WARD

CON Reg 350-100-1

HEADQUARTERS
UNITED STATES CONTINENTAL ARMY COMMAND
Fort Monroe, Virginia

Regulation 1 February 1968

No 350-100-1

TRAINING

Systems Engineering of Training (Course Design)

1. Purpose. This regulation establishes uniform procedures for designing new MOS-producing and functional courses, and redesigning existing MOS-producing and functional courses and ASubjScd conducted or prepared by USCONARC service schools and training centers.

Encl 3

2. General.

a. Systems engineering of training is a system for designing or redesigning MOS and functional courses and consists of the following processes accomplished in sequence:

(1) Job analysis.

(2) Selecting tasks for school training.

(3) Training analysis.

(4) Developing training materials.

(5) Developing testing materials.

(6) Conduct of training (not included herein; see FM 21-6).

(7) Quality control.

Details pertaining to processes cited in (1) through (5) and (7) above are contained in appendixes A through F.

b. The systems approach to training is based on evidence that the objective of each task to be performed in an MOS specialty can be precisely defined and measured. It insures that all factors relating to the development of a training program are considered in a definite sequence to reach the specific goal of training the student to perform in the MOS at the entry level.

c. USCONARC service schools and USATC currently use various methods and procedures in designing and redesigning MOS-producing and functional courses. The systems approach will insure that each school and training center uses the same orderly, systematic steps in developing new and existing courses.

3. Definitions. The principal critical terms are defined below (All other special terms are defined as they appear.):

a. Systems engineering of training: That series of orderly, systematic steps designed to produce a course of instruction that will

provide graduates with the skills and knowledge essential to perform at the entry level in his MOS.

b. Military occupational specialty (MOS): A grouping of duty positions possessing such close occupational or functional relationships that an optimal degree of interchangeability among persons so classified exists at any given level of skill (AR 320-5).

c. Duty position (duty assignment): A group of closely related tasks and responsibilities that normally are assumed by one individual assigned to a given position in a military unit (AR 320-5). It is that portion of the Army mission assigned to an individual for accomplishment. The assigned duty position title is normally descriptive of the specific job to which the individual is assigned, but it may not necessarily be the same as the title of the MOS.

d. Job: An organizational unit consisting of a group of duties and responsibilities that are separate and distinct from each other and performed by an individual in a duty position. The term "job," therefore, is used interchangeably with "duty position."

e. Job analysis: As used in this regulation, job analysis includes consideration of all jobs (duty positions) to be performed in an MOS.

f. Major duty area: A major area of work within a particular job. As distinguished from duty position titles, major duty areas are prepared for the convenience of job analysts and do not necessarily have direct relationship to any duty position titles.

g. Task: A specific action taken by an individual in performing his duty. A task has identifiable starting and ending points and results in a measurable product. In written form, a task statement consists of an action verb and an object--and sometimes a qualifying statement.

h. Task inventory: A detailed list of all tasks comprising a specific job, or jobs, of an MOS.

4. Applicability.

a. The procedures described in this regulation apply to all officer and enlisted functional and MOS-producing courses described in

DA Pam 350-10 and to any course or ASubjScd that has as its stated purpose the training of personnel for a specifically identifiable military job. These procedures also apply to career courses and other similar courses.

b. New courses and ASubjScd will be designed following the steps described in this regulation.

c. These procedures do not apply to orientation courses of short duration (1 to 2 weeks).

5. Responsibility.

a. The commandants of USCONARC service schools are responsible for systems engineering the MOS-producing, functional, and career courses for which they are proponents, including those taught at USATC. Proponents for existing MOS are listed in appendix A to CON Reg 611-204. When an MOS-producing course is taught at more than one service school or training center, the systems engineering of the course will be accomplished as mutually agreed between the activities concerned.

b. Proponents for increased-skill-level courses (leader preparatory and drill corporal) and NCO-candidate courses (NCO academy, senior NCO, and drill sergeant) are responsible for systems design of these courses and for coordinating with army and USATC commanders when following the procedures established in this regulation.

c. Proponents of ASubjScd are responsible for preparing the information required in appendixes A through E of this regulation and submitting recommended changes to the ASubjScd to this headquarters, ATTN: ATIT-TNG-CU. Upon approval of the recommended changes and publication of the revised ASubjScd, training center commanders will be responsible for the remaining requirements prescribed in this regulation.

d. Appendix B prescribes actions to be taken for selecting from the task inventory those tasks that should receive formal school training. This action will also produce a list of tasks designated for OJT. Service schools will use these tasks as a basis for preparing OJT packages to be forwarded to units as required.

6. Priority for course redesign.

a. It is anticipated that the systems engineering of all existing courses will take as much as 5 years to complete. This systems design will be accomplished by proponents on a periodic time-phased basis starting 1 April 1968. Proponents for courses and ASubjScd will develop plans for initiating and completing their systems design. Reports on the progress being made will be submitted as shown in paragraph 8 below.

b. Course revision schedules submitted as a result of the USCONARC letter referred to in paragraph 10h below will no longer apply. Course revisions that have been initiated as a result of that letter will be completed. All other courses, however, will be systems engineered according to the following priorities (starting 1 Apr 68):

(1) Category IV and Project 100,000 courses.

(2) High attrition courses (over 10 percent).

(3) High density courses.

(4) Other MOS-producing courses.

(5) Functional courses.

(6) Other courses and ASubjScd.

c. Courses and ASubjScd systems engineered before the receipt of OPO Data Bank feedback should use this feedback, when received, in the quality control and evaluation phase of the process.

7. Administration.

a. POI exceeding a 10 percent change to the total hours will be submitted to HQ USCONARC, ATTN: ATIT-TNG-CU, in accordance with paragraph 22, Annex Q to CON Reg 350-1.

b. Each POI and ASubjScd submitted to this headquarters for any reason will state that it has or has not been systems engineered in accordance with this regulation. To enable HQ USCONARC to record the increases or decreases in manpower, equipment requirements, funds,

and course length resulting from systems engineering, the letters of transmittal will summarize the changes and include specific information concerning those items that are a direct result of the systems engineering process (exempt report, para 39y, AR 335-15).

8. Progress of systems engineered courses (RCS ATIT-126).

a. Purpose. This report will enable this headquarters to maintain an active and up-to-date file on the number of courses and ASubjScd that have been and are in the process of being systems engineered.

b. Preparing agencies and frequency. USCONARC service schools and USATC will submit this report annually.

c. Period covered.

(1) The initial report will cover the period from April through June 1968.

(2) Subsequent reports will cover the period from July through June of each fiscal year.

d. Number of copies, due date, and routing.

(1) The initial report will be dispatched in one copy to this headquarters, ATTN: ATIT-TNG-CT, by 15 July 1968.

(2) Subsequent reports will be dispatched by 15 July of each year until the project is completed.

e. Preparation instructions.

(1) The initial report will list courses and ASubjScd under revision, and their estimated completion date.

(2) Subsequent reports will list courses and ASubjScd completed, as well as those initiated (with estimated completion date), during the time frame covered by the report.

9. Recommended changes. Recommendations for improving this regulation may be submitted after a course of instruction has been

completely systems engineered and the feedback on the graduates has been received. Comments should be keyed to specific page, paragraph, and line of text in which the change is recommended. Rationale will be included for each comment to insure understanding and complete evaluation. Comments should be sent direct to this headquarters, ATTN: ATIT-TNG-CT (exempt report, para 39y, AR 335-15). After receipt of comments, appropriate changes to FM 21-6 will be recommended by this headquarters to incorporate the principles of this regulation into that FM.

10. References.

a. AR 320-5, "Dictionary of United States Army Terms."

b. DA Pam 350-10, "US Army Formal Schools Catalog."

c. FM 21-6, "Techniques of Military Instruction."

d. Annex Q, "Army Service School Curriculum, Administration, and Training Policies," to CON Reg 350-1.

e. CON Pam 350-14, "Student Performance Objectives."

f. CON Reg 350-16, "Project One Hundred Thousand Student Class Comparison."

g. CON Reg 611-204, "Designation of MOS Responsibility."

h. Letter, ATIT-TNG-TOS, HQ USCONARC, 27 January 1967, subject: CON Pam 350-14, "Student Performance Objectives."

Appendix A

Job Analysis

Section I - Introduction

1. Objective of job analysis. The Army trains the soldier to perform in an MOS, and these MOS may contain one or more different jobs. The first step in system engineering is to perform a job analysis. Job analysis identifies the on-the-job performance requirements in terms of individual tasks and job characteristics for the MOS, such as duty position, work environment, and equipment requirements. The completed job analysis sets the framework within which all subsequent steps of the systems engineering process occur. This basic framework is task based and job oriented. Emphasis is on identifying the specific job requirements--those observable acts and behaviors required of MOS incumbents.

2. Scope. Job analysis consists of two operations; identifying the job and developing the task inventory. This appendix describes the considerations that are required in performing each operation. The sequence in which each operation is performed depends upon the circumstances. When the purpose of the job analysis is to analyze an existing job, the sequence is--

Identify the job ——— Develop the task inventory

An analysis that is designed to develop new Army jobs follows this sequence:

Develop the task inventory ——— Identify the job

Section II - Identifying the Job

3. General. Existing jobs must be identified in accordance with current DA publications that prescribe the authorized limits of responsibility. The basis for identifying a new job is a task inventory that establishes the requirement for the job. This section describes the minimum information needed for job identification.

4. Essential elements. Following are several elements of information that must be obtained and recorded for use when developing the task inventory (example 1 (app G) shows a detailed list and a suggested format):

a. Job title. To identify the job, enter the job title and any identifying code numbers. Also enter the name of the individual preparing the description and the date on which the description was completed. When a new job or a revision to an existing job is being identified, enter a proposed title and number and show it as such.

b. MOS job structure. Record the actual or proposed MOS. Briefly describe the skill levels authorized within the job, and note the skill level for which the course is to be designed, when applicable.

c. Duty position. Enter the actual or proposed duty position. For some existing jobs, the position titles typically assigned to the incumbents will differ from the official titles of the jobs. This is particularly true of jobs that cover a large number of functional specialties even though they have a common core of similar duties and tasks. These various job titles or duty position titles for existing jobs will provide some insight into the significantly different job requirements that are placed upon the job incumbent.

d. Units and organizations assigned. List the types of units and organizations to which the incumbents will be assigned.

e. Related units, organizations, and MOS. Units and organizations rarely function in isolation. There is normally considerable interaction with other units (higher, lower, and adjacent) and other MOS. List the typical units, organizations, and MOS with which the incumbent will be interacting.

f. Major job requirements. This section is the most important part of identifying the job. Record in broad terms actions required for on-the-job performance. These entries must be stated in performance terms.

g. Work environment. This information should include the type of shelter available, hazards, climatic conditions, and other special features of the work environment that will affect the manner or method of work performance. Record only those factors of the work

environment that will have a noticeable effect on job performance or place special demands upon the incumbent.

h. Supervision and assistance available. In most cases incumbents can obtain assistance from supervisors, senior technicians, and written job aids. Record only the absence of such assistance.

i. Equipment listing. This section is of particular importance to hardware-centered MOS, since the equipment dictates, to a large extent, the performance requirements of the job. The detail required in this section will depend upon the type of MOS involved, but as a minimum list major items of equipment that place performance demands upon the incumbent. Also note, when applicable, whether the available equipment is a standard item of issue or whether it was obtained from several different manufacturers. Tools and test equipment must not be overlooked. For instance, personnel trained to maintain communications equipment may encounter foreign-made equipment when assigned overseas. Personnel trained to operate data processing equipment will encounter a large number of different makes of data processing equipment when assigned within the United States. List this equipment by generic names, and note any significant differences in the configuration of the equipment. When equipment is standard, list the major items of equipment by name and official numerical designation.

j. Information sources. List the sources of information that control and direct the activities of the incumbents. Many of the possible information sources are described in paragraph 5 below.

