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Underground Coal Mine Supervisory and Management Training

Phase I Report

July 1979

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This report describes the activities and findings of the research pahse of a project to develop a safety-oriented training program for supervisory and management personnel in the underground coal mining industry. The research described herein seeks to identify managerial and supervisory practices and skills which may influence the effective implementation of safe mining methods, to further identify those skills and practices for which training and reinforcement are necessary, and to develop from such findings, a set of instructional objectives to form the basis for the development pilot test and validation phase of a

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.. safety-oriented training program.

Underground Coal Mine Supervisory and Management Training

Phase I Report

Bureau of Mines
Contract No. J0188053

Paul Loustaunau, Joseph Olmstead,
Richard Rosenblatt **and** Devah Walker

July 1979

HumRRO

HUMAN RESOURCES RESEARCH ORGANIZATION
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FOREWORD

This report is a statement of the work performed in Phase I of the "Development of a Safety-Oriented Supervisory and Management Training Program for the Underground Coal Mining Industry." The objective of the work in Phase I is to conduct research to:

- Determine relevant training materials that are available and in use.
- Conduct an assessment of supervisory and management training needs.
- Develop objectives for a training program to fulfill these needs.

Phase I will be followed by the development, pilot test, and validation of a safety-oriented supervisory and management training program.

The work for Phase I was performed by personnel of the Eastern Division of the Human Resources Research Organization (HumRRO). Principal participants are:

Mr. Paul E. Loustaunau	Project Director
Dr. Joseph Olmstead	Management Specialist
Mr. Richard Rosenblatt	Educational Specialist and Analyst
Ms. Devah Walker	Research Assistant
Mr. Leon Elder	Research Assistant

The cooperation and assistance provided by personnel of the organizations listed in Figure 1 made this effort possible. Of particular value was the time and attention given by personnel of the mines that served as sites for the training needs assessment, namely,

Penn Allegheny Mine, Tarentum, PA

Harman Mine, Harman, VA

Crescent Hills Mine, Daiseytown, PA

Kaiser Steel Mine, Sunnyside, UT

This work was ordered by the U.S. Bureau of Mines, Contract No. J0188053. Mr. James Peay of the Bruceton Research Center is the Project Officer.

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CONTENTS

INTRODUCTION

This report describes the activities and findings of the research phase of a project to develop a safety-oriented training program for supervisory and management personnel in the underground coal mining industry. In sponsoring this project the United States Department of the Interior, Bureau of Mines seeks to expand and strengthen the use of safe practices in coal mining, an industry which operates under inherently hazardous conditions and which is expected to grow significantly in the face of mounting nationwide energy problems. Accordingly, the research described herein seeks to identify managerial and supervisory practices and skills which may influence the effective implementation of safe mining methods, to further identify those skills and practices for which training and reinforcement are necessary, and to develop from such findings, a set of instructional objectives to form the basis for the development pilot test, and validation phase of a safety-oriented training program.

The principle activities described herein are: to evaluate existing managerial and supervisory training efforts for concepts and materials applicable to this project and to assess the state-of-the-art generally; to select, as sites for training needs analysis, and course pilot-testing, small, medium-sized and large underground coal mines representative of their types within the industry; to conduct the training needs assessment; and to develop course instructional objectives based on findings from the needs assessment.

The remainder of the report is organized in four main sections: methodology, results, discussion and implications. Within the methodology and results sections, contents are presented in the following sequence: evaluation of current methods; selection of representative mines; needs assessment; and development of instructional objectives. The remaining sections synthesize the results and discuss their implications for the programs to be developed in Phase II.

METHOD

REVIEW OF EXISTING MANAGEMENT AND SUPERVISORY TRAINING MATERIALS

Fifteen organizations were contacted in order to identify and review existing training programs for mine management and supervisory personnel. These organizations included ten mining company training departments, three educational and research institutions, one media development company and one government agency. A list of organizations contacted is presented in Figure 1. All were queried concerning their in-house use or knowledge of training materials for management and supervisory personnel in the underground coal mining industry. Ten organizations which indicated in-house use were visited in order to observe and evaluate the materials for applicability to this project's needs. The results of the materials review is presented in the section of this report entitled RESULTS.

Agencies contacted included:

The Mining Academy at Beckley, West Virginia

The Mine Safety and Health Administration in Arlington, VA

North American Coal at Powhatan, Ohio

Penn Allegheny Coal at Tarentum, PA

National Photo Laboratories at Houston, TX

Peabody Coal Training Office in St. Louis, Mo

Kaiser Steel Mine, Sunnyside, Utah

Harmon Mine, Harmon, VA

Crescent Hills Mine, Daisey Town, PA

Triangle Research Inc., Harmon, VA

University of West Virginia, College of Mineral and
    Earth Resources

National Coal Training Office, Lexington, KY

Freeman Coal Training Office, Frankfort, IL

Island Creek Coal Training Offices, in VA, WVA, and KY

Monterey Coal Company Training Office, Carlinville, IL

Figure 1: **Organizations Visited During
Training Needs Assessment**

DEVELOPMENT OF TRAINING ASSESSMENT INSTRUMENT

Coincident with the training materials review, project staff began development of the needs assessment approach and instruments. Those mining companies visited for training materials review were also used as sources of information of management/supervisory tasks and functions in safety and safety-related production areas. On the basis of interviews, company job descriptions and published documents, a comprehensive list of supervisory and management tasks was assembled. The task list was used to develop a detailed structured interview guide for use in the training needs assessment; the guide was divided into five topical areas:

1. Respondent background information
2. Job duties
3. Safety responsibilities
4. Regulations
5. Safety considerations for specific tasks

A copy of the interview guide is presented in the Appendix, pages A-1 through A-13.

Pilot testing of the needs assessment interview guide was conducted at the Penn-Allegheny Coal Mine in Tarenton, PA and at the Harman Coal Company in Harman, VA. In each case the guide was tested with the company training officer, the mine foreman or superintendant, and at least one first-line supervisor.

Two significant findings were obtained from the pilot test. First, the interview as then structured took far too much of the respondents time. No individual spent less than forty minutes with the interviewer while the Penn-Allegheny training officer spent 1.5 hours in filling it out; it was felt that such time demands would be intolerable given the constant attention to the work situation demanded of supervisory personnel.

Second, personnel at both mines were nearly unanimous in their opinion that supervisor/manager training in safety practices, procedures and techniques per se was not needed. They felt that nearly all such personnel were well schooled in technical safety considerations, were personally committed to the implementation of safe practices, and that safety is inextricably bound up in the proper application of any mining operation or support activity. Rather, training is most needed in the processes and functions typically performed by people in managerial and supervisory jobs: directing, managing (using staff effectively) decision-making, planning, problem analysis, interpersonal interaction, communicating (up, down, horizontally), etc. They need these skills whether they are involved in production matters or safety matters. On the basis of the pilot test experience, the interview guide

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was revised into a check-list of tasks generally performed by managers and supervisors. Respondents were asked to rate each task statement on a six point scale with respect to its significance for his job. A copy of the task list is shown on pages 53 through 56.

SELECTION OF REPRESENTATIVE SMALL, MEDIUM, AND LARGE MINES

Selection of the mines for the training needs analysis was made using computer tapes provided by the MSHA Analysis Center at Denver, CO. These tapes contained information on production, personnel employed, accidents and injuries for operating mines during 1977.

Data for production and personnel were on files physically separate from data for accidents and injuries; thus the files had to be merged in order to have a complete production/safety record for each mine. Further, the records in the production file were on the basis of mine shaft rather than mining company or operation. Since the managerial structure of a mining company must necessarily subsume personnel and operations at each distinct site, reliable characterization of mine operation size necessitated sorting mine shaft records in the hope that grouping them according to company name, address, county, and zip code would identify all working shafts under the management control of one mining company. This effort was only partially successful because variations in company name and address spelling precluded a completely accurate sort. Thus, it was necessary to print out the partially sorted records, identify related records by name and and select a sample as the basis for parameterization of mine size and safety record. Of the 3,842 mining operations so identified, thirty percent were randomly selected for analysis and determination of the characteristics of small, medium, and large mines. Results are presented on page 10.

CONDUCT OF TRAINING NEEDS ASSESSMENT

With the identification of mines meeting the size/safety criteria, candidate mining companies were contacted, project needs explained and cooperation requested. One small, two medium, and one large mine agreed to participate in the needs analysis. Supervisory, mid- and upper-management personnel were interviewed at each participating mine. The task list described on page 53 was administered and the personnel further interviewed for details of their job duties. Results of the training needs analysis are presented on page 10.

DERIVE TRAINING OBJECTIVES

Results from the training needs analysis were used in developing training objectives for management and supervisory personnel. On the basis of responses to the task list evaluation and comments by participants, management and supervisory tasks of consistent importance to job performance were organized into related groups and translated into training objectives.

