Miners can trip over rocks, and equipment has less room to operate and maneuver when crowded by spillage. Uneven floors caused by spillage is a contributing cause of haulage accidents.
 2. Substantial spillage increases resistance to ventilation. Spillage cuts down the volume of air passing by.

3. Do not attempt to clean up spilled ANFO or other explosives. Notify your supervisor or a powderman immediately.
- C. Spillage should be cleaned up wherever it poses a health and safety hazard. Depending on the size of the spillage, either shovels or loaders should be used in clean-up.

DEMONSTRATION NOTE: YOU MAY WANT TO HAVE THE TRAINEES ACTUALLY PERFORM A CLEAN UP TASK ON SOME OIL OR SALT SPILLAGE.

EVALUATION NOTE: HAVE TRAINEES ANSWER SELF-CHECK NUMBER ONE INDIVIDUALLY OR IN GROUPS OF THREE OR FOUR. REVIEW RESPONSES AND CLARIFY INCORRECT ANSWERS. QUESTIONS CONCERN CLEAN-UP AND HOUSEKEEPING.

SELF CHECK #1 SOLUTIONS

1. a, b, c, e, and f
2. Cleaning up as you work
3. true
4. e.
5. Spillage

Self Check: Clean-up and Housekeeping

Self Check #1 Housekeeping Procedures, Federal Regulations, and Hazards

1. **Unsafe conditions which contribute to accidents include:
(circle all correct answers)**
 - a. **Oily rags**
 - b. **Open grease and oil containers**
 - c. **Tangled hoses and discarded trash**
 - d. **Tools in proper place**
 - e. **Wearing tennis shoes**
 - f. **Fallen lose**
 - g. **Working in a mine**

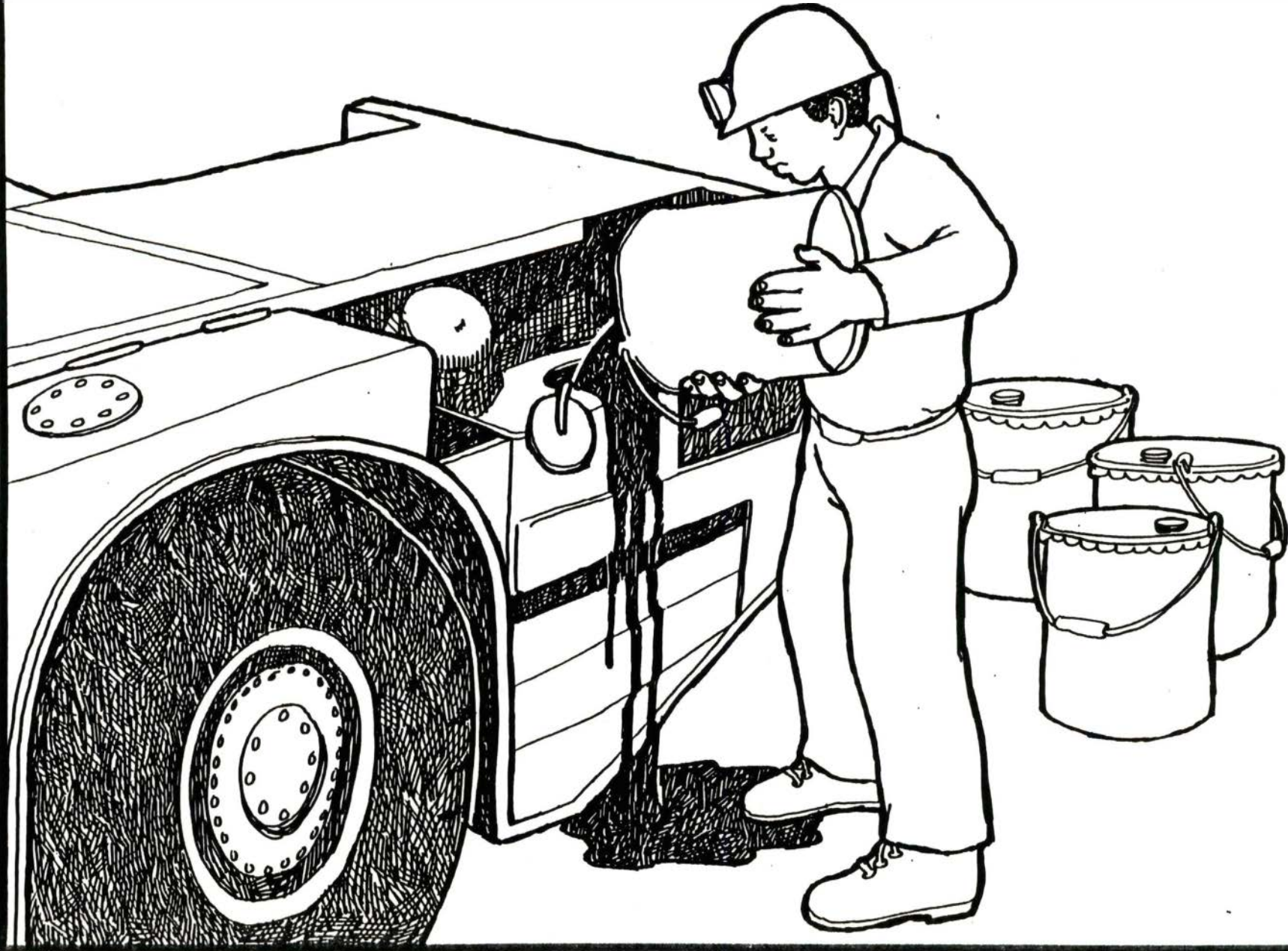
2. **(Cleaning up as you work, cleaning up at the end of your shift) is the best way to maintain a safe working environment.**

3. **The law states that toxic materials should be clearly labeled and safe handling procedures identified. (true, false)**

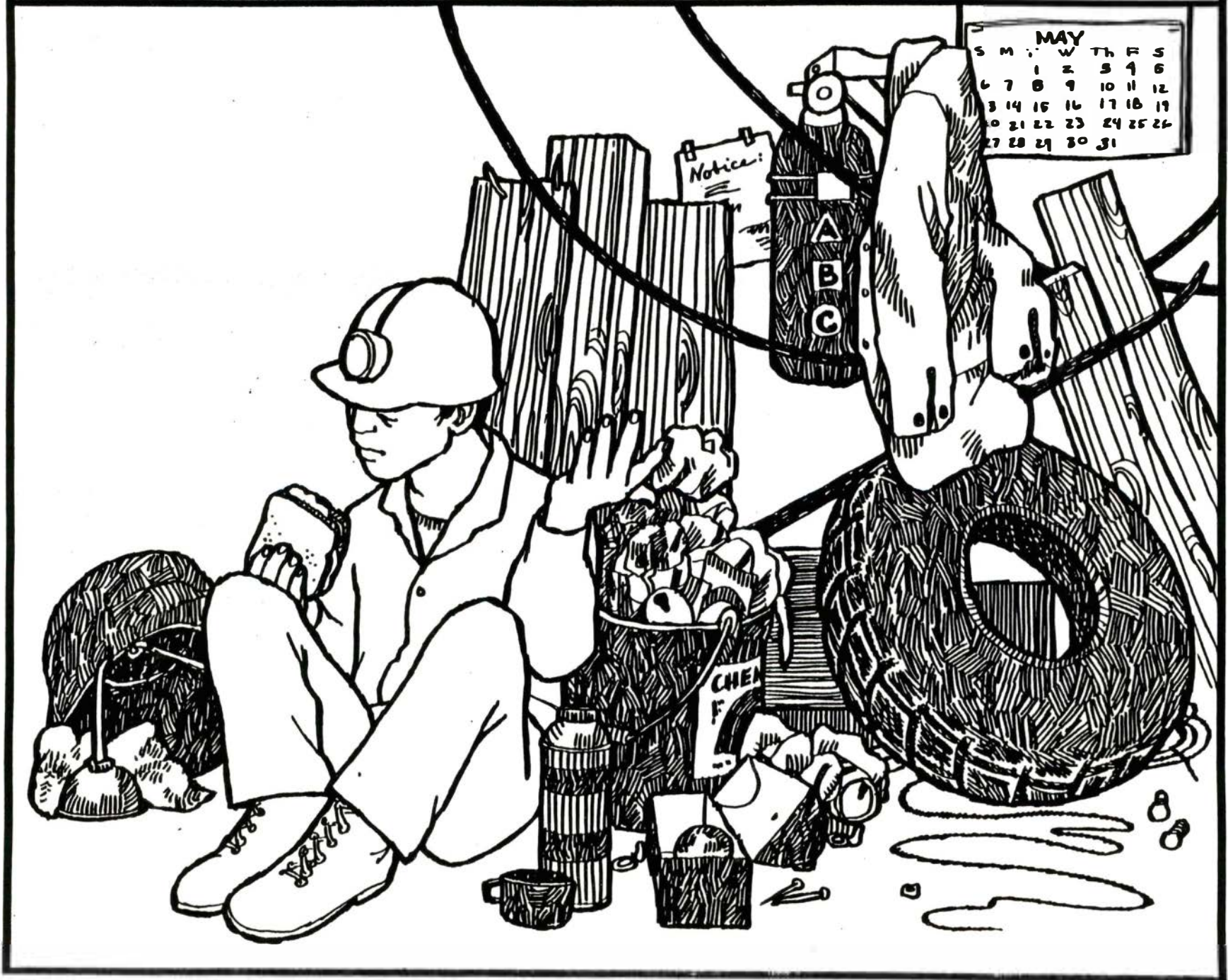
4. **If equipment or tools are broken during use:**
 - a. **Get it serviced or fixed at the end of your shift**
 - b. **Put it away so no one gets hurt**
 - c. **Let the next miner fix it**
 - d. **Leave it where it was broken so you can show it was an accident.**
 - e. **Get it repaired immediately.**

5. **_____ is a leading cause of miners tripping, is a major contributor to haulage accidents, cuts down the volume of air passing by, and should be cleaned up by either shovels or muckers.**

CLEAN UP ALL SPILLS



KEEP WORK AREAS CLEAN



APPENDIX C
PERFORMANCE BASED TRAINING FOR ANNUAL REFRESHER
AND EXPERIENCED NEW HIRE TRAINING

The development of Performance Based Training for the Annual Refresher and Experienced New Hire mandatory training was approached by dividing the training program into two categories. The first category consisted of training topics common to many mines. The second category was composed of training topics that are to be chosen by the local mine on the basis of mine specific accident analysis. That should be an on going process with training adjusted as needed to changes in the accident pattern. The purpose of the first portion of the training is to review procedures and skills that are likely to be needed in emergency or unusual circumstances but that are not likely to be exercised on a routine basis. Because these skills and knowledge are not used routinely and can't be observed readily, the training will have to utilize a contrived training situations. The training may take the form of classroom review or structured activities that take place in the work environment. For some topics the instructor may want to employ standard classroom techniques but the emphasis is on structured simulated emergencies in which the performance of the procedures or skills being reviewed can be observed and evaluated. The topics to be covered in this portion of the training include health, first aid, emergency transportation and emergency communications, mine gases, electrical hazards, and accident prevention. Details to be covered in these courses are outlined below.

Health

- Noise
- Toxic Materials

First Aid

- Shock
- Breathing
- Bleeding
- Cardiopulmonary Resuscitation (CPR)
- Handling and Transporting Victims
- Fractures

Emergency Transportation

- Hoisting Signals
- Evacuation Procedures

Emergency Communication

- Warning Signs and Signals
- Power Loss Response and Backup Signals

Mine Gases

- Potential Hazard(s)

- Physiological Effects
- Indicators of Presence
- Response to Presence

Electrical Hazards

- Lock Out and Tag Out Procedures
- Effects of Electrical Shock
- Electrocution Rescue Techniques

This program is designed to encourage an activities and performance oriented approach to refresher training. To that end several of the units include suggestions for evaluation and retraining techniques employing role playing and simulations that stress the performance of health and safety skills. These techniques are designed to be used in the work area, thus enhancing the face validity of the exercise. Individual mine instructors must evaluate the opportunities and constraints in their operations and make judgements as to which units should be delivered in this fashion. Training circumstances, including the style and skills of the instructor and/or the work group foremen who may be conducting the retraining, will determine how much of the retraining can be done using activities and exercises of this type. Experience has shown, however, that this approach is often more readily accepted by miners and generally more effective than standard classroom lectures or films, etc. The instructor will also have to determine how various topics from different units might be combined in one workplace exercise. An instructor might, for example, combine aspects of first aid training with an emergency evacuation drill by having the trainees "discover" a co-worker role playing an injured miner in their path as they are leaving their work area. The injury symptoms can be written on small cards and attached to a corresponding spot on the "victim". The trainer can make the problem as complex and elaborate as he or she wishes. As instructor skills grow with practice so can the detail and realism of the exercise. The elements of surprise and realism will enhance the impact of the approach.

Not all units or topics within a given unit are suited to review via a role play or other activity. Many topics are better reviewed with a simple discussion. These discussion can, however, take place in the work environment providing distractions such as noise or poor lighting don't detract from the training effort. When a conducive training atmosphere can be established a discussion session should be held in conjunction with a more active role play session. Interest in the discussion is usually heightened by an activity which points out to the trainees their need for increased knowledge or skill.

Conducting both simulations and discussions in the work place, when it's conducive, has advantages. Workers tend to be more relaxed there and are more willing to share experiences, questions or concerns with the trainer than they are in a formal classroom. The environment tends to stimulate recall of incidents and questions and it helps the instructor speak in terms of the reality of the work place, thus enhancing the validity of the material being reviewed. Conducting

activity based training in the work area also emphasizes use of "learning by doing" instructional techniques. These techniques have proven among the most effective for training miners.

While there are many advantages to activity oriented performance based training realizing those advantages will demand special attention and planning. One of the items needing additional attention is scheduling and coordinating the activities in conjunction with the production cycles of the mine. This becomes especially important and more difficult when the exercises are conducted throughout the year at a recommended interval of one every 6 to 8 weeks for each work group. The simplest way to overcome scheduling problems is to conduct the retraining in one annual mine-wide day long exercise. This approach is likely to be less effective, however, since the impact of more frequent practice is lost. In addition the mines training and safety officer(s) will be able to participate in the exercises, observe, and critique the individual trainees more effectively if the program is conducted in a series of smaller, more frequent sessions. Clearly some balance must be struck between a one day program and a series of sessions that interrupts production cycles.

There are also some potential problems with miner participation that a trainer will need to be prepared to handle. In most groups there will be one or two leaders who will make most of the decisions and perform most of the mock first aid. To expand the participation the trainer should occasionally halt the activity for discussion and critique, or ask the less active group member to make the next choice or describe the next step in the first aid or emergency procedure. One simple technique in getting others to participate is to have the normal group leader(s) role play an unconscious victim(s).

As mentioned earlier not all units lend themselves to activities. Some of the units can be handled very effectively by holding work group discussions in the work area. These discussions could be held at the end of a role play exercise while the miner's interest level is still relatively high.

The second category of training activity addresses the routine tasks and work behaviors and situations that can be observed during regular work patterns. While there are some standard items to be covered in this portion of the training the focus is on those tasks and hazards that are of importance to the individual mine. The standard topics that are to be included in this portion of the training are accident prevention, personal protective equipment and routine use of transportation and communication equipment. The details to be covered are outlined below.

Accident Prevention

- Common Types of Accidents
- Unsafe Conditions/Acts
- Lifting and Handling Materials
- Hand Tool Use

- Walkways and Stairways
- Accident Prevention Principles
- Bins, Hoppers and Stock Piles

Personal Protective Equipment

- Safety Lines
- Safety Glasses
- Ear Protection
- Safety Shoes
- Respiratory Devices
- Special Equipment
- Snug Fitting Sleeve and Pant Cuffs
- Self Rescuer

Routine Use of Transportation and Communication Equipment

- Cages
- Vehicles
- Bell System
- Phone System
- Regulatory Signs
- Surface Transportation on Mine Property

The other activities selected for attention during this portion of the annual retraining are to be determined by the local mine through an analysis of their own accident data. When that analysis reveals a particular type of injury or an abnormally high accident rate associated with a particular activity the trainer should develop and submit a training plan aimed directly toward reducing those injuries and accidents. Training in these areas may be accomplished through special classes or through a process of direct observation and feedback in the work place, or in conjunction with the structured activities and simulations used to review emergency procedures as outlined above.