5. Major information sources. There are numerous sources of information, both official and unofficial, that will assist in preparing and verifying the identification of the job and the task inventory. Following is a list of important information sources:

a. The Military Occupational Information Data Bank (MOIDB) within OPO will provide updated job performance data for existing jobs. The output from this source can be used to insure that the task inventory is complete.

b. AR enunciate policies, responsibilities, and administrative procedures. AR 611-101, 611-102, 611-112, 611-113, 611-201, and 611-202 are the basic source documents for the MOS title and number of existing military jobs.

c. TOE and TDA are excellent sources of information for position titles, job distribution among units, supervision available, and equipment lists. (When the job analysis is for the purpose of establishing new jobs, the analyst will be required to work with draft or proposed TOE or TDA.)

d. FM contain information concerning military doctrine, tactics, and techniques.

e. Preliminary operation and maintenance manuals often contain the same data as that contained in published TM. Documents of this type are available before TM are published and are used when developing descriptions for new jobs.

f. TM provide instruction covering equipment operations, maintenance, and overhaul instructions, including parts lists or parts breakdown, technical information, and prescribed performance procedures. Additional requirements for shipment, storage, and demolition are included when appropriate. These documents are basic to determining job performance and can be used in conjunction with TA, to identify required job performances.

g. TB provide supplemental information to TM.

h. Maintenance allocation charts specify the maintenance that mechanics and technicians are authorized to perform. These charts should be consulted for jobs that are in the early stages of development.

i. MWO furnish instructions for altering or modifying material. In many cases, an MWO will affect a job to a significant extent.

j. Qualitative materiel requirements contain a tentative logistical support concept and are basic source documents when a job analysis is performed very early in an equipment development cycle.

k. Qualitative and quantitative personnel requirements identify proposed jobs and describe the proposed major job requirements in addition to the proposed MOS titles and numbers.

l. Logistical support plans and maintenance support plans contain proposed TA, MOS titles and numbers, and major job requirements. These documents are prepared early in the equipment development cycle and revised as necessary.

m. Task and skill analysis data obtained from a contractor does not necessarily reflect DA doctrine but it does provide valuable information concerning the job and tasks that will most probably be required for equipment maintenance.

n. Organization and unit SOP provide data on actual job performances within a specific organization. Information of this type is usually available upon request.

o. Feedback can take various forms; the most common of these are questionnaires, interviews with returning job-experienced personnel, and on-site visits. Data derived from these sources provides information on what the job is or what individuals think it should be. This is valuable information to supplement data collected from authoritative references.

p. Military writings, such as historical records, reports of maneuvers and field tests, and combat tactics (e.g., "Survey of Military Personnel Management," published quarterly by OPO, and "Lessons Learned," (DA Pam 350-15-series) prepared by HQ USCONARC), provide data that may be beneficial in describing some positions and developing realistic training situations and problems.

Section III - Development of the Task Inventory

6. Purposes. Tasks are the basis for determining the content of training within the process of systems engineering courses of training. Task statements denote observable acts and behaviors performed by incumbents or significant end products produced by incumbents. Task statements are specific and concrete. The task inventory is the basic document for controlling the training content.

7. Sources of information. See paragraph 5 for information sources that contain task data.

8. Form and content of task statements. Each task statement will contain an action verb and an object and, when possible, a qualifier (fig 1).

a. Each task statement will begin with the verb. The action verb will be in the active voice, first person, singular form. The subject "I" is not written, but is understood.

b. The object is the element or thing acted upon.

c. The use of a qualifying phrase is optional but highly desirable and should be used when available to clarify the meaning, when there is a likelihood that incumbents are using more than one method to perform the task, or when specifying equipment.

ACTION VERB	OBJECT	QUALIFIER
Adjust	carburetor	
Inventory	supplies	
Select	ammunition	using computer

Figure 1. Examples of Task Statements.

9. Considerations in developing task statements.

a. Job holders develop a language of their own--technical terms, slang, or jargon. In a sense this language is a type of verbal shorthand that enables them to discuss particular aspects of the job without lengthy explanations. Quite often a word or phrase is given a narrow and specific definition peculiar to a particular military job; e. g., "pouching" has a specific meaning to postal personnel; "lager" is a special kind of tactical operation to an armor crewman; and "bracket" is a method of fire adjustment to an artilleryman.

b. Redundancy is encouraged when writing task statements. Use a term whenever it explains what the incumbent does. For example, a mechanic adjusts many items of equipment. The task statement for his job will use the word "adjusts" several times.

c. Avoid the use of multiple verbs or multiple objects in a task statement except when two or more actions are invariably performed together or when two tasks are not significantly different; e. g., "Assemble and disassemble individual weapon." Such statements as "Fire and

disassemble individual weapon" or "Remove and adjust carburetor" would not be acceptable task statements since the actions are often performed independently of each other by the incumbent.

d. The task inventory should list all tasks required for on-the-job performance. When in doubt about a particular task, include it in the inventory so that the validity of the task can be verified through OPO Data Bank or local feedback channels. The task inventory does not make training decisions; it identifies tasks for which training must be arranged. While the job analysis process is aimed at identifying those tasks most appropriate for formal training, it is of equal importance to identify those that do not require formal training.

e. Strive for simple and brief statements. The task inventory is designed to be meaningful to job-qualified individuals and training specialists. The following editing suggestions will be helpful in preparing task statements:

(1) Delete words or phrases that add nothing to the meaning of the task statement; e. g., "in accordance with Army regulations," "where appropriate," "as required," and "using prescribed procedures."

(2) Delete those tasks that are definitely implied by other tasks. This suggestion must be applied with caution since any task can be viewed as a means to some other larger job goal.

(3) The qualifications (intelligence, aptitude, knowledge, education, training, and experience) required of an incumbent are not duties or tasks and are not included in the task inventory.

10. Forms of the task inventory.

a. There are two forms of the task inventory, each equally useful.

(1) One form consists of lists of duty statements or activity areas, with subordinate groupings of task statements. This type of inventory is composed of simple declarative statements organized in the form of an outline. Example 2 contains a portion of a task inventory in outline form.

(2) The other form is a matrix in which the task statements are broken down into action-object components. Duty and task-related actions (stated as action verbs) are arranged along one axis, and the associated items of equipment, weapons, or other tangible objects are arranged along the other. Action-object relationships are then coded into the matrix. This matrix-type of inventory contains the same information as the outline form, but presents it in a more abbreviated and summarized form. Example 3 contains a portion of a task inventory in matrix form.

b. Either form of the task inventory may be adopted. However, the matrix can be used in developing the outline form because it provides a more systematic means of identifying relationships between the objects and actions. The development of each form is discussed in sections IV and V below.

11. Organizing the task inventory. Inherent in the development of the task inventory is the problem of organization and arrangement. Several draft versions of the inventory may be necessary before an appropriate arrangement is developed. To insure complete coverage and to eliminate any technical errors or ambiguities, successive drafts of the inventory should be reviewed by technically qualified personnel and persons actually occupying the job--or at least by persons with recent job experience.

Section IV - Developing the Outline Task Inventory

12. Advantages. In comparison with the matrix form, the outline form is more readily understood by job incumbents.

13. Steps in developing the outline task inventory.

a. Prepare an initial list of major duty areas. The major duty areas of the job are logical major divisions of the work and denote a certain type of work. Clues to these major divisions can be found in the information sources listed in paragraph 5 above.

b. Prepare statements denoting the various tasks performed by the incumbent. The sources of information listed in paragraph 5 provide the basis for task statements. For new equipment the primary source for task data is the contractor's task and skill analysis. Each task statement should be listed under the appropriate major duty area.

Section V - Developing the Matrix Task Inventory

14. Advantages. The matrix form yields a more compact arrangement of the task inventory, and interrelationships between tasks are more apparent.

15. General form of the matrix task inventory. Figure 2 shows a general matrix form that can be modified to meet local requirements. The tangible objects with which an incumbent works are recorded in the vertical axis of the matrix, and the action verbs describing the job are recorded along the horizontal axis, as shown in example 3.

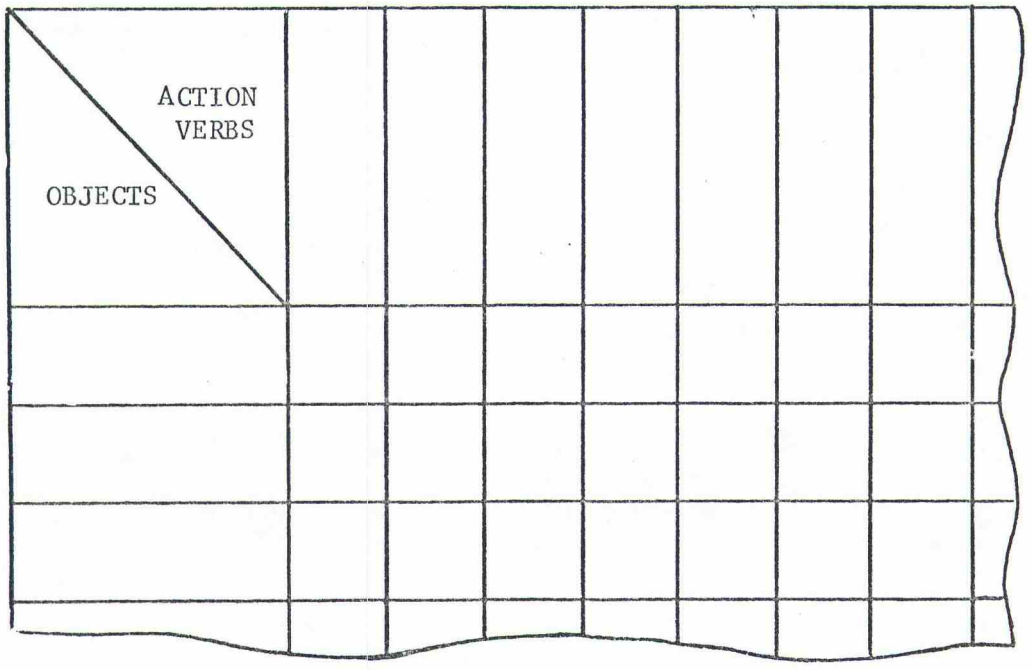


Figure 2. General Form of a Matrix Task Inventory.

16. Steps in preparing the matrix task inventory.

a. List the tangible objects. List in the vertical column every tangible object on which the incumbent performs some action; e. g., hardware, paperwork, or people. Judgment is required in compiling the list to preclude listing objects such as telephones, which the incumbent uses solely for communication purposes. The identification of the job, previously prepared (sec II above), should be used as a guide

in listing the tangible objects. For example, if the position description does not contain a job requirement pertaining to the office files, the files will not be listed as a tangible object. When in doubt about an object, include it in the list. If the object is inappropriate, it will be eliminated when the final matrix is developed.