In contrast to the tasks of skilled workers, such as hoist operators or miner operators, the activities performed by supervisors and managers do not consist of discrete, mutually exclusive elements. That is, many of the activities performed by supervisors and managers involve common elements, or "functions." For example, communication with subordinates is a function that is common to many of the activities of a supervisor. This considerable overlap in functions among tasks makes it more feasible to isolate the common functions and provide training in performance of each function than it would be to attempt to focus upon tasks and, for each task, train for performance of all elements in the task. The latter alternative would produce an enormous amount of redundancy in training programs, a condition which is not deemed desirable by most trainers.

Accordingly, in the present project, tasks of supervisors and managers were analyzed to identify the supervisory or management functions involved in their performance. This analysis produced lists of common functions which are fundamental to the jobs of supervisors and managers in the mining industry.

Each function was analyzed to identify the knowledges and skills required to perform it. Then, taking into account the constraints upon time, media, and methods indicated by training directors and managers, the knowledges and skills were translated into "enabling objectives" for training. "Enabling objectives" are those objectives which are to be achieved by program participants and which "enable" accomplishment of program objectives.

The enabling objectives, with their associated program objectives, are the principal outcomes and products of Phase I. They constitute the basic framework for design of the training program(s) to be developed in Phase II.

The enabling objectives were grouped according to program topics, each topic associated with a general program objective. Each program topic will serve as the foundation for one or more training modules.

RESULTS

The present section details the results of Phase I activities. The organization of findings follows the sequence observed in the previous section on Phase I methodology: Survey of Current Training Materials; Selection of Mines for Training Needs Assessment; Conduct of Training Needs Assessment; and Development of Instructional Objectives.

SURVEY OF TRAINING MATERIALS

As reported in the methods section, fifteen organizations were visited or contacted to determine the availability of training materials suitable for use in the contemplated course of instruction.

It was found that there are training materials in use covering technical subjects and for carrying out the training required by the implementing regulations for the 1977 Federal Mine Safety and Health Act. Training materials covering supervisory and management, however, are more scarce. There is a supervisor's safety training program by MSHA but the principal content is safety technology and not supervisory/managerial practices.

One inter-personal relations program for coal mine supervisors (face boss/coal boss) was developed by the National Photo Laboratory (NPL) at Houston, TX, under contract to the National Coal Association (NCA) and Bituminous Coal Operators' Association (BCOA). This program is quite well done and, according to users, holds the interest of the trainees. It consists of about 12 hours of films and 28 hours of discussion and workbook exercises (the course is programmed to last 40 hours). Those persons who have had experience with the program claim that it can last as long as 60 hours. The program is expensive. It costs from $425 to $480 per man, depending upon the number of people who take the program at one time. The general format is as follows:

Problems frequently encountered by first-line supervisors are presented in the films, the trainees are given a chance to resolve the problems on their own using workbooks. The instructor or monitor guides the discussions and provides the textbook solution to the problem and the rationale therefore. An instructor's guide is provided.

In developing this program NPL obtained the services of several training officers from large mines. A list of frequently encountered supervisory problems was assembled

and the proposed solutions were developed by supervisory training specialists at NPL under the guidance of the mine personnel.

This program to date has not been widely used by the industry. The principal criticism developed from contacts with training officers, is cost. Another criticism is that this program cannot be made to address specific problems at a particular mine. One mine, Kaiser Steel at Sunnyside, UT, put several of their supervisors and management personnel (Mine Superintendents, Mine/Shift Foremen, and Section Foremen) through the program during the 1977/78 coal strike. Those attending spoke well for the program.

The individual mining companies have conducted supervisory and management training. Some of the larger companies have training teams whose members have extensive education and experience in training and mining. They have developed and utilized training programs in management and supervision for all levels. The typical approach is to conduct a problem-solving type of session attended by all levels of management. The specific problem is one which that mine has recently encountered. Other large companies have commissioned colleges and universities to develop training materials in the supervisory and management area, as well as in the technical area.

The mining companies are, however, reluctant to make their programs available. They feel that the programs are assets that should not be shared with competitors.

The University of West Virginia College of Minerals and Earth Resources is developing a supervisory and management training program in inter-personal relations. This project is not likely to be completed before HumRRO's project. Contact has been established with Mr. Thomas Savidge, the Project Director, and data will be interchanged as it becomes available.

All of the training personnel and the mine operating personnel that we contacted felt that the training will be more effective if the trainees can relate situations presented in discussions, role playing or problem-solving directly to their mine. The fact that NPL's program did not permit trainees to do the above was the second most serious drawback to that program; expense was the first.

One interesting development that came out of the survey of available training materials was the fact that the mining industry is becoming more interested in supervisory and management training. Heretofore, the typical mid or top level mine managers had entered the mining industry on leaving school and had worked their way up the managerial ladder. Most of the training was obtained on the job. The individuals may have taken short courses for their section or mine foreman papers if such training was

required in the state. All training was technical. Even those persons with college backgrounds were mining engineers. The attitude of mine management, therefore, was that if a person was technically competent, he would automatically be able to handle people. The growing awareness, nationally, of the need to resolve people handling problems, and the influence of labor organizations have caused the mining industry to become more interested in developing supervisory and management skills. In addition, the growing influence of the petroleum industry (which apparently long ago recognized the need for supervisory and management training) on the mining industry through acquisition of major mining companies, has accelerated the growth of interest.

Although no "on the shelf" materials that could be used in their entirety were found, literature applicable to supervisory and management training in general was collected. Where applicable, this large collection of literature will be used in developing the subject matter for this program. An annotated bibliography with an integrated review of these materials is being prepared and will be delivered to the sponsor by September 30, 1979.

SELECTING MINES FOR THE TRAINING NEEDS ASSESSMENT

The contract required the HumRRO team to visit a large, medium, and small mine representative of its class. The decision was made to judge:

- the size of the mine by the number of man hours worked per year,
- "Representative" by the tons produced per man hour and by,
- the safety record, i.e., number of man days lost.

Information for selecting the mine sites was derived from tapes that were available at the Mine Safety and Health Administration Analysis Center at Denver. The tapes contained production and safety data for the year 1977, including the number of man hours the mine was worked; the amount of coal produced from that mine, and the number of fatalities and lost man days.

Organization of the data files precluded the creation of a single record for each mining company containing all production and safety data for operating shafts under the same management structure.

The data on the tapes is presented by a mine shaft. Thus a small mining operation with two or more shafts at different locations would have several discrete records. These could not be precisely sorted and grouped because spelling of company names changed from record to record. One entry might be ABC Coal, another ABC Inc. or simply ABC.

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Thus, sorting on state, county, ZIP code and company name was not precise enough to permit creation of an accurate summary record. Visual identification of unequivocal shaft groups was made and a 30 percent sample was taken over all groups to obtain size and safety data.

Once data was sampled, the small, medium, and large mines were grouped. For the first run, a small mine was one in which there were less than 100,000 man hours expended; a medium size mine was one with 100,000 - 500,000 man hours expended; and a large mine was one with more than 500,000 man hours.

At this point a problem with "small" mines was identified. There are approximately 880 mines that have less than 25,000 man hours, i.e., no more than 10-15 persons. Such a mine was considered to be more of a family type operation and not representative of a regular commercial venture. It was decided, therefore, to consider a small mine as expending between 50,000 and 75,000 man hours per year. This would mean about 25-40 personnel and require a formal organization structure.

The computer run gave tons of coal produced and the safety record of the mine. By combining tons of coal produced with man hours, an index of mine production level was obtained. Table 1 (on the following page) shows summary data and selection ranges for numbers of personnel in small, medium and large mines; the production records in tons per man hours; and the safety records, that is, lost man days per 1,000 man hours.

Two other items were considered in making the final selection. One item was the mining method utilized. It was felt that the results of the needs assessment would be more representative if a different mining method was used at each mine. The second item, and one of primary importance, was that the mine operator(s) be willing to participate in the program.

Our final selection then, consisted of these mines:

Large   Kaiser Steel Mine, Sunnyside, UT

Medium   Harman Mine, Harman, VA

Small   Crescent Hills Mine, Daiseytown, PA

The mining methods used were longwall, conventional, and retreat (removing the coal pillars from an old mine) mining at the large, medium and small mines respectively. The mine selected for the pilot test, Penn Allegheny, used continuous mining.