The individual mine's training plan will call out the targeted accident causes for the year using the data analysis to document the selection. The plan will also call out the approach, e.g., classroom, on site observation and feedback, simulations, or other exercises the instructor intends to use to conduct the training.

For each of the training units identified above an outline guide has been prepared. Each unit has a goal statement, one or more trainer objective statement(s), a statement of the performance desired from the miner and one or more suggestions for evaluation and retraining techniques that might be used with the unit. The Goal refers to the ultimate purpose of the unit, e.g. to eliminate injuries from the source specified. The Trainer Objective refers to what the trainer will be trying to accomplish in the session, e.g. material presented or activity undertaken. The Performance statement refers to what the trainee will know or be able to do subsequent to the retraining.

UNIT - HEALTH

UNIT GOAL - To reduce the health risk to miners from noise.

TRAINER'S OBJECTIVE - To reinforce awareness of noise hazard and techniques for reducing that hazard.

TRAINEE'S PERFORMANCE - The trainees will be able to describe the difference between temporary and permanent hearing loss. They will be able to identify the equipment or activities in the work environment that might cause hearing loss. Trainees will be able to describe engineering and administrative controls and personal protective equipment useful for reducing exposure to noise.

TRAINEE'S PERFORMANCE - Trainees will be able to determine when hearing protection is required. They will wear hearing protection when exposed to potentially hazardous noise levels.

SUGGESTED EVALUATION AND RETRAINING TECHNIQUES

During routine or special unannounced visits of the safety or training officer to the work areas they should inspect for possession and appropriate use of hearing protection devices. They should provide positive reinforcement for individuals who are using hearing protection or who have it available for use when it might be needed. Have foremen check and reinforce use of hearing protection on a routine basis.

The safety or training officer or the section foreman should call the work group together for review of noise hazards. They should have trainees identify potential sources of noise in the area. Fill in any sources they may not mention.

Present the visuals on noise exposure and hearing damage and discuss the content and relevance of the content to the mine environment. The visuals are at the end of this unit.

UNIT GOAL - To reduce the risk to miners from exposure to toxic materials.

TRAINER'S OBJECTIVE - To reinforce awareness of toxic material hazards and techniques for reducing that hazard.

TRAINEE'S PERFORMANCE - The trainees will be able to identify any hazardous material with which they might come in contact and will describe proper precautions for the routine use of those materials. They will be able to describe actions to be taken in case of an accident involving those materials.

SUGGESTED EVALUATION AND RETRAINING TECHNIQUE

The foreman or the mine safety training officer should call the work group together, or cover this topic in conjunction with another group session. This session could be conducted in a classroom or in the work place. Ask trainees to identify hazardous materials with which they might conceivably come in contact on the job.

Complete the list of hazardous materials used in the mine by recalling any the trainees fail to mention.

Ask the group to imagine that one of them has been asked to help with a job that involves a hazardous material. Ask the trainees to describe the precautions to be taken.

Their list should include:

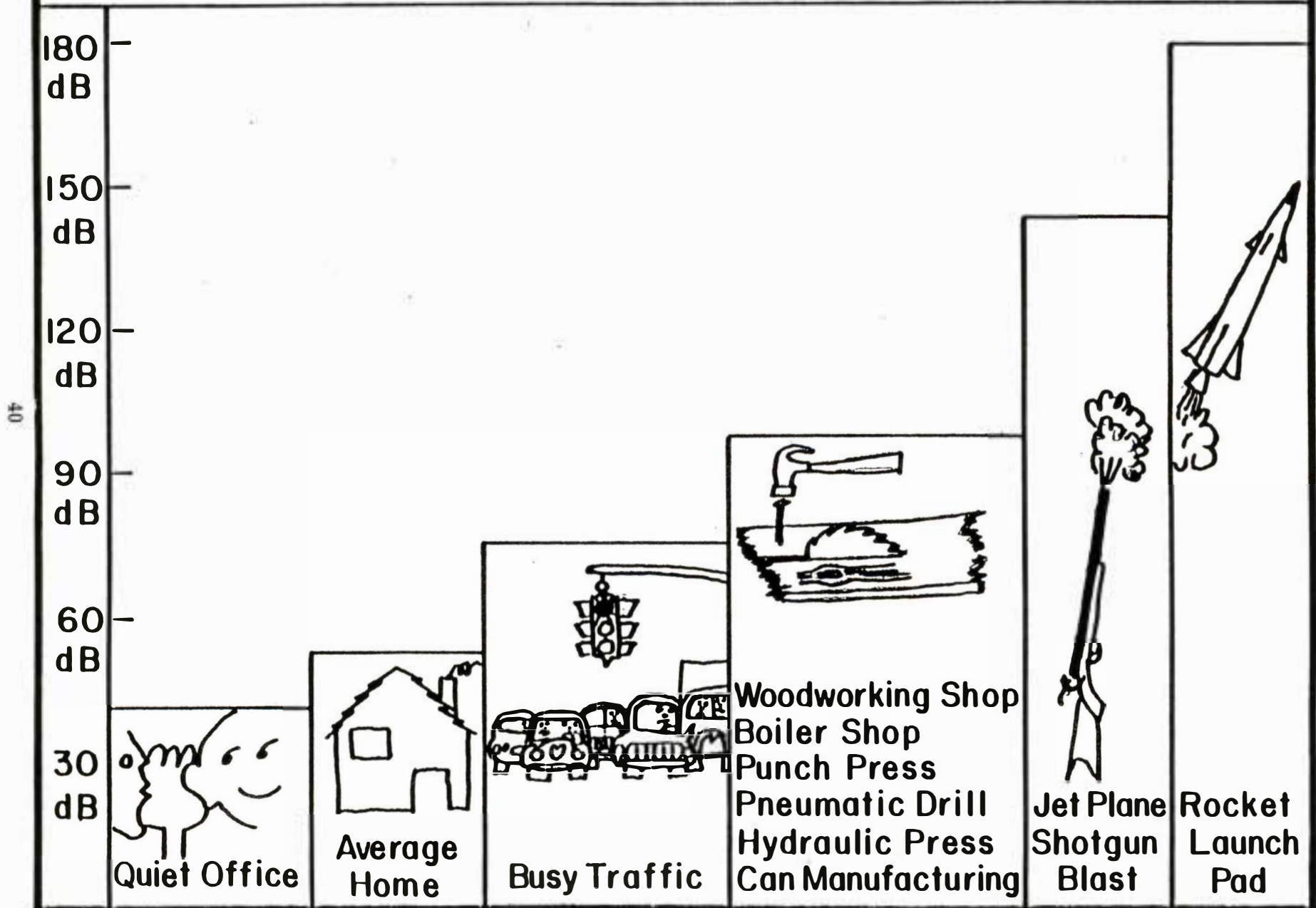
1. Read warning labels before working with a hazardous material.
2. Wear appropriate personal protective gear.
3. Provide adequate ventilation if call for on label.
4. Warn others if you bring a hazardous material into an area where its not normally used.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

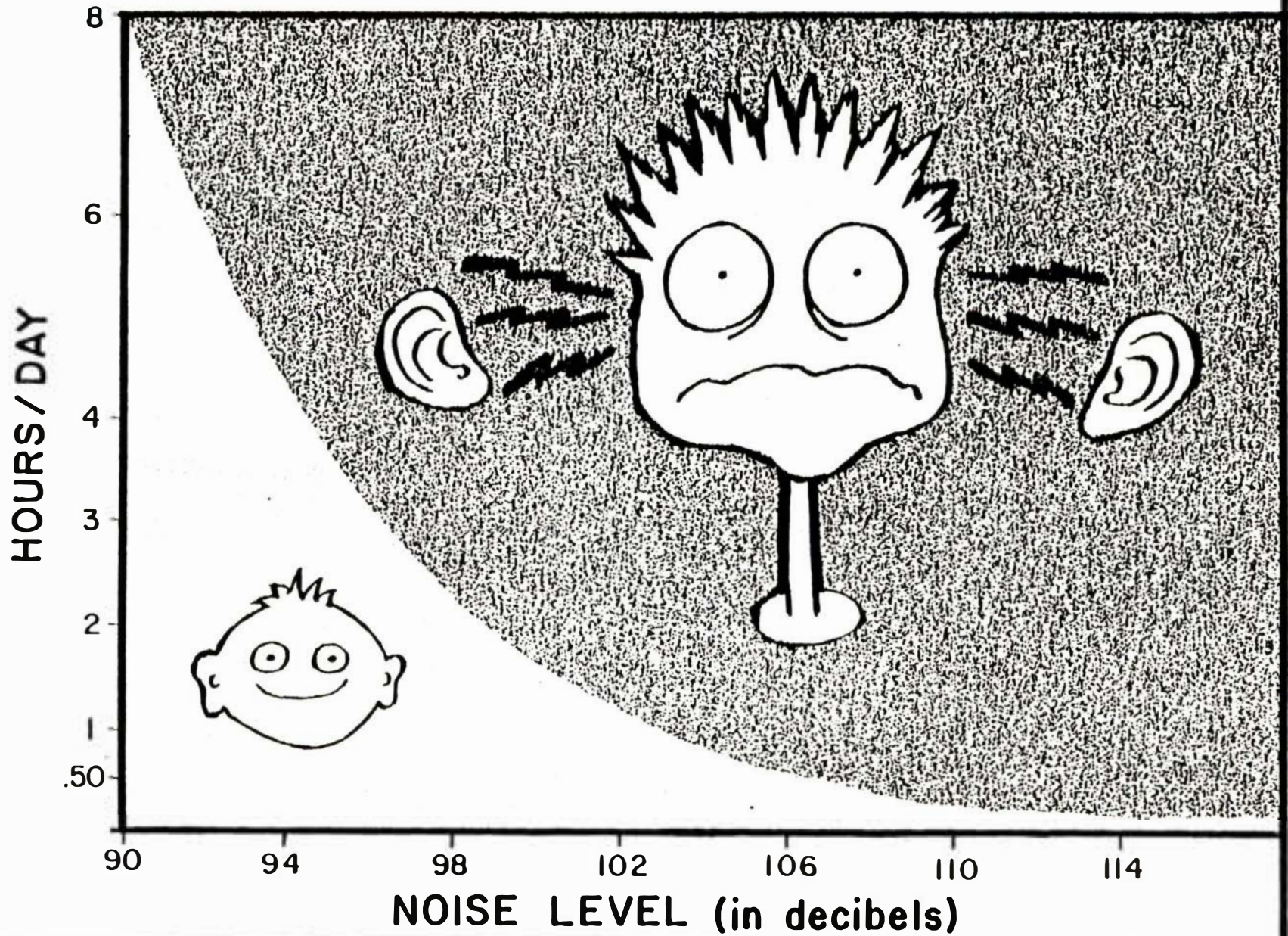
The mine safety training officer or the group foreman should ask trainees to identify hazardous materials on the work section, and how they would respond to an accidental exposure to these materials.

The trainees should be able to indicate what personal protective equipment should be used when handling toxic materials in both routine or emergency situations. Give warning to others if needed.

HOW MUCH NOISE IS TOO MUCH ?



PERMISSIBLE NOISE EXPOSURE LEVELS



UNIT - FIRST AID: SHOCK

GOAL - To minimize the severity of injuries through the proper application of first aid techniques for shock victims.

TRAINER'S OBJECTIVE - To provide review and/or exercise in the proper first aid response to shock victims or potential shock victims.

TRAINEE'S PERFORMANCE - Have trainees describe the signs and symptoms of shock. Fill in any items they fail to mention. Their list should include the following:

THE SIX (6) P'S

Prostration - collapse

Pallor - skin is pale

Perspiration - cold, clammy skin

Pulselessness - rapid, weak pulse

Pulmonary deficiency - shallow, irregular, labored, rapid breathing

Pupil dilation - eyes are dull and dilated

TRAINEE'S PERFORMANCE - Have trainees describe or demonstrate in simulated emergency activity the proper response when a victim may be in or may go into shock. Their list or demonstration should include the following:

1. Send for help.
2. Secure and maintain a clear airway.
3. Control bleeding.
4. Elevate lower extremities about 12 inches if injuries permit. Do not elevate unsplinted fractures. Do not elevate if spinal injury is suspected.
5. Prevent loss of body heat but do not overheat.
6. If victim is bleeding from a head wound or is having trouble breathing elevate head and shoulders.
7. If victim is bleeding from the mouth, is vomiting or may vomit, lay the victim on his/her side. (Be aware of possible spinal injury)

8. Splint fractures.
9. Avoid rough or excessive handling.
10. Do not feed or give victim anything to drink.
11. Record victim's vital signs and pass information to medical transportation team.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

The mine safety training officer or an adequately trained foreman should conduct this session as part of a larger emergency skills exercise or as a stand alone activity. Begin by having a role play "victim" collapsed in the work area. The "victim" could be conscious but incoherent, perhaps attempting to move around. Symptoms should be written on cards and attached to the victim in appropriate places. A card that reads, (Pulse: rapid, and weak) should be attached to the "victim's" wrist. A second card that reads (Skin: cold, clammy and pale) should be attached near the "victim's" face. A third card that reads (Breathing: irregular, labored, and rapid) should be on the "victim's" chest and a fourth that reads (Eyes: dull and dilated) should be attached near the "victim's" face.

As the trainees begin to examine the "victim" and determine their treatment the trainer can complicate the activity by interjecting new information, e.g., have the "victim" complain of severe back pain, or add airway blockage or the discovery of serious bleeding to the symptoms they must treat. The situation can be complicated by generating the need to move the "victim" quickly. This could be due to dangerous ground conditions near the victim, a fire, toxic fumes or an emergency evacuation signal. Make the reason for moving "victim" relevant to the local mine. Check the trainee's performance against the list of shock symptoms and first aid responses to shock given above. Provide both positive feedback and corrective information when the trainees complete the exercise.

UNIT - FIRST AID: OBSTRUCTED AIRWAY

GOAL - Prevent death or injury due to obstructed airways.

TRAINER'S OBJECTIVE - The trainer will present materials and exercises designed to prepare miners to respond properly to victims with blocked airways.

TRAINEE'S PERFORMANCE - The trainee will be able to describe or demonstrate methods for first aid treatment of obstructed airways. These will include techniques for clearing and opening airways and the use of both mouth to mouth and back pressure resuscitation. When trainees are demonstrating or describing first aid techniques for treating obstructed airways they should include the following points.

Obstructed Airway in an Unconscious Victim

1. Recognize unconsciousness.
2. Call for help and position victim. If victim is lying on stomach, roll as a unit onto back. Position yourself by the victim's head and shoulders.
3. Open airway by tilting head back.
4. Check for breathing.
5. If victim begins breathing, maintain open airway.
6. If victim is not breathing, begin rescue breathing.
7. Give four quick breaths - after the first breath, remove your mouth and let the air flow out of the victim's lungs. Watch for victim's chest and belly to see if it falls as his lungs empty.
8. If the air is flowing properly, breath three more times without waiting for the lungs to empty completely.
9. If air will not enter the victim's lungs, readjust the head tilt and try breathing again.
10. If air is still not entering the victim's lungs, roll victim toward you (on their side) and support their weight on your thighs.
11. Keep one hand on the victim's shoulder and raise the other hand about twelve inches from his back. Strike the victim right between the shoulder blades with the heel of your hand. Strike four forceful blows, in rapid succession.

12. Roll victim on back, reposition your body parallel to victim's body. Your knees are located below the waist line of victim.
13. With fingers of one hand, find the victim's navel. Lay the heel of your other hand on the victim's abdomen, about one inch above the navel.
14. After your first hand is in position, place your second hand on top of the first hand.
15. Push in and up - toward the victim's head. Deliver four rapid thrusts.
16. If the victim is obese, or pregnant do not use abdominal thrusts - use chest thrusts.
17. Locate xiphoid and properly position hands on sternum.
18. Deliver four quick downward thrusts.
19. Open the victim's mouth and scrape across the back of the throat and dislodge any obstruction. Clear any visible debris.
20. Tilt the victim's head back and try rescue breathing again.
21. If the airway is still obstructed, repeat steps 10 thru 20 again.
22. Continue until successful or medical help arrives.