(1) Depending upon the job, the tangible objects list will include one or more of the following categories: equipment, supplies, people, forms, and reports. Objects should be grouped by category when more than one category of objects is involved. Sources from which an initial list of tangible objects can be obtained include TM, FM, maintenance allocation charts, AR, TOE, TDA, interviews with experienced jobholders, SOP, and other similar sources.

(2) Some examples of paper objects are morning reports, requisitions, enlisted qualification records, stock record cards, equipment status reports, requests for waiver, publications, organizational charts, and discharge certificates.

(3) Examples of human objectives are superiors, subordinates, coworkers, visitors, and inspectors.

(4) Examples of objects for the categories of equipment and supplies are expendable supplies, typewriters, radio receivers, radars, missiles, tanks, and rifles. Only items of equipment that place some requirement on the incumbent should be listed. The equipment items should be broken down to the lowest maintainable item for the particular job. For example, if an electronics technician is authorized to replace malfunctioning items to the subassembly level, the list of objects should identify each subassembly separately.

(5) An initial list of objects should be checked by job-experienced personnel to insure that relevant objects have not been omitted.

b. List the action verbs. The action is an active verb that specifies what must be done to the object by the incumbent. The output of this operation is a list of all the actions that apply to the job being analyzed. A tentative list of appropriate actions can be obtained from the following sources:

(1) An analysis of on-the-job performance as prescribed in TM, FM, maintenance allocation charts, SOP, and other applicable publications. This method finds its greatest application in equipment-centered jobs where actual performance must be in accordance with authoritative publications.

(2) Actual observation of job performance. The opportunity to observe all aspects of on-the-job requirements is not often available. Observations of simulations that closely approximate on-the-job requirements can provide a useful substitution for on-site observation. On-site observations have their greatest value in refining the initial task list.

(3) Interrogating job-experienced personnel available to the training agency. This method is most appropriate for jobs for which detailed job performance is not specified in DA publications, and has the advantage of providing broad coverage in a rapid and inexpensive manner. The recommended approach when using this method is to ask, "What does the incumbent do to each object?" The answers to this question will be the job-required actions.

(4) Repetitive actions. Many of the actions will be repetitive for several of the items in the object list. For example, "file morning reports," "file training schedules," and "file equipment status reports," are tasks that use the same action word. This multiple usage will limit the number of action verbs.

c. Record the action verbs.

(1) Record the action words across the horizontal axis of the matrix. Allow enough spaces in the action row to provide for extra blank spaces after the initial list of action words has been entered. These spaces are for additional action words that may be discovered during the next operation in the development of the matrix.

(2) Examples of actions that are appropriate for the job of administrative supervisor are "compose," "edit," "review," "route," and "inventory." For the job of an electronics technician, sample actions are "energize," "inspect," "check," "paint," "lubricate," and "clean." Each action in the list must be defined to insure that usage is consistent throughout the job analysis. These definitions will usually be peculiar to each job or job family.

d. Determine the action-object relationships. After entering the objects and actions along their respective axes of the matrix, the following test is performed on each object:

(1) Ask the question "Does the incumbent perform this action to the object?" When the answer is no, place a dash (-) in the upper half of the square that marks the intersection of the object row and the action column. When the answer is yes, place an X in the upper half of the appropriate square. The X indicates that the incumbent performs this task. After placing an X in the upper half of the square, ask "Are any qualifiers required to complete the task statement?" Key the qualifiers into the lower half of the square as appropriate. For example, the qualifier "using typewriter" would be recorded in the matrix as shown in figure 3.

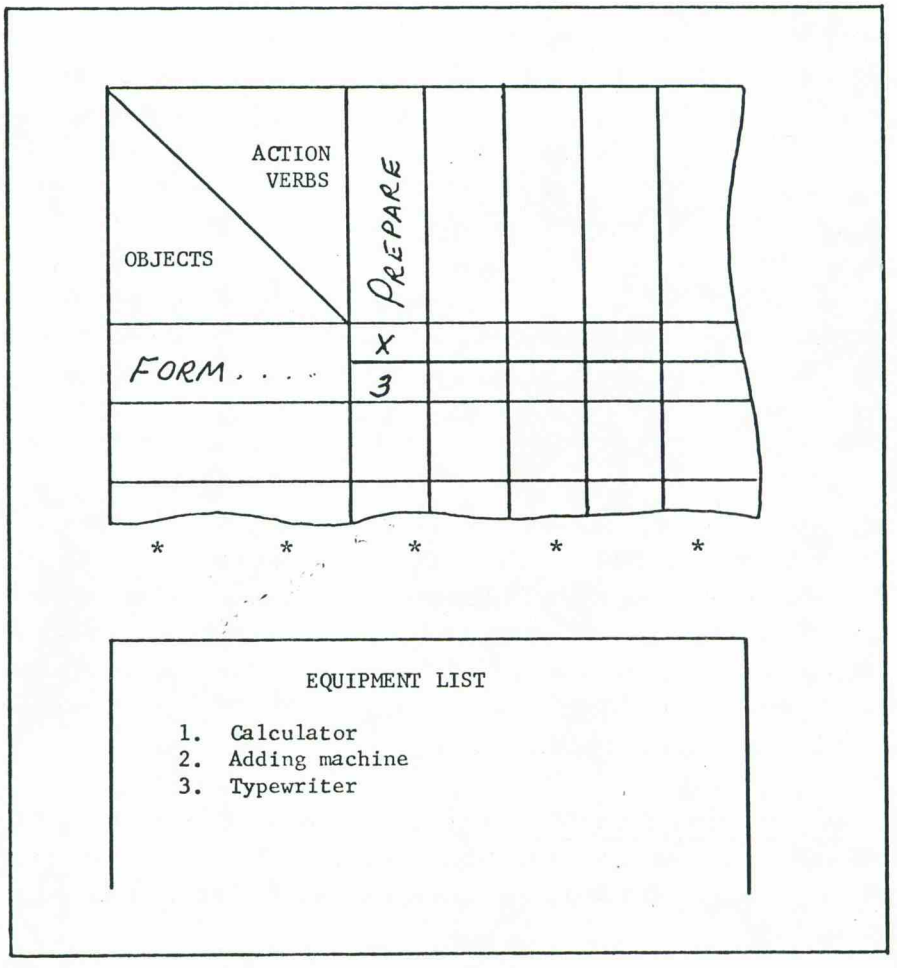


Figure 3. Entering Qualifiers in the Matrix Task Inventory.

The X in figure 3 indicates that the task is performed, and the 3 in the lower half of the square indicates that a typewriter (item 3 on the equipment list) is required. Additional qualifiers can be keyed into the matrix, using the same method.

(2) When all actions have been tested against the first object, check to determine whether there are any additional job actions to be performed on the object. If there are none, proceed to the next object and repeat the same process. When there are additional job actions to be performed, add the action to the horizontal axis of the matrix and place an X in the appropriate square. Key in the qualifiers as appropriate.

(3) Each time that a new action is added, a new column is created. Check all previously analyzed objects to determine whether any new action-object relationships have been created. This rechecking can be done each time a new column is created or after all objects have been tested against the initial action list. The dashes or X's in the squares indicate that a decision was made on each potential action-object relationship. A decision must be made on all squares before the matrix is complete. An X indicates that a job task requirement exists, and a dash indicates that no job requirement exists.

(4) The final operation is to perform an overall inspection of the matrix to insure that the same task has not been repeated in different forms or that the matrix does not contain requirements that are parts of other tasks. This can easily occur because in many cases a task will produce several outputs. For example, the task of evaluating personnel produces a byproduct that is a completed form. However, for another job, completing a form may be a separate task. Whether or not to eliminate items from the matrix is judgmental but should be based on the job requirements. Decide which of the entries best represents an actual job-required task rather than a part of a job-required task. Eliminate the subtasks from the matrix but record for later use when deriving training objectives. Continue the purging process until all subtasks have been eliminated.

17. The completed matrix. The completed inventory is a set of sheets similar to those shown in examples 3 and 4. For existing jobs this data should be validated through OPO Data Bank results and/or local feedback channels.

Appendix B

Selecting Tasks for Training

1. Purpose. This appendix prescribes procedures for selecting from the task inventory tasks that should receive formal school training--which is the second step of system engineering. Selecting tasks for school training implies other selections as well; for instance, tasks not selected for school training obviously are selected for training elsewhere or are specified as prerequisites. Essentially there are three main opportunities for the prospective trainee to learn to perform tasks: he has already learned to perform certain tasks; he may receive school training on the tasks in a course of training; or he may learn the tasks on the job. Which tasks he learns under which of these categories can be determined by applying certain selection criteria. This appendix prescribes the major considerations in identifying tasks most essential for formal school, ATP, or ASubjScd training, listed hereafter in this regulation as school training.

2. Major considerations. Selecting tasks for school training is a judgmental process. The following considerations are intended to assist in making these judgments and may be expanded. It is not necessary that a task meet all of the criteria to be selected for school training; however, a task should not be selected for school training unless it meets at least one of the following considerations:

a. Task criticality. The impact of human performance capabilities on the military mission varies from task to task. Certain equipment failures destroy a unit's capability to perform its assigned mission, while certain other requirements may have no immediate effect on mission accomplishment. For example, good preventive maintenance procedures require that surfaces with cracked or chipped paint be refinished as soon as possible; however, to delay the refinishing will have no immediate impact on mission accomplishment. If in the same unit the acquisition radar becomes inoperative, that unit is ineffective until the radar is repaired. Tasks of this type are critical to mission accomplishment and must be tentatively selected for school training.

b. Task similarity. Fortunately, there exists a high degree of similarity among the performance requirements of many tasks. This similarity results in transfer of training, which must be considered in

selecting tasks for school training. A major item of electronic equipment may contain several power supply chassis, and adjusting the output voltages is a task required with each chassis. Although each power supply is different, the similarity of the performance requirements of each task may be such that an individual can be trained to perform the task on one or two chassis and then be expected to perform the same task on other similar chassis without formal school training. In other words, some tasks may not be selected for training because of transfer of training. Care must be exercised to insure that the transfer gap is not excessive.

c. Tasks essential to other tasks. Certain tasks may not in themselves be worthy of training but are required in performing other tasks for which training must be furnished. For example, the task of assembling and disassembling an item of equipment may very well be delegated to on-the-job training, but the tasks of identifying, removing, and replacing defective parts in that item of equipment might be selected for formal course training. In a situation of this type, it is necessary to disassemble the item before defective items can be removed and replaced. Therefore, the task of assembly and disassembly must be formally trained.

d. Prerequisite ability. Can the man already perform the task? If he cannot perform the complete task, he may possess some of the skills and knowledges required. The formal training should exclude those skills and knowledges already possessed by the student. Examples of tasks in this category are washing vehicles, spot painting, and storing certain types of supplies.

e. Capability of learning tasks on the job. A field unit is restricted in its capability to conduct OJT because of limited personnel, equipment, facilities, time, and training materials. When a task is not selected for formal course training, there must be reasonable assurance that the new imcumbents will have the opportunity to receive the necessary OJT. One example of a capability gap exists in support maintenance units where the operational equipment for which the unit provides support belongs to the using unit and there is no opportunity for support personnel to use this equipment for OJT. In such instances formal course training is required.

f. Time available to develop job competence. How soon after being assigned to a unit is the individual expected to perform a particular task? If competent performance of the task is necessary

immediately on entry (and other selection criteria also apply), then that task should require school training.

g. Percentage performing the task. Quite often a particular task will be performed by only a small percentage of incumbents. In such cases, even though the particular task may meet a number of other criteria for formal training, it would be difficult to justify school training.