Table 1

Summary Data and Selection Ranges for Mine Classification

	SMALL	MEDIUM	LARGE
Manyears (= Manhours = 1840)			
Mean	32.64	141.905	647.92
SD	3.58	61.866	321.10
Range	27.765 →40.424	55.89 →270.65	275.75→1657.29
Selection Range (Mean+1/2 SD)	30.85 →34.43	110.972 →172.838	487.366→808.47
Number in Selection Range	64	74	52
Days Lost Per 1,000 Manhours			
Mean	13.178	7.663	4.146
SD	28.125	11.048	3.916
Range	0.00 →119.1	.00 →50.48	.107 →18.532
Selection Range (Mean+1/2 SD)	.00 →27.24	2.139 →13.187	2.188 →6.104
Number in Selection Range	64	74	52
Tons Per Manhour			
Mean	1.850	1.478	1.251
SD	1.007	.890	.556
Range	.20 →5.94	.16 →5.34	.46 →3.17
Selection Range (Mean+1/2 SD)	1.346 →2.353	1.033 →1.923	.973 →1.529
Number in Selection Range	64	74	52

NEEDS ASSESSMENT

Analysis of management and supervisory training needs was carried out to determine the types of tasks performed by personnel in these categories, the relative criticality or importance of the tasks identified, and those tasks where training is needed to improve the performance of managerial and supervisory personnel. This analysis was implemented by means of structured interviews of job incumbents at the representative small, medium, and large mines described on page 4 of the present report. The instrument employed

during these interviews, shown in Appendix B, was used to record incumbents judgements concerning the importance of each task to his job. Participating supervisors and managers were also queried about those aspects of their jobs which they felt could be enhanced through additional training.

A second aspect of the training needs analysis involved eliciting the experience of mine training officers and other management personnel concerned with employee training and development; these individuals were interviewed in an effort to identify management/ supervisory functions which consistently appear in need of training, and to identify the kinds of training approaches most favorably received and successfully used in mining organizations. This part of the training needs assessment involved management personnel from other mines as well as those participating in the structured interviews.

This section of the report will first present the results of interviews with training officers. Findings on task performance and criticality, derived from the structured interviews, will be presented next.

Interviews with training directors and other management personnel revealed a substantial degree of concensus about what characteristics should be built into the instruction in order to make the course acceptable to trainees and effective in achieving desired learning outcomes.

The course should be directly relevant to mining: Most of the respondents criticized existing "packaged" supervisory and management training programs for presenting concepts and techniques in a context either remote from or tenuously related to coal mining. Their experience has been that such courses lack "face validity" for mine personnel who, when confronting such material, will either dismiss it outright as inapplicable to their work situation or experience increasing difficulty in relating the instructional content to their particular frame of reference.

The course should be problem oriented: While to some extent principles, techniques and methods related to supervisory/management functions must be presented and discussed in a general way, their appreciation and assimilation by mining personnel will require that they be expounded in a context that directly demonstrates their applicability to the kinds of problems faced by mining personnel. This requirement is in part due to the insistence of managers and training directors that training which gives attention to job-related problems is a requisite for utility in a mining environment. The requirement is also in part due to the conviction that problem-oriented programs will be

more successful in generating involvement of the participants. A corollary point made by many of the training officers is that considerable discussion methods will need to be used in order to ensure that course participants will be able to comprehend the subject matter in terms that are meaningful to them and related to their own experience and practices.

The course should emphasize "local" problems: Supervisors and managers, according to the training officers, are concerned with problems arising in the fulfillment of their specific job duties and will expect that the instructional material be geared to their unqiue concerns, and that they will come away from the course with appropriate solutions or approaches. Experience has been that participants tend to direct discussions toward specific local problems and that in order to ensure continued serious consideration of course content, principles and methods should be presented and discussed in a context strongly influenced by salient concerns of participants.

Instructional Segments must be brief: The point was frequently made that no course session should exceed two hours duration and preferably be no longer than one and one-half hours. Supervisory personnel are salaried and typically work ten hours a day. Further, the press of daily routine and the occurrence of unanticipated problems require sustained attention and mobility on their part. Thus instructional materials must be organized and presented in a way that permits the coverage of topics and conclusion of relevant discussion and problem solving in a short period of time.

The course should be inexpensive: By inexpensive is meant sparing of dollar and training personnel requirements. A large percentage of mining operations have relatively few personnel and a limited budget for activities unrelated to mining of coal. A course costing several hundreds of dollars per attendee is going to be viewed by small mining operations as too costly to use. One of the most frequently heard criticisms of the BCOA-sponsored course, "Working With People," was that it cost too much to put on. In addition we were repeatedly cautioned not to use instructional methods that require sophisticated experience or extensive training in order to qualify instructional personnel. According to our interviewees, personnel responsible for training do not have much more formal education than the supervisors and managers participating in the course. Thus, instructional methods requiring considerable sophistication or experience on the part of the trainer, such as that required for role-playing, will be impractical for many mining companies, since they are likely not to have the time, money or inclination to acquire such capabilities.

The opinions and experience of training officers and managers summarized in the paragraphs on the preceding page, will likely be important determiners of the final form of the contemplated course. A more detailed discussion of their implications will be presented in the discussion section of the present report.

TASK CRITICALITY

Means and standard deviations of importance ratings were computed for each task within each organizational level. Then, tasks were ordered according to mean importance ratings.

Upper Managers

Table 2 shows judged importance of tasks for upper managers. Five tasks were unanimously judged as "Highly Important" by upper managers. These tasks are "Set Long Range Goals," "Set Objectives," "Discuss Long Range Plans with Subordinates,"

Table 2

Task Importance Ratings of Upper Managers

	Task	Mean	SD
1.	Set Long Range Goals	5.00	.000
2.	Set Objectives	5.00	
3.	Discuss Long Range Plans with Subordinates	5.00	.000
4.	Formulate and Review Long Range Policies and Procedures	5.00	.000
5.	Communicate with Subordinates	5.00	.000
6.	Prepare Records and Reports/Paperwork	4.66	.577
7.	Control Internal Business Affairs	4.50	.866
8.	Review Work of Subordinates/Lower Level Units	4.33	1.155
9.	Interpret and Execute Policies	4.16	1.443
10.	Discuss Short Range Plans with Higher Management	4.00	1.414
11.	Coordinate Activities of Several Units/Dept's.	4.00	1.732
12.	Discuss Short Range Plans with Subordinates	4.00	1.732
13.	Troubleshoot Technical Problems	4.00	1.732
14.	Handle People Problems	4.00	1.732
15.	Represent Department to Higher Management	3.83	1.258
16.	Advise and Instruct Subordinates on Work Problems	3.33	1.527
17.	Counsel Subordinates About Work	2.66	2.082
18.	Counsel Subordinates Who Have Problems	2.66	2.082
19.	Organize Personnel and Equipment for Work	2.33	.577
20.	Handle Conflicts Between Subordinates	2.16	1.258
21.	Train Personnel	2.00	.866

"Formulate and Review Long Range Policies and Procedures," and "Communicate With Subordinates." Following these five tasks, greater variability and lower ratings appear, with great variability for lowest rated tasks.

It is noteworthy that upper managers judged "people-oriented" tasks as less important than tasks concerned with operations and administration. Among the five highest-rated tasks, only "Communicate With Subordinates" can be construed as primarily concerned with the "people" aspects of management. Most tasks involving interactions with people received mean ratings of "4" or less, with five such tasks falling among the lowest six ratings.

Middle Managers

Task importance ratings for middle managers are shown in Table 3. Although middle managers rated the same tasks as upper managers, a somewhat different pattern can be noted. Although operations and administrative activities received moderately high ratings,

Table 3

Task Importance Ratings of Middle Managers

	Task	Mean	SD
1.	Communicate with Subordinates	5.00	.000
2.	Coordinate Activities of Several Units/Dept's.	4.78	.387
3.	Organize Personnel and Equipment for Work	4.66	.577
4.	Counsel Subordinates About Their Work	4.55	.508
5.	Troubleshoot Technical Problems	4.33	.764
6.	Prepare Records and Reports/Paperwork	4.28	.857
7.	Review Work of Subordinates/Lower Level Units	4.22	.696
8.	Discuss Short Range Plans with Subordinates	4.22	1.070
9.	Set Long Range Goals	4.22	1.351
10.	Set Objectives	4.22	1.351
11.	Discuss Long Range Plans with Subordinates	4.22	1.351
12.	Counsel Subordinates Who Have Problems	4.16	1.041
13.	Advise and Instruct Subordinates on Work Problems	3.61	1.858
14.	Handle Conflicts Between Subordinates	4.05	.916
15.	Formulate and Review Long Range Policies and Procedures	4.00	1.000
16.	Control Internal Business Affairs	3.83	1.655
17.	Discuss Short Range Plans with Higher Management	3.78	1.111
18.	Train Personnel	3.72	1.185
19.	Handle People Problems	3.61	1.858
20.	Represent Department to Higher Management	3.05	.582
21.	Interpret and Execute Policies	2.44	.509

tasks involving interactions with subordinates were judged as more important than for upper managers and as important as operations and administration.

It appears that interpersonal relations are a more important aspect of the middle manager job than for upper managers. However, it should be noted that all tasks received relatively high ratings of importance, with only one task—"Interpret and Execute Policies"—receiving a mean rating of less than "3".

