

Technical Report 601

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**DEVELOPMENT AND EVALUATION OF MANAGEMENT
ALTERNATIVES, JOB PREPARATION PACKAGES
AND BATTLE DRILL GUIDELINES:
FINAL TECHNICAL REPORT**

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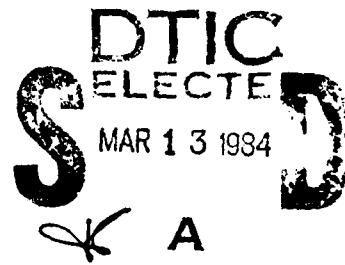


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battery personnel actually do based on extensive questionnaires and observations; and a description of job and career preparation procedures.

Phase II - Design and Test Planning - included research to identify and design innovative garrison management approaches and research to identify and design appropriate job performance aids to assist job holders cope with their requirements.

During Phase III - Testing and Refinement - the management recommendations were tracked and the job aids tested and refined.

The report presents an overview of the entire research project, describes products and test results and summarizes key findings. A bibliography of twenty-two reports which contain the detailed methodology, results, and conclusions for each portion of the project is included.

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FOREWORD

The Monterey Field Unit has as its primary mission, execution of research to improve training in units. The Unit Training Programs (UTP) Team has concentrated over the past several years on the unit training environment.

Unit training is today governed by the Battalion Training Management System (BTMS). The UTP Team conducted the research and development underlying the BTMS for the Army Training Board (proponent for unit training management) during the period 1975 through 1978. A field test of the prototype BTMS held during 1978 demonstrated that a hostile training environment could easily frustrate any training management system. At the request of DCSOPS Training, FORSCOM DCSOPS, and the Army Training Board, research was conducted from 1979-82 to determine how to improve the unit training environment.

This report provides a comprehensive summary of the entire three year research program, along with detailed references to the research reports that were written.



EDGAR M. JOHNSON
Technical Director



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ACKNOWLEDGMENTS

This report summarizes a three-year research project for the Army Research Institute and provides a bibliography of the twenty-two resulting reports. The research was performed by the Presidio of Monterey Office of McFann, Gray & Associates, Inc., under contract number MDA903-79-C-0194. Dr. Howard H. McFann was the Project Manager, and the Project Directors were Mr. Michael R. McCluskey, Mr. Steven Funk, and Dr. Paul R. Best. During the course of the project the staff included: Ms. Marian Alden, Mr. Roy Avant, Mr. Joseph Barron, Ms. Beth Batzer, Dr. Hilton Bialek, Dr. Marsha Palitz Elliott, Ms. Nancy Euske, Ms. Sandy Galuppo, Mr. Thomas Gambell, Mr. Robert Giesler, Mr. J.T. Harden, Dr. Carol A. Johnson, Ms. Wendy McGuire, Mr. David Nichol, Mr. Kay Rigg, Ms. Jami Salas, Ms. Aurelia C. Scott, Ms. C.J. Sons, Ms. Rhonda Talley, Mr. Howard Tokunaga, Mr. George Vandecaveye, and Ms. Mary Anne Wood.

The Chief of the Army Research Institute Field Unit at the Presidio of Monterey was first Mr. Jack Sternberg followed by Dr. James Thomas. The Contracting Officer's Representative who provided technical guidance and review throughout the project was Dr. Jack Hiller. The Military Research and Development Coordinators for the field unit were Major Don Loftus and Major Thomas Jones. Dr. Robert Holz, Chief of ARI's FORSCOM Scientific Coordination Office, provided critical input to the project as well as arranging for timely FORSCOM support.

The research for this project was conducted principally in the 7th Infantry Division, Fort Ord, California, and was coordinated by the Division G-3s (COL Phillip Browning, COL Robert Ord, and LTC J. Howard) who assisted the research effort by developing schedules of activities, arranging for personnel to complete interviews and questionnaires, providing access to units for observation, and generally providing support and encouragement throughout the project. The project itself was initiated at the request of the Chief of Staff of the 7th Infantry Division at the time (now MG John Hemphill) and sustained by 7th Infantry Division Commanders MG Philip Feir and MG Thomas Ayers. The project staff expresses their deep appreciation to the leaders and members of the 7th Infantry Division who contributed their time and energy.

DEVELOPMENT AND EVALUATION OF MANAGEMENT ALTERNATIVES, JOB
PREPARATION PACKAGES AND BATTLE DRILL GUIDELINES: FINAL
TECHNICAL REPORT

BRIEF

Requirements:

This report summarizes a three-year research program to improve the efficiency of garrison management of infantry companies and field artillery batteries; to enhance the abilities of company/battery commanders to develop and manage effective and efficient combat training; and to enhance the development and job performance of non-commissioned officers.

Procedures and Findings:

Phase I - Information and Synthesis - produced a compendium of all company/battery official requirements; research results as to what company/battery personnel actually do based on extensive questionnaires and observations; and a description of job and career preparation procedures.

Phase II - Design and Test Planning - included research to identify and design innovative garrison management approaches and research to identify and design appropriate job performance aids to assist jobholders to cope with their requirements.

During Phase III - Testing and Refinement - the management recommendations were tracked and the job aids were tested and refined.

The report presents an overview of the entire research project, describes products and test results and summarizes key findings. A bibliography of twenty-two reports which contain the detailed methodology, results, and conclusions for each portion of the project is included.

Utilization:

This report is useful for reviewing the general approach and findings in each of the research areas and as an index to the project publications.

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INTRODUCTION

Time is a critical, scarce resource which Army units must use efficiently to accomplish their missions. Army units are staffed and organized to conduct combat missions. To perform these missions effectively in combat, the units must devote considerable time and resources to peacetime training. Moreover, effective training demands extensive effort devoted to scheduling, planning and assigning personnel, resources, and ranges in addition to the training itself.

The time to conduct and manage combat training requirements is constantly threatened by competing demands on the units. The bulk of these competing demands may be classified as garrison and administrative tasks. These garrison and administrative tasks emanate from a variety of sources. Post support activities require soldiers to perform special duty assignments in essentially civilian jobs. Individual job training prior to unit assignment has been reduced resulting in the need for more individual job training and training administration in units. Finally, changes in the recruiting pool require more basic skills education and job supervision to prepare soldiers before individual or collective training can be conducted meaningfully.

Because of this increased demand on the time and resources available in units, FORSCOM asked ARI to develop ways to increase the time and resources available for training. Based on this request, a three-year research program was designed and executed by contract (McFann, Gray & Associates, Inc.) and by ARI personnel (Unit Training Programs Team of the Monterey Field Unit). This report provides a comprehensive summary of the research conducted in this program.

There were nine specific objectives covered by the research program that supported the design of garrison management innovations. The first three of the objectives were met during the first year. As stated in the contract Statement of Work, these were:

1. "Determine the organizational policies from division, brigade and battalion sources that influence company/battery organizational procedures and identify the policies and functioning of companies and batteries by reviewing standard operating procedures and other administrative documentation, and by conducting structured interviews and administering questionnaires.
2. "Identify the specific job responsibilities and tasks performed by company/battery commanders and their subordinate officers and NCOs by observing job activities, and by employing structured interviews and questionnaires.
3. "Determine the procedures and materials used for job training of company/battery commanders, their subordinate officers, and NCOs in an operational FORSCOM Infantry division by reviewing their job preparation training programs."

During the second contract year, three objectives were specified by the Statement of Work:

4. "Formulation of innovative management procedures which will reduce the time lost to garrison/administrative tasks.
5. "Design of job aids to support implementation of the innovations, the performance of routine garrison/administrative tasks and the acquisition of professional skills by company grade NCOs.
6. "Design of implementation plans, procedures and materials to enable a field test of second year's research products."

The three objectives of the third contract year were:

7. "Further develop, evaluate and refine garrison management innovations and implementation procedures.

8. "Evaluate and refine job aids designed to support efficient performance by company grade NCOs and officers.
9. "Evaluate and refine a guideline designed (by ARI) to aid TRADOC school developers of small unit training systems, based on battle drills."

Figure 1 illustrates the interrelationship of the nine objectives. Phase I (Year One) produced the information base which was used in the subsequent phases. Company/battery requirements were compiled from all available official documents; actual tasks conducted in companies and batteries were determined; and job and career preparation procedures were revised. During Phase II, research into management approaches and job aids was conducted to develop techniques to help units cope with their requirements. Phase III was designed to test, evaluate, and refine the procedures and products.

The following sections of this report present an overview of the entire research project, describe products and test results, and summarize key findings. References are provided to the specific reports which contain the detailed methodology, results, and conclusions for each portion of the project.

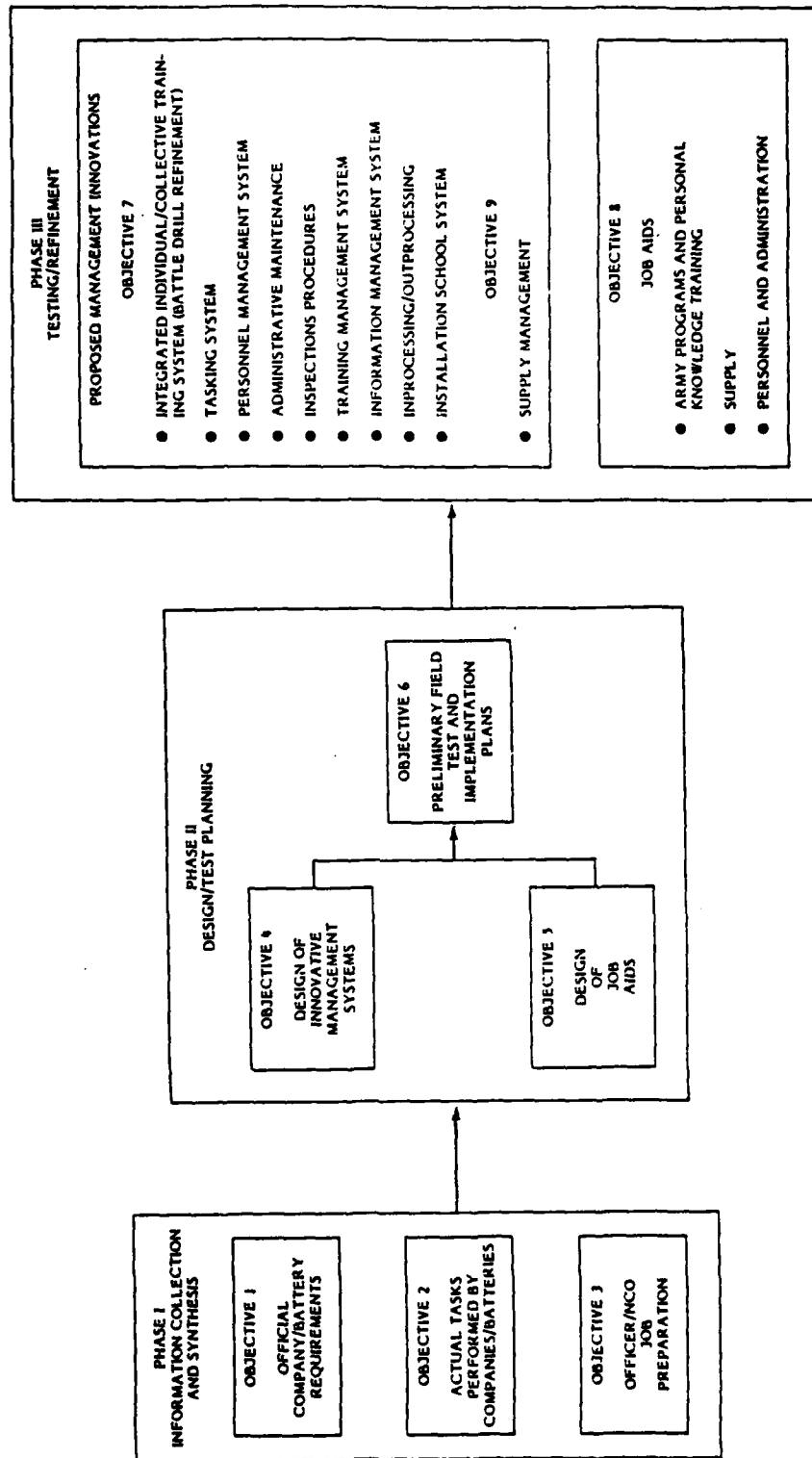


FIGURE 1: RESEARCH OVERVIEW

PHASE I

The first phase of the project was devoted to defining the problem, identifying sources of existing information, gathering information, and identifying data which might be developed through new research. The project information requirements fell into three categories: missions, job responsibilities, duties and tasks required of Infantry Companies and Field Artillery Batteries (Objective 1); job responsibilities and tasks actually performed (by company/battery commanders, officers and NCOs) (Objective 2); and procedures and materials used for job training and professional development of FORSCOM company/battery commanders, officers, and NCOs (Objective 3).