Obstructed Airway in a Conscious Victim

1. Recognize signs of an obstructed airway.
 - a. A weak, ineffective cough
 - b. high-pitched, crowing noises while inhaling.
 - c. bluish color of the lips or skin
 - d. inability to speak
 - e. clutching throat - (universal distress signal)
2. If airway is obstructed, and victim is standing, position yourself behind and slightly to the side of the victim.
3. Deliver four back blows with one hand while using other hand to support front of victim.
4. Stand behind the victim and place your arms around his waist.
5. Locate victim's navel with one hand.

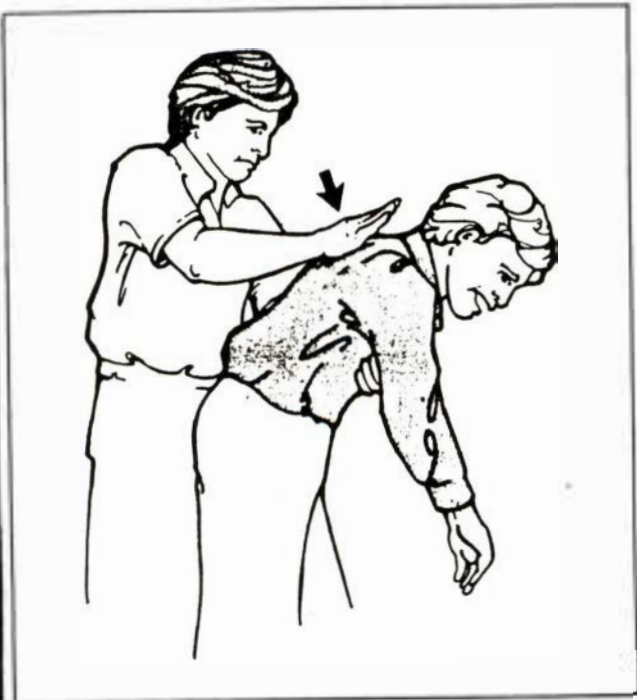
6. Make a fist with your other hand and place the thumb side of that fist against the victim's abdomen approximately one inch above the navel.
7. Place the second hand on top of your first hand and deliver four quick upward and inward thrusts.
8. If the victim's airway does not clear, proceed with steps two through seven.
9. For an obese or pregnant person, stand behind them and place your arms under the victim's armpits.
10. Deliver four quick chest thrusts instead of abdominal thrusts.
11. If victim is in a prone position, use the recommended procedures.

SUGGESTED EVALUATION AND TRAINING TECHNIQUES

In conjunction with other emergency retraining or as a separate activity the mine safety training officer or the work group foreman should create a simulation in which the work crew finds a role play "victim" who is suffering from a restricted airway. If available, place a "Resusci-Anne" in the work area to serve as the victim so that resuscitation techniques can be practiced more easily. The activity could also be staged in a classroom in conjunction with lectures and films, etc. Check performance of trainees against the criteria listed above. Practice procedures for both conscious and unconscious victim.

***NOTE:** do not actually administer the chest or abdominal thrust to "victim" during role play. Excess pressure on the xyphoid could cause internal damage to a fully conscious person.

OPENING OBSTRUCTED AIRWAYS

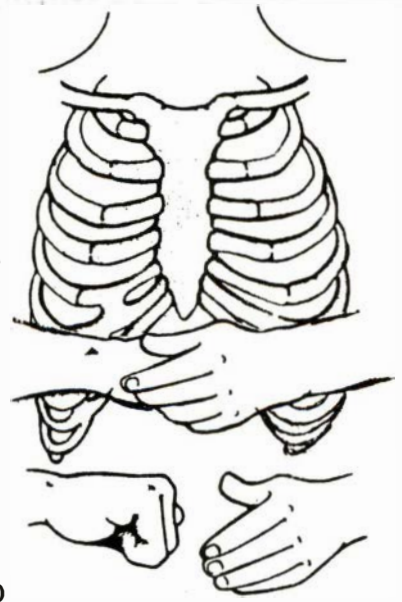


FOUR SHARP BLOWS
WITH HEEL OF HAND
OVER SPINE

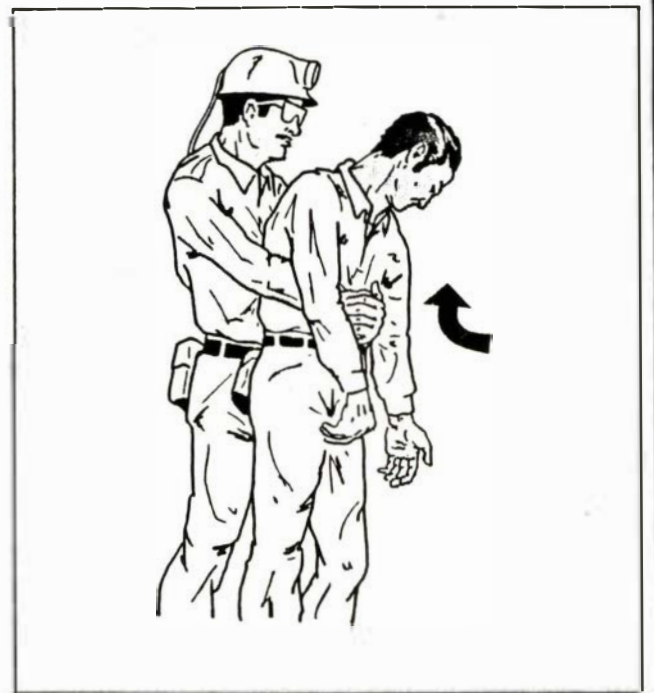
MAKE A FIST, CLASP
HAND OVER FIST

PLACE THUMB OF FIST
AGAINST ABDOMEN

ADMINISTER 4 QUICK
INWARD AND UPWARD
THRUSTS



ALTERNATE BACK
BLOWS AND
ABDOMINAL THRUSTS



UNIT - FIRST AID: CONTROL OF BLEEDING

GOAL - To minimize the severity of injuries through the application of proper bleeding control techniques.

TRAINER'S OBJECTIVE - To present information and exercises that review bleeding control techniques.

TRAINEE'S PERFORMANCE - The trainees will be able to identify and describe the benefits, disadvantages and proper applications of compression, pressure point and tourniquet methods of bleeding control. Their list should include the following points:

1. Most external bleeding is best controlled by direct pressure on the wound.
2. Indirect pressure, e.g., pressure on arteries is used when direct pressure is not sufficient or can't be applied because of injury or position of victim.
3. If indirect pressure e.g., pressure point control is used, direct pressure should also be maintained when possible.
4. Indirect pressure should be terminated when bleeding is controlled and should be reapplied only if bleeding begins again.
5. The use of a tourniquet is appropriate only in case of severe life threatening hemorrhage such as partial or complete severance of a limb or otherwise uncontrollable bleeding.
6. Use a wide strap, belt or cloth, never anything narrow like a rope or shoe lace.
7. Once applied don't remove, notify medical personnel of tourniquet by marking the time of application on victim's forehead.

TRAINEE'S PERFORMANCE - The trainees will demonstrate the use of compression, pressure point and tourniquet methods of bleeding control. During the demonstration watch for the following:

CONTROL OF BLEEDING

1. Lay victim down, legs semi-flexed and elevated.
2. Maintain open airway.
3. Maintain body heat.

4. Keep victim still.
5. Do not remove impaled object - bandage around it.
6. Apply direct hand pressure to wound with gauze, other clean material or hand until bandage can be applied.
7. If bleeding continues apply more pressure.
8. Elevate bleeding part if possible.

ARTERIAL BLEEDING - Bright Red, Pulsating

1. Indirect pressure on artery feeding injured body part.
 - a. Temporal for scalp
 - b. Facial for face
 - c. Carotid for neck
 - d. Subclavian for chest or armpit
 - e. Brachial for arm
 - f. Femoral for leg

TOURNIQUETS

A tourniquet should be used only as a last resort to control life threatening bleeding.

Injury to or loss of limb is possible consequence of tourniquet use.

1. Place close to wound
2. Place pad over artery before applying constricting band.
3. Tighten just enough to control bleeding.
4. Don't loosen.
5. Mark victim with indication that tourniquet is in place, and the time of application of the tourniquet.

INTERNAL BLEEDING

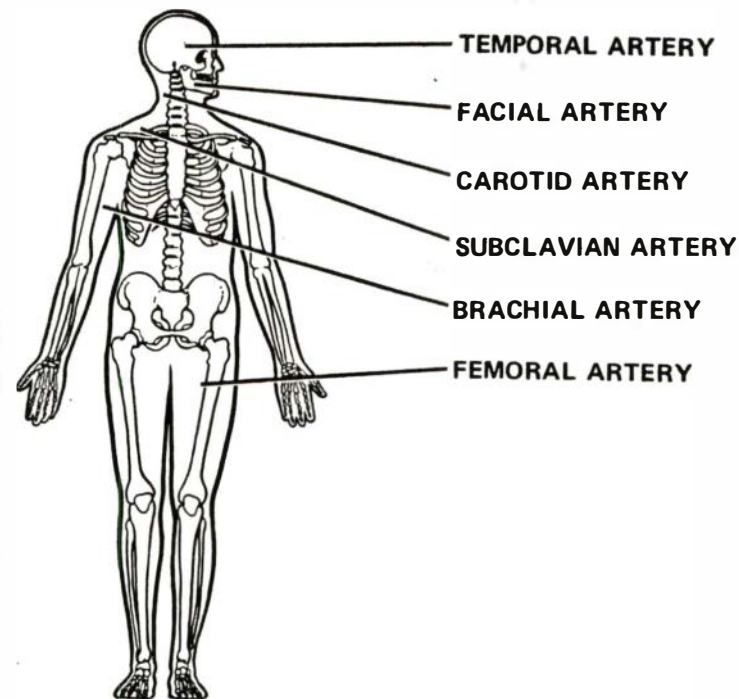
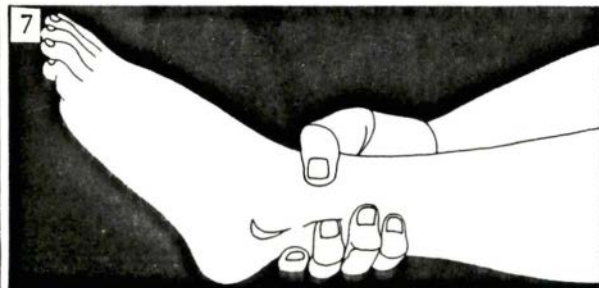
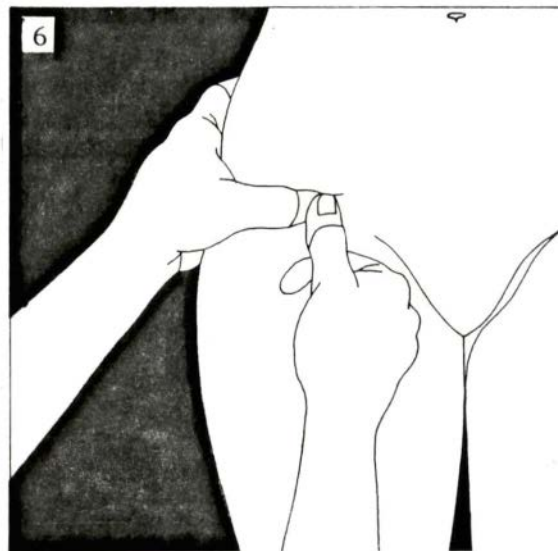
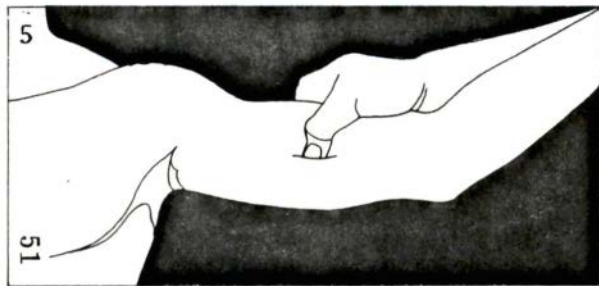
1. Treat the victim for shock.
2. Give nothing by mouth.
3. If bleeding is in an extremity apply pressure bandage to the site.

SUGGESTED EVALUATION & TRAINING ACTIVITY

Combine bleeding control with unannounced role playing sessions on shock, broken bones, or CPR. Place tags on victim that indicate severe bleeding from various body parts and have trainees describe or demonstrate appropriate response.

This activity could be conducted in either a classroom or the workplace. A classroom may make it easier for the instructor to control participation and observe the miners response while the work area might provide for more realism. The local trainer should choose the site that is most effective in his/her situation.

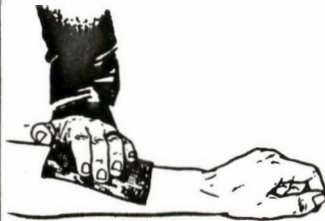
PRESSURE POINTS



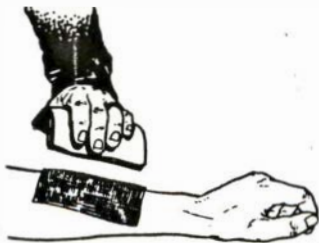
1. For a wound of the scalp or temple, compress the temporal artery.
2. For a wound of the lower face (below the eyes), apply pressure to the facial artery along the lower jaw.
3. For a neck wound, compress the wound site. Do not compress the carotid artery, as this could cause stroke.
4. For a shoulder wound or hemorrhage of the upper arm, compress the subclavian artery.
5. For a wound of the lower part of the upper arm or of the elbow, press the brachial artery.
6. For thigh wounds, apply great pressure to the femoral artery against the femur.
7. For foot wounds, compress the entire network of arteries in the ankle.

BLEEDING CONTROL

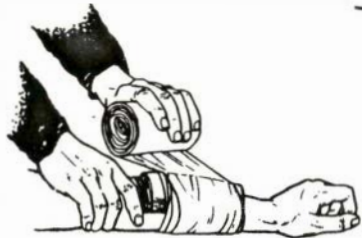
PRESSURE BANDAGE: MILD BLEEDING



APPLY PRESSURE
WITH STERILE DRESSING



APPLY ADDITIONAL
DRESSINGS IF NECESSARY

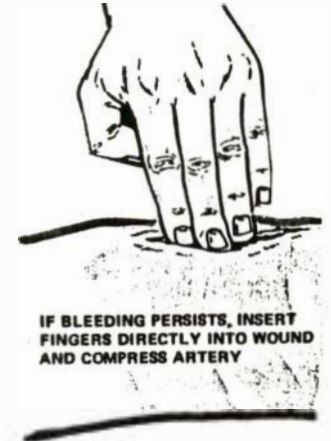


BANDAGE WOUND

DIRECT PRESSURE: PROFUSE BLEEDING



PLACE HAND DIRECTLY ON
WOUND AND EXERT PRESSURE



IF BLEEDING PERSISTS, INSERT
FINGERS DIRECTLY INTO WOUND
AND COMPRESS ARTERY

TOURNIQUET: LIFE THREATING BLEEDING ONLY



PLACE PAD OVER
MAIN ARTERY



KNOT THE MATERIAL
AND INSERT A DEVICE
TO TIGHTEN TOURNIQUET

TIGHTEN ONLY ENOUGH
TO STOP BLEEDING



MARK TIME TOURNIQUET
WAS APPLIED

UNIT - FIRST AID: CPR

GOAL - To lessen the severity of injuries or prevent the loss of life through the use of cardiopulmonary resuscitation.

TRAINER'S OBJECTIVE - To present information and conduct exercises that review the proper use of CPR.

TRAINEE'S PERFORMANCE - The trainees will be able to describe circumstances under which CPR techniques should or should not be administered. Use visual at end of this unit to emphasize need to begin CPR quickly.

TRAINEE'S PERFORMANCE - The trainees will describe or demonstrate CPR procedures. Their description or demonstration should include the following points:

Cardiopulmonary Resuscitation (CPR)
(Single Rescuer)

1. Recognize unconsciousness.
2. Call for help and position victim.
3. Open airway.
4. Check for breathing.
5. If victim is breathing, maintain open airway.
6. If victim is not breathing, begin rescue breathing.
7. If airway is blocked, begin procedure to clear obstructed airway.
8. When airway is open, give four quick breaths.
9. Check for a carotid pulse.
10. If pulse is present, continue with rescue breathing.
11. If pulse is absent, begin cardiac compression.
12. Locate the xiphoid process on the lower end of the sternum. This is done by running two fingers up the rib cage until your middle finger fits right into the notch in the center of the chest and your index finger is lying across the lower end of the sternum.