First-Line Supervisors

Table 4 shows importance ratings for first-line supervisors. It is important to note that all 30 tasks received mean ratings of 3.16 or higher. Furthermore, on all but six tasks, standard deviations are small, indicating little disagreement concerning importance of the tasks. Examination of ratings for each member of the sample revealed that, where large variability was found for a few tasks, it can be attributed mainly to differences in mine size and to corresponding differences in supervisor duties because of mine size. In short, supervisors in large mines have certain responsibilities, e.g., estimating needed supplies, which in small mines may not be included in duties of first-line supervisors.

COMMON FUNCTIONS

Those tasks found to be of most consistent importance for job effectiveness were analyzed to identify the common functions performed by managers and supervisors.

Functions of Managers

For upper and middle managers, it was found that functions were essentially the same. Differences between the two levels in importance ratings for tasks indicate relative frequencies of performance and emphasis required by the jobs and not essential differences in the functions performed. Accordingly, a common list of functions was developed for upper and middle managers.

Common Functions of Upper and Middle Managers

- Leading an organization
- Supervising subordinate managers or supervisors
- Communicating in writing

Table 4

Task Importance Ratings of First-Line Supervisors

Task	Mean	SD
1. Check Condition of Worksite	5.00	.000
2. Give Orders and Instructions About the Work	5.00	.000
3. Train Crew Members on the Job	5.00	.000
4. Motivate Crew Members	4.89	.196
5. Enforce Policies, Procedures and Safety Rules	4.89	.196
6. Handle Complaints of Crew Members	4.89	.196
7. Counsel Crew Members About Their Work Performance	4.89	.196
8. Counsel Crew Members Who Have Problems	4.89	.196
9. Communicate With Crew Members	4.88	.196
10. Discuss Safety Regulations	4.83	.289
11. Receive Directives from Shift Foreman Mine Supervisor Regarding Safety, Mine Policy and New Operations	4.72	.255
12. Prepare Reports and Paperwork	4.72	.255
13. Discuss Situation with Off Going Section Foreman	4.66	.577
14. Discuss Equipment Condition with Maintenance Foreman	4.66	.577
15. Troubleshoot Problems as They Arise	4.66	.577
16. Check Work of Crew Members	4.66	.577
17. Represent Company to Crew	4.55	.774
18. Build Teamwork Within the Crew	4.55	.774
19. Check Condition and Inventory of Supplies	4.50	.866
20. Discuss Policy Regulations	4.39	.677
21. Investigate Potential Problems	4.33	.577
22. Instruct Crew Members on How to Handle Problems	4.33	.577
23. Receive Orders For the Days Work Shift Foreman	4.33	1.155
24. Handle Conflicts Between Crew Members	4.22	1.351
25. Discuss Situation With Fire Boss Prior to Start of Shift	4.16	1.041
26. Cite Needs of the Crew to Higher Management	3.83	.389
27. Plan Work	3.83	1.041
28. Check Condition of Equipment	3.66	.577
29. Estimate Supplies Needed	3.16	2.021
30. Estimate Manpower Requirements	3.16	2.021

- Communicating within the organization
- Communicating orally face-to-face
- Setting and implementing goals
- Formulating and executing policies
- Planning and controlling
- Coordinating activities and developing teamwork
- Providing technical expertise to organization
- Evaluating performance of individuals and units
- Counseling subordinates on performance

Twelve common functions were identified. For the most part, they involve activities that are performed by managers in most organizations. Performance of technical functions were not included because such functions may differ widely and development of instruction in technical functions is not a part of the present project. Thus, it is clear that the functions of managers in the mining industry are quite similar to those in other industries and differences occur only in the contexts of operations and the industry—specific technical knowledge required for performance of the functions within particular contexts.

Functions of Supervisors

Seventeen common functions were identified for first-line supervisors. The functions follow:

Common Functions of First-Line Supervisors

- Leading a work crew
- Providing support for crew members
- Developing teamwork within work crews
- Helping crews to accomplish work goals
- Directing the work
- Motivating employees
- Organizing crew and equipment for work
- Enforcing rules and regulations
- Planning daily work activities
- Representing the work group
- Providing technical competence to work crews

- Handling performance problems among crew members
- Evaluating performance
- Counseling employees on performance
- Training employees on the job
- Communicating with higher levels of the organization
- Communicating with members of the work crew

The 17 identified functions are conceived to be common to all first-line supervisors in the mining industry. Thus, the functions are common to both mining crew foreman and maintenance foreman. Differences would occur only in terms of the specific nature of the work in which the functions are performed.

TRAINING OBJECTIVES

Each function was analyzed to identify the knowledges and skills required to perform it. Then, taking into account the constraints upon time, media, and methods recommended by training directors and managers, the knowledges and skills were translated into enabling objectives. The objectives were grouped according to program topics which follow closely the common functions of managers and supervisors.

For each topic, a program objective was developed. "Program Objectives" represent the conceived purposes of the training program. They should not be confused with training objectives, which represent the goals to be achieved by participants during, or by completion of, the program. In this instance, "enabling objectives" shown below are the objectives for which end-of-course criterion measures will be developed and upon which end-of-course achievement of participants will be evaluated. Those objective statements which begin with "know" represent required knowledges; those statements which begin with "be able to" represent skills.

Only cognitive skills are included in the objectives, e.g., "distinguish between," "identify," etc. No behavioral, i.e., "acting" skills are included. Careful consideration was given to the issue of whether behavioral skills should be included in the objectives. It was concluded that the great variability in sophistication and competence among mine training personnel precludes the inclusion of material aimed toward the development of behavioral skills, which usually involve interpersonal interaction. In supervision and management, the development of behavioral skills frequently requires the use of experiential training methods, for which a reasonable degree of sophistication is required. Although

many mine training personnel certainly possess the required sophistication, many others do not. Accordingly, the inclusion of behavioral skills, and the design of training which would have a reasonable chance for developing them, would preclude effective use of the course by many trainers. For this reason, behavioral skills were not included in the objectives.

Each program topic represents a unified conceptual area. Each topic, with its associated program objective and enabling objectives constitutes the foundation for one or more training modules. A module is a self-contained instructional unit which can be used by trainers in combination with other modules according to the particular needs of trainees or selected purposes of training managers.

Objectives for Managers

Objectives for managers are shown on pages 20 -25. They cover 13 topics and associated program objectives, with 89 enabling objectives which represent 62 knowledges and 27 skills. Thus, a training program covering all topics would consist of a minimum of 13 modules. If modules are held to two hours, as preferred by mine trainers and managers, a few topics for managers may warrant more than one module for full coverage because of their complexity

Objectives for Supervisors

Objectives for first-line supervisors are shown on pages 26 - 32. They cover 19 topics and associated program objectives. They include 107 enabling objectives, consisting of 62 knowledges and 45 skills.

A training program covering all topics would consist of a minimum of 19 modules. A few topics may warrant more than one module.

TRAINING OBJECTIVES FOR
UPPER AND MIDDLE MANAGERS

I. ROLE OF THE MANAGER

Program Objective:

To instruct participants in the role of the manager in underground mines.

Enabling Objectives:

1. Know the basic functions of management.
2. Be able to describe the application of each function to management of an underground mine.
3. Know the management activities required for development of an organization as an effective system.
4. Be able to identify the principal obstacles to development of an effective mining organization and ways of overcoming the obstacles.

II. LEADERSHIP IN MANAGEMENT

Program Objective:

To provide an understanding of the function of leadership in mine management and of ways of providing such leadership within a mining organization.

Enabling Objectives:

1. Know that leadership in management is the process of influencing individuals and groups to accomplish organizational objectives.
2. Know the principal ways in which a manager above the first level can exercise leadership.
3. Know the organizational conditions necessary for effective performance by a mining organization.
4. Be able to identify the principal obstacles to development of required organizational conditions.
5. Know the principal factors that contribute to a favorable work climate within mining organizations.
6. Be able to identify the principal obstacles to development of a favorable work climate within a mine.
7. Be able to identify potential courses of action for overcoming obstacles to development of a favorable work climate.

III. SUPERVISING SUBORDINATES

Program *Objective*:

To instruct participants in principles of supervising subordinates who are themselves managers or supervisors.

Enabling Objectives:

1. Know the principal sources of supervisory influences.
2. Know the conditions necessary for effective performance by subordinate managers or supervisors.
3. Know the essential functions of supervision in directing subordinate managers or supervisors.
4. Be able to distinguish between authority and responsibility as they apply to delegation.
5. Know the difference between delegation and abandonment of responsibility.
6. Know the effects upon the manager and subordinates of failure to properly delegate.
7. Know the basic principles of delegating.
8. Know the principles of obtaining results without excessive pressure.
9. Know the recommended technique for correcting deficient performance.
10. Be able to identify the symptoms and causes of resistance to direction by subordinates.
11. Know the principal ways of overcoming resistance to direction.

IV. WRITTEN COMMUNICATION

Program Objective:

To instruct participants in the principles and importance of effective written communication.

Enabling Objectives:

1. Know the functions of written communication.
2. Know the types of communication that should be accomplished in writing.
3. Know the characteristics of a well-written communication.
4. Be able to write a memorandum to shift foremen concerning adherence to a safety regulation, which meets the requirements of a well-written communication.