OBJECTIVE 1: REQUIRED MISSIONS, RESPONSIBILITIES, DUTIES AND TASKS

A compendium containing all of the documented, required missions, responsibilities, duties, and tasks in Infantry Companies and Artillery Batteries was developed. The contents of this compendium were derived from Army Regulations, Field Manuals, local publications (from the Fort Ord MOS Library), DA Pamphlets, FORSCOM Circulars and Regulations, TRADOC Pamphlets, Modified Tables of Organization and Equipment (MTOES), unit Standard Operating Procedures (SOPs), Battalion Goals memoranda, monthly training schedules, Training Notes, and interviews and discussions with division and unit level officers and NCOs. The interviews were used to locate or identify sources of requirements. The final compendium contained only entries found in official documents.

This compendium, entitled Missions, Responsibilities, Duties and Tasks of Infantry Companies and Field Artillery Batteries (Giesler, Harden, Best, and Elliott, 1980) was published as an ARI Research Report. An initial framework for classifying combat and non-combat activities was derived as part of the project and is shown in Figure 2. The report by Giesler, et al., includes descriptions of both non-combat and combat activities. However, a major contribution of this

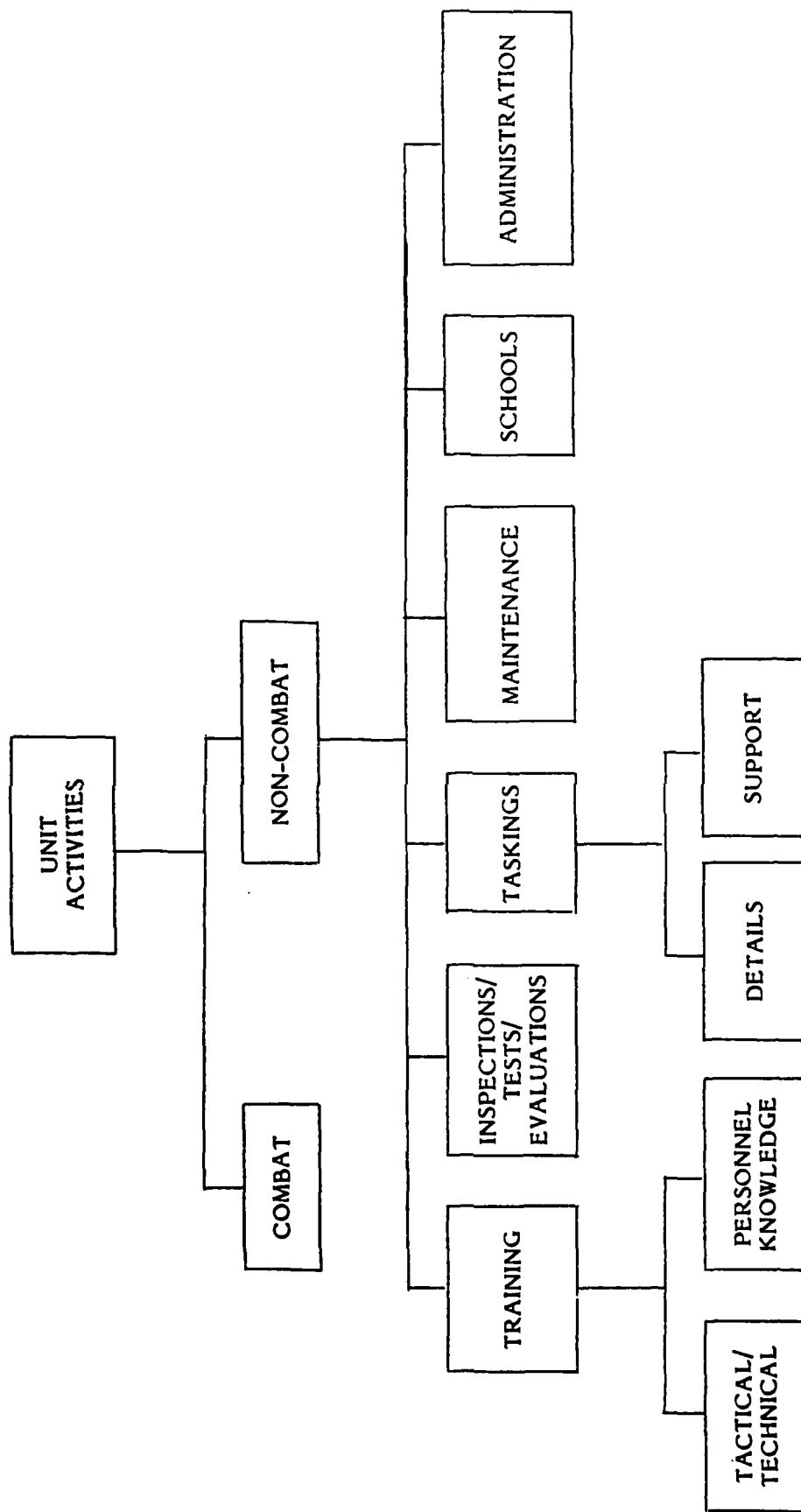


FIGURE 2: SCHEME FOR COMBAT AND NON-COMBAT ACTIVITIES

effort is the identification and cataloging of all the non-combat or garrison/administrative requirements. The major non-combat activity classifications are defined in Table 1.

TABLE 1: NON-COMBAT ACTIVITY CLASSIFICATION

1. **ADMINISTRATION.** Unit activities connected with required administrative procedures of the unit.
2. **INSPECTIONS/TESTS/EVALUATIONS.** Includes all the mandatory measurements, ratings, and evaluations activities.
3. **TASKINGS.** Two kinds of unit taskings are identified:
 - 3.1 **Support.** Those tasks performed by a unit in support of another unit's mission.
 - 3.2 **Details.** Special unit assignments not support connected.
4. **MAINTENANCE.** Includes unit activities required to maintain unit equipment.
5. **SCHOOLS.** All required activities provided by target unit or higher unit involving assignment of personnel for additional military related training.
6. **TRAINING.** Two distinct training activities are identified and they closely follow but are not necessarily synonymous with the collective-individual skill dichotomy.
 - 6.1 **Personal Knowledge Training.** Training activities which provide the individual soldier with information deemed essential for proper military performance and conduct.
 - 6.2 **Tactical/Technical Training.** Refers to training activities which provide practice in or preparation for carrying out of combat missions.

Each of the non-combat activities is described in this report using the format below.

- **Activity:** The missions, responsibilities, functions, and tasks in this report have been listed under the broad organizing title of "activity." The term "activity" is not a standard label or classification used in job and task analyses. As used in this report, the term refers to a "group of actions or subject areas that are widely different." The statements found to describe activities were very different in terms of specificity. The activities ranged from very broad subject areas such as "training management" to fairly specific sets of tasks such as "preparation of sick slip."
- **Missions:** An important consideration in identifying mission statements is the distinction between unit/element mission statements and a task description of a leadership responsibility: the former emphasizes requirements of the collective; the latter focuses on requirements of one individual. As a working definition of a "mission," the following criteria were applied to unit requirements. The requirement:
 - A. Must involve the official engagement of at least a sub-element of the unit; OR
 - B. is directed at all individual members of a unit, element, or sub-element and is to be provided by the unit, element, or sub-element; AND
 - C. must appear in printed form in an official Army document.

Using these criteria, attempts were made to examine all relevant Army documents. There are four main documentation categories:

- A. Army Regulations, Circulars, Directives, etc. These are issued at the Department of the Army level.
- B. Major Command Regulations, Circulars, Directives, etc. FORSCOM and TRADOC are the major commands most likely to be issuing documents relevant to this project.
- C. Division Regulations, Circulars, Directives, etc. These usually are identified as Fort Ord documents.
- D. Brigade Battalion SOPs. These documents generally translate directives from Division, major commands, and Army into operational requirements and are produced within the using unit.

Mission statements were often derived from more than one of the sources listed above.

- Responsibilities: The purpose of the responsibilities section was to identify specific responsibilities associated with the accomplishment of the mission and activity statements. The intent was to limit the statements to company/battery level or lower. However, in some cases, higher headquarters groups were listed when the responsibilities were shared or coordinated with the company/battery level. (Higher headquarters implies battalion level and higher.)
- Functions and Tasks: This category described the functions and tasks that "should" be completed by personnel in companies/batteries according to published Army doctrine. The main intent was to identify tasks for specific jobs which could be directly related to the accomplishment of the activities, missions, and responsibilities. In most cases, specific individuals were not identified.

- Frequency: This section provides the "frequency of occurrences" of the activities.
- References: This section documents the sources of information utilized in obtaining the information for the activities.
- Comments: This category is used to express pertinent information, either in the form of documented information or the authors' notes.
- Document Comparison: This category was listed only if multiple references were used and differences were found in the information presented. If several references were used and were consistent, or if they were used for different sections of the activity, the document comparison category was not used.

All missions, responsibilities, functions, and tasks are cross-referenced by responsible individuals, if specified, and by the document from which they were obtained.

OBJECTIVE 2: ACTUAL JOB RESPONSIBILITIES AND TASKS

While the Objective 1 effort was focused on the required unit activities, Objective 2 focused on the activities unit members actually spent their time performing.

Two sources of data were generated to identify which requirements/missions are actively pursued, and who spends how much time on them. The bulk of data came from an extensive job-task questionnaire, and the secondary source was extended observations of soldiers at work.

The questionnaire was constructed by building on the information in the Missions, Responsibilities, Duties and Tasks of Infantry Companies and Field Artillery Batteries report, (Giesler, et al., 1980) and by conducting structured interviews

of jobholders. The questionnaire was administered to a sample consisting of 163 jobholders, representing all types of units and duty positions, in the 7th Infantry Division (7ID). The specific objectives of the questionnaire were to determine 1) specific tasks performed by each jobholder, 2) the amount of time spent on each task, 3) the extent and nature of time spent on each task, and 4) those tasks or parts of tasks which could be performed by civilians in order to free soldiers for combat training. The questionnaire included 572 job tasks in seven categories:

- Administration
- Supply
- Tests/Inspections/Evaluations
- Taskings/Support/Details
- Schools
- Maintenance
- Training

As can be seen, the questionnaire contained an additional category (Supply) which has been subsumed under a broader one (Maintenance) in Objective 1. This is an example of the process of continual refinement which occurred throughout the project. While each phase built on earlier ones, the nature of the project required sufficient flexibility to incorporate new information or to focus the effort in a slightly different direction. Therefore, while there was a consistent theme to the project, it sometimes required an effort to track details through the entire three-year period.

The questionnaire responses were used to produce rank-ordered lists of time-consuming job tasks performed by jobholders in each of four key duty positions - company/battery commanders, first sergeants, executive officers and platoon leaders. These duty positions were considered most important because of their management, training, and supervisory responsibilities. In addition, these jobs represented major elements in the management systems to be developed. In terms of identifying areas for reducing the requirements of the major duty positions or increasing the efficiency of operations, the categories of Adminis

tration and Tests/Inspections/Evaluations appeared to have high potential for time savings and for redistribution of effort into training activities. The complete list of high time tasks is contained in a report entitled Actual Missions, Activities and Job Tasks in Companies and Batteries (Scott, Johnson, McCluskey, Tokunaga, Giesler, Whitmarsh, and Hiller, January 1980).

As mentioned earlier, in addition to questionnaires, information at the job-task level was collected by observing unit personnel performing their jobs. The total amount of time spent on each task performed was recorded. In addition, the following information was also collected:

- Type of unit
- Time of day
- Post cycle
- Duty position

Observational data were also collected on company/battery commanders, first sergeants, executive officers, and platoon leaders.

During the observation period, the subtasks performed as a part of each major task were described and recorded. These subtasks were used to more fully describe the management functions and content areas. Content analysis of these subtasks provided insight into the types of tasks which were time consuming. A content analysis of personnel management, for example, demonstrated that the first sergeant expends a large percentage of time with tasks related to the duty roster, meetings, and formations. Also, administration was an area in which the personnel spent a great deal of their time. Consistent with the questionnaire data, content analyses revealed that the most time consuming tasks in administration were providing information, reviewing paperwork, inspecting, and planning.