13. Lay the heel of the other hand on the victim's chest. Center the heel of this hand over the mid-line of the sternum, right beside the index finger.
14. The hand used to locate the xiphoid is now placed on top of other hand - heels parallel.
15. Lift fingers off the chest - it is best to interlace fingers. It is most important that only the heel of the hand be in contact with the chest.
16. While hands are kept in place on victim's chest, position your shoulders directly over the victim's sternum and straighten out your arms. Always keep your arms straight.
17. Always remember, it is extremely important that your hands be placed in the proper pressure area to effectively compress the heart and to prevent injury to surrounding organs.
18. Never exert any pressure on another person's chest while practicing CPR. Exerting pressure on the chest of someone whose heart is functioning can be dangerous. Rather, it is recommended that practice always be performed on a mannequin.
19. In order to effectively carry out CPR, you must use enough force to depress the sternum $1\frac{1}{2}$ " to 2" on an adult victim.
20. Use the weight of your body to depress the sternum. Use a rocking motion from your hips and do not bounce or lift your hands off the victim's chest.
21. For a single rescuer the rate of compressions is 80 per minute. After the first four breaths - you must alternately perform fifteen compressions and two quick, full breaths.
22. Each time a rescuer changes from breaths to compressions, he must relocate the proper area on the sternum for hand placement.
23. Pause after one minute and every four to five minutes thereafter to check the following:
 - a. carotid pulse
 - b. breathing
 - c. pupils
24. The breathing and pulse can be checked simultaneously. Check this first, then check the victim's pupils. Dilated, wide-open pupils are an indication that there is not enough oxygen getting to the brain. If the pupils constrict when you lift the eyelid, adequate oxygen and blood flow is probably getting to the brain.

Cardiopulmonary Resuscitation - Two Rescuers
Ratio - 5 Compressions to 1 Breath

1. Arrive on scene. Single rescuer is performing CPR on victim.
2. Identify yourself as a certified rescuer and let it be known that you are willing to help.
3. The single rescuer acknowledges that he wants help and is ready to switch over to two person CPR.
4. Take a position at the victim's head on side opposite of first rescuer.
5. Check victim's pulse.
6. If pulse is present during compressions, call out "stop compression".
7. Check for a spontaneous pulse.
8. If pulse is present, have first rescuer discontinue compressions.
9. If pulse is absent, begin CPR again.
10. Give one, full breath.
11. First rescuer begins compressions at the new rate of sixty per minute.
12. First rescuer must count compressions out loud - counting one one thousand, two one thousand, three one thousand, four one thousand, five one thousand.
13. Give one full breath upon release of every fifth compression. Remember, give the breath on the up-stroke of the fifth compression.
14. The first rescuer or compressor indicates that he is tired and wants to switch roles.
15. At the end of the fifth compression the first rescuer goes to the victims head and checks for a carotid pulse while you move in line to perform the chest compressions.
16. If no pulse is present, continue CPR.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

CPR should be reviewed only by persons certified to conduct such training. CPR should be reviewed by having the trainees use a Resusci-Anne if one is

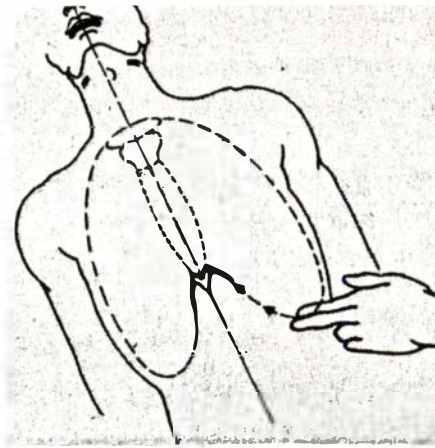
available. If no such training aid is available have one crew member role play a "victim". Do not actually compress the victim's sternum. The most effective way to handle the session is to surprise the trainee with the need to use CPR. This can be done by combining the CPR retraining with some other exercise, Emergency Evacuations, for example. In this way realism will be added to the session. The trainer should complicate the situation as appropriate. Both one and two person resuscitation should be reviewed. Broken bones, shock or bleeding can be added to the "victim's" symptoms by attaching cards to the "victim" indicating various additional problems. The trainer may want to further complicate the problem by telling the trainees practicing CPR that the work area has begun to fill with smoke and the "victim" will have to be moved.

Check performance of trainees against the list of items presented above. Use the visuals at the end of this unit to review CPR techniques with the trainees.

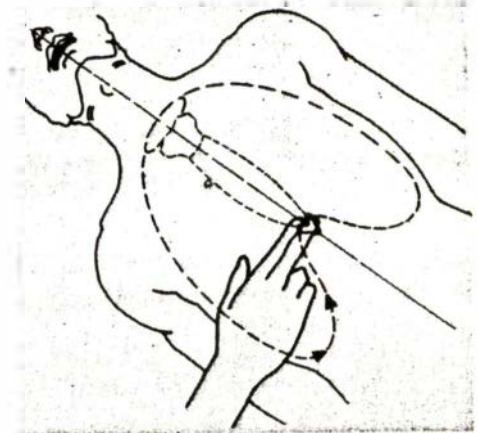
HAND PLACEMENT FOR CPR



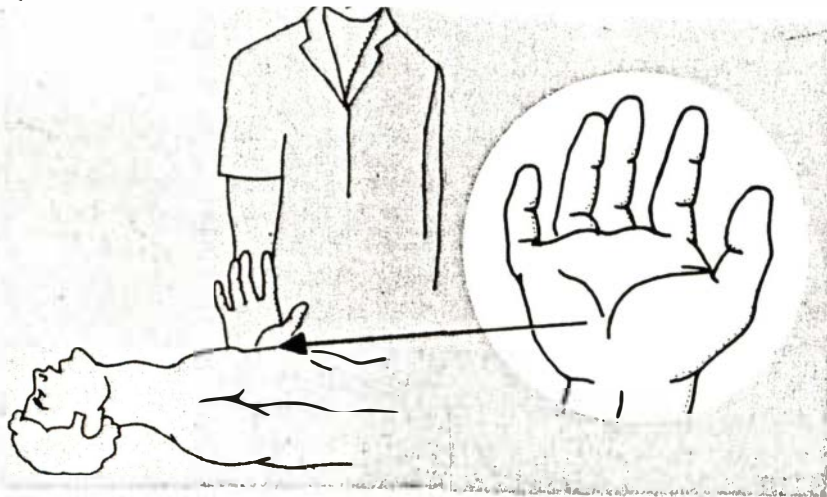
External cardiac compression is produced by vertical downward pressure through both arms to depress the adult sternum one and one-half to two inches.



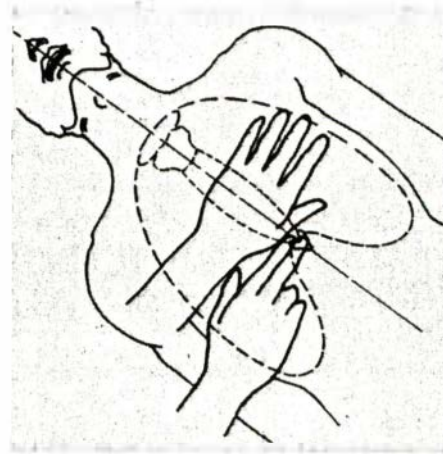
a



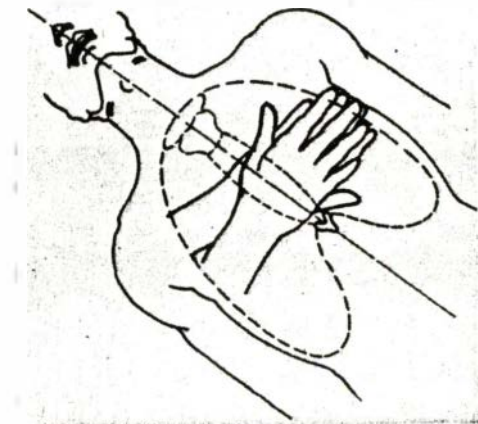
b



c



d



e

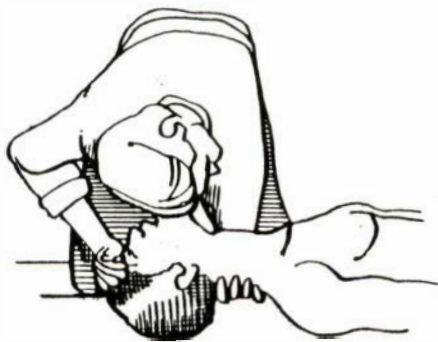
The correct hand position for cardiac compression is shown. (a) The index and middle fingers of the EMT's hand nearer the patient's feet are slid along the center of the patient's ribcage to the notch in the center of the chest. (b) The middle finger is pushed high into the notch, and the index finger laid on the lower portion of the sternum. (c) The heel of the second hand is then placed on the lower half of the sternum, (d) touching the index finger of the first hand. (e) The first hand is then removed from the notch and applied over and parallel to the hand on the patient's lower sternum.

SINGLE RESCUER CPR

CALL FOR HELP



OPEN AIRWAY
AND CHECK
FOR BREATHING



BEGIN RESCUE
BREATHING WITH
4 QUICK
BREATHS



CHECK FOR
CAROTID PULSE



APPLY CARDIAC
COMPRESSIONS (15)
1 AND, 2 AND, 3 AND,
4 AND, ETC. TO 15



ALTERNATE (2) BREATHS
WITH CARDIAC PRESSURE
(15)



CONTINUE UNTIL HELP
ARRIVES OR VICTIM
RECOVERS

USE OF A SECOND RESCUER

IF YOU ARE IN THE PROCESS OF PERFORMING CPR,
YOU HAVE ALREADY:

- RECOGNIZED UNCONSCIOUSNESS
- POSITIONED THE VICTIM
- CALLED FOR HELP
- OPENED THE AIRWAY
- BEGUN PERFORMING SINGLE RESCUER CPR

AT THIS POINT ANOTHER TRAINED CPR RESCUER
ARRIVES ON THE SCENE.



59

ONE RESCUER WILL PERFORM EXTERNAL CARDIAC
COMPRESSION, WHILE THE OTHER WILL PERFORM
RESCUE BREATHING. WHEN TWO PEOPLE PERFORM
CPR TOGETHER THE COMPRESSION COUNT CHANGES
TO 1 1,000, 2 1,000, 3 1,000, 4 1,000, 5 1,000, REPEAT.

RESCUE BREATHING COORDINATION

RESCUER 2 GETS READY:

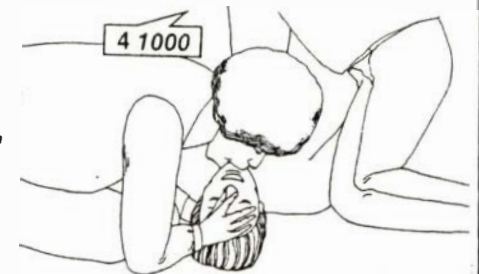
- IDENTIFICATION
- READINESS
- CHECKS PULSE



RESCUER 2 OPENS AIRWAY AND
PREPARES TO DELIVER BREATH



RESCUER 2 TAKES BREATH AFTER
THE COUNT "FOUR ONE THOUSAND."



RESCUER 2 DELIVER BREATH ON THE
WORDS "ONE THOUSAND" AFTER THE
COUNT OF FIVE.



RATE, RATIO & MNEMONIC

INTRODUCTION

The chart below summarizes what we've just been talking about. It specifies the rate, ratio and mnemonic for both single rescuer and two rescuer CPR. Be sure you learn them thoroughly so you never confuse them in a rescue situation.

COMPARING RATE, RATIO, MNEMONIC

	Single Rescuer CPR	Two Rescuer CPR
RATE	80 per minute	60 per minute
RATIO	15:2	5:1
MNEMONIC	One and two and three and four and five . . . One and two and three and four and ten . . . One and two and three and four and fifteen . . .	One one thousand Two one thousand Three one thousand Four one thousand Five one thousand One one thousand Two one thousand Three one thousand Four one thousand Five one thousand

DECISION TABLE

IF ...

THEN ...

You feel a pulse with each compression ...



This indicates that compression is adequate.

You can't feel a pulse with each compression ...



The compressor may be getting tired, or his technique may be off a bit. He should re-assess his hand, arm, and body position, and be sure he's compressing deeply enough and over the right location.

You still can't feel a pulse after re-assessing the compressor's technique ...



Switch rescuers. The compressor probably *is* tired and should switch.

Spontaneous circulation resumes, but breathing is shallow and inadequate, and the victim is still unconscious ...



Stop compression ...

Continue rescue breathing to be sure enough oxygen is getting into the victim's lungs ...

Continue to monitor the pulse to be sure circulation doesn't stop again.

IF ...

THEN ...

Spontaneous breathing and circulation both resume, but the victim is still unconscious ...



Roll the victim on his side. Be careful if you suspect a neck injury. Maintain the airway by keeping the head tilted backward, supported on the victim's upraised arm ...

Continue to monitor the victim until professionals take over his care ...

Be prepared to begin CPR again, if necessary ...

Watch to make sure the victim's airway does not become obstructed if he begins to vomit.

Spontaneous breathing and circulation both resume, and the victim regains consciousness ...



Keep the person calm and lying on his side ...

See that professionals are called to take over his care, to be sure he is out of danger ...

Be prepared to begin CPR again, if necessary ...

Watch to make sure the victim's airway does not become obstructed if he begins to vomit.

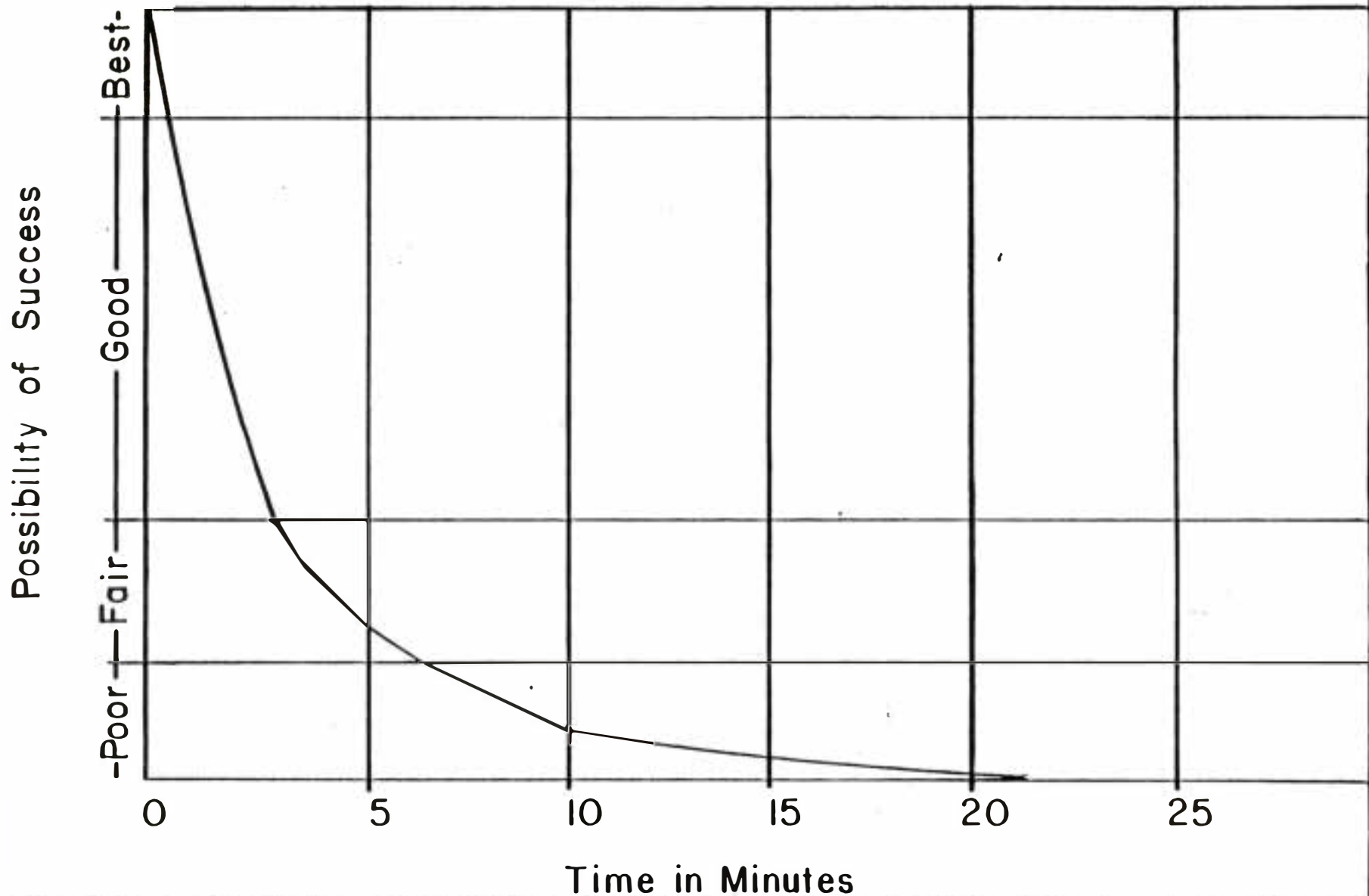
The victim shows no sign of resuming circulation, breathing, or consciousness ...