V. ORGANIZATIONAL COMMUNICATION

Program Objective:

To increase participants' awareness of the dimensions and importance of organizational communication.

Enabling Objectives:

1. Know four barriers to communication within organizations.
2. Know the impact upon communication effectiveness of each barrier.

3. Know at least one method for minimizing each barrier.
4. Know the six principles of effective organizational communication.
5. Be able to identify the two most common communication problems in mines and the best solutions for coping with the problems.

VI. INTERPERSONAL COMMUNICATION

Program Objective:

To familiarize participants with principles of effective interpersonal communication.

Enabling Objectives:

1. Know the four dimensions of interpersonal communication and how each can be a source of error or distortion.
2. Know the principal barriers to effective interpersonal communication.
3. Be able to identify the most common sources of poor interpersonal communication in mines.
4. Know effective methods for overcoming the principal barriers to interpersonal communication.

VII. SETTING AND IMPLEMENTING GOALS

Program Objective:

To instruct participants in methods of setting and implementing effective organizational and individual goals.

Enabling Objectives:

1. Know the functions served by goals in an organization.
2. Know the characteristics of an effective goal.
3. Be able to assess the effectiveness of an organizational goal statement.
4. Be able to write an effective goal statement for a mine foreman.
5. Know the concept of Management Objectives and how it might be applied in a mine.
6. Know the implications of an ineffective organizational goal for first-line supervisors, workers, and organizational performance.
7. Know the most appropriate method for communicating goals within a mining organization.
8. Be able to compare and contrast the directive and participative styles of goal setting and specify when the use of each is most appropriate.

VIII. FORMULATING AND EXECUTING POLICIES

Program Objective:

To familiarize participants with methods of directing through the formulation and execution of policies.

Enabling Objectives:

1. Know the functions served by policies in an organization.
2. Be able to distinguish between direction by policy and administration by rule and procedure.
3. Be able to distinguish between mining situations requiring policy direction and those requiring rules and procedures.
4. Know the most probable effects upon an organization of unclear policies.
5. Know how to determine whether policies are correctly interpreted.
6. Know the appropriate procedure for insuring that policies are properly executed.
7. Know the recommended procedure for communicating policies within a mining organization.

IX. PROVIDING TECHNICAL EXPERTISE

Program Objective:

To develop participant awareness of appropriate methods of using technical competence or expertise in managing an organization or supervising subordinates.

Enabling Objectives:

1. Know that excessive use of technical expertise is the most common means of oversupervision.
2. Know the potential effects of excessive use of technical expertise.
3. Know when the exercise of technical expertise is appropriate and when it is not.
4. Know how to use technical competence to stimulate subordinate performance.
5. Know the functions of quality review in managing an organization or department.
6. Be able to distinguish between quality review and excessive use of technical expertise.

X. PLANNING AND CONTROLLING

Program Objective:

To instruct participants in the use of planning and controlling as tools for managing an organization.

Enabling Objectives:

1. Know the relationship of planning to goal setting and controlling.
2. Know the skills needed for effective planning.
3. Know the characteristics of effective long-range and short-range plans.
4. Know the steps in developing an effective plan.
5. Know the function of controlling in managing and organization.
6. Know the functions of control measures.
7. Know the basic elements of controlling: setting standards, measuring results, reporting, taking corrective action.
8. Know the various types of constraints that can be used by a mining organization to control performance.
9. Be able to differentiate between the potential positive and negative effects of constraints.

XI. COORDINATING ACTIVITIES AND DEVELOPING TEAMWORK

Program Objective:

To instruct participants in methods of coordinating activities of subordinate departments and of developing teamwork among subordinate managers or supervisors.

Enabling Objectives:

1. Know the manager's role in coordinating the activities of several subordinate units or departments.
2. Know the function of superordinate objectives in management of multi-unit operations.
3. Know the principal conditions that can impede coordinated effort and teamwork within a mining organization.
4. Be able to identify common situations in which coordination between organizational units is required and those in which coordination is not required.
5. Be able to identify common problems in mining organizations that should be handled on a one-to-one basis with individual subordinates and those which should be handled with subordinates as a group.
6. Know the characteristics of an effective management team.
7. Know the principal factors that can inhibit teamwork among management personnel.
8. Know the best methods for developing teamwork among subordinate managers or supervisors.
9. Be able to specify potential methods for overcoming selected obstacles to teamwork among management personnel.

XII. EVALUATING PERFORMANCE OF INDIVIDUALS AND UNITS

Program Objective:

To instruct participants in principles of performance evaluation.

Enabling Objectives:

1. Know the necessity for clear standards of performance for each subordinate job.
2. Know the importance of communicating performance standards and expectations to subordinates.
3. Know the importance of evaluating the performance of an individual rather than his personal characteristics.
4. Be able to identify factors beyond a subordinate's control that may affect his performance.
5. Know the factors to be taken into account in developing performance standards for both individuals and units.
6. Be able to distinguish between performance failures of individuals due to inadequate ability and those due to inadequate motivation.
7. Be able to distinguish between performance failures of a department or work unit due to inadequacy of personnel and those due to management inadequacy.
8. Be able to develop a clear performance standard for a mine foreman.
9. Be able to develop a clear performance standard for a subordinate department.

XIII. COUNSELING SUBORDINATES ON PERFORMANCE

Program Objective:

To familiarize participants with principles of counseling employees on performance.

Enabling Objectives:

1. Know the importance of periodic reviews of performance.
2. Know the functions served by counseling of subordinates on their performance.
3. Know the risks involved in counseling subordinates ineffectively.
4. Know the best approach for conducting a performance review with a subordinate.
5. Be able to specify the steps in conducting a good performance counseling interview.
6. Be able to determine when special counseling of an employee on his performance is necessary

TRAINING OBJECTIVES FOR
FIRST-LINE SUPERVISORS

I. ROLE OF THE SUPERVISOR

Program Objective:

To instruct participants in the role of first-line supervisors in underground mines.

Enabling Objectives:

1. Know the basic purposes of supervision.
2. Know how supervision contributes to the work climate in a mine.
3. Know the essential functions of a supervisor in managing a mine work crew.
4. Be able to identify the essential supervisory functions in the job of mine foreman.

II. LEADERSHIP AND SUPERVISION

Program Objective:

To instruct participants in the fundamentals of leadership as a part of the supervisor role.

Enabling Objectives:

1. Know that leadership in supervision is the process of influencing individuals and groups to accomplish organizational objectives.
2. Know the bases of supervisor influence in mine work crews.
3. Know how the bases of supervisor influence can be used to achieve work objectives.
4. Know the advantages and disadvantages of directive and non-directive styles of leading mine work crews.
5. Be able to distinguish between directive and non-directive styles of leadership in supervision of mine work crews.

III. PROVIDING SUPPORT FOR CREW MEMBERS

Program Objective:

To familiarize participants with ways of providing the support needed by members of work crews.

Enabling Objectives:

1. Know the most common support requirements of work crew members.
2. Know the principal ways in which constructive support can be provided to work crew members by a supervisor.

3. Be able to identify the necessary conditions for effective employee performance in a mine.
4. Know the potential dangers of employee overdependence upon supervisors.
5. Be able to identify the most common causes of overdependence upon a supervisor in mine work crews.
6. Know the principal ways of preventing overdependence in mine employees while maintaining supervisory control.

IV. DEVELOPING TEAMWORK WITHIN WORK CREWS

Program Objective:

To instruct participants in ways to develop and maintain a cohesive work group.

Enabling Objectives:

1. Know the characteristics of an effective work group.
2. Know the principal personnel factors that can influence crew cohesiveness.
3. Be able to identify organizational factors that can diminish cohesiveness in a work crew.
4. Be able to identify the principal factors that determine the effectiveness of work crews in underground mines.
5. Know the best method for developing teamwork in a mine work crew.
6. Be able to identify potential sources of difficulty in developing teamwork in mine work crews.
7. Be able to identify potential methods for overcoming identified sources of difficulty in developing teamwork in mine work crews.

V. HELPING CREWS TO ACCOMPLISH WORK GOALS

Program Objective:

To instruct participants in supervisory behaviors that contribute to accomplishment of individual, crew, and company performance goals.

Enabling Objectives:

1. Know the functions served by individual and crew performance goals.
2. Be able to identify potential areas of conflict between employee, crew, and company goals.
3. Know the characteristics of an effective performance objective.
4. Know the best approach for stimulating good performance among work crew members.
5. Be able to identify the skills needed by a supervisor in attempting to rechannel a "mismotivated" employee.
6. Be able to identify the most common problems encountered by supervisors in meeting crew performance objectives.
7. Know appropriate methods for overcoming the most common problems encountered by supervisors in meeting crew performance objectives.

VI. MOTIVATING EMPLOYEES

Project Objective:

To acquaint participants with basic principles and methods for motivating employees.