In order to compare the information from the two methods of data collection, the items in the task questionnaire were categorized into the broad content areas which matched the observation form (Johnson, Tokunaga, and Hiller, 1980).

For each duty position, the total percentage of time spent in each content category was computed for both the questionnaire and the observational data. These totals are presented at the bottom of Table 2. Due to rounding, the values for the questionnaire data may not equal 100%. The original observational data included two categories, Personal Activities and an overall Miscellaneous category, which were excluded from the analysis. This was because the task inventory did not contain parallel tasks. For that reason, the percentages for the observational data do not total 100%.

There was a systematic inflation of the absolute amount of time spent in the inventory responses. However, the large amount of variance accounted for, (e.g., 74% of the variance in the observation categories for the first sergeant was accounted for by the inventory responses) indicate that the data collected by the inventory was reliably related to the observation criterion.

Since the observation data is considered to be a valid estimate of job behavior, the Pearson correlation coefficients demonstrate the validity of the questionnaire data. The systematic inflation may be easily corrected by dividing each of the inventory task items (or the categories) by the total amount of time reported on the inventory. The proportional time estimates calculated this way may then be used directly, or absolute time estimates may be calculated by multiplying the proportions by the actual amount of time available within a given time span.

In November 1979, the data collection effort was expanded to five additional FORSCOM divisions. The purposes of this expanded data collection effort were:

- To expand the data base to include a sample of divisions in order to increase the generalizability of the effort.
- To collect further information on garrison/administrative problems at the company/battery level in order to identify the most common detractors to combat training across FORSCOM divisions.

TABLE 2: PERCENT OF TIME IN EACH ACTIVITY AREA AS DETERMINED BY INVENTORY (I)
AND OBSERVATION (O), CORRELATION COEFFICIENT, AND PERCENT OF VARIANCE ACCOUNTED FOR (r^2)

	CO/BC		XO		ISG		PL/AXO	
	% time I	% time O	% time I	% time O	% time I	% time O	% time I	% time O
Individual Training	7.15	14.77	3.71	10.35	2.07	5.70	7.49	16.52
Collective Training	3.67	7.11	1.83	3.78	9.04	1.18	1.60	4.53
Mandatory Training	6.82	1.35	1.34	2.14	1.72	.50	.50	5.38
Miscellaneous Training	17.25	14.22	7.86	8.88	3.74	4.09	11.52	10.29
Logistics	1.00	.67	.85	1.48	.13	.87	.93	3.79
Maintenance	11.34	3.37	19.79	12.83	.30	2.17	12.82	12.65
Supply	8.96	3.19	15.47	3.62	.95	1.98	8.09	7.56
Details/Support	2.29	3.92	2.38	3.78	1.51	3.04	.97	1.23
Housekeeping	3.24	.49	.85	1.81	4.65	6.51	.47	.76
Personnel Management	19.35	16.12	18.94	11.68	27.97	39.53	19.41	12.37
Unit Administration Miscellaneous	18.92	22.86	26.98	26.32	47.93	27.94	36.22	11.80
Total	99.99	88.07	100.00	86.67	100.01	93.51	100.02	86.88
	$r = .79^{**}$ $r^2 = .62$		$r = .83^{**}$ $r^2 = .69$		$r = .86^{**}$ $r^2 = .74$		$r = .63^*$ $r^2 = .40$	

*p .05
**p .01

- To collect examples of potential solutions to management problems at the company/battery level.
- To examine the utility of those solutions to the development of innovative management approaches with the 7th Infantry Division serving as a test bed.

The data were collected through structured interviews at division, brigade, battalion, and company/battery levels. In all, 198 interviews were conducted and a content analysis was performed on the data. The results of the data collection in the five divisions were presented in an ARI Research Report, Training Detractors in FORSCOM Divisions and How They are Handled (Funk, Johnson, Batzer, Gambell, Vandecaveye, and Hiller, May 1980). Table 3 presents the most significant detractors from training mentioned in the interviews. They are in rank order by level of command. The report presents a discussion of each problem area and potential solutions.

TABLE 3: MOST FREQUENTLY MENTIONED DETRACTORS TO COMBAT TRAINING BY LEVEL OF COMMAND IN FIVE FORSCOM DIVISIONS

Detractor	Company/ Battery N=66	Battalion N=70	Brigade/ DIVARTY N=32	Division N=30
● Low fill	1*	1	1	1
● Individual performance	2	3	3	3
● Turbulence	3	4	2	1
● Installation support and taskings	4	2	2	2
● Lack of equipment and material	5			
● Lack of time	6			

*1 = most frequently mentioned

OBJECTIVE 3: OFFICER AND NCO TRAINING AND PROFESSIONAL DEVELOPMENT NEEDS

The approach taken to Objective 3 was to describe in detail the process and procedures used to prepare Infantry and Field Artillery officers and NCOs for their jobs, and to evaluate the adequacy of the preparation. This research effort focused exclusively on training and preparation for non-combat activities which at this point in the project were defined to include:

- maintenance procedures;
- supply procedures;
- completion of administrative forms;
- unit record keeping;
- administration and assessment of training;
- personnel management activities (including counseling);
- tests inspections and evaluation; and
- training in garrison/administrative duties.

Since activities not directly related to combat preparation consume a large percentage of the workday, a logical question to ask is: "Are the personnel trained to handle the non-combat tasks?" This portion of the research effort examined the extent to which training for these tasks is provided and whether the training is appropriate and sufficient preparation for officers and NCOs. Each non-combat task was examined, and one of the following recommendations was made regarding the preparation and training it requires:

- no change;
- revise/clarify the documentation;
- develop job performance aids;
- coordinate/distribute existing materials;
- conduct on-the-job training; or
- develop formal/standardized training.

An ARI Research Report entitled The Process and Procedures Used for Job Preparation, Field Artillery and Infantry Officers and NCOs (Elliott, Harden, Giesler, Scott, and Euske, 1980) provides the results of this effort. The following topics are covered in the report:

- comprehensive description of the career progression of Infantry and Field Artillery officers and NCOs;
- description of resident, installation and unit training opportunities with discussion of course/class objectives, instructional procedures and class materials;
- cross-match of non-combat tasks with training relevant to each; and
- preliminary recommendations for preparing officers and NCOs for the non-combat activities based on the following information:
 - the time required to perform the activity;
 - the perceived importance of the activity;
 - the sources of training available;
 - the likelihood that training would reduce time spent on the activity;
 - the jobholders' perception of training required to adequately perform the activity; and
 - the researchers' experience in and knowledge of the Army system.

The results of this effort indicated the need for job performance aids to assist in a large number of non-combat tasks (the addition of training to already overcrowded TRADOC resident courses was considered out of the question and probably unnecessary given effective job aids). Research into the development of job aids began under Phase II, and during Phase III prototype job aid formats were produced and evaluated. These activities are described in subsequent sections of this report.

The Phase I - Objective 3 report (Elliott, et al., 1980) provides a useful reference of training sources cross-matched with training needs for non-combat tasks.

PHASE II

Phase II was designed to develop: company/battery management innovations which would free commanders, officers, and NCOs to devote more time to training (Objective 4); materials and procedures necessary to implement the management innovations, support routine garrison/administrative task performance and enhance professional development of officers and NCOs (Objective 5); and plans, procedures and materials for a field test of the Phase II research products (Objective 6).

OBJECTIVE 4: DESIGN OF ALTERNATIVE MANAGEMENT PROCEDURES FOR COMPANIES/BATTERIES AND DEVELOPMENT OF ASSOCIATED MANAGEMENT EVALUATION METHODOLOGY

Design of Company/Battery Management Procedures

Using the knowledge and experience gained during the first year of the project as well as drawing on personal experience and knowledge, the project staff held a brainstorming session to generate a list of problem areas and issues within the host division. The problem areas were rank ordered (see Table 4) by project staff and then used as a basis for generating management innovations. It should be noted that the problem areas were not independent from each other, but simply served to ensure that all important issues were considered.

The project team then generated an array of potential solutions to the problem areas. In addition to information collected in five other FORSCOM divisions regarding actual and suggested methods of handling similar problems (Funk, et al., 1980), team members used their knowledge of management theory and experience with the military system.

The top four problem areas in Table 4 were determined to be outside of the control of the division. They were, therefore, not addressed in generating potential solutions.

TABLE 4: RANK ORDERING OF PROBLEM AREAS IN THE 7ID

Problem Areas	Rank
Shortage of NCOs and Critical MOSs	1
Turbulence	2
Personnel Shortages	3
Characteristics of Incoming Personnel	4
Time Spent in Personnel Management	5
Taskings	6
Training Management	7
Information Management	8
Administrative Tasks	9
Maintenance	10
Supply	11
Inspections	12
Inprocessing/Outprocessing	13
Redundancy	14
Schools	15

The potential solutions to the remaining problem areas in Table 4 were categorized into nine areas:

- Inprocessing/Outprocessing
- How taskings are selected and distributed
- Training management
- Personnel management
- Information management
- Maintenance administration
- Supply management
- Inspection procedures
- Installation school responsiveness

An extensive array of potential solutions was generated in each of these areas. A simplified example of the solutions suggested for the problem area of inprocessing/outprocessing is shown in Figure 3. Note that a variety of approaches are listed, some of them contradictory. Other solutions may impact across several problem areas.

A series of military reviews were conducted to validate the problems, refine the alternative solutions, and to increase the probability of acceptance of the innovations.

The review process, as shown in Figure 4, included:

- review by panels of personnel from companies/batteries and battalions;
- review by Division Staff and Major Commanders;
- review by Chief of Staff and Assistant Division Commanders (ADCs); and
- information briefing to Commander, 7th Infantry Division.

This process took place during both Phase II and Phase III. In Cycle 1 of the military review process, the list of innovations was refined, and redundant and competing innovations were resolved. This process involved the participation of company, battery, and battalion officers and NCOs. Four panels of six subject matter experts each reviewed the suggested innovations, and they were revised to increase the feasibility of successful implementation.

Potential Approaches: Inprocessing
● Conduct inprocessing testing before unit assignment (<u>e.g.</u>, driver's test, ASVAB, BSEP) ● Develop a replacement battalion ● Develop procedures to more effectively process personnel on weekends ● Use chain-of-command sponsors
Potential Approaches: Outprocessing
● Batch process legal appointments ● Examine and streamline the separation process ● Design job aids for outprocessing procedures ● Create JAG assistance teams for unit legal personnel ● Have a system for outprocessing where an individual enters, is outprocessed, and leaves

FIGURE 3: EXAMPLE OF POTENTIAL SOLUTIONS INPROCESSING/OUTPROCESSING

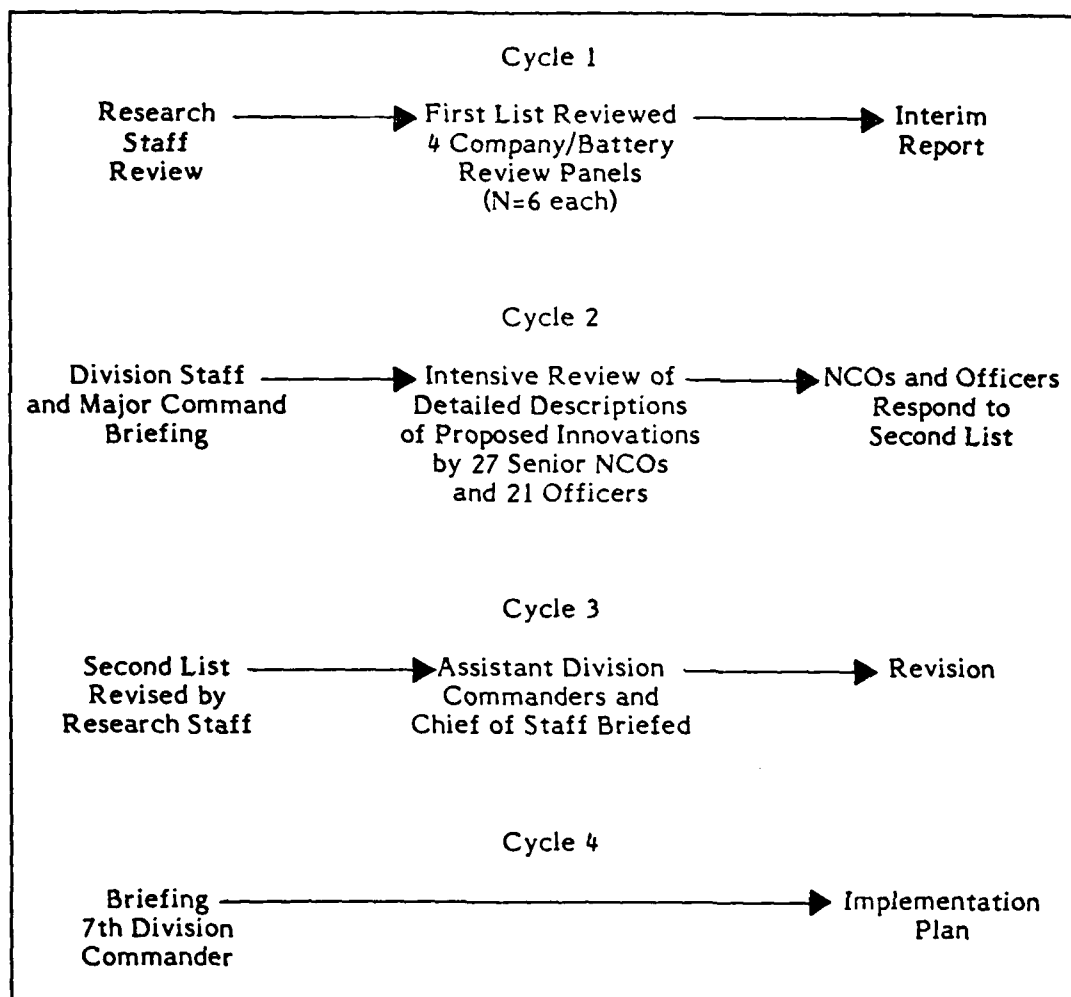


FIGURE 4: MANAGEMENT SYSTEM REVIEW PROCESS

During Cycle 2, written responses were collected from 27 NCOs and 21 officers at the major command and division staff levels. A content analysis was performed on the questionnaire responses, and again, the recommended innovations were refined.