3. Interrelationships of selection criteria. A task should be evaluated against all of the criteria before the decision is made as to whether or not the task should be recommended for school training. For example, a certain task might meet the criticality criterion but be very similar to another task already selected for school training. In this case, the repetitive task normally would not be selected. Units may not possess the capability to conduct OJT for a particular task; or, as may be expected, a combination of other tasks appropriate for formal training may contain task elements similar to the task in question. Even though units may lack the capability to conduct training of a particularly critical task, school training of the task may not be necessary because of transfer of training.

4. Recording tasks selected. Tasks selected for school training must be identified on the original task inventory. The original task inventory, showing the tasks recommended for formal training, provides a document that clearly identifies those tasks selected for school training as well as those tasks that must be learned by OJT, extension courses, or other means.

5. Existing limitations are not considered. When tasks are being selected for school training, the existing limitations in personnel, funds, facilities, time, and equipment are not taken into account. The process of selecting those tasks recommended for school training is aimed at identifying the minimum essential school training needed for an individual to enter a particular MOS. The task selected for training provides training agencies with the resource justification in support of resident training. When additional resources are required, the training agencies must first make all possible internal adjustments before requesting assistance from higher headquarters.

Appendix C

Training Analysis

Section I - Introduction

1. Purpose. Training analysis is the third step in systems engineering a course of instruction, and it bridges the gap between the job requirements and the classroom. Thus far in the process, the job has been described in task statement form, and certain tasks have been selected for school training. While at a level of generality sufficient for describing the job and making curriculum decisions, these task statements may be stated at too gross a level for instructional purposes. Further analysis of each task selected for training is needed before preparing the actual training materials and test instruments. This appendix describes the procedures required to bridge the gap between selecting tasks for school training and developing training materials and test instruments.

2. Steps in the process. The four operations required before developing training materials and test instruments are as follows:

a. Identifying the job conditions, standards, and supporting skills, knowledges, and attitudes.

b. Converting job requirements to training objectives and criteria.

c. Developing the course structure.

d. Developing a course evaluation concept.

Section II - Identifying Job Conditions, Standards, and Supporting Skills, Knowledges, and Attitudes

3. General. Information about the job conditions, standards, and required skills, knowledges, and attitudes must be obtained before

training objectives can be prepared. This information can be conveniently recorded on a job task data card (fig 4). This section describes the development of that job information needed before training objectives can be prepared.

TASK:

SUBTASK:

JOB CONDITIONS:

JOB STANDARD: ___Published ___Derived ___Implied

SUPPORTING SKILLS AND KNOWLEDGES (Include conditions and standards when identifiable in job-related terms):

ATTITUDES:

Figure 4. Job Task Data Card.

4. Subtask identification. The first decision that must be made concerning each task selected for training is whether the task can be converted direct to the action element of a training objective or whether it must be divided into subtasks because of grossness or complexity. In certain instances it becomes necessary to divide a task into subtasks before the level of detail is suitable for training purposes. The subtasks then become the action element of the training objectives. The following criteria are intended to assist in determining the desirability of developing subtasks:

a. Learning advantages. Student learning is more efficient when the training provides small step progression, proceeds from the simple to the complex, and provides immediate knowledge of results. These are some of the learning principles that must be considered when judging whether or not a task is at a level of detail suitable for training purposes. The following examples illustrate how subtasks can be used to take advantage of certain learning principles:

(1) The task statement "perform daily check on the Hawk illuminator" is very appropriate for task inventory purposes but may not be desirable for training purposes. This task can be broken into such subtasks as "perform main power supply daily checks," "perform transmitter daily checks," and "perform tracking computer daily checks." This subtask breakout provides greater flexibility for applying accepted principles of learning to the training program.

(2) The task "process a message in a tactical communication center" is very appropriate for job analysis purposes but not for training purposes. The subtask breakouts of "affix date-time group to the message," "make entry in communication center log," "record message on DA Form 11-53, Operator's Number Sheet," and "determine means of communication available by checking overhead means chart" provide the needed flexibility for small step progression.

(3) Subtask breakouts have significant learning advantages for equipment-oriented tasks. In many instances equipment complexity, size, and nonavailability may cause training and learning problems. These problems can be eliminated by providing for student practice of subtasks on simple subtask trainers that possess the necessary psychological simulations. The subtasks can be learned in a simple context, and this learning will transfer to the operational equipment.

b. Repetitive subtasks. Many tasks have common or similar subtasks, and this can be used to advantage in designing a resident training program. When repetition occurs, it may not be necessary to have the student repeat the subtask while learning to perform each separate task. For example, there are several tasks in which the automotive mechanic must remove one or both rear wheels in order to perform the specific maintenance operation. The subtask of removing and replacing the wheels could be trained separately, and the specific repair could be learned with the wheels removed.

c. Capability for learning subtasks on the job. A subtask breakout can be used in certain instances to refine the list of tasks recommended for training. When portions of a task can be learned on the job and there is no time-sharing or interaction with other subtasks, only that portion of the task requiring school training should be identified; e.g., the job requirement of "paint metal surfaces." It could be assumed that learning to perform the subtask of "brush painting" is simple and appropriate for OJT and the subtask of "spray painting" is one that may require formal training.

d. Applicability. The above criteria are not intended to be all inclusive and should be supplemented as local requirements dictate. Whether or not a subtask breakout is appropriate depends to a large extent on the level of detail contained in the task inventory. Each task recommended for training must be recorded in the space provided on the job task data card, or a similar recording device. It is suggested that subtasks be entered on separate cards. The task from which a subtask is derived should also be listed on the card that contains the subtask. Figure 5 illustrates a completed job task data card for a subtask.

TASK: Perform daily check on HAWK illuminator.

SUBTASK: Perform transmitter daily check on HAWK illuminator.
JOB CONDITIONS: See standard description of HAWK firing battery conditions.
JOB STANDARD: X Published ___Derived ___Implied
TM 9-1430-511-12/1, Table 8
SUPPORTING SKILLS AND KNOWLEDGES:
1. Determine value of voltmeter readings.
2. Determine value of ammeter readings.
Conditions: Same as job conditions.
Standard: No DA standard.
ATTITUDES: Illuminator radiation is harmful to body tissue. Clear all personnel and equipment from the antenna area.

Figure 5. Completed Job Task Data Card.

5. Identifying job conditions.

a. The on-the-job conditions that significantly influence the performance of each task or subtask must be identified since the training conditions must duplicate or simulate the significant on-the-job conditions. The significant on-the-job conditions provide the basis for determining the necessary training conditions. Following is a list of the principal job areas in which significant conditions may be identified:

(1) The range of problems (possible options).

(2) Tools, equipment, and clothing requirements.

(3) Special job aids and manuals.

(4) Environment.

(5) Special physical demands.

b. Jobs often contain groups of tasks that are performed under the same conditions. For this reason it is not always necessary to restate the conditions in detail for each task. A standard description of the conditions applicable to a group of tasks can be prepared, and only a reference to the standard description will be required in the conditions statement. For example, an electronics technician assigned to a DS platoon performs the majority of his tasks in the DS shop or at the firing battery. A description of the conditions at the DS shop and the firing site (example 5 (app G)) would account for most of the on-the-job conditions encountered by an incumbent in this particular job.

c. The job conditions, or a reference to a standard description of conditions, for each task selected for school training must be recorded on a job task data card, or similar device.

6. Identifying job standards.

a. Performance standards. The standard of performance is the third element of information required in describing a job requirement. The tasks and subtasks selected for training will fall into one of two categories: those tasks for which there are published DA standards of performance, and those tasks for which there are no published DA standards. It is this latter category that deserves special consideration. The absence of a published DA standard does not mean that a standard does not exist for the particular task. These standards may be implied or derived.

b. Implied standards. The performance of certain tasks is controlled by broad regulatory requirements that govern such aspects as format, content, sequence, and procedures. However, these same regulations imply such performance standards as "complete and accurate," "submitted on time," and "correct solution." For example, the implied standard for a computer programer is that he prepare computer programs with no errors. It is unreasonable to expect the incumbent to detect all errors before the program is inserted into the computer. The routine job procedure is to subject the program to a test run in the computer with known outputs to detect and correct errors in the program. The

trial run process continues until the program is perfected. This trial run process must be accounted for in describing the job-required standards. In like fashion, all tasks with implied standards must be examined in detail to insure that the actual job-required standard is identified.

c. Derived standards.

(1) The standard for some tasks can be derived from other aspects of the job. The overall characteristics of an item of equipment can be used to establish a standard for the individual tasks or subtasks that are required to operate or maintain that item of equipment. For example, long-duration fire bursts by a machinegunner may overheat and damage the weapon. Therefore, in addition to accuracy, the standard must include a maximum burst duration, which is derived from the operating characteristics of the weapon.

(2) Other tasks may require a different approach because the job standards are highly subjective and there is no single correct solution. In these instances it will be necessary to derive a standard that reflects, to the maximum extent possible, a real job-required standard. It is suggested that standards of this type be derived by a panel of experts with experience in performing or supervising the tasks.

(3) Job standards can also be derived from actual job performance data collected by direct observation.

d. Recording standards. Record on the job task data card the job-required standard for each task or subtask and the type of standard (i.e., published, derived, or implied) as illustrated in figure 5.

7. Deriving supporting skills and knowledges.

a. Supporting skills and knowledges are the motor and mental components of a task or subtask that have special requirements for minimum performance. Any component of a task that can be performed properly in response to verbal or written instructions would not be identified as a supporting skill and knowledge for instructional purposes.

b. The requirement to place a toggle switch in the "ON" position is an example of a task component that does not have a special requirement for minimum performance. The task component of "measure voltage with a multimeter" does possess special requirements in that the incumbent must connect the multimeter leads to the proper test

points, place the multimeter controls in the appropriate positions, and determine when the correct output indication is obtained. The requirement to "measure voltage with a multimeter" would be identified as a supporting skill and knowledge.

c. Identify the job conditions and standard for each supporting skill and knowledge when it is possible to do so in job-related terms. This information is required because the supporting skills and knowledges will be converted to training objectives.

d. Record the supporting skills and knowledges derived from each task or subtask on the job task data card (fig 4). Normally, supporting skills and knowledges are repetitive among tasks or subtasks within a particular job. Therefore, a separate list of supporting skills and knowledges should be prepared in which each has an identifying number or symbol. The supporting skills and knowledges may then be identified by their symbol on the job task data card.

e. No attempt will be made in this publication to distinguish between supporting skills and knowledges. The requirement is to identify the task or subtask components that have special requirements for minimum performance. The classification of each component as either a skill or a knowledge serves no useful purpose. The only precaution given is to avoid including knowledges that exceed the military requirement for successfully performing a task.

8. Identifying significant attitudes.

a. Any attitudes that are essential to job performance must be identified. These attitudes will become a part of the training objectives to insure that they become a part of the training program. For example, one of the greatest hazards associated with ammunition is fire; a positive attitude toward fire prevention is an indispensable attitude for all tasks associated with ammunition.

b. Record the significant attitudes in the space provided on the job task data card (fig 4).