Enabling Objectives:

1. Know the more common causes of poor motivation among mine employees.
2. Know the function of the work group in maintaining motivation.
3. Be able to distinguish between performance failures due to lack of ability and those due to poor motivation.
4. Be able to distinguish between reward and punishment and the reinforcing effects of each.
5. Be able to identify potential rewards under the control of a mine supervisor.
6. Be able to identify potential punishments under the control of a mine supervisor.
7. Know the differential effects upon motivation of rewards and punishment.
8. Be able to describe the most feasible method for developing and maintaining a positive motivational climate in a work crew.

VII. ORGANIZING CREW AND EQUIPMENT FOR WORK

Program Objective:

To instruct participants in procedures for organizing crew and equipment for work.

Enabling Objectives:

1. Know the importance to efficiency and productivity of proper organization of crew, equipment, and materials.
2. Know the importance of allocation of manpower to tasks based on task requirements.
3. Know the importance of making equitable work assignments.
4. Know factors to be considered in making equitable work assignments.
5. Be able to allocate personnel, materials, and equipment to tasks according to a time phased daily work plan.

VIII. ENFORCING RULES AND REGULATIONS

Program Objective:

To instruct participants in supervisory behaviors that promote employee adherence to rules and procedures.

Enabling Objectives:

1. Know the principal reasons why employees resist or fail to adhere to rules and procedures.
2. Know supervisor behaviors that promote acceptance of rules and procedures by subordinates.
3. Know supervisor behaviors that encourage adherence to rules and procedures by subordinates.

4. Know supervisor actions that can lead to employee failure to adhere to rules and procedures.
5. Be able to distinguish between violations that are due to employee ignorance or inability and those due to lack of motivation, and describe the appropriate supervisory action for each case.

IX. PLANNING DAILY WORK ACTIVITIES

Program Objective:

To familiarize participants with factors associated with planning daily work activities.

Enabling Objectives:

1. Know the reasons for systematic planning of work activities.
2. Know the factors to be taken into consideration in planning daily work activities.
3. Be able to accurately estimate the time requirements for accomplishment of the principal tasks of mine work crew.
4. Be able to accurately estimate the personnel and material requirements for accomplishment of the principal tasks of a mine work crew.
5. Know the steps to be performed in development of a daily work plan.
6. Know likely causes for the use of contingency plans and when to use them.
7. Know limitations and utility of mnemonic devices, such as checklists, for recording progress.

X. DIRECTING THE WORK

Program Objective:

To familiarize participants with supervisory activities which contribute to or impede effective performance of work crews.

Enabling Objectives:

1. Know the most common problems affecting mine work crew performance.
2. Be able to specify four supervisory activities that help subordinates perform their jobs.
3. Know the most common ways a supervisor's actions can impede the performance of subordinates.
4. Be able to distinguish between authority and responsibility.
5. Know the limits of supervisor authority and when authority should and should not be used.
6. Be able to distinguish between harassment and appropriate direction of employees.
7. Be able to distinguish between performance problems that are under the control of a supervisor and those that are not under his control.
8. In an analysis of common performance problems of mine work crews, be able to describe methods of overcoming problems under the control of the supervisor.

XI. REPRESENTING THE WORK GROUP

Program Objective:

To acquaint participants with the several types of representation by a supervisor that are necessary for maintaining an effective work crew.

Enabling Objectives:

1. Know how the supervisor position links the work crew to company management.
2. Know the functions served by a supervisor when representing his work crew.
3. Know the common expectations that crews may have for supervisors as representatives.
4. Be able to identify groups or individuals in the mine organization to which a supervisor might represent his work crew.
5. Be able to identify the more common problems likely to be encountered by a supervisor because of his "man in the middle" position between company management and employees.
6. Be able to describe how common "man in the middle" problems may be avoided or handled effectively.

XII. PROVIDING TECHNICAL COMPETENCE TO WORK CREWS

Program Objective:

To develop participant awareness of appropriate methods for exercising technical competence in supervising work crews.

Enabling Objectives:

1. Know the functions served by technical competence in supervision.
2. Know when the exercise of technical competence is appropriate and inappropriate in supervising miners.
3. Be able to recognize the probable effects of oversupervision through the use of technical competence.
4. Be able to identify situations in which a supervisor should provide technical expertise and when he should not.

XIII. HANDLING PERFORMANCE PROBLEMS

Program Objective:

To instruct participants in the sources of performance problems and methods for resolving them.

Enabling Objectives:

1. Know factors that can cause performance problems.
2. Know supervisory techniques that maximize chances of identifying and resolving performance problems.
3. From case descriptions, be able to identify potential sources of performance problems and appropriate supervisory techniques for resolving the problems.

XIV. EVALUATING PERFORMANCE

Program Objective:

To instruct participants in principles of performance evaluation.

Enabling Objectives:

1. Know the necessity for clear standards of performance for each job or task.
2. Know the importance of evaluating an individual's performance on a job and not his personal characteristics.
3. Be able to identify factors beyond a subordinate's control that may affect performance.
4. Be able to distinguish between performance failures due to inadequate ability and those due to inadequate motivation.
5. Know the factors to be taken into account in developing performance standards.
6. Be able to develop a clear performance standard for each job or task in a mine work crew.
7. Be able to evaluate an individual's performance against a standard stated in terms of time, output, and quality.

XV. COUNSELING EMPLOYEES ON PERFORMANCE

Program Objective:

To familiarize participants with principles of counseling employees on performance.

Enabling Objectives:

1. Know the importance of periodic review of performance.
2. Know the purpose of counseling employees on performance.
3. Be able to determine when special counseling of an employee on his performance is necessary.
4. Know the best approach for conducting a performance review with a crew member.
5. Be able to specify the steps in conducting a good performance counseling interview.

XVI. GIVING ORDERS AND INSTRUCTIONS

Program Objective:

To instruct participants in methods for giving effective orders and instructions.

Enabling Objectives:

1. Know the characteristics of a good order or instruction.
2. Know the factors to consider in determining the ability of a subordinate to carry out an instruction order
3. Know methods for insuring that subordinates understand instructions correctly.
4. Know factors and conditions that can interfere with or impede understanding and acceptance of orders and instructions.
5. Be able to formulate an understandable and acceptable work instruction.

XVII. TRAINING ON THE JOB

Program Objective:

To instruct participants in principles and methods of on-the-job training.

Enabling Objectives:

1. Know how to assess the need for OJT.
2. Know the steps to follow in training an employee on the job.
3. Know the steps to follow in determining the effectiveness of on-the-job training.
4. Know the method for coaching an employee in performance of job tasks.
5. Be able to train another person in performance of a task using OJT principles.
6. Be able to instruct another crew member in how to conduct on-the-job training.

XVIII. UPWARD COMMUNICATION

Program Objective:

To familiarize participants with principles of upward communication.

Enabling Objectives:

1. Know types of information that should be communicated upward.
2. Be able to identify appropriate recipients for selected types of information.
3. Be able to state the proper channels for upward communication within his organization.
4. Know the reasons why a supervisor might be reluctant to communicate information upward.
5. Know the most appropriate method for overcoming barriers to upward communication.
6. Be able to identify barriers to upward communication in his mine and possible ways of overcoming them.

XIX. DOWNWARD COMMUNICATION

Program Objective:

To instruct participants in principles of communicating with subordinates.

Enabling Objectives:

1. Know the responsibility of a supervisor for communication with subordinates.
2. Know the effects of poor communication upon employee attitudes and performance.
3. Know the most common barriers to communication within mining organizations.
4. Be able to identify three potential barriers to effective communication with subordinates.
5. Know at least one method for reducing communication barriers with subordinates.
6. Know what a supervisor can do to minimize communication problems within a work crew.
7. Be able to distinguish between work problems due to poor communication and those arising from other sources.
8. Know how to develop a climate for two-way communication in a work crew.

DISCUSSION

The purpose of Phase I of this project was to assess the training needs of supervisors and managers in underground coal mines, and to determine the availability of feasible materials which could be incorporated into training programs for supervisors and managers. The study produced a number of findings which have important significance for subsequent phases. The more significant findings will be summarized and discussed in this section.

TRAINING NEEDS

Probably the most significant finding with respect to training needs is the consensus among managers and training directors that operating supervisors and managers are reasonably well-trained in the technical aspects of both safety and mining questions, but they need training in supervision and interpersonal relations. Numerous training programs covering technical aspects are available and conducted. It was agreed by most respondents that additional such programs are not required. On the other hand, there was also universal agreement that managers and supervisors badly need training in techniques through which they can get safety practices and mining operations implemented effectively by subordinates, i.e., in techniques of management and supervision, with particular emphasis upon those aspects commonly subsumed under the rubric "human relations." It was the consensus that many managers and supervisors are not proficient in such activities as "communicating," "motivating employees," "building teamwork," etc., which are needed in order to achieve good results in safety and operations.