The refined list of innovations was prepared for the Assistant Division Commanders and the Chief of Staff of the 7th Infantry Division. They determined that the innovations should be presented to the Commanding General. Prior to this briefing, personnel from staff sections which would be affected by the innovations worked with project staff to further refine the systems.

The latest version of the management innovations as of the end of Phase II is contained in the report Development and Implementation of Garrison Management Alternatives (Johnson, Funk, Elliott, Meliza, and Hiller, 1982).

Development of a Company/Battery Management Evaluation Methodology

A necessary component of the research program was a task which aimed to develop a methodology for evaluating the effectiveness of the garrison management innovations. A variety of unit effectiveness measurement concepts was identified at the outset of this task. These encompassed unit processes such as communication, decision making and gathering information, and unit performance topics such as accomplishment of tasks, appearance of personnel, AWOL rates, etc. Evaluation concepts were then developed for use in examining each of the management innovations.

Figure 5 summarizes evaluation dimensions associated with each of the candidate alternatives. As can be seen, the measurements address either the specific time spent performing a particular task or represent more general measures associated with the quality/effectiveness of soldier or unit performance.

Specific Evaluation Dimensions
Inprocessing/Outprocessing Unit: • Total time and elapsed time spent inprocessing/outprocessing by soldiers of each rank (i.e., enlisted, NCOs, officers). • Frequency of contacts between soldier and inprocessing/outprocessing unit. • Time spent by soldier at each exposure to I/O Unit. • Number of unprepared soldiers arriving in a unit. • Soldier morale. • Frequency/type of disciplinary problems. Tasking System: • Average lead time for taskings (distinguishing between heavy and light taskings). • Number of changes required in training plans due to taskings. Training Management System: • Training schedule changes over a fixed time period. • Time spent conducting training. • Reduction of preparation time for mandatory training. • Time planning and preparing for training. • Number/rate of acquired individual skills recorded in job books and/or auxiliary pages. • ARTEP effectiveness and efficiency. Personnel Management System: • Amount of time spent on personnel and administrative management. • Time spent searching for key information. • Frequency of personnel problems. Information Management System: • Time spent processing paper. • Decrease in the number of Fort Ord supplements. • The number of typed responses at the company/battery level.

FIGURE 5: SUMMARY OF EVALUATION DIMENSIONS

Maintenance Administration:

- Reduction in vehicles, with subsequent reduction in availability.
- Increase in mechanic time spent maintaining vehicles.
- Reduction in the total amount of deadline time spent on vehicles.

Supply Management:

- Reduction in processing time of supply reports.
- Number of times unit must borrow necessary equipment.
- Performance of units on command inspections.
- Decreased time spent by CO and XO in supply.

Inspections:

- Reduced time preparing for inspections.
- Reduced time correcting deficiencies.
- Number of courtesy inspections requested.
- Individual and mandatory skills acquired.

School System:

- Number of people attending school during inappropriate cycle.
- Improved job performance in areas which school addresses.
- Increased relevance of schools to job needs.

FIGURE 5 (Continued)

Measurements were defined to determine the "Time Savings" associated with each of the alternatives as compared to past standards at the company/battery level. These time savings can be converted to a dollar basis as discussed below. All time saved at the company/battery level (a desirable result of the innovations) would be reported even though the time burden for a particular function may have been transferred to a higher echelon and could result in either no change or an increase in net system costs.

Quality/effectiveness measures of soldier/unit performance are not necessarily directly convertible to dollars. Due to the subjective or general nature of these quality/effectiveness measurements, one workable evaluation approach is a scheme reflecting four general categorizations as shown in Figure 6.

Management Innovation	Quality/Effectiveness Performance			
	Degraded	No Change	Some Improvement	Much Improvement
	Index			
	-1	0	+1	+2
1				
2				
3				
Etc.				

FIGURE 6: PERFORMANCE MEASUREMENT

Several approaches to modeling the incremental costs associated with implementing the management innovations were examined. The prototype model which was developed for use during Phase III measured resources associated with each of the innovations in terms of three variables: people, facilities, and time. Dollar conversions of people and facilities can be based on standard Army comptroller factors. Time-to-dollar conversions can be based on person-year equivalencies costed at the average pay scale judged appropriate for the particular situation.

The following general algorithm provides the resource accounting rationale that was planned for each alternative innovation or current procedure to accumulate the net dollar savings costs associated with each innovation:

$$\text{Net \$ Savings} = \text{Time \$ Savings} - \text{Incremental Overhead Support}$$

Alternatives would be classed into one of three general cost-savings categorizations as shown in Figure 7. These broad categories allow for the degree of accuracy expected in the basic time and cost data that could be collected.

Alternative	Net \$ Savings		
	Minor or None 1 PYE*	Some Gain 1-5 PYE	Significant 5+PYE
1			
2			
3			
Etc.			

* Person-Year Equivalent

FIGURE 7: SAVINGS CATEGORIZATIONS

The overall merit of a particular alternative is based on its cost-savings category and its quality/effectiveness index. Figure 8 shows a potential composite cost-performance rating scale for use in classifying the alternative management innovations. In particular, this evaluation scheme can identify those alternatives that are clearly superior or those that are clearly inferior. For example, superior alternatives would be those offering cost savings with some or much improvement in performance (++) . Inferior alternatives would be those offering no cost savings and/or those resulting in degraded performance (-).

\$ Savings	Performance Index	Cost-Performance Rating
Significant	2 1 0 -1	++ ++ ++ -
Some	2 1 0 -1	++ + + -
Minor	2 1 0 -1	+ + + - -

FIGURE 8: COMPOSITE COST-PERFORMANCE

Implementation of the evaluation methodology was planned for Phase III. However, as discussed under Objectives 6 and 7, this was not feasible.

OBJECTIVE 5: DEVELOPMENT OF JOB TRAINING MATERIALS AND JOB AIDS

Identification and Prioritization of Tasks

The job task questionnaire developed during Phase I contained a total of 572 job tasks associated with garrison/administrative duties of Infantry companies and Field Artillery batteries. Considering the number of these job tasks and the limited contract resources available, it was necessary to develop a system with which to select and rank order tasks to guide the development of job preparation materials.

The initial prioritization took into account all the data collected from three different sources and resulted in three lists:

1. The results of the Job Task Questionnaire administered in the 7th Infantry Division during the first contract year were used (see Scott, et al., 1980, for the questionnaire). These tasks were prioritized by using the formula below:

$$\frac{\text{Percent Performing} \times \text{Time Spent} \times \text{Training Required}}{\text{Development Cost (in time)}} = \text{Working Priority}$$

2. A task list from the First Sergeant's School at Fort Bliss which categorized tasks into a first priority and a second priority level of interest (Barron, et al., 1981).

3. The data collected from officers and NCOs at five additional FORSCOM divisions which were rank ordered according to their reported needs for coping with garrison/administrative activities.

These task lists were merged and refined by identifying those tasks which would best meet the management needs of officers and noncommissioned officers in the field. This was accomplished by rank ordering these tasks under the functional areas utilizing a panel composed of:

- staff members of the research team which administered the questionnaires and conducted the field observations;
- staff members that conducted the field trips to the five additional divisions; and
- ARI staff members of the ARI/POM field unit.

The revised task list was then analyzed to identify those tasks which were both a Fort Ord priority and a First Sergeant's course priority. These tasks were placed at the top of the list under each functional area.

Examination of Existing Job Guidance and Training Materials

After identifying and prioritizing the tasks, relevant training materials were sought. Staff members of the research team visited four TRADOC schools to examine and collect relevant class materials.

The schools are listed below.

- Infantry School, Fort Benning, Georgia
- Field Artillery School, Fort Sill, Oklahoma

- Quartermaster School, Fort Lee, Virginia
- Institute of Personnel and Resource Management, Fort Benjamin Harrison, Indiana

Analyses of Selected Tasks

Detailed task information was obtained for each of the selected tasks by interviewing subject matter experts and reviewing relevant documents. The procedures included:

- Administration of a 125 item job-task questionnaire (Scott, et al., 1980) which employed three rating dimensions:
 - Total estimated amount of time spent to perform the task
 - Importance of the task for garrison/administrative activities or combat readiness
 - Type of job preparation required for successful task accomplishment
- Interviews to discuss the task analysis resulting from the questionnaire in terms of:
 - Completeness
 - Job tasks and task steps involved
- Production of a representative sample of job aids using a variety of design approaches.
- Initial critique - This stage consisted of an initial critique of the prototype job aids by ARI and subject matter experts at Fort Ord.

Four to six jobholders commented on each Job Preparation Package (JPP).

- Evaluation - Following the initial critique, the prototypes were deleted or revised to incorporate observations and comments. This review process continued into the testing phase in selected units in the 7th Infantry Division.

Tryouts of Job Preparation Packages (JPPs)

After the design issues were resolved through the review process, a set of 77 individual JPPs/job aids were produced to support 156 tasks grouped under six functional areas:

- Inspection Checklist Book
- Required Training Programs
- Correspondence Format Book
- Training Resource Book
- Soldier Problems/Referral
- Supply Book

Each of the job aids were reviewed by ARI and subject matter experts at Fort Ord. Modifications and refinements to the job aids continued into Phase III of the contract in conjunction with the field testing at Fort Ord. As a result of these reviews, the number of job aids was reduced to 54. The report, Development of Job Preparation Packages (JPPs) (Barron, Harden, and Funk, March 1981) lists original job aids and the tasks included under each functional area, and presents the job aids themselves. Field tryouts of job aids were conducted within operational units in the 7th Infantry Division during Phase III.

OBJECTIVE 6: DEVELOPMENT OF PRELIMINARY IMPLEMENTATION PROCEDURES AND MATERIALS FOR PROPOSED MANAGEMENT INNOVATIONS

The major activities in addressing this objective were to conduct pilot tests of the management innovations discussed above under Objective 4 and to prepare an implementation plan for the field test to be conducted during year three of the contract. The report, Implementation Plan and Issues (Johnson, 1982) presents the implementation plan and related considerations.

A prerequisite for completing the implementation plan was the completion of the design of the management innovations. This process involved review and critique of the innovations by increasingly higher levels of personnel at the division in which they were to be implemented (see Figure 4). At each level of review, the innovations were refined. Due to constraints encountered, which are inherent with conducting research in operations units, the management innovations were not finalized during Phase II. Therefore, it was not possible to develop and conduct pilot tests of the innovations during Phase II. However, a general implementation plan was developed.

The nature of most of the potential innovations and of the operational units precluded the use of a pure experimental design. Many of the innovations involved changes at division level making it difficult to isolate units not affected. The dynamic nature of the research environment also makes it impossible to ensure that changes in criterion data would be due solely, or even partially, to the innovation. In addition, there are a multitude of operational constraints limiting what can be done. The test plan, therefore, involved periodic collection of criterion data to allow analysis of trends. The data collection methods were tailored to each specific implementation approach, and to the operational constraints of the units involved in the research.