Continue CPR until a responsible person takes over his care, or until you are totally exhausted and cannot continue.

BEGIN RESUSCITATION IMMEDIATELY

THE POSSIBILITY OF SUCCESSFUL REVIVAL
DECREASES WITH TIME



UNIT - EMERGENCY EVACUATIONS, AND USE OF TRANSPORTATION AND COMMUNICATION SYSTEMS IN AN EMERGENCY.

GOAL - To eliminate injuries or accidents due to improper use of the mine's transportation and communication systems in emergency situations.

TRAINER'S OBJECTIVE - To present information and conduct exercises needed by trainees to recognize and avoid unsafe conditions and unsafe acts when they use the mine's transportation and communication systems during emergencies.

TRAINEE'S PERFORMANCE - When presented with various hypothetical emergency drill situations by the instructor the trainee will describe or demonstrate the proper use of the transportation and communication systems.

TRAINER'S OBJECTIVE - To review the meaning of emergency, warning and regulatory signs or signals used in the mine.

TRAINEE'S PERFORMANCE - Describe or demonstrate the proper response to rules or regulations printed on signs and indicate the meaning of and proper response to emergency signals found in the mine.

SUGGESTED EVALUATION TECHNIQUES

The mine's safety training officer or the supervisor of the work group should conduct this retraining unit. To do so he/she should go to the work place and announce a hypothetical emergency situation that would require the use of the mine's emergency transportation and communication system(s). The situation should be one that is possible to the individual mine, i.e. fire, gas outburst, inundation, etc. The trainer should observe the crew's response and check their use of the system by noting the following:

1. Warn other miners - know emergency hoist signal
2. Orderly exit
3. Follow signs
4. Know primary route
5. Know secondary route

UNIT - ELECTRICAL HAZARDS

GOAL - To recognize, eliminate or avoid electrical hazards in mining.

TRAINER'S OBJECTIVE - To present information and review procedures so that trainees know how to follow proper lock-out and tag-out procedures.

TRAINEE'S PERFORMANCE - Use lock-out equipment and tag-out cards in conjunction with blade switches or plug-receptacle combinations.

TRAINEE'S PERFORMANCE - Recognize the importance of these procedures and know the reasons for using them.

TRAINER'S OBJECTIVE - Review hazards associated with the use of batteries and battery chargers.

TRAINEE'S PERFORMANCE - Recognize hazards and know what corrective measures to follow.

TRAINER'S OBJECTIVE - To have trainees practice the rescue of a person being electrocuted.

TRAINEE'S PERFORMANCE - Demonstrate several rescue techniques using whatever non-conductive equipment or material is readily available.

TRAINER'S OBJECTIVE - To review unsafe acts and hazardous conditions contributing to electrical accidents.

TRAINEE'S PERFORMANCE - List equipment hazards e.g., faulty splices or grounds, and hazards that may be caused by worn personal protective clothing.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

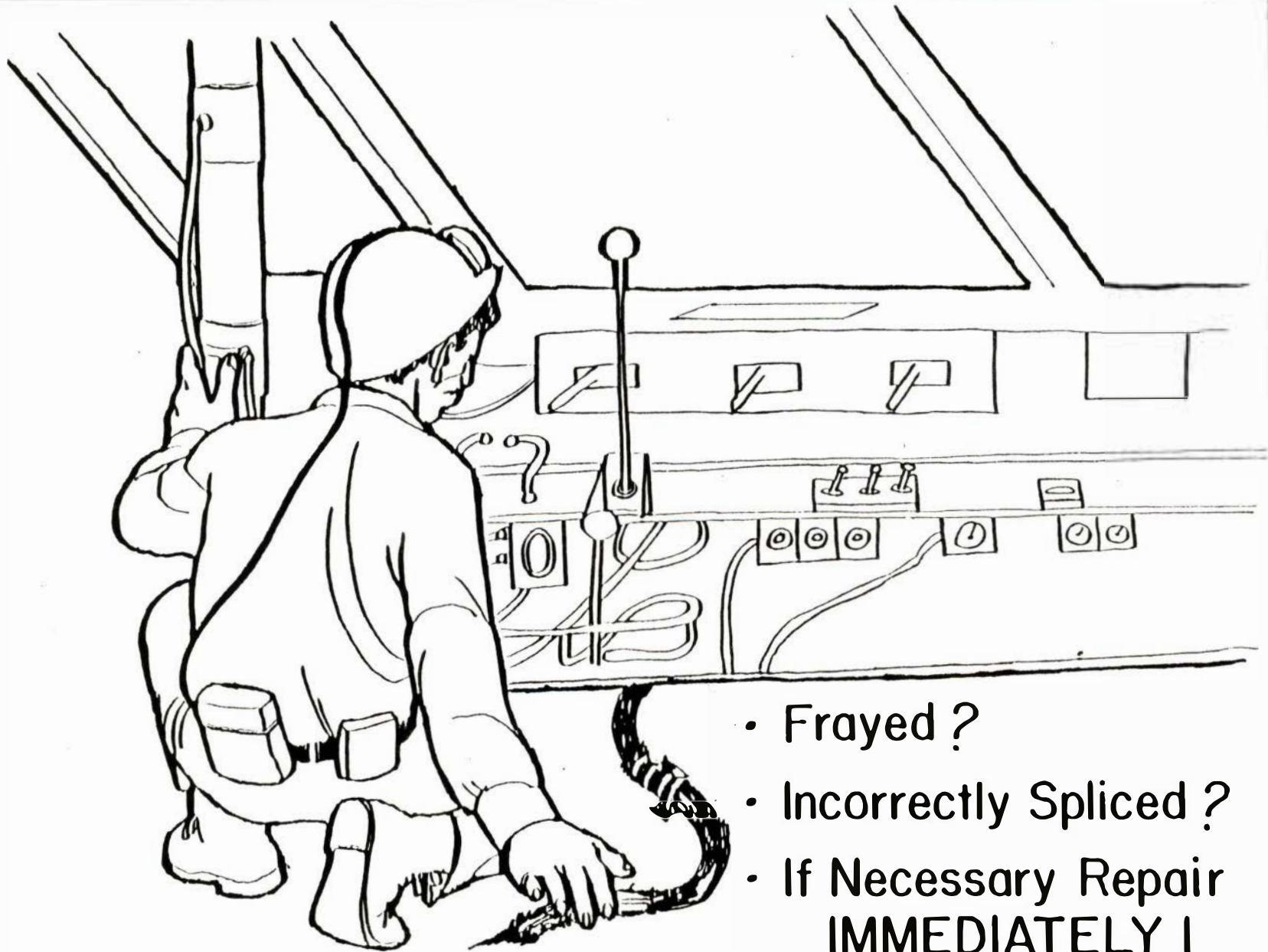
As a stand alone exercise or in conjunction with other emergency response training, the work group foreman or the mine's safety training officer should stage an electrocution injury. Have "victim" in simulated contact with electrical power source so that cutting off power and rescue from source can be practiced. Attach tags to "victim" that indicate a severe burn on contact point and that breathing and heart have stopped. Check trainee response against CPR performance criteria. Rescue techniques should include use of non-conductive item, such as shovel handle, coat or other item that might be available in the work area to dislodge the victim from contact with power source. Trainees should mention sending someone to cut off power and if possible another to call for help.

Present miners with sections of damaged and/or spliced electrical cable. Have them select the ones that are faulty or might present a hazard and have them tell why they judged each to be hazardous or safe. Have the miners tell you what they are to do when they spot hazardous electrical splices or cable damage.

At end of the exercise have trainees inspect their clothing, especially gloves, that might allow an otherwise avoidable contact with electrical power.

Discuss information on the visuals included with this unit.

ALWAYS CHECK CONDITION OF ELECTRIC CABLE



- Frayed ?
- Incorrectly Spliced ?
- If Necessary Repair IMMEDIATELY !

L E T T E R C A U T I O N S C U

SHUT OFF CURRENT

AND/OR

GET PERSON OFF CIRCUIT FAST.

DON'T TOUCH PERSON DIRECTLY. USE:

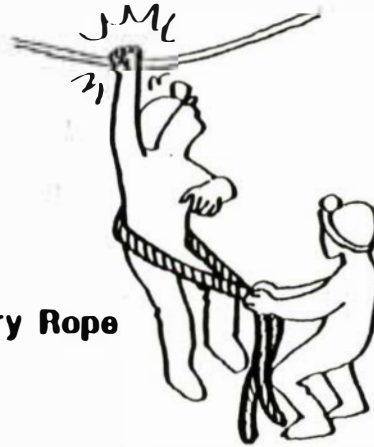
DON'T place your body directly in front of circuit-breaker—

ON
OFF

USE your left hand



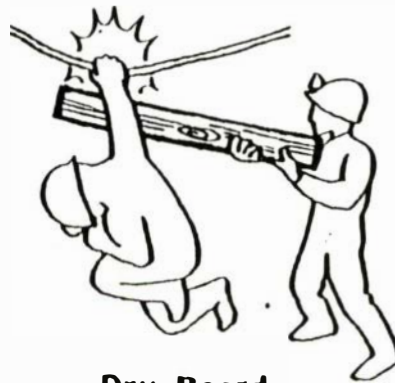
Dry Rope



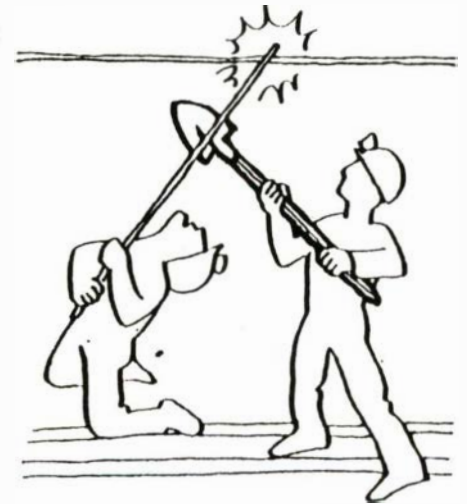
Dry Jacket



Dry Board



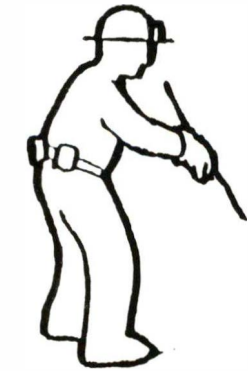
Dry Wooden-handled tool



BE QUICK.

ELECTRICAL CURRENT (MILLIAMPERES)

100
50
20
8
5



Feel Nothing

SAFE



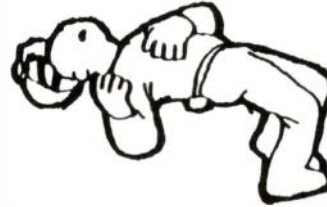
Muscle Control
Not Affected

SLIGHT
SHOCK



Unable to Let
Go of Wire

PAINFUL
SHOCK



Respiratory
System
Paralyzed
Breathing
Difficult

VERY PAINFUL
SHOCK



Heart Stops.
Immediate CPR
Necessary.
Severe Burns

USUALLY
FATAL SHOCK

SEVERITY OF SHOCK

UNIT - MINE GASES

UNIT GOAL - To prevent accidents or illness due to noxious or explosive mine gases.

TRAINER'S OBJECTIVE - To assure that miners are aware of the dangers from mine gases and to remind them of proper precautionary measures.

TRAINEE'S PERFORMANCE - Trainees will be able to answer written or oral questions pertaining to gases that might (within reason) present a hazard to the miners. Proper trainee response will depend on mine conditions and questions asked.

TRAINEE'S PERFORMANCE - Trainees will be able to describe physiological effects or potential hazards of mine gases.

TRAINEE'S PERFORMANCE - Trainees will be able to describe indicators of the presence of explosive or noxious gases and demonstrate use of detection devices.

TRAINEE'S PERFORMANCE - The trainees will be able to describe the steps to be taken if they detect or suspect gas levels above maximum tolerable levels.

TRAINEE'S PERFORMANCE - Trainees will be able to describe the symptoms of oxygen deficiency and use of detection devices.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

In conjunction with an emergency evacuation drill the foreman or the mine's safety training officer should hold a brief review of the dangers, signs and proper response to explosive or noxious gases in the mine. Call on a trainee to demonstrate the use of the self rescuer, have others critique the demonstration.

Use the following information and the visuals at the end of this unit as guides to your discussion of the types, sources, detection, effects and control of mine gasses. This discussion may be held in a classroom or in the work place.

Review only those appropriate for your mine but be ready to answer trainee questions regarding others.

NITROGEN

1. Nitrogen is released into the mine from the detonation of explosives.
2. It is colorless, tasteless and odorless.
3. Excessive amounts of nitrogen produce an atmosphere that will not support life and can result in asphyxiation.

CARBON DIOXIDE

1. Carbon dioxide is produced by respiration, fires and explosions.
2. The gas is colorless, odorless, and tasteless.
3. Carbon dioxide is not poisonous at smaller concentrations, but at 3% breathing is faster, and at 12% people lose consciousness.

CARBON MONOXIDE

1. Carbon monoxide is produced by fires, explosions and diesel engines.
2. Carbon monoxide is colorless, odorless and tasteless.
3. Symptoms of increased carbon monoxide poisoning are:
 - a. Slight tightening across forehead
 - b. Throbbing temples and headache
 - c. Severe headache and dizziness
 - d. Rapid pulse and flushed color
 - e. Unconsciousness and death

OXIDES OF NITROGEN: NITRIC OXIDE AND NITROGEN DIOXIDE

1. Produced by diesel engines, electrical discharges, and detonation of explosives
2. Both have an irritating odor. Nitrogen dioxide has a brick red color at higher concentrations.
3. They are extremely toxic in small amounts

SULFUR DIOXIDE

1. Formed in fires or detonation of explosions in mines containing iron pyrite.
2. Detected by its irritating sulfur smell

HYDROGEN SULFIDE

1. Produced when blasting for sulfide ores and occurs in some natural gas, oil, and coal fields.
2. Colorless but has an odor of rotten eggs
3. Sensitivity to the odor disappears rapidly with the breathing of a small quantity of the gas.

4. Very toxic
 - a. Irritation of eyes and nose at lower concentrations
 - b. Eye inflammation and intense pain at higher concentrations.
 - c. Produces sudden poisoning at higher concentrations.

HYDROGEN

1. Not normally found in mine air, but is produced during the charging of batteries
2. Colorless, odorless and tasteless
3. Flammable at concentrations of 4% and greater

ACETYLENE

1. Used for lighting purposes in non-gassy mines as well as welding
2. Smells like geraniums
3. Not poisonous, but combustible in small amounts

ROCK GAS

Most of the above gases occur in mixtures. One such mixture is rock gas, which consists of nitrogen and carbon dioxide. Rock gas creates a hazardous oxygen deficient atmosphere. Rock gas enters the mine from adjacent rock strata.