Accordingly, it would appear that the content of any training program intended to achieve acceptance by the industry should be concerned with general management and supervisory activities, heavily weighted in the direction of interpersonal and group relations and superior-subordinate interaction. Of course, such content should be presented at levels of complexity appropriate to the intended audience.

Of equal importance are the findings concerned with program formats, media and methods preferred by managers and training directors. Again, respondents were quite

emphatic that, to gain acceptance by the mining industry, training programs for managers and supervisors must be:

    (1) Inexpensive in terms of both materials and administrative costs

    (2) Directly relevant to mining

    (3) Susceptible of being focused upon local problems, ie g., local problem-centered

    (4) Capable of being administered in blocks of two hours or less by company personnel.

These results will have quite significant implications for types of materials, media and format which should be used in the design of programs. Thus, the fact that program content should be directly relevant to mining would probate the use of most materials currently in use for training managers and supervisors, because very few materials specific to mining are in existence and the only ones which are of desirable quality are copy-righted and for sale.

Similarly, the insistence that training be local problem-centered will place some con-straints upon the format and methodology of contemplated programs. Managers and training directors desire programs which permit participants to view training content within the context of local problems. This means that any program must have sufficient built-in flexibility to allow trainers to adapt content and methods to local issues and to provide full opportunity for participant discussion of local issues and problems. It also means that instruction in many of the more critical topics and issues of management and super-vision must be given fairly superficial treatment because most of the program time would be allocated to discussion of local problems and issues rather than to the inculcation of knowledges and skills according to a conceptual framework derived from current research-based knowledge about the most effective methods of managing and supervising in production-oriented organizations.

The fact that there is great variability in knowledge, expertise and sophistication among trainers in the mining industry also places considerable constraint upon the types of training methods which can be included in the programs to be developed in Phase II. Although some trainers in larger mines are highly sophisticated in the methodologies which have been most effective in training managers and supervisors, others are much less knowledgeable. In most small mines, there is no one who is capable of conducting supervisory training. On the other hand, lack of supervisory training personnel in the small mines leads many managers to turn to colleges, consultants, or professional training organizations, where they may obtain more expert trainers than those found within the training departments of the larger mining companies.

Nevertheless, this wide variability in expertise of the potential users of programs produced by this project will constrain the types of methods which can be included. For example, any experiential methods beyond the most rudimentary type of role-playing are simply not feasible. Although such methods, when properly conducted, should be highly effective within the mining industry, they are not practicable because many trainers would not have the capabilities to conduct them. Accordingly, training methods used in the programs to be developed must, of necessity, be limited to the more common types of discussion-based methods which have experienced many years of success in industrial training. Even with these methods, however, it will be necessary to provide very complete, step-by-step guidance to trainers in the form of instructor's guides, training aids, etc.

EXISTING MATERIALS

With the exception of the BCOA program, discussed earlier, literally no acceptable training materials that are also specific to the mining industry were found. The BCOA program is excellent; however, most trainers reported that it is too expensive. In addition, the BCOA program is copyrighted and, accordingly, could not be used in this project, even if desired. The upshot is that materials for the programs to be developed in Phase II will have to be developed in full or adapted by HumRRO.

TRAINING OBJECTIVES

Conventional competency-based training development procedures normally would have resulted in performance-based terminal training objectives each of which would have required actual performance of one, or a part, of the tasks identified as critical to the job under investigation or performance of a simulated task whose characteristics were such as to permit generalization to the actual tasks. However, a number of factors mitigated against the use of such objectives as the framework for the programs to be developed in Phase II.

First, and the most relevant, is the fact that it can be anticipated that, usually, participants in any one training session will represent a number of different jobs, with associated variations in tasks which may be similar but also different. Accordingly, objectives keyed to a task specific to any one job, e.g., coal boss, simply would not be fully relevant for other jobs or even jobs with the same title in different organizations. For this reason, it was necessary to move back a step from tasks to common functions

and to develop generalized program objectives (purposes) keyed to the functions, which can be accomplished through the achievement by participants of enabling objectives.

Second, in soft skill areas, such as management and supervision, it would be possible to write terminal learning objectives that are performance-based and, on paper, would be keyed to the tasks identified in the needs assessment. However, such objectives would be nothing more than written statements which could never be achieved in practice. In soft skill areas, objectives must be, usually, less concrete and less specific than those developed for hard skill tasks. Since a basic premise of good competency-based training is that objectives must be achievable by students when they are properly trained, the development of task-specific performance-based objectives is not practicable for training supervisors and managers.

Finally, the training needs voiced by managers and training directors, discussed in the preceding section, preclude task-based skill training. The problem-oriented sessions stated as a condition for acceptance by mine trainers and managers will require much more flexible programs than would be permitted by programs which are carefully designed to accomplish highly specific performance-based objectives. In short, successful objectives-based training must be controlled by the training design; problem-centered training is controlled more by the trainer and somewhat less by the design. The objectives presented in the Results section represent a compromise between the two approaches. They will permit a reasonable control by the program design; but, they will also permit sufficient flexibility as to gain acceptability within the mining industry. The determining factor will be the methodologies finally selected to accomplish the objectives.

IMPLICATIONS

The learning objectives presented in the Results section are the principal products of Phase I. They will provide the frameworks for the programs to be developed in Phase II and will drive the developmental activities in that phase.

Two basic programs of approximately 20 2-hour modules each are planned. One program will be designed for use with managers; the other will be used to train supervisors. Content methodology and materials will be designed to be appropriate for the respective levels of competence and education of the two groups.

One or more 2-hour modules will be devoted to each program objective and will be designed to accomplish several or all of the associated enabling objectives. Approximately one hour will be devoted to instructor presentation and class discussion and/or

practical exercises, e.g., brief cases, problem analyses, etc., designed to teach basic concepts related to the enabling objectives. A second hour will be devoted to analysis and application of the concepts to local issues, using a modified conference method.

In addition, a set of 10 problem-solving modules, designed to be used with vertical (across level) groups of personnel is recommended. These modules would include a brief introduction of a problem topic and review of previously-taught concepts related to it, followed by a guided analysis of local relevant issues and problems and discussion of possible solutions.

The concept for these problem-solving modules was developed because of the strong desire by managers and trainers for a mechanism through which managers and supervisors within a mine can jointly attack local problems and derive solutions which an be implemented. Although such a procedure is actually Organizational Development (OD) rather than training, it was concluded that such a program could be of value, especially with respect to gaining acceptability of the program. The 10 problem-solving modules would be an optional block which, if desired, could be used over a period of weeks or months after all participants had been exposed to the original basic programs for their respective levels. Thus, participants would enter the problem-solving sessions already equipped with concepts, knowledges, and skills developed in the basic programs, accordingly, they would be better equipped to cope with the real-world problems covered in the problem-solving modules.

For each program, HumRRO will develop a curriculum guide (instructor's handbook), which will contain full and complete, step-by-step guidance for conducting all sessions. Because of the fact that many trainers will require quite detailed guidance, the handbooks will contain all required information, including step-by-step procedures, all training aids, and specimens of all materials needed to conduct the programs. In addition, HumRRO will develop all required training aids and student handout materials, which, when taken collectively, will constitute student texts, suitable for both advance preparation for each module and for later use as a reference volume. In addition, HumRRO will provide as a part of the curriculum guides, brief tests designed to measure student achievement and identify areas in which remedial work may be required.

CONCLUSION

In this report, HumRRO has presented the findings of its needs assessment and review of available materials, training objectives derived from the needs assessment, and brief discussions of the programs planned to be developed in Phase II. The proposed programs will meet a need that is presently not filled within the mining industry and it is believed that they will receive a high level of acceptability within the industry.

Appendix A

INITIAL STRUCTURED INTERVIEW GUIDE

Questionnaire has 5 sections:

1)   Background Information
2)   General Questions on the Job
3)   General Questions on Safety
4)   General Questions on Regulations
5)   Questions on the Safety Considerations for Specific Tasks

Date: _____ Mine: _____

Time Started: _____ Circle One: SM   MED   LG

Time Completed: _____ Interviewer: _____

Interview No.: _____

Section 1:   Background Information Form

1. Name: _____

2. Title/Position: _____

3. How old are you? _____ years

4. How much schooling have you completed?

     ☐ Less than 8th Grade
     ☐ Some High School
     ☐ High School Graduate
     ☐ Technical School Training
     ☐ Some College
     ☐ College Graduate _____ (Degree)
     ☐ Some Graduate School
     ☐ Graduate Degree _____ (Degree, Area)

5. How long have you been in your current position? _____ months

6. What was your previous job? _____

7. Did you have any special training to prepare you for your current job?

     ☐ Yes   ☐ No

     If yes, what? _____

     _____

     _____

8. Have you had any special training since taking your current job?

     ☐ Yes   ☐ No

     If yes, ask: on what?_____

     _____

     How long did it last? _____

     Was the course worth your time? _____

9. What do you think, or hope, will be your next position? _____

_____

10. Who is your supervisor? _____

What is his title? _____

11. Who reports to you? _____

How many: _____

Titles: _____

Section 2: General Questions on Your Job

1. If you had to break your duties into 3 or 4 major categories, how would you do it?

    Here are some examples to help you.