PHASE III

Phase III was designed to continue the research conducted during the first two phases with the goal of evaluating and refining the prototype research products, i.e., the garrison/administrative management innovations and implementation procedures (Objective 7) and the job aids (Objective 8). Work on one of the management innovations, Development of an Integrated Individual and Collective Training System, was carried out during Phase III by ARI in conjunction with the Army Training Board. ARI personnel developed Drill Training Objectives and associated materials which link together individual skill training (required by Soldier's Manuals) and collective skill training (required by ARTEPs). ARI produced a guideline for TRADOC designed to aid training developers to prepare small-unit drill training packages. The evaluation and refinement of this guideline constituted Objective 9.

OBJECTIVE 7: DEVELOPMENT AND IMPLEMENTATION OF GARRISON MANAGEMENT INNOVATIONS

The review process for the management innovations is reiterated in Figure 9. During Phase II, the management innovations were presented to the Assistant Division Commanders and Chief of Staff of the 7th Infantry Division (Cycle 3). During Phase III, the innovations were refined jointly with the appropriate 7th Division Staff members and then presented to the Commander (Cycle 4).

The development and refinement process spanned Phase I and II (approximately two years). During this time, the 7th Infantry Division took action to implement many of the recommendations in one form or another before experimental design and controls could be achieved. The actions taken make it impossible to conduct a formal evaluation. There was no possibility of collecting before/after data or establishing experimental and control groups. However, while it was not possible to document the extent to which changes were a function of the project, the Division Commander stated that it was instrumental. It is clear that one of the

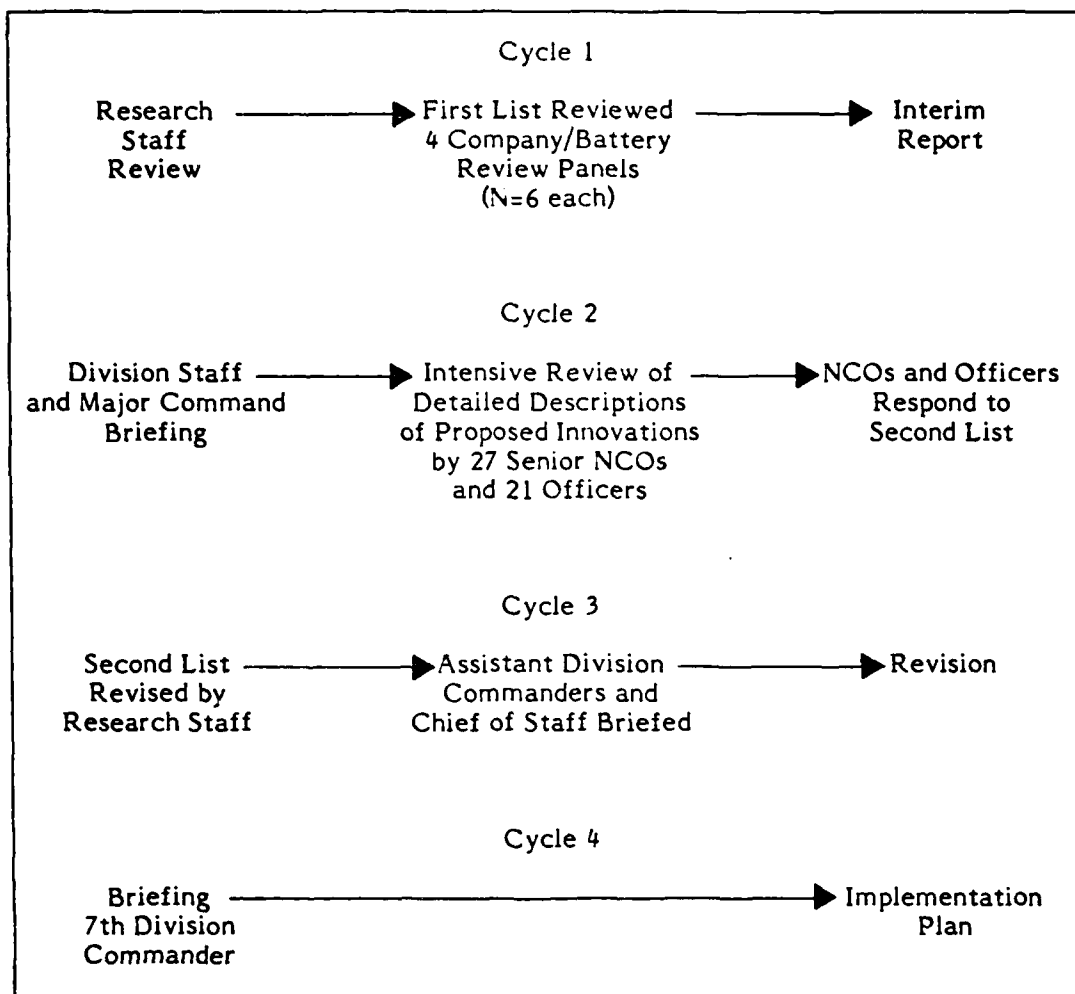


FIGURE 9: MANAGEMENT SYSTEM REVIEW PROCESS

goals of the project was accomplished in that many changes designed to increase efficiency did, in fact, occur. This section documents, to the extent possible, the actions taken regarding the various recommendations.

In addition to these actions, the division decided to support a formal field test of the job aids (discussed in the next section of this report and in Elliott, Harden, Meliza, Van Hoose, Barron, and Hiller, 1982) and the battle drill training package (discussed later in this report and in Barron, 1982) developed by ARI.

The results of this project also substantially contributed to the FORSCOM Training Environment Study (1980-81), whose focus was to reduce detractors and to develop initiatives to enhance the combat effectiveness of FORSCOM units. It also provided information to the DA Deputy Chief of Staff for Operations' (Training) Study on Training Detractors (1980-81).

- The following recommendations were implemented, in whole or in large part, by the 7th Infantry Division:

Centralize inprocessing including housing soldiers. (Recommendation partially implemented by 7ID. Letter dated 21 August 1980 describes procedures as including: Immunization, Issue of TA-50 field equipment, Defensive Driving Course, Administration of BSEP screening tests, Orientation of Fort Ord and surrounding area, Chaplain orientation, Educational opportunities.)

Make time used visible by establishing a "time bank." (Similar system adopted by 7ID approximately August 1980.)

Move training down the chain of command. For example, have NCOs attend the convoy classes and conduct the troop movements to Camp Roberts and Fort Hunter Liggett.

Adhere to scheduled cycles. Changing the length of the training or support cycle impacts on the quality of training for other units (e.g., holding units in the field to act as ARTEP evaluators). (Adopted upon assumption of command by new Division Commander.)

Schedule routine medical and dental appointments only in the afternoon, leaving the morning for prime-time training.

Schedule routine administrative appointments during support cycle (e.g., not on birthdays) so personnel can be available for prime training.

Eliminate inappropriate requirements (e.g., Rape Prevention classes for all-male battalions).

Reduce the number of people involved in job books and extend the time allowed to conduct corrective training from 24 hours to one week. Job books currently take up a lot of time of unit leaders and are of limited use to the soldier. (Job books are no longer formally inspected, but are used by platoon personnel.)

Stabilize assignments of key personnel (i.e., all officers, E-7s and above) for 18 months.

Develop job aids for preparation of the OER, SEER, and EER.

Develop a job aid that lists the most common soldier problems, and provides references, locations, and telephone numbers of referral agencies handling common soldier problems. (Developed by DPCA.)

Allow each battalion commander a quota of courtesy inspections from division. Inspection teams would provide results to the battalion commander and function as an MTT. (Courtesy inspections are available.)

Reduce time spent acquiring support from other units.

Direct inspection teams to provide technical advice and assistance during inspections to increase skill in units and reduce leader involvement in administrative tasks.

Have COMET and IG use same criteria for inspections. This will reduce training and preparation time in units. (COMET eliminated 2 Apr 81.)

Institute an unannounced IG with lower standards. (Unannounced IGs implemented 15 Jan 81.)

Restructure maintenance standards.

Develop and disseminate all inspection checklists (including IG) in a tabbed notebook form to company/battery level. This will reduce disruption of training programs for last minute preparation. (Unannounced IG policy eliminates preparation time. Guidance handbook has been prepared by IG for dissemination.)

Develop a resource book with examples of supply procedures for officers and NCOs to reduce errors and learning time.

Assign assistant division staff officers from operational units so staff officers are sensitive to operational constraints in units. (Current 7ID policy.)

- The following recommendations received a positive response with the noted actions taken:

Centralize outprocessing. (There is currently a Central Clearance Roster; AG recommended no changes from current procedures.)

Put training schedule on word processor in PAC so they can be easily updated and corrected. Do not have PAC do training schedules, just use the machines. (Under consideration - dependent upon acquisition of additional word processors.)

Authorize a clerk and typewriters at company level; recognize it as an SD position. (FORSCOM has made a formal request to DA to change MTOE to provide clerk to units.)

Authorize key regulations at company/battery/ level: AR 600-200, AR 635-200, AR 220-35. This will reduce the time spent by unit clerks to get information needed to do their job. (AG agrees, no action taken.)

Program recurring reports on word processor at PAC (e.g., DA Form 638). (AG agrees, no action taken.)

Examine reporting system to identify and eliminate duplication. (AG agrees, no action taken.)

Develop a procedure to make it easier for unit commanders to award or change soldiers' MOSs. (Being examined at DA and FORSCOM level.)

Implement division policy which allows graduates to call or visit schools for consultation or technical advice. This reduces demand on unit leaders. (DPT agrees, no action taken.)

Extend the deadline for maintenance turn-in beyond noon. Current policy causes delays and interferes with morning operations. (G-4 agrees, no action taken.)

- The following recommendations were deleted based on input from various levels of command:

Control the number of training schedule changes.

Develop structured OJT programs for critical MOSs (e.g., 76D, 76Y, 63B, 71L).

Develop standardized ARTEP scenario for frequently used ARTEP terrain (e.g., intel briefing, enemy situation, friendly forces, etc.).

Enforce TC-21-5-7 (e.g., examine whether training schedules reflect time to train for each level of command through squad).

Schedule time for corrective training after ARTEPs.

Use BTMS director and OESO with BTMS certification as BTMS consultants.

Develop standard job aids/work plans for mandatory training.

Establish an "Enlisted Week" every 6 months, in which NCOs and soldiers go to the field to conduct individual training under the command of the CSM. While the NCOs and soldiers are in the field, officers attend classes, conduct TEWTS for future training, etc.

Develop a trainer resource book that identifies training sources, materials, and services available at company/battery level; and the location and telephone numbers of Fort Ord training resources. This book would identify request procedures, special kinds of requests, and services available (e.g., construction of training aids, repositories for publications, etc.).

Put TEC trainer at CQ station with SQT tapes related to classes CQ must prepare.

Develop a training-event back-planning chart that identifies when requests must be made.

Perform all critical MOS training at post schools. Include evaluation of individual training as one day of a week long IG inspection. The IG inspection would include:

- 3 days - traditional IG stressing administration and equipment maintenance
- 1 day - mobilization test (e.g., perform three of ten major tasks for an EDRE)
- 1 day - mini-SQT with an abbreviated written test and three or four HOC stations conducted by NCO Academy.

Provide TEC trainers in barracks after normal duty hours with tapes related to SQT or subjects to be used in T-week.

Develop a master chart that identifies the individual skills required for each skill level of each ARTEP task (e.g., taken from platoon leaders and company commander training management books).

Schedule ARTEPS in the middle of training cycle.

Institute an on-post nuclear training program for artillery.

Make support cycle and/or school lengths coincide. For example, if PNCOC/BNCOC is going to be six weeks long, so should the support cycle so that: (1) the trained NCOs can be in their units during the training cycle, and (2) schooling can be completed in the support cycle. Long-term schools may be split between two support cycles. (DPT says not feasible.)

Lengthen BTMS planning horizons so personnel can learn as they plan and arrange required support. (ADC(M) says not feasible.)

Develop a systematic way to reward good training at all levels from squad leader level through battalion level, so that training is perceived as important as administration (e.g., reward tactical training with adventure training, mountaineering, survival training, rubber boat operations).

Develop competitions between units in battalions that consider performance of all sections (e.g., maintenance and supply as well as line platoons or crews) and that include training performance in addition to administrative task performance.

Develop a job aid for handling administrative discipline/administrative discharge procedures.

Examine the First Sergeant's Course to determine if it is responsive to unit needs and recommend changes to the POI and/or teaching methods, if appropriate.