SMOKE

Trainees are often confused about the danger from smoke. Smoke consists of small particles of soot and tars. These particles irritate the nose and throat, but are not poisonous unless mixed with carbon monoxide or other gasses produced by burning of synthetic materials such as plastics in a vehicle. Lungs can be burned from super heated smoke. The fires that produce smoke also create an oxygen deficient atmosphere.

METHODS OF TESTING FOR GASES

Review company policy regarding air quality and permissible levels of contaminants.

The level of oxygen is tested with various liquid absorption devices, fuel cells, or the flame safety lamp.

The levels of sulfur dioxide, hydrogen sulfide, and oxides of nitrogen are measured with indicator tubes. The tube contains a chemical which changes color in relation to the amount of gas in the air.

The level of carbon monoxide is tested with a detector tube. The tube contains a chemical which changes color in relation to the amount of carbon monoxide in the air.

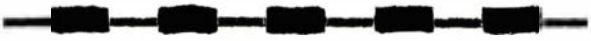
CONTROL OF MINE GAS HAZARDS

The best defense against accumulation of toxic gases is adequate ventilation to dilute and carry away the gases.

EMERGENCY RESPONSE

Hazardous gas conditions call for emergency responses, these include:

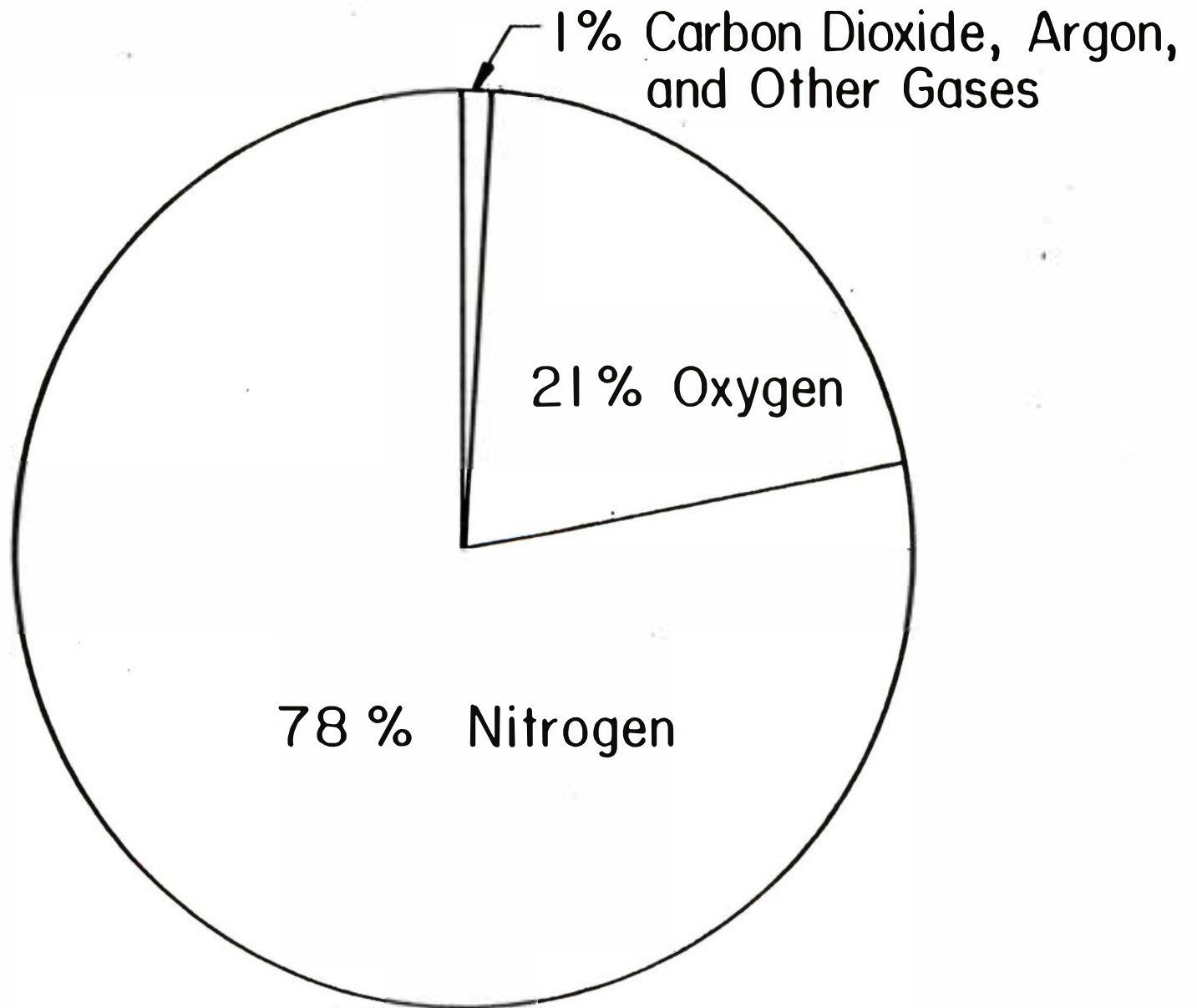
1. Warning other miners of the danger.
2. Use your self-rescuer and keep it on.
3. Move to fresh intake air because the ventilation system will move the poisonous gases toward the return air.



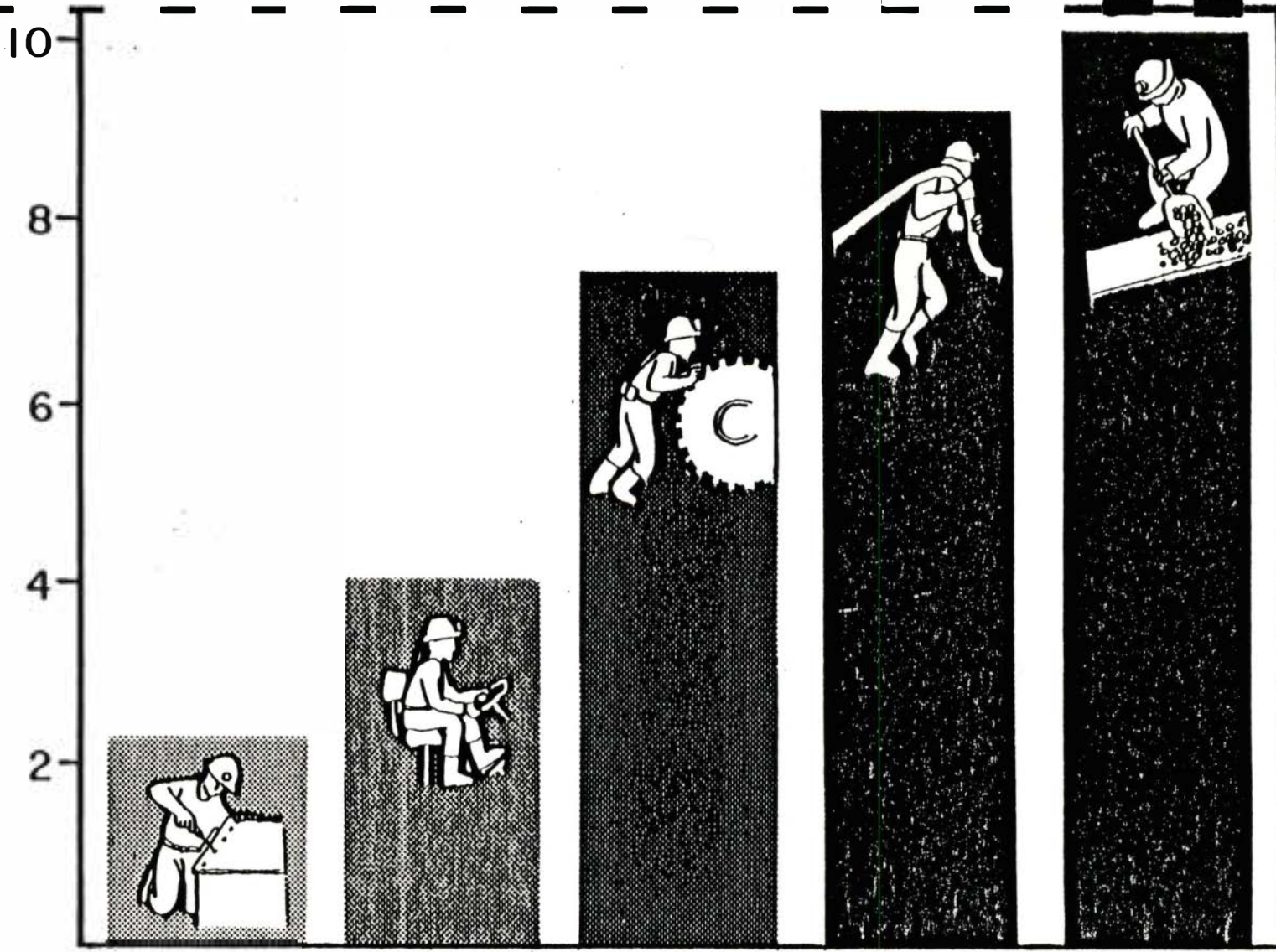
20.95% O₂
0.03% CO₂

16 % O₂
4 % CO₂

COMPOSITION OF AIR



OXYGEN CONSUMPTION (approximate liters per minute)

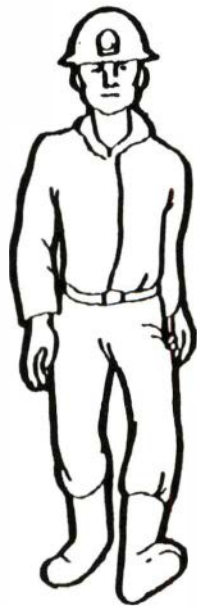


Light Moderate Moderately Heavy Heavy Very Heavy

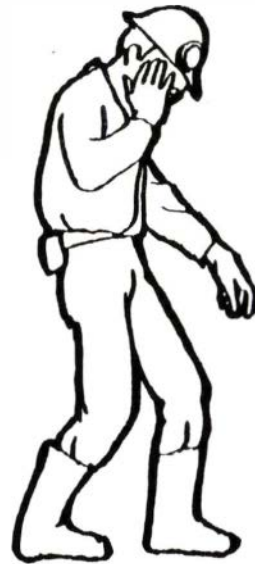
WORK ACTIVITY

EXPOSURE TIME, HOURS

4
3
2
1



safe working environment



throbbing temples
dizziness
severe headache
rapid pulse



unconsciousness
and death

DANGEROUS or FATAL EFFECTS

HAZARDOUS EFFECTS

NO PERCEPTIBLE EFFECTS

100

200

300

400

500

600

CARBON MONOXIDE CONCENTRATION
(parts per million-PPM)

UNIT - PERSONAL PROTECTIVE EQUIPMENT

GOAL - To eliminate injuries due to the lack of or improper use of personal protective equipment*

TRAINER'S OBJECTIVE - To present information and review how and when to use personal protective equipment.

TRAINEE'S PERFORMANCE - Trainees are to utilize personal protective equipment in all appropriate circumstances. Trainees are to be observed using personal protective equipment properly and consistently during routine and/or unannounced inspections.

TRAINEE'S PERFORMANCE - When questioned trainees shall be able to describe the proper use of all personal protective equipment, how the equipment works, how it is to be obtained and the circumstance under which each should be used.

*Personal protective equipment includes safety lines, safety glasses, hearing protection, steel toed shoes, self-rescuer, snug fitting sleeve and pant cuffs or leg bands and such respiratory devices or other special equipment as might be issued by the company.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

When the mine safety training officer makes routine or special visits to the work area he/she should note the use or lack of use of personal protective equipment and provide positive feedback for those using the equipment properly. Instruction for those not using such equipment when use is warranted should also be provided. Question trainees during the group discussion portion of an emergency simulation on the proper use of personal protective equipment. If there are no visits by a safety training officer then the foreman should assume these training tasks.

UNIT - ROUTINE USE OF TRANSPORTATION AND COMMUNICATION EQUIPMENT

GOAL - To eliminate injuries and accidents resulting from routine use of mining transportation and communication equipment.

TRAINER'S OBJECTIVE - The trainer will review precautions that are needed to eliminate hazardous use of mine transportation equipment.

TRAINEE'S PERFORMANCE - Trainees will exhibit safe habits while riding in man trip cars or cages or when transporting materials. These habits are to include but are not limited to the following.

- No horseplay
- No body parts extended beyond the envelope of the man trip or cage.
- Safety glasses and other personal protective gear in place.
- All chains and gates properly closed.
- No tools, equipment or supplies (other than hand tools) should be transported with people.
- Proper securing of all materials being transported so that they can't hit the sides of the shaft.
- Proper handling of all explosives, blasting accessories and toxic materials being transported on man trips or cages.

TRAINEE'S PERFORMANCE - The Trainees will be observed following safe work procedures while transporting materials in the mine. These procedures will include the following.

- Keep loads within dimensional and weight limits of conveyance being used.
- Use proper lifting and carrying techniques for loading and unloading vehicles.
- Keep vehicle operator vision clear.
- Operate vehicles at safe speeds and under control at all times.
- Use vehicle backup alarm.

TRAINER'S OBJECTIVE - To present review of hazards associated with routine use of the transportation system.

TRAINEE'S PERFORMANCE - Trainees describe and discuss hazardous behavior associated with routine use of the transportation system they have observed or have had questions about during the last year.

TRAINEE'S PERFORMANCE - Demonstrate safe riding techniques in simulated or actual use of the transportation system.

TRAINEE'S PERFORMANCE - Demonstrate use of phones, radios, or hoist pull bottles to communicate with others in the mine.

TRAINEE'S OBJECTIVE - To present a review of hazards that might arise as a result of the misuse of the mine communication system.

TRAINEE'S PERFORMANCE - Trainees will demonstrate proper use of routine hoist signals. During regular work cycles or during a training session trainees will be observed properly giving and responding to routine hoist signal.

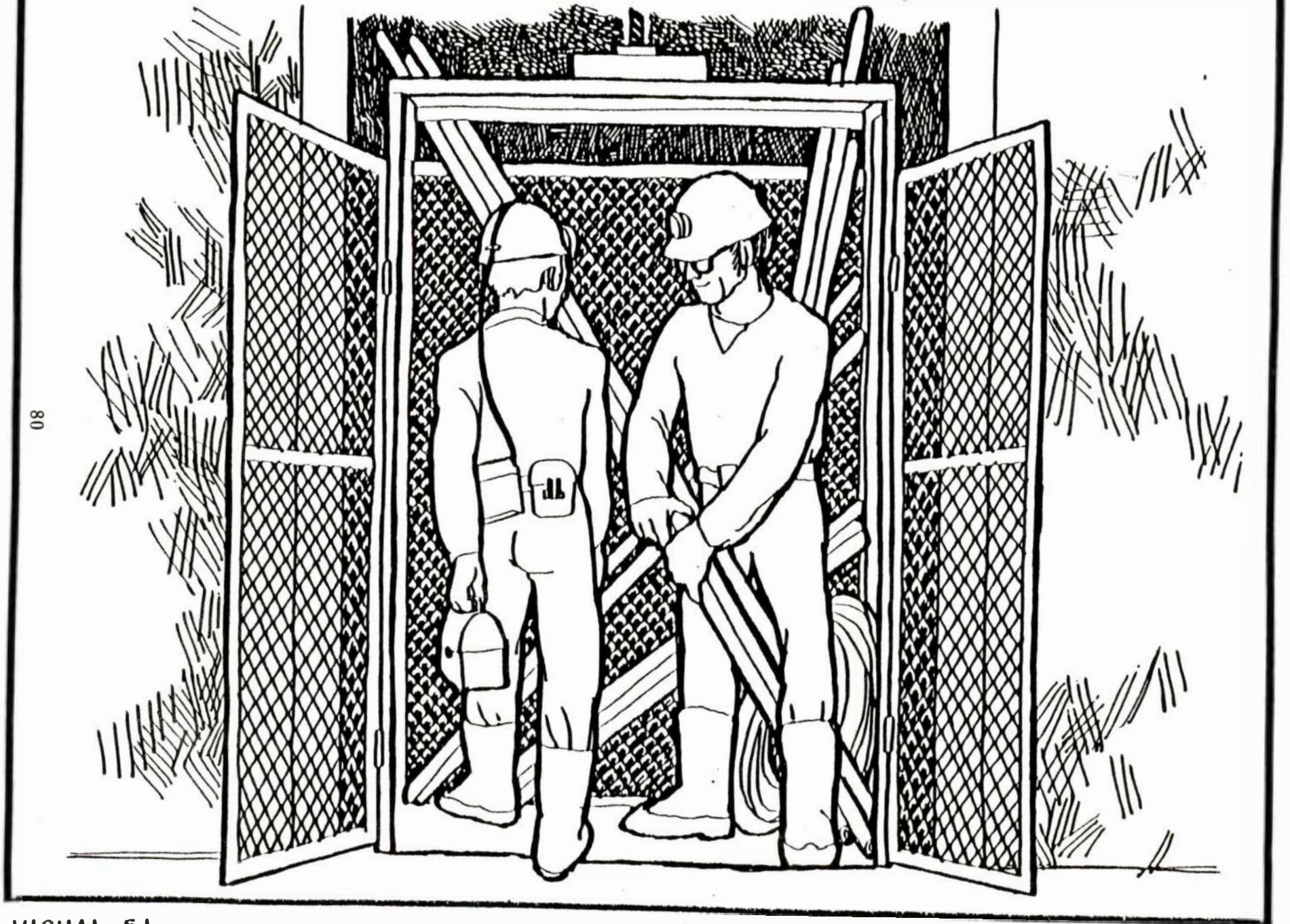
TRAINER'S OBJECTIVE - To present a review of accidents and injuries that might result from unsafe use of personal vehicles on mine property.