    (Hand them sheet of paper.)

    (A) _____

    (B) _____

    (C) _____

    (D) _____

    (E) _____

    (F) _____

2. If safety is NOT on list:

    You didn't mention safety as an area. Did you omit it or do you think of safety as part of these other categories?

    _____

    _____

    _____

3. Is there a written description of your job?

    [] Yes   [] No

    If yes, (ask for a copy)

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EXAMPLE CATEGORIES

How you spend your time:

DOING INSPECTIONS

ON PEOPLE PROBLEMS

CONDUCTING OPERATIONS

EQUIPMENT MAINTENANCE

GOING TO MEETINGS

WRITING REPORTS

PAPER WORK

4. As far as your total time at work goes, what percent of your time do you spend on each of the following activities?

(Hand them a list to fill in and a pencil)

Activity	% of Time
Report writing	_____
Going to meetings	_____
Inspection of equipment and site	_____
Conducting daily operations	_____
In emergency situations	_____
With employees' problems	_____
Inventory and ordering supplies	_____
Receiving and making assignments	_____

5. Can you think of any of your important duties that I left out?

[ ] Yes   [ ] No

If yes, what are they? _____

_____

_____

_____

_____

Activity	% of Time
Report writing	_____
Going to meetings	_____
Inspection of equipment and site	_____
Conducting daily operations	_____
In emergency situations	_____
With employees' problems	_____
Inventory and ordering supplies	_____
Receiving and making assignments	_____

6. I see you spend the greatest proportion of your time on _____
                                                              (Fill in)

   What are your major problems in _____
                                              (Fill in)

   _____

   _____

   _____

   _____

7. Are there any of these duties where you feel additional training would improve your performance?

   ☐ Yes   ☐ No

   If yes, which ones: _____

   _____

   _____

8. What about your superiors? Can you think of any area where they need more training?

   ☐ Yes   ☐ No

   If yes, what? _____

   _____

   _____

   _____

9. What about the people reporting to you? Is there any additional training you would like to see them get?

   ☐ Yes   ☐ No

   If yes, what? _____

   _____

   _____

   _____

Section 3:   General Questions on Safety

1. What are your major responsibilities, in general, in the area of safety?

   _____

   _____

   _____

   _____

2. A few minutes ago you mentioned you spent _____ % of your time on _____ .
   What are the safety issues in _____ that you do or are responsible
   for doing?

   _____

   _____

   _____

   _____

   _____

   _____

3. Do you generally make policy or carry out the orders of your supervisor when it comes to
   safety matters?

         Make Policy   Implement Policy

   (Depending on previous answer EITHER)

   Who does make the safety policy for this mine? __ _____

   _____

   OR

   Who is in charge of implementing the policies? _____

4. In general, do you have checklists to go through periodically for safety measures or do you just
   recognize a hazard as you perform your duties?

         ☐ Checklist   No Checklist

   (If checklists, get copies and note frequency used on each.)

5. Do you receive reports on accidents that allow you to see how your men do?

☐ Yes ☐ No

If yes, do these reports show your men in comparison to the rest of the mine or mines in the state, or mines across the nation?

☐ Yes ☐ No

6. Do you ever set goals in terms of reduced accidents or improved safety for your men?

☐ Yes ☐ No

If yes, how do you communicate these goals to your men?

_____

_____

_____

How often do you do this? _____ times/year.

7. In assigning tasks to units or individuals, do you take into account their past performance relative to accidents and safety matters?

☐ Yes ☐ No

If yes, how? _____

_____

_____

8. What is the responsibility of _____, your boss, in safety matters?

_____

_____

_____

_____

9. What are the safety duties of the men working for you?

_____

_____

_____

_____

Section 4: General Questions on Regulations

1. When was the last time you were aware of new Federal or State regulations?   _____ Year

2. Did you have any special meetings or training in order to learn about these regulations?

    [ ] Yes   [ ] No

    If yes, what? _____

    _____

    _____

3. Are these the most important set of safety regulations the mine follows?

    [ ] Yes   [ ] No

    If no, what are? _____

    _____

    _____

4. What affect did the _____ regulations have on the operation of your mine?

    _____

    _____

    _____

    _____

    Were there any changes to you on the job?

    [ ] Yes   [ ] No

    If yes, what? _____

    _____

    _____

5. In overseeing the work of your men, how do you insure that they perform their work safely and in accordance with the regulations?

    _____

    _____

    _____

    _____

Section 5: Tasks and Their Safety Considerations

Tasks:

1. Receive and make work assignment

2. Conduct pre-work inspections

3. Conduct operations

4. Inventory and order supplies

5. Troubleshoot problems

6. Write reports

TASK: _____
(Fill in number)

Safety Duties	Purpose		Interpersonal Relations	Time	Equipment	Environment	Skill/Knowledge Needed	Problems	Training Needed	Criteria for Knowing Done Correctly
1		[ ] Do yourself [ ] Delegate to whom? _____ _____ _____							You [ ] Men [ ] Boss [ ]	
2		[ ] Do yourself [ ] Delegate to whom? _____ _____ _____							You [ ] Men [ ] Boss [ ]	
3		[ ] Do yourself [ ] Delegate to whom? _____ _____ _____							You [ ] Men [ ] Boss [ ]	

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Appendix B

TASK LISTS FOR MANAGERS AND SUPERVISORS

TASK LIST
FIRST-LINE SUPERVISOR

	Job Significance	Training
Pre-Shift Activity		
<u>Communicate with peers and higher management</u>		
Receive orders for days work—shift foreman	_____	_____
Discuss situation with off going section foreman	_____	_____
Discuss situation with fire boss	_____	_____
Receive directives from shift foreman/mine superintendent regarding safety, mine policy, new operations	_____	_____
Discuss equipment condition with maintenance foreman	_____	_____
<u>Represent crew to higher management</u>		
Cite needs of the crew	_____	_____
<u>Plan daily work activities</u>		
Estimate supplies needed	_____	_____
Estimate manpower requirements	_____	_____
Investigate potential problems	_____	_____
Plan work	_____	_____

<u>Significance for Job.</u>

5 - Highly important part of job
4 - Important part of job
3 - Moderately important part of job
2 - Part of job but <u>not</u> important
1 - Insignificant part of job
0 - Not part of job

	Job Significance	Training

Shift Activity

Organize crew and equipment for work

	Job Significance	Training
Check condition and inventory of supplies	____	____
Communicate with crew members	____	____
Represent company to crew	____	____
Discuss safety regulations	____	____
Discuss policy regulations	____	____
Motivate crew members	____	____
Build teamwork within the crew	____	____
Check condition of worksite (housekeeping gas checks, ventilation curtain, water)	____	____
Check condition of equipment	____	____
Give orders and instructions about the work	____	____
Instruct crew members on how to handle problems	____	____
Troubleshoot problems as they arise	____	____
Check work of crew members	____	____
Train crew members on the job	____	____
Enforce policies, procedures, safety rules	____	____
Handle complaints of crew members	____	____
Counsel crew members about their work performance	____	____
Handle conflicts between crew members	____	____

End of Shift

	Job Significance	Training
Counsel crew members who have problems	____	____
Prepare reports and paperwork	____	____

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Mine _____

Title _____

TASK LIST
MIDDLE AND UPPER MANAGEMENT

	Job Significance	Training
Plan Long Range Operations		
Set goals	_____	_____
Set objectives	_____	_____
Discuss with subordinates	_____	_____
Formualte and review policies, procedures	_____	_____
Plan Short Range Operations		
Organize personnel and equipment for work	_____	_____
Coordinate activities of several units/departments	_____	_____
Discuss with subordinates	_____	_____
Discuss with higher management	_____	_____
Review work of subordinates/lower level units	_____	_____
Represent department to higher management	_____	_____
Interpret and execute policies	_____	_____
Train personnel	_____	_____
Direct-On-going Operations		
Communicate with subordinates	_____	_____
Control internal business affairs (costs, budgets, inventory/order supplies)	_____	_____
Prepare records and reports, paperwork	_____	_____
Troubleshoot technical problems	_____	_____
Counsel subordinates about their work	_____	_____
Advise and instruct subordinates on work problems	_____	_____
Handle conflicts between subordinates	_____	_____
Counsel subordinates who have problems	_____	_____

Significance for Job

    5 - Highly important part of job

    4 - Important part of job

    3 - Moderately important part of job

    2 - Part of job but not important

    1 - Insignificant part of job

    0 - Not part of job

For each major activity (planning long range, planning short range, directing on-going operations, controlling business affairs), as the following three questions:

1. Tell me a little about what you do in this area of activities.

2. In this area, what gives you the most problems?

3. How do you usually handle them?

DATE

ILMED

_8