Section III - Converting Job Requirements to Training Objectives

9. General. The tasks and subtasks recommended for training, their associated conditions and standards, the supporting skills and

knowledges, and the significant attitudes will be converted to training objectives (performance objectives). This section provides guidance for preparing training objectives, which is the critical point in the development cycle because it determines the content of a training program. Each element (action, condition, and standard) and criterion of training objectives is discussed in the following paragraphs as it applies to the systems engineering of a training program. CON Pam 350-14 provides additional guidance for preparing training objectives. A training analysis information sheet (fig 6) is suggested for recording the training objectives.

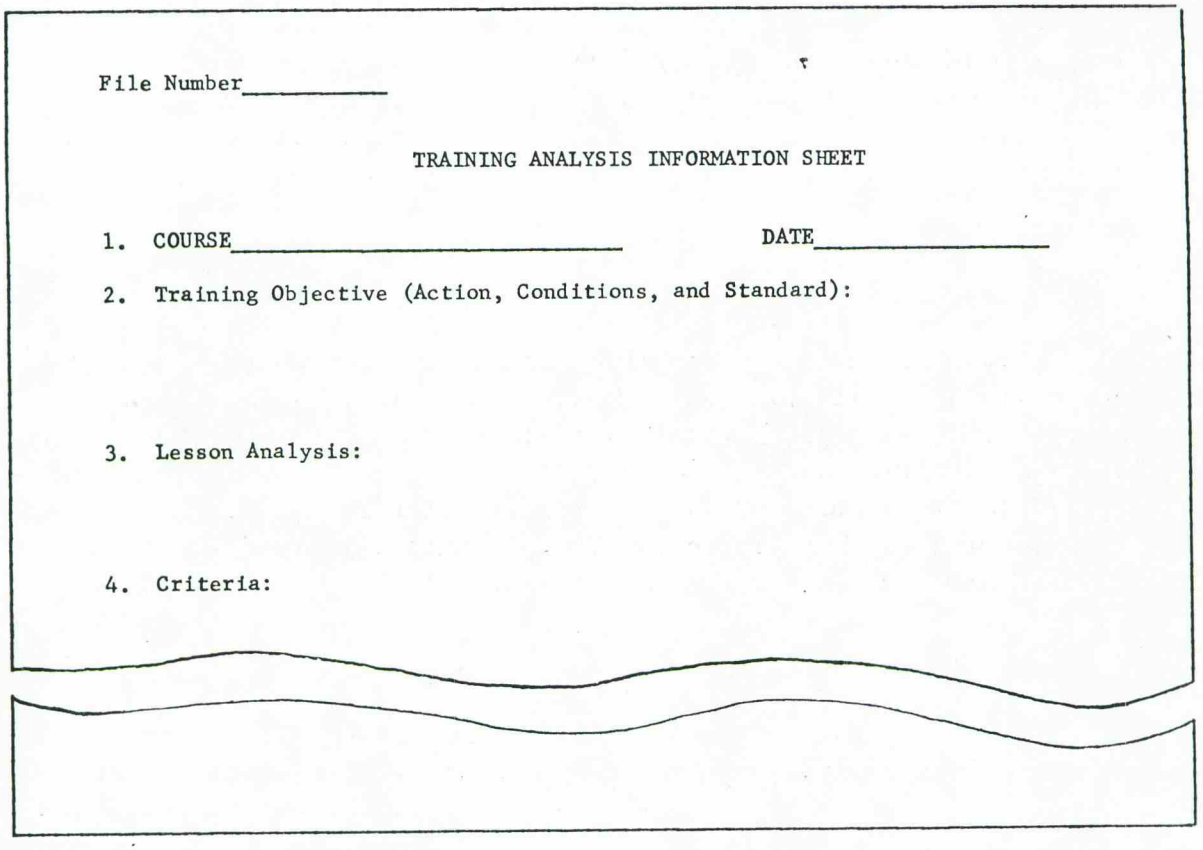


Figure 6. Training Analysis Information Sheet.

Procedures for completing paragraph 3 of this sheet are explained in appendix D.

10. Training action.

a. The action element of a training objective specifies what a trainee must be able to do as the result of school training. In most instances the training action will be identical to the task, subtask, or supporting skills and knowledges recommended for school training and can be taken direct from the job task data card.

b. Action elements that are derived from the job analysis data will require the trainee to perform those actions that will be required of him on the job. For example, the job requirement of "inventory classified files" should be converted direct to a training action. Conversions such as "describe the types of classified files," "state the major items of consideration when inventorying classified files," and "explain the procedures for inventorying classified files" should be avoided. Any training action that falls short of requiring the student to "inventory classified files" would be inappropriate for a job-related training program.

11. Training conditions.

a. The training conditions are derived from the job conditions recorded on the job task data card or a standard description sheet. Training conditions must approximate those job conditions that influence task performance. The guiding principle is realism to the extent possible for training purposes when specifying training conditions. Conditions such as "from memory," "without assistance," and "without reference" should be avoided unless they are realistic conditions for job performance.

b. Many job tasks and subtasks are performed under the same job conditions; therefore, training actions will be performed under the same training conditions. When this occurs, it is not necessary to repeat the conditions for each objective. One standard description will be sufficient in stating the training objective. Example 6 illustrates a "standard description." This approach will reduce the redundant effort required to prepare training objectives, but it should not be considered a license to omit necessary considerations.

12. Training standards. The standard is that part of a training objective that specifies the acceptable level of performance that must be achieved by the trainee. Training standards should be stated in realistic terms that reflect on-the-job requirements. Job tasks can be classified

into two broad categories--tasks with a published DA standard, and tasks for which the job standard is either implied or derived.

a. Training standards for tasks with published DA standards. A published DA standard exists for many tasks performed by military personnel. When a published job standard does exist for a particular task, the training standard will equal, be less than, or exceed the job standard.

(1) Training standard that equals the job standard. Training agencies are chartered to produce graduates who meet job entry requirements. Normally, the job entry requirements are less than those expected of a fully qualified jobholder. There are, however, instances when equipment, personnel safety, and other factors will require a training standard equal to the standard expected of experienced jobholders. Such high standards must actually be required before they can be firmly established as training standards.

(2) Training standard that is less than the job standard. This should be the standard usually adopted in training programs. The decision of how much less is judgmental in the initial stages and subject to revision, based on feedback information.

(3) Training standard that exceeds the job standard. The training standard should exceed the job standard only in exceptional cases, and each instance must be justified. Developing student performance capabilities that exceed the job standard may be justified when the on-the-job performance is required under adverse mental and/or physical conditions that cannot be simulated in the training situation and the graduate must perform in the atmosphere immediately upon assumption of his duties. The amount of overtraining is judgmental, and the initial estimates are subject to revision, based on feedback.

b. Training standards for tasks with implied or derived standards.

(1) Such standards should be determined in the same manner as for tasks with published standards, whenever possible. Avoid resorting to academic training standards in the absence of published job standards. Training standards such as "no errors permitted," "within 15 minutes," and "90 percent correct" assist in evaluating the school accomplishments but may not be job-related requirements.

(2) Avoid unnecessary overtraining for tasks having implied standards. The task of "type a disposition form" has an implied standard that the finished product will be prepared in a certain format, on a particular form, and without errors. It would be inappropriate to establish a training standard of "no errors permitted" when the AR pertaining to correspondence permits pen-and-ink corrections. A training standard of "format must be correct and errors corrected with neat erasures that do not mar the copy" might be entirely adequate for job entry requirements. This training standard is realistic in terms of actual job performance because it also insures that the students receive training in making neat erasures.

13. Training standards for supporting skills and knowledges. These standards are developed in the same manner as described in the preceding paragraphs. Keep in mind that all training standards are derived from job standards.

14. Attitudes. The significant attitudes identified as being necessary for job performance must be incorporated in the training program. Usually an attitude requirement will become a part of the training standard. For example, a welder must wear certain protective clothing and/or equipment while performing a welding task. Wearing protective clothing and/or equipment must become an additional training requirement for acceptable performance to insure that the trainee understands the use of specific items of protective clothing and equipment.

15. Recording the training objectives. Record on separate training analysis information sheets the training objectives that identify actions, conditions, and standards. Example 7 illustrates the recording of one training objective.

16. Developing criteria. The criterion for a training objective establishes the student performance that will be accepted as evidence of successful accomplishment of the training objective. Each criterion must consist of a task, conditions, and a standard that are derived from the training objective. The ideal situation exists when the requirements of the criterion are identical to the requirements of the training objective. This exact duplication will not be possible in all instances because of time and resource limitations that make it necessary to sample the requirements of the training objective. Record the criterion in the space provided on the training analysis information sheet. Examples 8, 9, and 10 illustrate some of the relationships of the criterion to a training objective.

Section IV - Course Structure

17. General. It has been demonstrated that learning will be more efficient if the interrelationships of the learning experiences are perceived in advance by the students.

a. After selecting the tasks, skills, and knowledges that are to be formally trained, and after developing the training objectives for these elements of learning, it is necessary to bind them together in some orderly manner. This arrangement of training objectives is called course structure.

b. The "structuring" of a course is no more than the arrangement of the training objectives to be mastered according to some logical sequence that is understandable to the student. This logical arrangement or order may reflect the sequence of procedural steps involved, the functional areas in which the graduate is expected to operate, the organizational level at which the graduate may be expected to perform, the various items and components he is expected to repair, or any one of many other logical orders. Remember at all times, however, that it is the structuring of the training objectives that is important, not the rationale used in arriving at that structure.

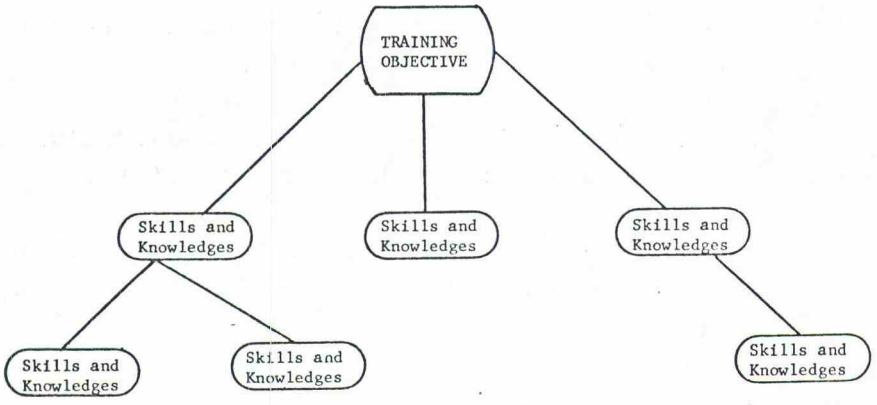
c. This section describes procedures and techniques that may be used in arriving at an optimum course structure.

18. Steps in sequencing. In the preceding section of this chapter, each training objective and its criterion were entered on a separate sheet called a training analysis information sheet. It now remains to arrange these sheets in their most logical order for instructional purposes. Arranging the training objectives will be done in three steps: sorting training objectives into closely related groupings or clusters, sequencing the training objectives within these clusters, and sequencing these clusters into an overall course structure.