TRAINEE'S PERFORMANCE - Trainees will demonstrate safe operation of personal vehicles on mine property. Trainees will operate personal vehicles within prescribed speed limits on mine property. When questioned trainees will be able to correctly state mine property speed limits. When questioned trainees will be able to identify any peculiar hazard related to driving on mine property such as blind corners rail road crossings, single lane bridges etc. Trainees will be observed following or will describe safe load limits for personnel vehicles on mine property.

SUGGESTED EVALUATION AND TRAINING TECHNIQUES

The mine safety training officer or the work group foreman should gather the crew together in the work place and ask them to demonstrate the use of the transportation and communication system. Cover any uncommon signals or situations they might not be in the habit of using. Ask trainees to list safety precautions for use of transportation system. Use list given above as reference for your mine.

SECURE LOOSE MATERIALS



80

UNIT - ACCIDENT PREVENTION

GOAL - To eliminate mining accidents through the application of accident prevention principles.

TRAINER'S OBJECTIVE - To refresh the trainee's awareness of mining accidents common to the mine and the precautions that should be taken to prevent them.

TRAINEE'S PERFORMANCE - The trainees will be able to list in rank order the major causes of injury in the mine during the previous year.

TRAINEE'S PERFORMANCE - The trainees will be able to describe unsafe conditions or acts that contribute to common injuries.

SUGGESTED EVALUATION AND TRAINING TECHNIQUE

The content of the accident prevention unit is to be derived from an analysis of injury data from each mine. The findings from that analysis should be discussed with each work crew. This might be done by either the foreman or the safety training officer at the conclusion of one of the simulation exercises suggested for other refresher training units.

Although the content of the unit should be based on individual mine accident analysis there are some types of accidents that are common in nearly all underground salt mines and therefore ought to be reviewed in conjunction with topics selected through the accident data analysis. The following topics should be covered.

- Lifting and carrying
- Use of hand tools
- Walkways and ladders
- Working around bins, hoppers and stock piles.

Create and present a simple pie chart showing the percentage distribution of type of accidents the mine has.

The following points should be raised in a discussion of accident prevention in relation to these topics. Use the visuals included at the end of this unit to emphasize accident prevention techniques.

LIFTING AND CARRYING

1. Use a test tug to determine the approximate weight of the item before you try to pick it up. This prevents over straining or loss of balance when picking a load whose actual weight varies significantly from the anticipated weight.
2. Position feet close to object. As you lift tuck chin close to chest. Keep back straight.

3. Move feet to turn to side. Don't swing from waist, this places strain on back.
4. Don't carry an item so it blocks your view.
5. If item is too bulky to see path or too heavy, get help.

USE OF HAND TOOLS

1. Check for damage, don't use defective tools.
2. Check electrical cord for wear.
3. Don't use if the insulation is damaged.
4. Use the proper tool for each task.
5. Wear eye protection when needed.
6. Return tool to maintenance or store properly.

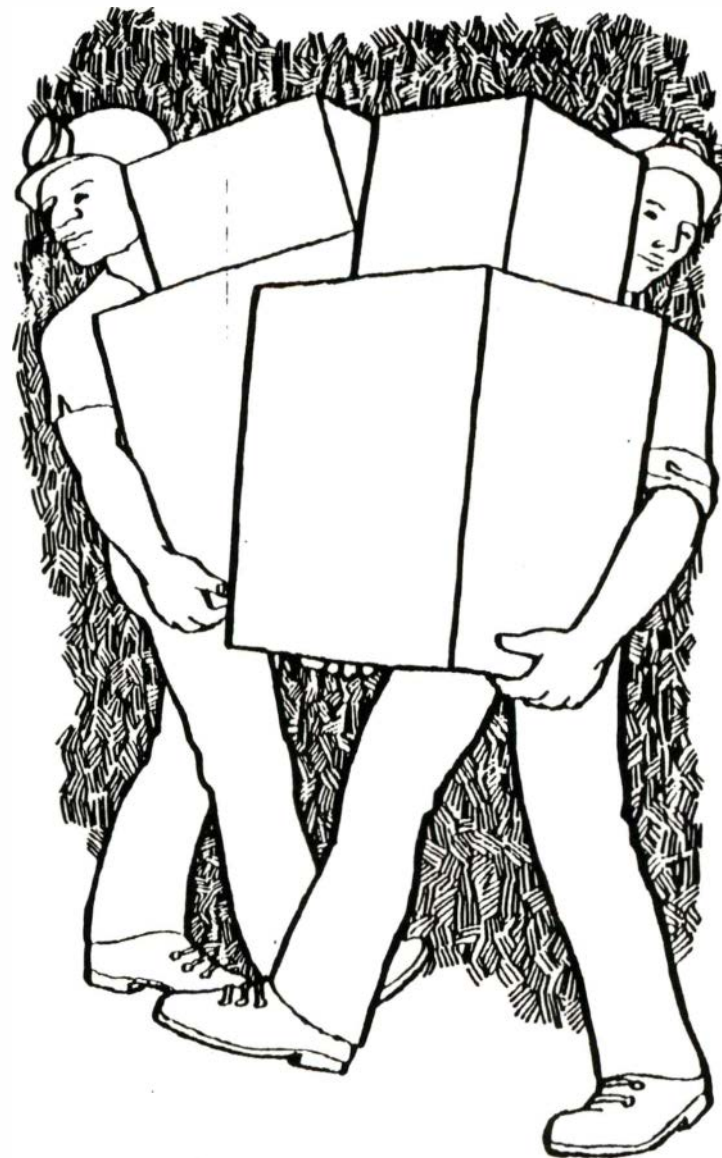
WALKWAY AND LADDERS

1. Be conscious of footing.
2. Use correct angle on ladder.
3. Use safety line when needed.
4. Keep feet of ladder level.
5. Keep hands free when climbing, or descending ladder, use tool belt or pulley to raise and lower tools or supplies.
6. Keep mud off of ladder rungs.

BINS, HOPPERS AND STOCKPILES

1. Never enter a bin or hopper without a safety line and proper ventilation.
2. Stock piles are often unstable, material slides easily, don't stand or work around the base.
3. Don't stand, or drive equipment near the edge of a feeder pile.

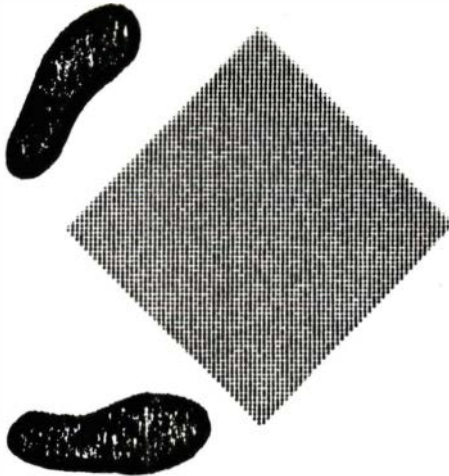
HANDLING MATERIALS



PROPER LIFTING

POSITION:

One foot
to the side



One foot behind

READY:

Back
straight

Chin
tucked in

Knees
bent



Grasp object
with whole hand

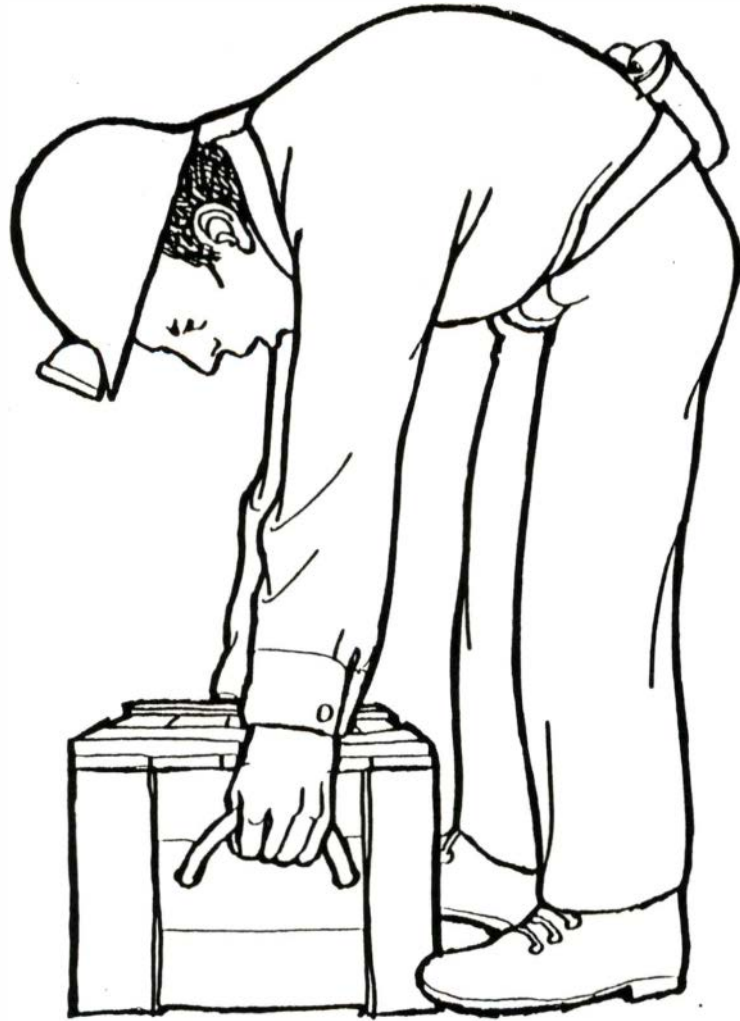
LIFT:

Elbows
tucked in



Body weight
directly over feet

PROPER LIFTING

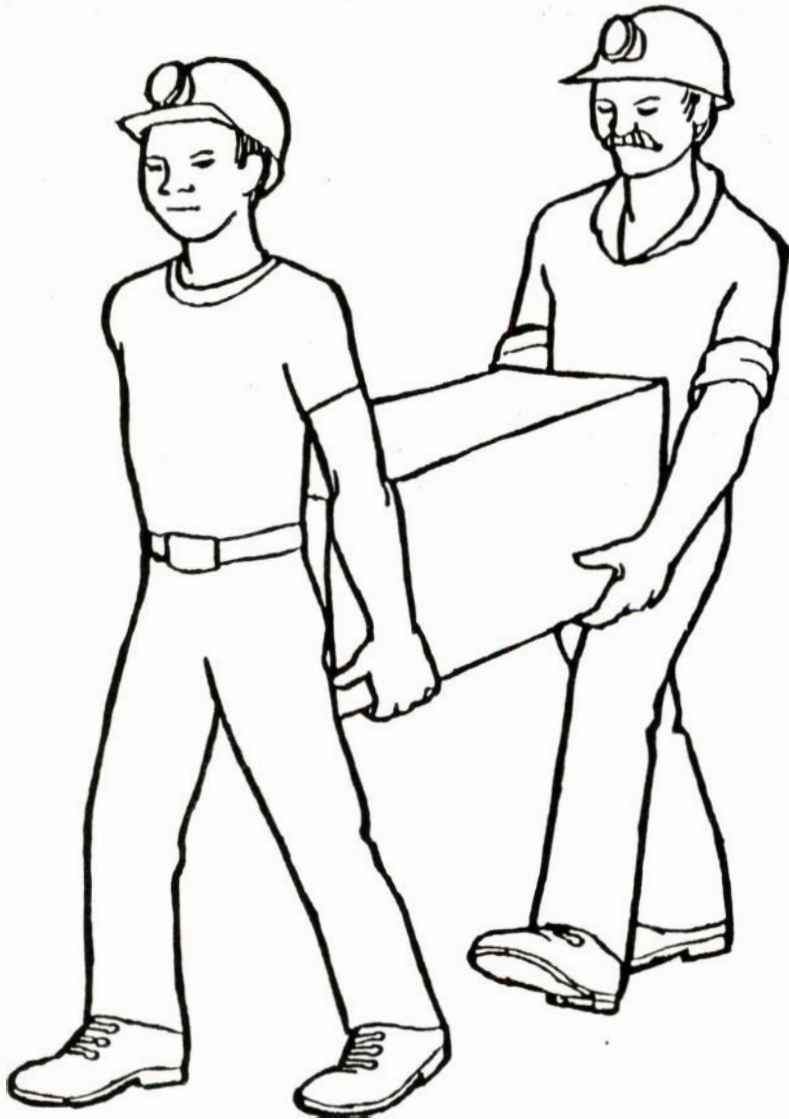


NO



YES

IF THE LOAD IS TOO HEAVY:



GET HELP! Both face in direction of travel.

LIFTING IN CONFINED AREAS

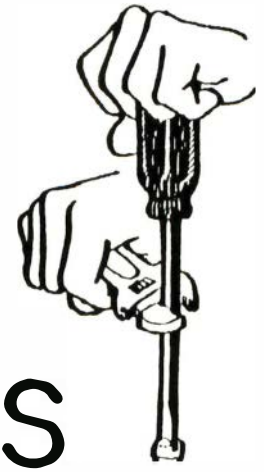
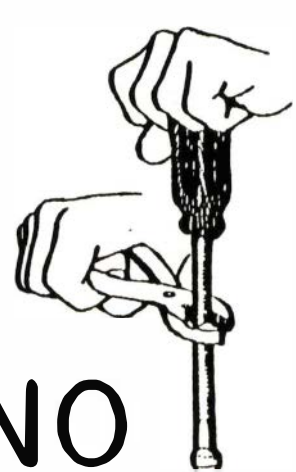


ON HANDS AND KNEES:

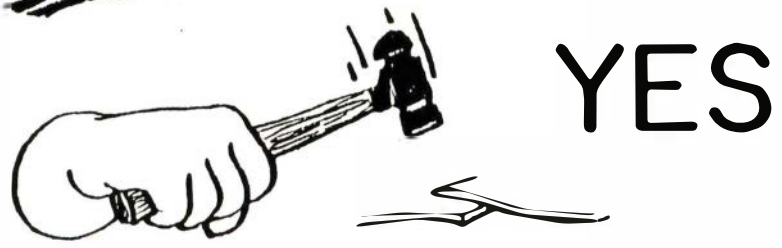
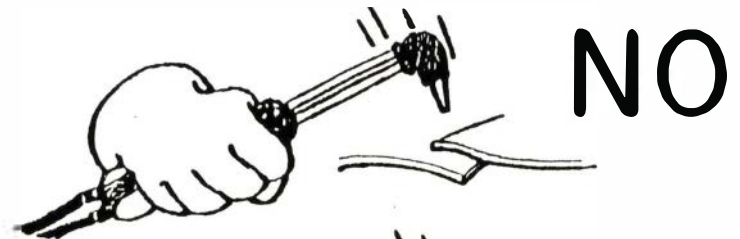
Lift object with one hand,
balance with the other.