Develop policy to ensure that personnel counseling is part of the junior NCO professional development program.

Eliminate any additional duties not mandated by FORSCOM or DA, or any that represent SD positions. This would partially reduce internal turbulence and time spent in administration. (AG says not feasible.)

Establish a post level school for newly assigned E-5s to last 3-4 weeks. Attendance would be required before an E-4 could be an acting NCO. (AG says not feasible.)

Prorate NCOs and critical MOSs between headquarters elements and line battalions, so that all the talent is not at headquarters. For example, have division headquarters staffing of E-6s and E-7s be the same percent of fill as Infantry battalions. (AG says not feasible.)

Authorize a civilian secretary for the Battalion Commander. (Deleted on basis of senior staff input.)

Develop internal SD document specifying internal SD authorizations at all levels of command. (Deleted on basis of senior staff input.)

Prorate NCOs and critical MOSs. (Deleted on basis of senior staff input.)

Establish a "survival skills" course for new E-5s and acting NCOs. (Deleted on basis of senior staff input.)

Restrict copies of correspondence to those who need them.

Develop division correspondence format books and distribute it to unit level. Provide several copies so that all who prepare drafts will have formats readily available.

Implement policy to use informal correspondence as much as possible, (e.g., handwritten memos, telephone calls).

Implement a policy and develop a procedure for changing DA and FORSCOM directives and regulations so that they do not have to be supplemented. Supplements cause additional training time for new personnel. (AG says not feasible.)

Preprint response format for required actions. (Deleted on basis of senior staff input.)

Develop a quarterly Division Update Packet. (Deleted on basis of senior staff input.)

Explore possibility of using CETA employees in maintenance jobs.

Develop job aids for training DMMC computer operators.

Conduct Routine DA Form 2406 review at brigade.

- Review would be attended by:
 - Brigade Commander
 - S-4s
 - BMDs
 - Shop Chiefs
 - Battalion Commanders
 - DISCOM Commander
 - DS Co Commander
 - FASCO
- Battalion commanders would brief 2406 status and problems or rationale.
- Priorities would be determined for DS Company support and tasks to be performed by units and DISCOM.

Use CETA personnel at GS and higher levels. (Deleted on basis of senior staff input.)

Track requests, due-outs, vehicle status, etc., on word processor or micro-computer.

Require battalion commanders, S-4, BMO and maintenance NCOs to meet with DISCOM-DS support personnel (e.g., DMMC, FASCO) on a regular basis (e.g., monthly/quarterly).

Use CETA employees in supply at consolidated installation activities. (Deleted on basis of senior staff input.)

Add positions to MTOE for supply personnel at company/battery level. (Deleted on basis of senior staff input.)

Include individual training in the IG inspection as one day of a week-long inspection.

Develop job aid that can be used in post schools and taken from the schools back to the job by graduates.

Establish MOS producing schools on post. (Deleted on basis of senior staff input.)

Implement a program to ensure that school content and graduate proficiency is responsive to changing unit needs. Any shortfall in responsiveness by schools must be compensated for by unit leaders. (DPT says not necessary.)

Evaluate current centralized and decentralized motor pools at battalion level to determine which method works best. (G-4 does not agree. Both systems are currently being used based upon commander prerogatives.)

Increase local maintenance training. (G-4 does not agree.)

Improve school system on post for mechanics and TAMMS/PLL CLERKS. (G-4 does not agree.)

Use contract training team to conduct training at battalion level in maintenance, records, etc. (Use retired NCOs and Warrant Officers through the local community college system or funded from Division funds.) (G-4 does not agree.)

Program recurring reports (e.g., DA Form 2406) in word processor at PAC. Do not have PAC prepare reports, just use their machine. Reduces preparation time. (G-4 does not agree.)

Place equipment in administrative storage when units are zeroed out. Excessive time to maintain this equipment is eliminated. Equipment can be rotated quarterly or semi-annually. (G-4 does not agree.)

- No action was taken on the following recommendations:

Allocate TMP administrative use vehicles to battalion or brigade/DIVARTY for administrative/garrison tasks in lieu of using tactical vehicles, e.g., two trucks per battalion.

Review Fort Ord regulations and supplements for usefulness and necessity by project teams made up of Brigade/DIVARTY/Battalion supply personnel.

The objective is the elimination of unresponsive or development of more responsive procedures. ARI will facilitate the process (e.g., training of project and review teams, development of process).

Review the Report of Survey process to reduce time spent investigating and processing.

Institute a centralized location for reports of survey at DMMC

Use GPLD more extensively for low-cost losses, e.g., under \$300.

Have Post Laundry pick-up/deliver laundry at company/battery supply rooms.

Centralize high-priced items with low demand, and decentralize other resources to reduce response time and the number of administrative actions to get parts.

Conduct personal knowledge and mandatory subjects on a minimum required schedule (e.g., once per year) at unit level. If soldiers receive initial training during inprocessing, units can conduct classes a minimum number of times.

Utilize same instructor to present subjects to different units in battalion.

A review of the actions taken by the Division to implement the recommended innovations was conducted in an attempt to determine if there were any patterns evident in the implementation decisions. It appeared during this review as though an "intuitive cost/benefit analysis" had been performed by the Division. Recommendations which appeared to be of relatively low cost and easily integrated into the current system seemed more likely to be adopted.

In an attempt to discover if this was indeed the case, three members of the project staff (a retired Army NCO, a retired Army officer, and a research psychologist) independently evaluated a preliminary version of the recommendations on their "costs" in terms of: a) extra people/time, b) extra money, and c) degree of disruption or change required in the current system. This panel also evaluated each recommendation for "benefits" in terms of: a) time/personnel saved, b) money saved, c) degree of improved efficiency, and d) potential improvement in combat training.

The raters used a five-point scale to independently rate the innovations on each of the above factors. The ratings for costs and the ratings for benefits were averaged for each innovation. Each innovation was assigned a "+" or a "-" depending upon whether the majority of the raters considered the benefits or the costs as higher.

Table 5 shows how these cost/benefit judgments related to the actions taken by the Division. As can be seen in the table, 83% of the recommendations which were implemented, in whole or in part, had benefits which outweighed the costs. In addition, 71% of the recommendations which received a positive reaction but which have not yet been implemented, had higher benefits than costs. However, only 37.5% of the recommendations which were deleted were rated higher on benefits ($\chi^2 = 9.39, P < 0.1$). It should also be noted that the majority of the innovations at this stage of the development process were found by this analysis to have greater benefits than costs.

Several cautions on these findings must be noted. The nature of the post hoc analysis allows for a possible bias of these results. The staff which rated the innovations had general familiarity with the changes which had occurred in the Division. It would have been preferable to have conducted this analysis with data collected from "naive" subjects. In addition, although the raters were fairly familiar with the impact of various recommendations, a more stringent analysis of the full range of impact could be conducted by collecting more objective data.

Nevertheless, it appears that the decision regarding whether or not to implement a given recommendation is related to a judgment regarding the relative costs and benefits. This implies that future research of the kind described here may benefit from application of this evaluation technique as a component in the development research plan.

TABLE 5: COST/BENEFIT RATING RESULTS FOR INNOVATIONS

	<u>Recommendations</u>			TOTAL N
	IMPLEMENTED	POSITIVE RESPONSE, NO ACTION	DELETED	
Benefits > costs	83% (15)*	71% (5)	37.5% (9)	29
Costs > benefits	17% (3)	29% (2)	62.5% (15)	20

*Numbers in parentheses are the number of recommendations rated. The total in each column varies from the number of recommendations in the prior section due to the version rated.

OBJECTIVE 8: EVALUATION AND REFINEMENT OF JOB PERFORMANCE PACKAGES

Evaluation was accomplished through intensive review by proponents and through use in the 7th Infantry Division. Specifically, four groups of subject matter experts reviewed the 54 job aids: course developers at the First Sergeant's School, Fort Bliss; training and supply/logistics specialists at the Quartermaster School, Fort Lee; subject matter experts at the Soldier Support Center, Fort Benjamin Harrison; and company/battery officers and NCOs at the 7th Infantry Division, Fort Ord.

The First Sergeant's School, Quartermaster School, and Soldier Support Center reviewed the job aids and provided both written and oral suggestions. Some of the recommendations were based on the necessity for updating job aids to keep current with the regulations. Format suggestions were also made. All of these suggestions were considered and incorporated as appropriate.

In the 7th Infantry Division, the job aids were evaluated through hands-on use. The three packages of job aids were distributed to two Infantry battalions and one Field Artillery Battalion at Fort Ord. The Headquarters and Headquarters Company/Battery plus two other units within each battalion were briefed on the development of the job aids and the procedure to be used to collect the evaluation data. The commander, executive officer, and first sergeant from each participating company/battery each received a personal copy of the three job aid books. Two additional copies of the set of aids were provided in each unit to be loaned to interested soldiers.

All users were asked to write their comments directly on the job aids including corrections, updates, and any additional suggestions. In addition, researchers visited the units on a bi-weekly basis and conducted brief interviews with the commander, the executive officer, the first sergeant, and those who had checked out the loan copies. These individuals were asked to assess each job aid they used in terms of its accuracy, its completeness, and the extent to which it saved time on the job. More general comments were also gathered regarding how the

job aids might be better packaged, the problems individual soldiers encountered in using the job aids: information which would help researchers determine how the aids would be best implemented. Users were also asked to identify any additional job aids which would help them carry out their garrison/administrative duties more efficiently and effectively. All of this information was summarized, and recommendations for modifications of the job aids were made.

Interview Results

The bi-weekly interviews produced specific comments which were consolidated with those suggestions written directly on the job aids. Most of these recommendations for revision identified references which were out of date.

In general, comments voiced during the bi-weekly visits were positive: 83.7% of the aids were seen as saving time; and the majority of aids were seen as accurate (94.6%), complete (83.9%) and useful (97.3%).

It is noteworthy that all individuals who participated in the evaluation asked to keep their copies of the aids. Further, approximately 20 additional sets were requested by others who did not take part in the evaluation, but who had heard about the aids.

Finally, as a further statement of their value, a large number of additional activities were identified during the interviews as requiring job aids by respondents at the 7th Infantry Division:

1. Maintenance
 - TAMMS Procedures
 - PLL Procedures
 - Requisition Procedures
 - Turn-in Procedures
 - Equipment accountability
 - Diagnostic system for solving common equipment failures
 - Files
 - Maintenance Planning

- Motor Pool Publications
- PMCS Procedures
- Supervisory Training for Maintenance Managers
- 2. COMMO
- 3. NBC
- 4. Legal matters
 - Pretrial confinement
 - Chapter Actions (including Chapters 5, 10, 13 and 14)
 - Record of Proceedings (Article 15, UCMJ)
- 5. Morale Support Fund
- 6. Health and Welfare Inspection

Overall, the job aids were seen as a useful tool helping officers and NCOs better cope with the many garrison/administrative requirements they face.

To help summarize these results and to give a final opportunity for users to provide feedback on the job aids, a summary questionnaire was distributed at the end of the field test period. This instrument was given to the 27 participating officers and NCOs, as well as to personnel who borrowed and used the loan copies. The total number of respondents was 31.

Questionnaire Results

Based on the summary evaluation, 70% of officers and NCOs participating in the field test used the aids. Typically, the respondent referred to between six and ten of the aids over the two-month evaluation period. Use does not appear to be associated with demographic variables (e.g., time in service, current position, current rank).

General comments indicated that the aids are very helpful as a basic guide. The majority of users agreed that the aids are useful as an orientation to one's job (52.2%); as a refresher (95.7%); and as a teaching aid to instruct subordinates on their additional duties (60.9%). Given the high turnover throughout the Army, the job aids are useful because they provide a quick overview of the new soldier's duties.

A number of comments were made during the evaluation period. Selected comments were then incorporated into a formal questionnaire. The responses to this questionnaire, summarized in Table 6, give the flavor of the general response to the job aids. In addition, respondents were asked to evaluate the formats of the job aids (which include a short summary of the garrison/administrative requirement, the military source(s) describing the requirement, specific procedural steps, and additional references). Almost all (93.5%) agreed that the formats were good.