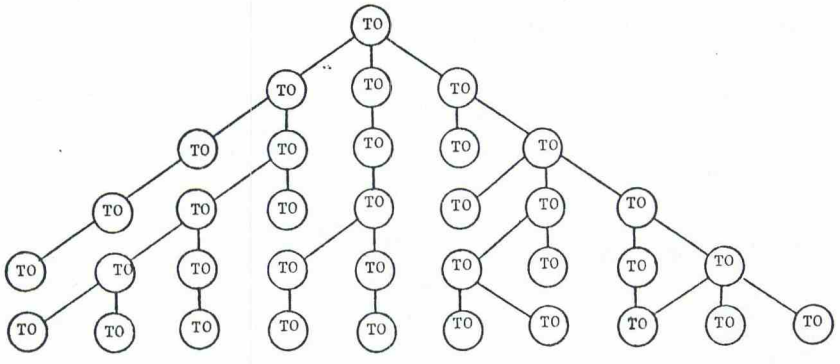
a. Developing clusters. Suppose that the training objectives to be sequenced pertain to a wheeled-vehicle repairman course. Each of these would be read independently to determine the commonalities contained in the objectives. Certain objectives would pertain to fuel and exhaust systems; others to final drives; and some to electrical systems, power trains, suspension systems, auxiliary systems, bodies, or chassis. Some of the clusters will contain only a few training objectives; others

will contain many. The training objectives in each cluster are related because of this sorting; however, they are placed in random order.

b. Sequencing within clusters. The training objectives within each cluster must be individually sorted to determine their most logical order. Visually inspect the sheets in the cluster, and select the one task that appears to be the ending or most complex task. Read each of the other objectives, asking the question, "Should this objective be reached before or after the last one selected?" Then place each sheet before or after the previous sheet in accordance with the answer to the question. Soon all of the objectives in the cluster will be in a definite sequence. The normal arrangement of objectives within a cluster tends to take a pyramidal form; i.e., each training objective for a complex task will be preceded by a number of training objectives representing the supporting skills and knowledges. This pyramidal structure (fig 7) tends to hold true for both single objectives and clusters of training objectives.



Typical Sequence Within a Training Objective.



Typical Cluster Sequence of Training Objectives.

Figure 7. Pyramidal Form of Sequenced Training Objectives.

c. Sequencing of clusters.

(1) The clusters are then sequenced in the same way that the individual objectives within the clusters were sequenced. As an example, consider a cluster of training objectives related to engines. What other groups of objectives must students meet before they can reach the training objectives for engines? Since one of the objectives for engines is "must be able to tune an engine," it can be assumed that the engine must be running. If so, the students must have already reached the training objectives for the fuel and exhaust systems and electrical systems. It is apparent that both fuel systems and electrical systems must be sequenced before engines. It is not critical that the students master the objectives of one of these systems before the other. Thus, the course sequence would be as illustrated in figure 8.

Not at all apparent

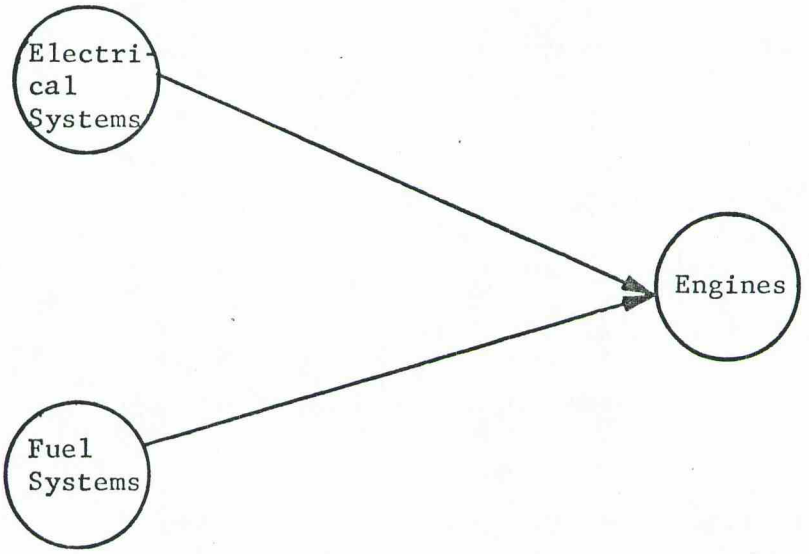


Figure 8. Cluster Sequence.

(2) The transmission system receives its power from the engine and provides power to the power train; the power train drives the final drive; and the final drive powers the suspension system. There is, therefore, a sequential relationship between these systems, as shown in figure 9.

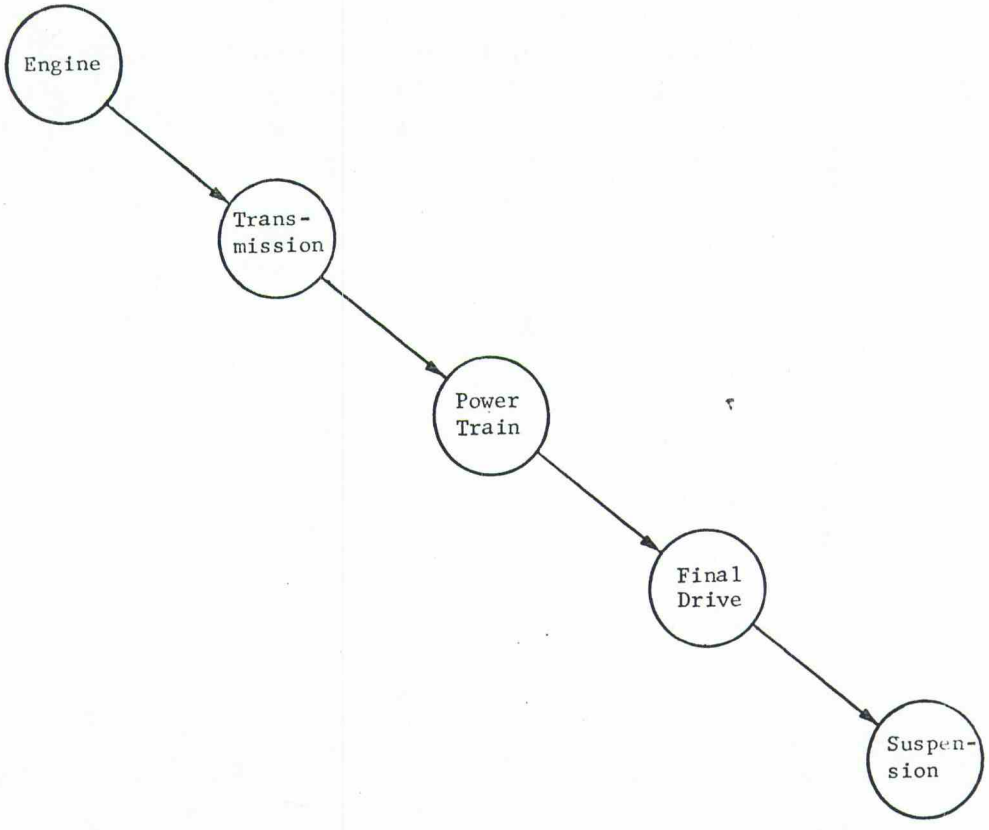


Figure 9. Continued Cluster Sequence.

The student must understand this sequential relationship in troubleshooting the transmission.

(3) The same type of questioning procedure shows that the suspension system, in addition to having a sequential relationship back to the engine, is mounted upon the chassis and requires the prior reaching of the training objectives for the chassis. Likewise, the student should master the chassis before he faces the training objectives for the body. This sequence is shown in figure 10.

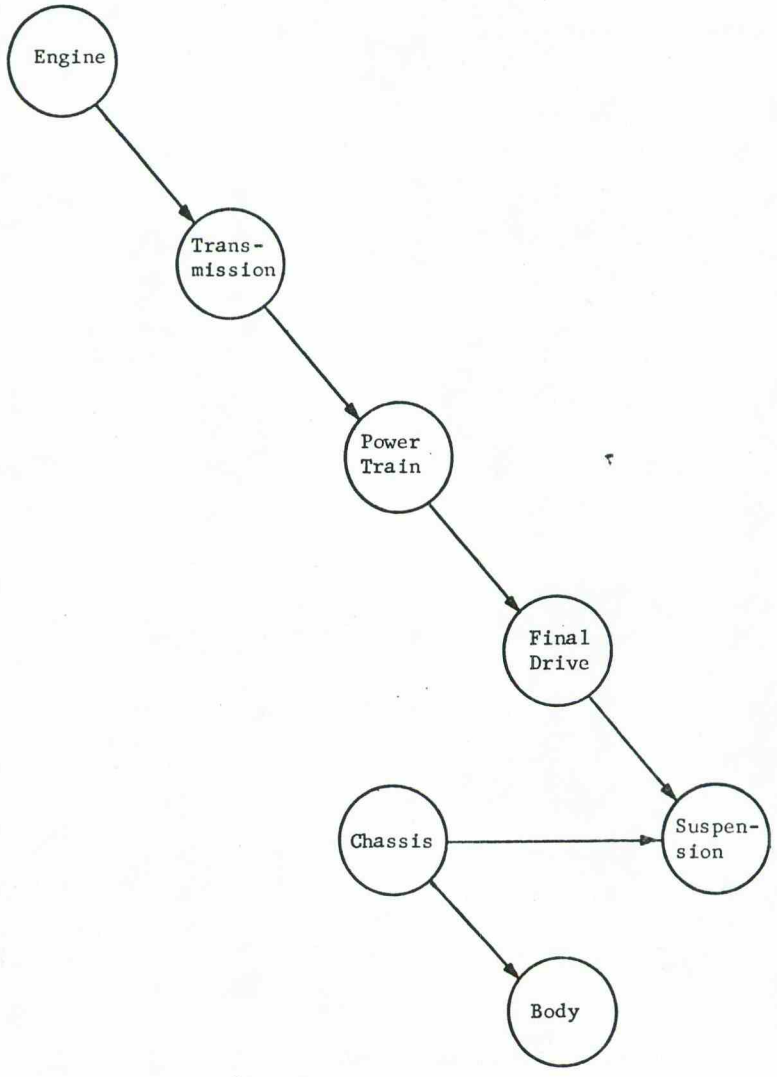


Figure 10. Continued Cluster Sequence.

(4) There is one remaining cluster: auxiliary systems. An inspection of these training objectives shows that they deal with two types of systems, those dealing with electrical items and those dealing with mechanical items. The objectives in both the electrical system and the transmission clusters must be mastered before those in the auxiliary cluster. The sequential relationship between all clusters emerges as shown in figure 11.