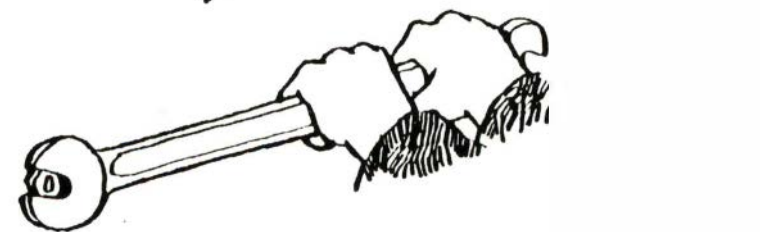
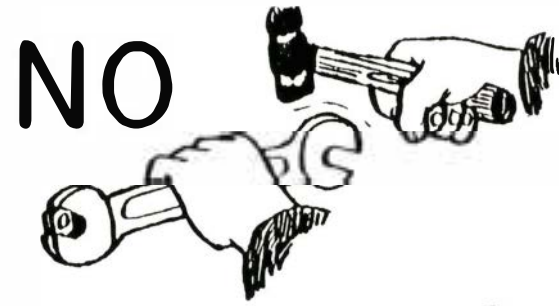
**Hold the Nail Near the Head,
Not Near the Point**



**NEVER Use Pliers on a
Screwdriver. Use a Wrench ONLY
on Square-Shanked Screwdriver.**

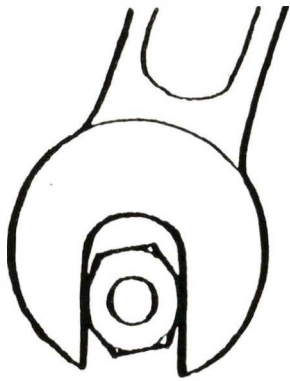


**NEVER Use the Torch as a
Hammer!**



**NEVER Force a Wrench with a
Hammer — Get a Longer Wrench!**

NO



YES



Use the Wrench that Fits the Bolt!

NO



YES



Use the Screwdriver that Fits the Screw!

NO

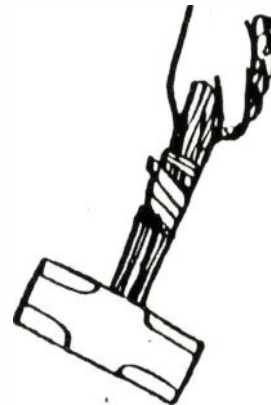


YES

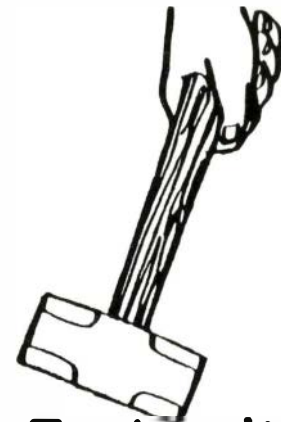


Moveable Jaw of Crescent Wrench Must be TOWARDS the Direction of Pull

NO



YES



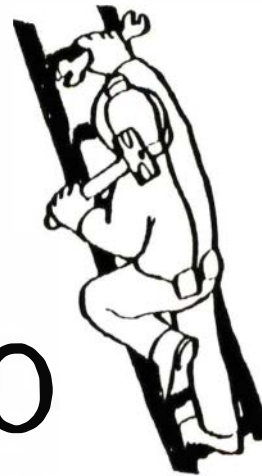
NEVER Use Tools with Cracked or Split Handles!

NŌ

YĒS



NEVER Use Your Hand to Guide a Cable Through a Sheave. Use a Board!

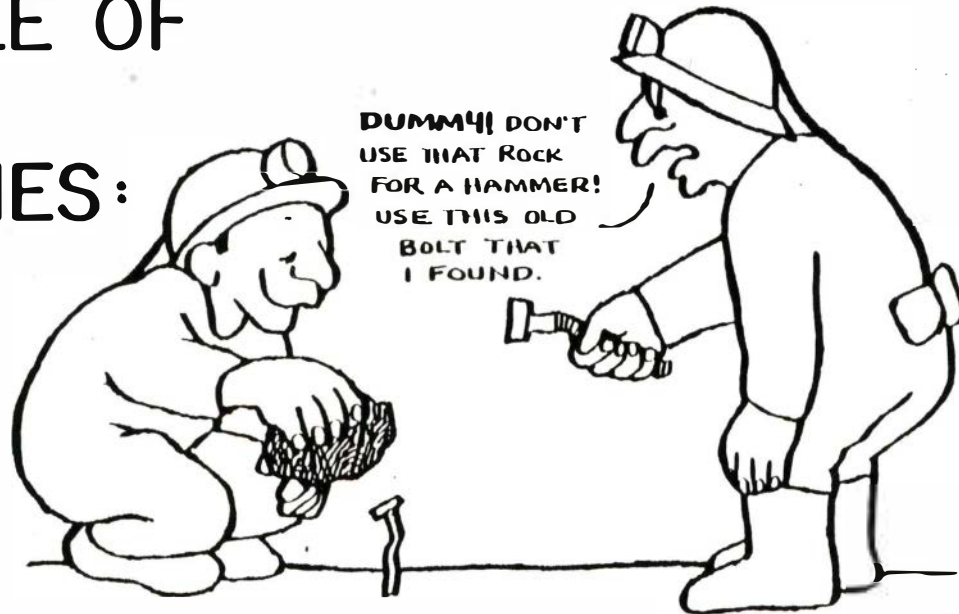


NO

YES

NEVER Carry Tools in Hand on Ladder. Use a Strong Sack, or Hoist in a Bucket.

A TALE OF TWO DUMMIES:

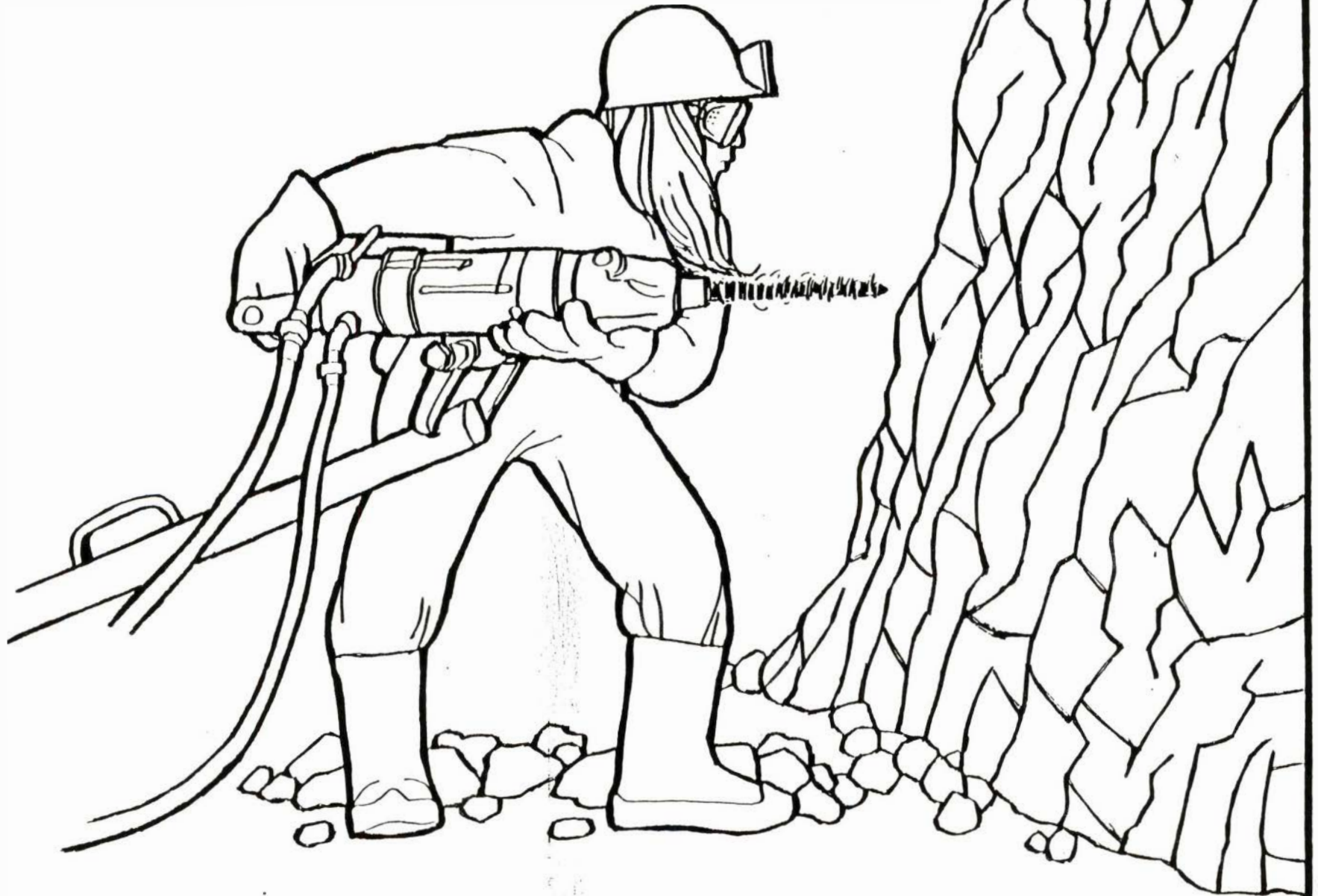


DUMMY! DON'T USE THAT ROCK FOR A HAMMER! USE THIS OLD BOLT THAT I FOUND.

USE THE RIGHT TOOL FOR THE JOB!

If You Don't Have it, GO GET IT!

KEEP HAIR AND LOOSE CLOTHING
AWAY FROM MACHINERY



SKILLS CHECKS

This section of the Annual Retraining Guide presents several model "skills checks". These are brief descriptions of situations that might arise in which the proper response of the miners would be critical. Use these skills checks during discussions of related topics (e.g. CPR, bleeding control etc.). Using these models, prepare your own "skills checks" by describing emergency situations that might have or actually have occurred in your mine. Supply details from your mine (e.g. specific locations, names, conditions or circumstances) that will add to the realism of the skills check.

HEART ATTACK SKILLS CHECK

You are taking a break to catch your breath after helping one of the older miners unload a supply pallet. The other miner slumps to the floor, grabs at his chest and is having trouble breathing. He says his chest and left arm hurt. What do you do?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. Call for help.
2. Make the victim as comfortable as possible.
3. If an oxygen tank is near by, give the victim O₂.
4. If victim loses consciousness, keep airway open and check for pulse.
5. If symptoms indicate, initiate rescue breathing and CPR.

OBSTRUCTED AIRWAY SKILLS CHECK

You are sitting next to your buddy eating dinner. You finished up a job before taking your dinner break so the others are finished and back at work, the two of you are alone. Suddenly your buddy begins to choke, gasp for air, and clutch at his throat. What do you do? What would you do different if there were others present?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. Call for help.
2. If victim is standing or sitting, place one hand on chest of victim and deliver four forceful blows to his or her back, right between the shoulder blades, with the other hand.

3. If the victim's airway does not clear, deliver four rapid abdominal thrusts.
4. Continue alternating back blows and abdominal thrusts until victim's airway is cleared.
5. If the victim loses consciousness and falls to the floor, protect his or her head, adjust head tilt, and initiate back blows and abdominal thrusts as indicated for a victim in a prone position.
6. Send another person for help.

IMPALED OBJECT AND BURN INJURY SKILLS CHECK

A shop foreman is injured when vapors in a 55 gallon drum he is torching in half causes it to explode. When you get to him he is unconscious, has burns on his face and hands and has a piece of scrap metal protruding from his chest. You see bubbles in the blood around the wound and hear a sucking sound when he breaths. What do you do?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. Call for help.
2. Keep victim's airway open.
3. Do Not remove the impaled object from the victim's chest.
4. Pack available material such as aluminum foil, vaseline gauze, saran wrap, sandwich baggie, rolled-up bandage dressing, etc. around impaled metal to stop the air flow into the chest cavity.
5. If available, administer oxygen.
6. Do not use ointments or sprays on burn areas.
7. Cover burn areas with clean sheet or burn pad. Cover eyes with a moist pad.
8. Burns to the face may cause breathing difficulty, so be extremely alert for signs of this.
9. As a result of a flash fire, even when there is little external evidence of a burn, the larynx may have been exposed to sufficient heat and chemical irritants to cause laryngeal edema (a swelling of the tissues of the larynx). This complication can develop rapidly, so the patient must be transported to a hospital as rapidly as possible.

10. When hands or feet are burned, dressings should be applied between the fingers and toes to minimize contact of damaged skin tissue.
11. Transport to medical facility.

BROKEN BONES SKILLS CHECK

You are helping to set up a scaffolding. Your buddy slips and falls from the second level. When you reach him he has a compound fracture above his ankle that is bleeding profusely. He complains of back pain and begins to lose consciousness. What would you do?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. Call for help.
2. Check airway but do not move victim's head.
3. Apply pressure to stop bleeding of wound.
4. If successful in stopping the bleeding, the lower leg should be splinted. This, however, should not be done at this time if it will cause too much movement of the patient.
5. With a fall like this, always suspect a back injury.
6. When help arrives, apply traction to the victim's head, immobilizing it in line with the rest of the body. Do not release traction until the victim is secured to a spineboard of some type.
7. Use extreme caution and proper procedure when placing victim on a spineboard.
8. Immobilize victim's head and neck with available materials.
9. Transport to medical facility.

RESCUE CARRY AND RESCUE BREATHING SKILLS CHECK

You go to an enclosed storage area to get supplies. As you enter you notice a strong odor and see a miner lying face down at the foot of a step ladder. A five gallon bucket of solvent has been spilled over a wide area of the floor and has soaked the miner's clothes. The victim is unconscious and is too big for you to pick-up. The victim is not breathing nor can you detect a pulse. What would you do?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. First, of all, by staying in the storage area long enough to check the victims vital signs, you made what could have been a fatal mistake.
2. The instant you saw the situation you should have returned to prop open the door and while doing so, called out for help. Had you stayed in too long you may have become the second victim and no one would have known that you and the first victim were in trouble.
3. Since time is of the essence, and you don't know if,
 - a. The victim fell off the ladder, dropped the solvent can, and was knocked unconscious or,
 - b. The victim had a heart attack, fell and knocked over the can of solvent or,
 - c. The victim was overcome with solvent fumes.
4. If you feel that it is safe for you to re-enter the storage area, do so. Carefully turn the victim over (suspect a back or neck injury).
5. Grab the victim's shirt near the collar and drag him or her to a safer area. Use your forearm to support the victim's head.
6. Once you are in an area that is relatively safe, open the victims airway and begin CPR.

CONTROL OF BLEEDING
SKILLS CHECK

You and your buddy plan to meet for a beer on the way home from work. You round a corner and see that his car has left the road and rolled over. He has managed to crawl out of the car and is standing beside it. He is bleeding profusely from a scalp wound. He is incoherent and can't tell you much about his injuries. What do you do?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. Have the victim sit or lie down with his head elevated.
2. Bandage the scalp wound and while doing so check the victims pupils for unequal dilation which may be caused by a brain contusion.
3. Keep a close watch for any change in the victim's breathing pattern and for convulsions.
4. With a head wound, always suspect a neck or back injury and act accordingly.

5. The single most important observation that the rescuer can make concerning the neurological status of any victim is to record the state of his consciousness. If a victim with an apparent head injury becomes progressively more unconscious, he must be transported to a hospital immediately.
6. One way to aid a patient with internal head injuries is to hyperventilate them.
7. Remember, facial and scalp wounds tend to bleed more profusely due to the presence of many blood vessels. Be extremely cautious of the internal damage.
8. Flag down help.

ELECTROCUTION SKILLS CHECK

The equipment you've been running is not operating as it should. You suspect a short in the electrical system so you park the machine and call the electrician. You and a buddy watch as he begins his trouble shooting check. Suddenly you see a flash and the electrician is jolted back but remains in contact with the machine. What do you do?

TRAINEE SHOULD MENTION THE FOLLOWING:

1. Send your buddy to cut off the electricity at the distribution or if possible, trip the breaker switch on the equipment.
2. You, use a section of dry wood or other non-conductive material and try to knock the electrician away from the electrical source.
3. Once the electrician is separated from the electrical source, you may have to perform CPR while your buddy goes for help.