TABLE 6: RESPONSES TO JOB AIDS QUESTIONNAIRE

Percentage of Responses*			
Agree	Disagree	No Comment	
Job aids as a supplement to the regulations:			
80.6	9.7	9.7	a. The job aids are a good consolidation of the regulations.
87.1	6.5	6.5	b. The job aids save time because you deal with one book rather than several.
71.0	12.9	16.1	c. The job aids saved me time I would have had to spend researching regulations, circulars, etc.
80.6	9.7	9.7	d. Generally I found the job aids easier to read than the ARs.
Job aids as a performance aid:			
77.4	9.7	12.9	a. If I had these job aids when I first took this position my job would have been much easier.
90.3	3.2	6.5	b. I know the procedures, but the job aids offer a good refresher.
74.2	6.5	19.4	c. The job aids are especially helpful given the high turnover. They provide a good orientation to the job.
83.9	0	16.1	d. The format is good. I can take out the needed sections and distribute them to the people who need them.

*To simplify the presentation, percentages are rounded to the nearest tenth. This accounts for totals varying from 100%.

Finally, respondents were asked for their overall evaluation of the aids. The responses were quite favorable. Based on a five-point scale ranging from 1 (Highly Disagree) to 5 (Highly Agree), the average ratings were 3.65 and higher for all the items as shown in Table 7.

TABLE 7: OVERALL QUESTIONNAIRE RATINGS OF JOB AIDS

Items	Mean Rating
The job aids were accurate.	3.81
The jobs aids were complete.	3.65
The job aids saved time on the job.	3.88
I feel the job aids should be instituted at Fort Ord.	4.08
I feel the job aids should be applied Army-wide.	3.92

Finalization of Job Aids

All of the 54 job aids were revised based on the evaluations by the four subject matter expert groups. Thirteen of the 54 required only word changes and the addition of items. The majority of aids, however, were extensively modified.

Aids with overlapping content were consolidated. For example, Develop/ Establish Unit Awards and Decorations Procedures was combined with Prepare/ Recommend Personnel for Awards and Decorations to produce Establish Unit Awards Procedures and Recommend Personnel for Awards.

Other aids required format changes. The aid, Solving Soldiers' Problems, for example, was modified to include a flowchart and detailed resource lists. The

aid focusing on Personnel Actions (DA Form 4187) was altered to reflect the decision-logic format suggested by course developers at USASMA. In each case, format changes were made to simplify job aid use.

Other aids required considerable updating to reflect reference changes (e.g., Evaluate Subordinate Enlisted Leaders; Prepare a Report of Survey; Prepare DD Form 1131, Cash Collection Voucher; Process Absentee's Clothing and Equipment; etc.). In one case, updated references even required deletion of an aid (Prepare a Government Property Lost or Damaged (GPLD) Report) since this task is no longer performed. Unfortunately, not all updated resources were available by the time of this publication (specifically AR 710-2 and the supporting DA Pamphlet 710-2-1 are unavailable until April 1982). Thus, several aids will need to be revised at a later point in time.

Discussion of Job Aid Evaluation

Several results emerged from the evaluation of job aids which have important implications for research on garrison/administrative job aids. This section provides a discussion of the evaluation results and recommendations for future research.

Job Aids Are Useful In More Efficiently and Effectively Completing Garrison/Administrative Requirements

The problem which sparked the research reported here was the significant amount of time devoted to fulfilling garrison/administrative requirements. Such requirements take up time which might, in part, be spent in the conduct of combat training. Officers and NCOs at unit (company/battery) level are inundated with administrative requirements and thus have a real need for guidance in carrying out their garrison/administrative duties. It is clear from the evaluation results that job aids can contribute to effective and efficient job performance.

A large majority of the officers and NCOs participating in the field test of job aids found the aids useful for more efficiently and effectively carrying out garrison/administrative requirements. Job aids were found to provide a good orientation to one's job, a method of orienting others to their job requirements, and a teaching aid with which to instruct subordinates on their additional duties. Some of these garrison/administrative topics are not taught in Army schools, and even when courses are available, given the large amount of personnel turbulence in today's Army, soldiers are frequently reclassified without an opportunity to attend relevant schools. The fact that job aids serve as an orientation tool, then, is of special importance.

Through research described in this report, a useful tool was identified for addressing and helping to alleviate the problem of fulfilling the large number of time consuming garrison/administrative tasks. At the same time, an important implementation problem was raised by the evaluation results - frequent changes in the regulations upon which the job aids are based.

Changing Regulations

The only persistent concern raised by the four subject matter expert groups which reviewed and evaluated the job aids was over the frequent changes in the documentation upon which the aids were based. How would job aids be updated to accommodate the flux in Army regulations? Could a format be designed which would be relatively immune to regulation changes?

In response to the concern over the regulation changes and their effect on the accuracy and usefulness of job aids, the researchers carefully examined the regulation changes which occurred during the time in which job aids were developed and field tested. In 14 months, approximately one quarter of the aids were affected by changes in the documentation upon which they were based. Of the 54 job aids which were field tested, 9% of the aids dealing with Army Programs and Personal Knowledge Training required updating due to regulation changes; 20% of the aids involving Personnel and Administration activities

required updating due to regulation changes; and 44% of the Supply aids required updating. (In fact, if those aids are included which will need to be updated in April to comply with the new AR 710-2 and DA PAM 710-2-1, the percentage of Supply aids requiring modification due to regulation changes jumps to 67%.)

There are a number of possible ways of addressing this implementation problem. The regulations themselves could be simplified and written in a job aid format. This would eliminate a middle step: as the regulation was changed, the aid would automatically change.

It is clear from the evaluation results that regulation changes do not influence all job aids equally. Some topic areas, such as Army Programs and Personal Knowledge Training, are more static in content. For these areas, the formats utilized in the present research suffice.

However, for those content areas which fluctuate such as Supply, design alternatives need to be explored which are relatively immune to regulation changes. One such format was suggested by the USASMA: a decision-logic format which would structure the requirement and then tell the user where to look to find answers to specific garrison/administrative questions.

Even with the development of special formats, inevitably some updating of job aids will be required. The Army is moving rapidly toward an organization-wide application of computers for management of administration, a natural trend given the numerous and complex tasks with which today's soldier is confronted. Computers could provide an efficient vehicle for updating job aids so that all Army units are functioning consistently and in accordance with current doctrine. In fact, by moving to a paperless, electronic office system, the regulations themselves could be written to include the details necessary to guide job aids; they could, in essence, contain job aids.

Recommendations

Thus, the implementation problem raised by the number of regulation changes found during the job aid evaluation suggests several directions for future inquiry. First, the possibility of adjusting the format of regulations should be explored. Second, research should be conducted comparing different job aid formats in terms of their resistance to regulation changes and their relative adequacy for guiding garrison/administrative tasks. Third, the application of computers to assist in job performance and in the process of updating job aids should be seriously examined.

Out of this inquiry would come a set of design specifications and implementation and management procedures which would make possible the effective application of job aids in the unit. In turn, the soldier would be better able to cope with and effectively carry out the myriad and time consuming garrison/administrative requirements.

An annotated list of the job aids is included in Appendix A. The full set of job aids is included as a volume of the report: Development of Job Preparation Packages (JPPs) (Elliott, Harden, Barron, Van Hoose, Meliza, and Hiller, 1982).

OBJECTIVE 9: EVALUATION/REFINEMENT OF A DRAFT GUIDELINE FOR PREPARING INFANTRY BATTLE DRILLS

As part of the overall project, an ARI in-house work unit developed a concept of integrating individual and collective training for small units (e.g., rifle squad, fireteam) (see Meliza, Hardy and Hiller, in preparation). The essence of this concept is to analyze the ARTEP missions to identify "chunks" or "slices" of battle which recur throughout the mission and thus constitute building blocks. Each of these "slices" or segments is the basis for conducting specific drill-like training. This training involves demonstrated proficiency of the personnel involved in all individual and collective skills required for the performance of

each drill. ARI staff conducted a tryout of selected light infantry drills with the 7th Infantry Division. A specific product of the ARI in-house research effort was the development of a Guideline For Designing Drill Training Packages which provides directions on how to analyze ARTEP missions to identify meaningful "drills" and provides guidance for the preparation of associated training materials to be used by trainers and training managers. Objective 9 provided a process for the evaluation/refinement of the draft guideline for preparing infantry battle drills. A summary of the various working phases of the project and some overall observations/recommendations concerning the final ARI draft Guideline for Designing Drill Training Packages are provided in this section.

As noted, the purpose of this effort was to provide constructive feedback during the development of the draft guideline based on its direct trial implementation by project staff. It was assumed that the guideline was being developed for use by infantry training developers although a broader user group was also envisioned by the review team. This working process, in effect, provided a practical test environment to examine the adequacy of the various parts of the guidance to explicitly convey their intended meaning.

The effort to critique the guideline took place in three stages. Each of these stages will be described in more detail below.

The working procedures in the first two stages included:

- Listings of selected ARTEP training tasks
- Development of a candidate list of drills
- Development of training objectives
- Development of training material

Five to six project staff members were involved in the drill development activities. This provided valuable internal staff dialogue during the test product development. It also provided a good sample base for evaluating the guideline as a vehicle for communicating the drill development procedure.

Working Procedure

The development of the Guideline itself took a period of several months, the completed draft being delivered in January 1982. During its preparation, various partial drafts were used as the basis for a continuing interstaff critique/dialogue between ARI and MGA. This ongoing dialogue could be characterized by three general stages which spanned Phase III.

1. Initial Development: This initial stage focused on the inter-relationship and roles of the various key training documents (ARTEP/Soldier Manuals/Technical publications, etc.) in the formulation and support of the Battle Drill Concept. It also provided the MGA professional staff the opportunity to apply the guidance contained in an initial draft guideline to the development of a series of Battle Drill Task Objectives for the light infantry. ARTEP 7-15 was the primary source document with draft ARTEP 71-2 as backup. This provided a rich opportunity to raise important definitional questions with ARI staff members.
2. Follow-on Draft Testing: This stage began with receipt by the project staff of a redraft of the Guidelines in July 1981. In this case, draft ARTEP 71-2 became the principal source document, and drill development testing was focused on the mechanized infantry squad-platoon. Similar procedures were followed as in stage one with five project staff members producing working drafts of several Drill Training Objectives. These were again critiqued by ARI and resulted in interstaff working dialogue. During follow-on draft testing, the Guideline was used to accomplish each of the following steps:
 - Drill Definition
 - Drill Training Objective Development
 - Drill Trainer's Guide Development
 - Roadmap Development

Drill trainer's guides and drill interrelationships (roadmaps) were developed during this period and the products were used as the basis for discussion with ARI. These discussions centered on how the Guideline could be altered to improve the drills which resulted from its use.

3. General Critique: This critique constituted the later stages of the project, up to and including the final report. The objective was to offer constructive comments/recommendations on improving the overall Guideline as a functional tool/vehicle for the development of drills by developers within all of the Combat Arms of the U.S. Army.

Recommended Revisions

The purpose of this evaluation effort was to assist ARI in producing a guideline of practical use to training developers in their working environment. It was also meant to support the concept of drill training as a most direct and useful method for improving the quality of Combat Army Training in the U.S. Army. It is the consensus of the project staff that the research approach taken by the ARI staff in the development of the drill guideline will result in a training tool lending significant leverage to unit trainers. The recommended revisions were offered to provide constructive feedback to the guideline developers.

A detailed critique of the guideline is contained in the report Evaluation/Refinement of a Draft Guideline for Preparing Infantry Battle Drills (Barron and Avant, 1982). The proposed changes include additional diagrams to assist the developer through the drill development process; suggestions on the organization of material leading to the development of training objectives; and a chapter which provides some tools for planning and controlling a drill development project. A recommendation was also made that a field test be included as part of drill package development prior to publication.