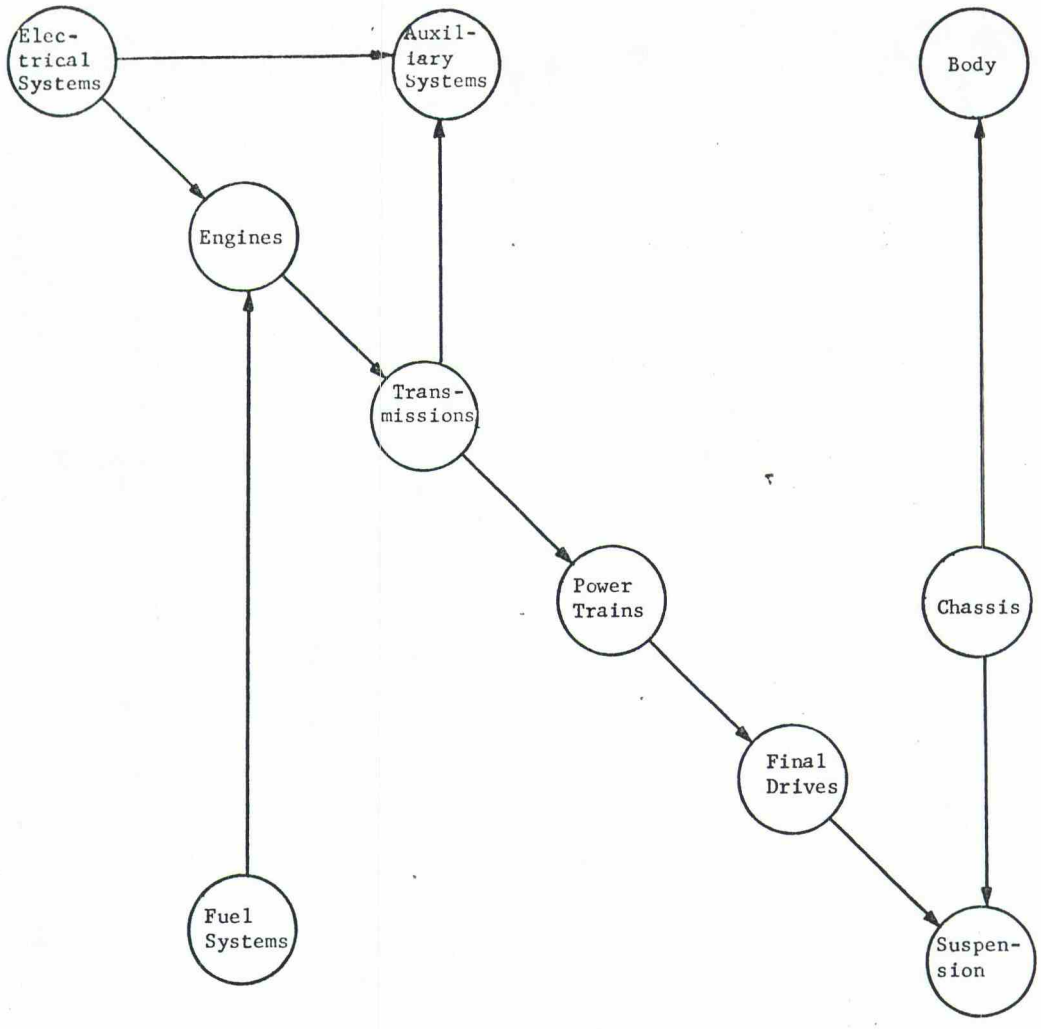


Figure 11. Completed Sequence of Clusters.

(5) As illustrated in figure 11, a branching sequence evolves rather than a straight, linear course sequence. If it is desired that this branching sequence be converted to a linear sequence without disturbing the course structure, choices must be made between what are apparently parallel clusters of learning. The clusters such as auxiliary systems and chassis present no problem. The only criterion for the presentation of the auxiliary system cluster is that it must be preceded by both electrical systems and transmissions. Therefore, it may be placed immediately after the transmission cluster. Note, however, that course structure and integrity will be maintained if the auxiliary system objectives are sequenced behind power trains. By similar logic, the most

appropriate position for the chassis cluster would appear to be between the final drives and suspension clusters. The entire course sequence would now be linear, except in two places: the parallel clusters of electrical systems and fuel systems, and the parallel clusters of body and suspension. Again, a straight linear sequence may be accomplished by applying logic, this time using as a base the principles of learning--student readiness, simplicity of tasks, and the inclusion of tasks that most closely echo the overall structure. In applying these principles, one would probably find that the students are equally ready, considering their past backgrounds, to master tasks in either fuel systems or electrical systems. An examination of their past training may indicate that either of the clusters may contain the more simple tasks in terms of a particular population of students. All other things being equal, the tasks for the fuel systems may be found to more nearly echo the overall structure of the course by the very location of its components throughout the vehicle. Therefore, the fuel system objectives might be trained before those for the electrical systems. In a like manner, logic may lead to the choice of presenting the "body" training objectives before those for the suspension. The straight linear course sequence, without having disrupted the course structure, would be derived as illustrated in figure 12.

19. Consensus sequencing. The method for sequencing the training objectives described in the preceding paragraph infers that one individual performs the analysis although, necessarily, the completed course sequence would be coordinated with other knowledgeable persons. A systematic means of combining the judgments of several knowledgeable persons in sequencing the training objectives is called "consensus sequencing." In using consensus sequencing, a group of experienced persons independently of each other arrange the clusters in their most logical linear order. Each planner assigns a rank order to each cluster, awarding one to the first cluster and the highest number to the last cluster. The ranks assigned to each training objective by each judge are averaged. The obtained average rank of each training objective would thus represent a consensus on the most appropriate course sequence.

20. Alternative approaches to course structure. The previous paragraphs illustrate but one method of sequencing training objectives. There are other accepted methods that would probably be equally effective. It is not the rationale that is of prime importance. A logical course structure and sequence must be developed that can be clearly communicated to the students.

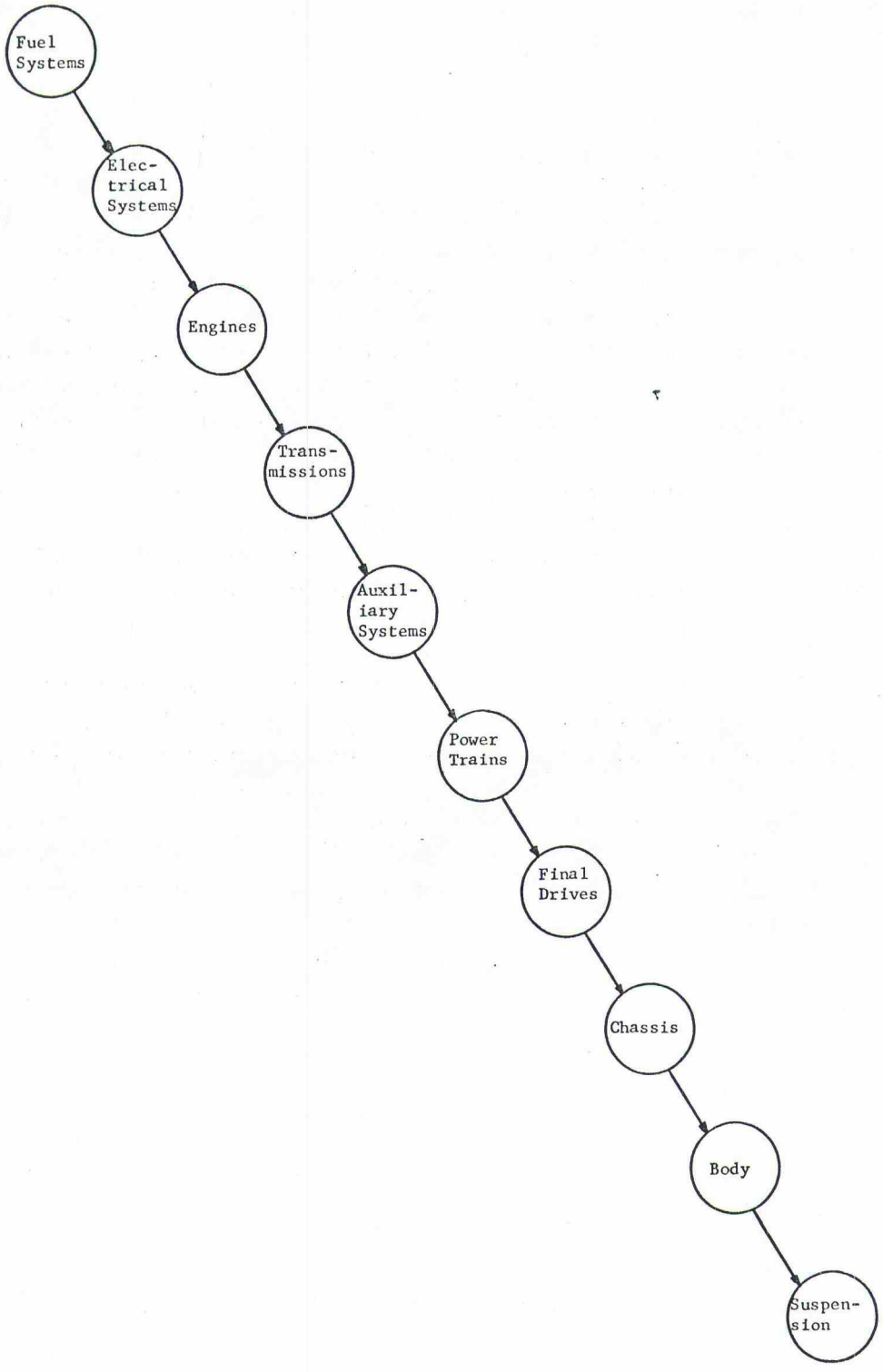


Figure 12. Linear Sequence of Clusters.

Section V - Course Evaluation Concept

21. General. As a part of the overall course structure and sequence, decisions must be made regarding the most appropriate points within the course sequence for evaluating student achievement. These decisions must be made in terms of the most logical positions within the sequence for testing student achievement.

22. Relationship to course structure. As noted in section IV, the course structure is determined by sorting and resorting training objectives shown on training analysis information sheets. This sorting and resorting results in a file of these sheets completely sequenced for the course, as illustrated in figure 13.

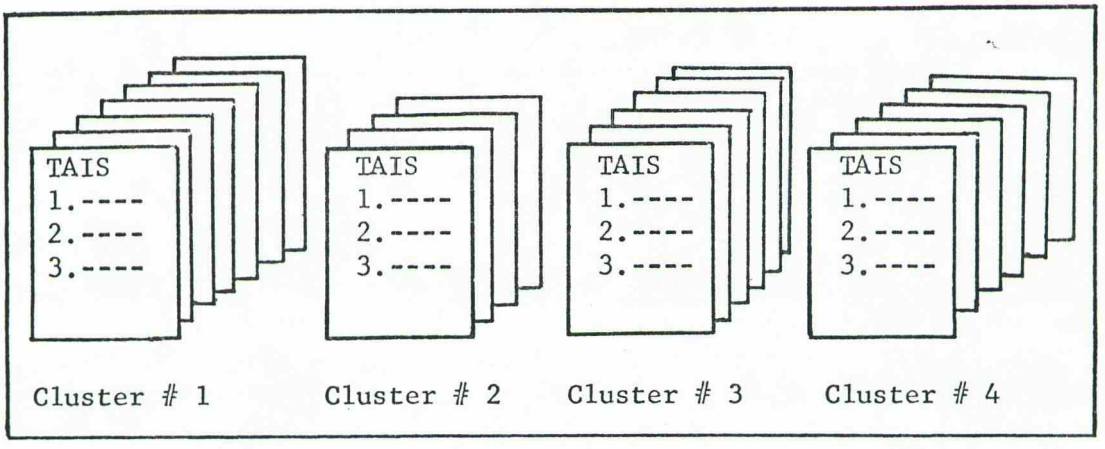


Figure 13. Training Analysis Information Sheets Arranged in a Course Sequence by Clusters.

23. Identifying evaluation points within the course sequence. A course evaluation concept could be derived by analyzing all the training analysis information sheets, but such a file would be rather voluminous and awkward to handle. It is therefore suggested that a separate sheet be prepared for each cluster, listing all training objectives within that cluster. These additional sheets, inserted in the course sequence, may be designated as evaluation planning information sheets. Their relationship to the course sequence is illustrated in figure 14.