BIBLIOGRAPHY OF PROJECT REPORTS

PHASE I REPORTS

- Bialek, H.M., Best, P.R., Giesler, R.W., Harden, J.T., and Elliott, M.P., Missions, Responsibilities, and Goals of Combat Support Companies and Field Artillery Batteries, MGA Product Report, Presidio of Monterey, CA, April 1979.
- Best, Paul R., and Elliott, Marsha Palitz, Company/Battery Management Assessment Model, MGA Research Report, July 1979.
- Best, Paul R., Scott, Aurelia C., Johnson, Carol A., and Elliott, Marsha Palitz, Development and Assessment of Company/Battery Management Approaches, MGA Research Report, January 1980.
- Elliott, M.P., Giesler, R.W., and Harden, J.T., The Process and Procedures Used for Field Artillery Officer and NCO Job Preparation, MGA Product Report, Presidio of Monterey, CA, August 1979.
- Elliott, M.P., Giesler, R.W., and Harden, J.T., The Process and Procedures Used for Infantry Officer and NCO Job Preparation, MGA Product Report, Presidio of Monterey, CA, September 1979.
- Elliott, M.P., Harden, J.T., Giesler, R.W., Scott, A.C., and Euske, N., The Process and Procedures Used for Job Preparation: Field Artillery and Infantry Officers and NCOs, ARI Research Report, 1314, January 1980.
- Giesler, R.W., Harden, J.T., Elliott, M.P., and McCluskey, M.R., Duties and Job Tasks of Personnel in Combat Support Companies and Field Artillery Batteries, MGA Research Report, May 1979.
- Giesler, R.W., Harden, J.T., Best, P.R., Elliott, M.P., Missions, Responsibilities, Duties and Tasks of Infantry Companies and Field Artillery Batteries, ARI Research Report 1288, AD A099 989, September 1979.
- Johnson, C.A., Tokunaga, H., and Hiller, J.H., "Validation of a Job Analysis Questionnaire Against Intensive Observation." Paper presented at The Military Testing Association Meeting, May 1980, Montreal.
- McCluskey, M.R., and Bialek, H.M., Actual Missions and Goals of Companies and Batteries, MGA Product Report, Presidio of Monterey, CA, June 1979.
- Scott, A.C., Johnson, C.A., McCluskey, M.R., Tokunaga, H.T., Giesler, R.W., Whitmarsh, P.J., and Hiller, J.H., Actual Missions, Activities and Job Tasks in Companies and Batteries, MGA Technical Report, Presidio of Monterey, CA, May 1980.

PHASE II REPORTS

Barron, J.M., Task 2 Report: Design of Cost-Effective Evaluation Methodology, MGA Product Report, ARI Field Unit, Presidio of Monterey, CA, March 1981.

Barron, J.M., Harden, J.T., Funk, S.L., Hiller, J.H., and Whitmarsh, P.J., Development of Job Preparation Packages (JPPs), MGA Product Report, ARI Field Unit, Presidio of Monterey, CA, March 1981.

Funk, S.L., Johnson, C.A., Batzer, E., Gambell, T., Vandecaveye, G., and Hiller, J.H., Training Detractors in FORSCOM Divisions and How They are Handled, ARI Research Report, 1278, May 1980.

Funk, S.L., Johnson, C.A., Elliott, M.P., Rigg, K.E., Meliza, L., and Hiller, J.H., Proposed Garrison Management Alternatives, ARI Technical Report, March 1981. (This report was subsumed under Johnson, Funk, Elliott, Meliza, and Hiller, 1982.)

Johnson, C.A., and Scott, A.C., Evaluation Dimensions, Measures of Effectiveness and Method of Synthesis, MGA Product Report, August 1980.

Johnson, C.A., Task 4 Report: Implementation Plan and Issues, MGA Product Report, Presidio of Monterey, CA, February 1981.

PHASE III REPORTS

Barron, J.M., and Avant, R.L., Evaluation/Refinement of a Draft Guideline for Preparing Infantry Battle Drills: Final Report, MGA Product Report, February 1982.

Elliott, M.P., Harden, J.T., Barron, J.M., Van Hoose, H., and Hiller, J.H., Development of Job Preparation Packages, ARI Research Report (Final Draft), February 1982.

Johnson, C.A., Funk, S.L., Elliott, M.P., Meliza, L., and Hiller, J.H., Development and Implementation of Garrison Management Alternatives, MGA Product Report, February 1982.

Meliza, L., Hardy, G.O., and Hiller, J.H., Development of an Integrated Individual and Collective Training System, ARI Technical Report, in preparation, 1982.

APPENDIX

ANNOTATED JOB AID LIST

ARMY PROGRAMS AND PERSONNEL KNOWLEDGE TRAINING

Plan/Conduct a Training Meeting (Unit Leaders)

Guidelines for planning and conducting unit training meetings specifying participants and meeting content.

Responsibilities and Inspection Guidance for Dining Facility Operations and Food Preparation

Inspection specifications for Food Service Stewards, Cooks, Mess Attendants and Headcounters; procedures for accounting for rations; and directions for completing the meal card (DD Form 714), signature headcount sheet (DA Form 3351), cash meal payment sheet, meal guest register (DA Form 3032), and headcount record (DA Form 3933).

Weight Control Program

Requirements of Unit Commander in terms of identification of overweight personnel and necessary record keeping and counseling.

Fire Prevention Program

Listing of Unit Fire Marshal duties and Building Fire Marshal duties.

Crime Prevention Program

Description of required inspections and security procedures, and listing of Crime Prevention Officer duties.

Hearing Conservation Program

Procedures to protect areas from dangerous noise levels.

Physical Security Program

List of Physical Security Officer duties and description of procedures to secure equipment and supplies (vehicles and motor pool; hand tools, toolsets, kits and shop equipment; clothing; subsistence items; administrative/housekeeping supplies; repair parts; POL products; audio-visual and photographic equipment) and weapons (arms room; individual weapons; IDs; ammunition; TOW). Also specifies control of keys and locks.

Field Sanitation Team Training

Requirements of Commander and Field Sanitation teams to control basic environmental sanitation hazards.

Army Reenlistment Program

Guidelines for Unit Commander and Unit Reenlistment NCO in terms of displaying reenlistment publicity materials, conducting job performance/reenlistment interviews, preparing/reviewing Bars to Reenlistment, and reviewing/filing of DA Form 1315.

Army Physical Fitness Program

Description of physical fitness training activities and evaluation procedures including annual physical fitness test.

Plan/Conduct Athletics and Recreational (A&R) Program

Procedures for initiating and operating a unit recreational/sports program including staffing, identifying facilities, and surveying soldiers interests and skills. Unit Commander duties and Sport Coordinator duties are specified.

SUPPLY

Maintain Unit SOP

Description of the contents of the standard unit SOP.

Establish Suspense Files

Directions for setting up a suspense file.

Inventory Weapons by Serial Number

Listing of required serial number inventories plus instructions for completing the Monthly Serial Number Inventory of Weapons Form.

Check Weapons and Ammunition In and Out of Arms Room

Directions for how to complete DA Form 3748 (Weapons Receipt) and FORSCOM Form 213-R (Weapons and Ammunition Daily and Turn-In Register) to maintain accountability of weapons and ammunition.

Prepare a Report of Survey

Instructions for preparing DA Form 4697 (Department of the Army Survey) to report government property which has been lost, damaged, or destroyed.

Prepare DD Form 1131, Cash Collection Voucher

Directions for completing DD Form 1131 (Cash Collection Voucher) for items which have been lost, damaged, or destroyed when person admits pecuniary liability and offers to pay cash for the item(s).

Process Absentee's Clothing and Equipment

Procedures for processing clothes and equipment belonging to soldiers who are absent without leave (AWOL). Includes description of requisite forms and correspondence.

Prepare Adjustment to Property Book

Instructions for preparing DD Form 444 (Inventory Adjustment Report) used to make minor administrative adjustments in reporting of property.

Prepare a Statement of Charges

Directions for completing DD Form 362 (Statement of Charges) used to reimburse the government for lost, damaged, or destroyed property resulting from neglect or fault.

Establish a Supply Room File System

Listing of required supply room files with short description and disposition instructions.

Prepare Request for Ammunition

Instructions for preparing DA Form 581 (Request for Issue and Turn-in of Ammunition).

Determine the Issue Priority Designator (PD)

Procedures for selecting the correct Priority Designator (PD) based on the Force/Activity Designator (F/AD) and the Urgency of Need Designator (UND).

Establish Procedures for Accounting Lost, Damaged, or Destroyed Property

Decision matrices for determining the appropriate adjustment document based on the type of action and the kind of liability involved.

Prepare Request for Personal Clothing

Directions for completing DA Form 3078 (Personal Clothing Request), the only document used to obtain personal clothing issued to enlisted personnel.

Record the Issue and Turn-In of Organization Clothing and Individual Equipment

Instructions for preparing DD Form 3645 (Organization Clothing and Equipment Record).

Transfer Responsibility of Property

Guidelines for preparing DD Form 1150 (as both a turn-in document and as an issue document) and DA Form 2062 (as a hand receipt).

Supply Officer

Specifications of supply responsibilities for Company Commander, Supply Officer, Supply Sergeant, Armorer or Supply Specialists, Supply Clerk, Platoon Leaders, and Property Book Officer.

PERSONNEL AND ADMINISTRATION

Inspect Unit Administration Files

Procedures for inspecting unit administration files in terms of proper file label (with correct disposition instructions), file contents, and file order.

Prepare/Review Military Correspondence

Discussion (with examples) of the proper use and format of five different types of military correspondence: the military letter, the indorsement to the military letter, the non-military letter, the Disposition Form (DA Form 2496), and the Memorandum.

Establish/Maintain Source of Regulations, FMs and Circulars

Methods of distributing and resupplying DA and other government publications. Includes a list of key publication indexes. Also specifies procedures for completing DA Form 12 (Request for Establishment of a Publications Account).

Personnel Asset Inventory (PAI)

Procedures used by Unit Commanders to ensure total agreement (zero strength deviation) with various personnel data sources. Specifies required DA forms.

Review/Maintain the Personnel Strength Zero Balance (PZB) Report

Description of PZB Report in terms of format, content, frequency of use, and steps taken upon receipt of this report.

Review/Maintain the Unit Manning Report (UMR)

Definition of utilization and description of the UMR in terms of functions, format, and steps taken upon receipt of the report.

Prepare/Review Organization Strength Reports (DA Form 3732)

Procedures for completing DA Form 3732 to be prepared whenever a change in unit personnel strength occurs.

Brief Newly Assigned Personnel and Determine Their Utilization

Guidelines for briefing and assigning personnel based on their abilities, experience, and potential.

Sponsor Incoming Soldier/NCO

Job aid providing a checklist for processing new members into the unit.

Review the Personnel Qualification Record, Part I (DA Form 2)

Description of DA Form 2 including sample format and steps to be taken upon receipt of this form.

Establish Unit Awards Procedures and Recommend Personnel for Awards

Guidelines for establishing standard policy and procedures for issuing awards and decorations and information to determine eligibility of personnel for awards. Includes instructions for completing DA Form 638 (Recommendation for Award).

Evaluate Subordinate Leaders: Officers

Description of the Officer Evaluation System and Officer Evaluation Reports (OERs). Includes instructions for completing DA Forms 67-8 and 67-8-1.

Evaluate Subordinate Leaders: Enlisted

Description of the Enlisted Evaluation System and Enlisted Evaluation Reports (EERs). Includes instructions for completing DA Form 2166-6.

Prepare/Review Recommendation for Promotion of Personnel (E2-E6)

Specification of steps taken upon receipt of the SIDPERS report "Enlisted Personnel Eligible for Promotion Consideration" to promote eligible personnel.

Solving Soldiers' Problems

Job aid to help the First Sergeant assess soldier needs, determine whether he/she has the expertise to meet those needs, and if not, identify the appropriate referral agency. An extensive list of local referral agencies is attached.

Review Pay Inquiry (DA Form 2142)

Guidelines for preparing and reviewing DA Form 2142 (Pay Inquiry) which is completed when a soldier has a pay inquiry or problem.

Prepare/Review Request for Reassignment for Reasons of Extreme Family Problems

Description of the steps taken when a soldier requests reassignment because of family problems. Includes procedures for completing DA Forms 4187 and 3739 (Personnel Action) and DA Form 3739 (Application for Assignment/Deletion/Deferment for Extreme Family Problems).

Prepare/Process Request for Emergency Leave

Description of DA Form 31 (Request and Authority for Leave) when used in an emergency situation. Includes proper format and steps taken in processing this form.

Review a Request for Leave or Pass (DA Form 31)

Instructions for review and processing of DA Form 31.

Prepare/Process Individual Sick Slip (DD Form 689)

Instructions for completing DD Form 689 which is used when a soldier reports on sick call, is treated at the hospital or dispensary, and is referred to medical personnel.

Prepare/Review Accident Reports (DA Form 285)

Instructions for completing and processing DA Form 285 to be completed as soon as an accident occurs.

Recommend to Command Approval/Disapproval on Personnel Action Form (DA Form 4187)

Instructions for completing and processing DA Form 4187 to report duty status changes that influence pay entitlements or to request an individual personnel action.

Initiate Action for Investigation for Allegation of Discrimination

Job aid which lists the steps taken to initiate action when a suspected act of discrimination against a soldier has occurred.

Evaluate Unit Morale and Welfare

Job aid to help the First Sergeant identify changes in unit morale and welfare. Includes statistical indicators (e.g., AWOL/desertion rate) and observational indicators (e.g., participation of unit members at service clubs, craft shops, and sports events).