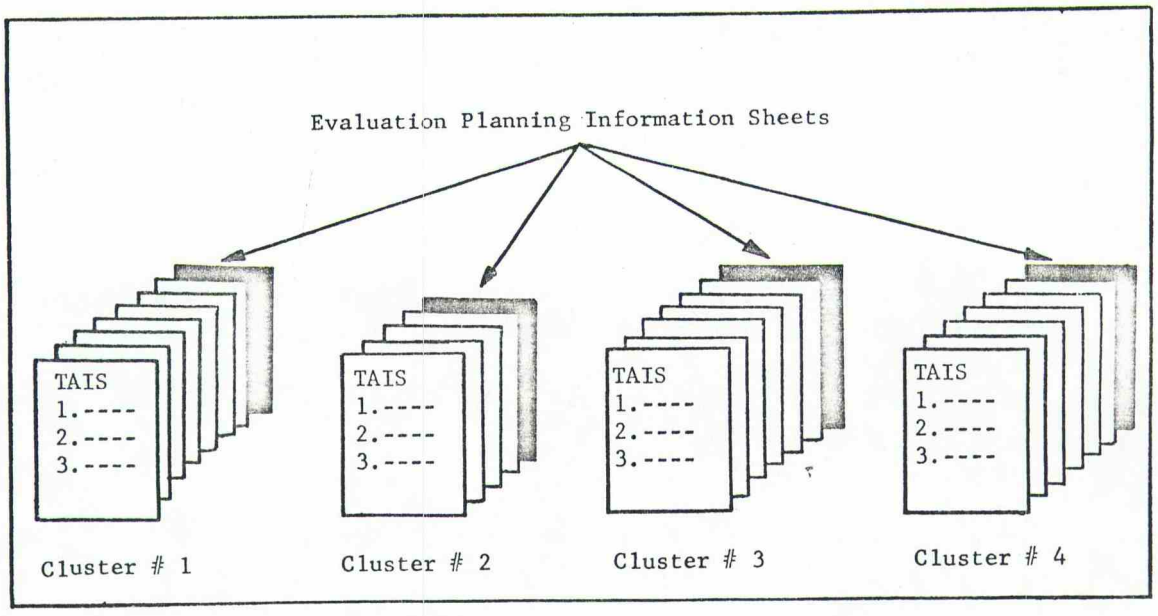


Figure 14. Training Analysis Information Sheets Arranged in a Course Sequence by Clusters with Added Evaluation Planning Information Sheets.

Each of these sheets will not contain all objectives found within a single cluster; e.g., all of the objectives for "Fuel and Exhaust Systems." Even as the clusters are groupings of objectives within a total course, these objectives will tend to fall into subgroupings within the cluster; e.g., tanks, lines and fittings, pumps, carburetors, manifolds, mufflers, and pipes. A subjective determination must be made as to whether the entire cluster should be examined as a unit, or whether there are logical groupings of training objectives within the cluster that should be examined separately. The basic course evaluation concept is derived from an analysis of the objectives. These are tentative points only and are subject to modification based on subsequent actions during the course development process.

Appendix D

Preparation for Training

Section I - Introduction

1. General.

a. Preparation for training might well be called the production phase of the systems engineering process because all instructional and administrative materials are developed, including POI, lesson plans, handouts, and training media to support learning.

b. Regardless of the kind of instruction material being produced, its preparation must be guided by student-centered learning principles. The training materials produced must guide the student toward successful accomplishment of the training objectives.

c. This appendix outlines the concepts and procedures for preparing instructional materials and aids, including POI, training schedules, lesson plans, handouts, and training aids, for each of the training objectives. This is the fourth step in the overall system engineering process.

2. Considerations. The primary consideration in preparation for training is accomplishment of the training objectives. Other considerations are characteristics and capabilities of students and instructors and available or obtainable resources such as facilities, materials, equipment, simulators, personnel, training methods, and training media.

Section II - Learning Analysis

3. Analysis of training objectives. The first operation in the analysis of learning is to identify the teaching points needed for students to accomplish the training objective. Next, decisions are made on appropriate references, the teaching method and media to be used, equipment requirements, training aids, and time estimates. The training analysis information sheet, or a similar recording device should be used to insure uniformity of the learning analysis. A partially completed training analysis information sheet is illustrated in example 11 (app G).

The following discussion is keyed to the columns in paragraph 3 of the example.

a. Teaching points (colm a). Prepare a detailed list of the teaching points needed for the students to accomplish the objective.

(1) Examine each point in detail to determine whether it can be learned directly by the students or whether subordinate points are required.

(2) Organize the teaching points in the most effective sequence from the learner's point of view. In sequencing the teaching points the primary consideration is how the students can learn the material most effectively rather than how it can be presented most effectively.

b. References (colm b). Identify reference materials that contain information essential to the teaching points. List each of these references opposite the teaching point it concerns. Instead of listing complete titles, a standard list of references may be prepared separately and referred to in this column.

c. Methods of instruction (colm c).

(1) Selecting methods of instruction should be based on what the training objective requires the students to do. Methods of instruction include lecture, conference, demonstration, case study, seminar, PE, and self-study (including homework).

(2) The basic criteria in selecting a method of instruction are its effectiveness and relative cost in facilitating learning. The instruction must train the students to perform a specified task. Consequently, the method of instruction selected must be the most appropriate for student mastery of the training objective. Each separate method of instruction has unique advantages and limitations. A combination of several methods of instruction may be required for students to achieve a specific training objective. The basic considerations in selecting methods of instruction include the following:

(a) Cost versus effectiveness. The results achieved must be evaluated against the cost or availability of necessary resources. Resources include money, personnel, time, facilities, materials, and materiel.

(b) Limitations that may be imposed by restrictions on resources in (a) above that may require trade-offs between methods of instruction. For example, restrictions on the number and qualifications of instructors may dictate the use of a large group conference when a small group seminar is the first choice as a method of instruction.

(3) The method or combination of methods used will depend on many things, but primarily it will depend on the needs of the particular learning situation. Since most learning for all Army jobs requires the development of both knowledges and skills, a combination of methods will usually be necessary to accomplish effectively the formal training objective. In actual use there can be no sharp dividing line between the methods of instruction. It is best to seek a "mix" of two or more methods in order to find the most efficient and effective combination.

(4) Indicate in this column the method or methods that appear to be most appropriate for each teaching point.

d. Media (colm d).

(1) Instructional media are equipment, systems, devices, or aids used to present instruction. Types of media and aids may vary from a relatively simple training aid in the form of a chart to a complex computer-based instructional system. Essentially, the media and aids must be the means of presenting instruction and be used to support the selected methods of instruction. The methods of instruction may be presented through the use of one of several media, such as film, educational TV, or live instruction. The primary criterion to be considered in selecting the media is the extent to which they can contribute to the methods of instruction selected.

(2) Other criteria that should be considered in selecting media include--

(a) Specific gains in learning effectiveness that may be achieved.

(b) Reliability of machines or systems.

(c) Convenience, responsiveness, and adaptability to the training.

(d) Cost and time required to prepare instruction for presentation.

(e) Cost of presenting instruction.

(f) Other significant unique advantages and limitations.

(g) Comparisons of media that are competitive in cost and results.

(3) Indicate in this column the media and aids that will be used to support each training point.

e. Training equipment material (colm d) and facility (colm f).

(1) Equipment or simulations of equipment of several types are frequently required to develop student proficiency. If instruction is to be efficient and effective, the right type of equipment in the right quantities must be available when required. Equipment is expensive. Equipment procurement and installation require considerable lead time. Often equipment places demands on facilities. For these reasons, the precise quantity and kind of equipment needed to support the training must be determined well in advance of the time it is to be used.

(2) The selection of training equipment is determined by many factors; however, the primary factors to consider are training objectives and student load. The objective will determine whether the actual equipment is necessary or whether a training aid will suffice. The student load will determine the amount of equipment required.

(3) Local factors for determining the type and quantity of training equipment required, when applied properly, will usually result in an ideal training situation. Unfortunately, compromises may often be necessary because of limiting factors such as facilities, safety requirements, security requirements, availability, and costs.

(4) In columns e and f enter any training equipment and facilities required to support the teaching points.

4. Review of training analysis information sheet.

a. Review the methods of instruction selected as the most desirable in light of available media (colm d), training equipment (colm e), and facilities (colm f). If the desired support is not available or obtainable, adjust accordingly. However, make every reasonable effort to support the most effective training.

b. Review the training objective of the lesson and the lesson content involved, and estimate the time for each teaching point. Enter this estimate in column g of the training analysis information sheet. These time estimates must be consolidated into a total estimate of time required for accomplishing the objective.

5. Results of the analysis of the training objectives. The analysis of the training objectives results in an estimate of the resources required in support of the training program. Adjustments in these estimates may be anticipated when feedback information from the training quality control is received.

Section III - Developing Instructional Materials

6. Identify lessons. Lessons are convenient groupings of objectives for instructional purposes. A lesson is a logical unit of instruction in a course and may concern a single training objective or two or more related training objectives. The number of objectives included in a lesson may vary widely, depending on the number and complexity of the skills and knowledges inherent in the objectives. The time devoted to a lesson may vary from 1 hour to 8 or more hours, depending on the content implied by the objectives and on the interrelationship of the objectives. The primary consideration in determining the length of lessons will be how the material can be learned most effectively by the students. If the lessons are too short and numerous, or too long, the students may have difficulty in relating the parts to the whole, and vice versa. To evaluate student progress and to provide timely motivation, intermediate and ultimate objectives need to be clearly defined so that the students can integrate all of the details in the instruction.

7. Lesson plan design.

a. Planning a lesson is not an ironclad step-by-step process with each step isolated from the next. There are no rigid steps that can

be followed in one fixed order for all training situations. FM 21-6 provides general guidance in this area. Local regulations at each training agency contain specific format and content requirements.

b. Lesson planning should be a continuous process, with revisions made to incorporate the latest technology and the results of training quality control information. The preceding analysis of the training objective on the training analysis information sheet indicates that the lesson plan should include a detailed plan for the learning activities that must take place. A lesson plan prepared properly should embody the following:

(1) Logically sequenced teaching points that are clearly related to one or more of the training objectives.

(2) A narrative explanation in sufficient detail to provide qualified instructors with a clear and precise understanding of how the instruction is to be conducted, and how the teaching points are related to the training objectives and to each other. In brief, the lesson must detail the methods, sequence, and content of the instruction to a degree that will insure student achievement of the training objectives even though the lesson is taught by different instructors.

8. Training literature.

a. Training literature may have a significant impact on student accomplishment of the training objective. Selecting and designing effective training literature are integral parts of the whole process of developing student performance capabilities.

b. Some factors that influence the development of training literature follow:

(1) Training literature provided the student must apply directly to the objectives and lesson content, as identified in the training analysis information sheet.

(2) Training literature should be easy to comprehend and follow.

(3) Information from military publications will be reproduced only when the publication in question is not available in sufficient

quantity, or if the information to be reproduced must be rewritten for purposes of simplicity, clarity, or organization. Care should be exercised in extracting information from military publications since the incumbent is usually expected to use those publications. Training the student to use the publications is often an essential objective of the training.

c. In developing training literature, the following design features should be applied:

(1) Standardization of format and, where possible, standardization of procedures.

(2) Hunting should be minimized.

(3) Practice materials should feature real situations insofar as practicable.

Section IV - Administrative Documents

9. Developing the POI.

a. A POI provides specific information concerning course purpose, prerequisites, outline of subject matter, description of training objectives, lesson content, time allocations, methods of instruction, and reference material. The completed training analysis information sheets provide sufficient information for developing the POI.

b. Specific information with regard to format, content, and processing of POI and ASubjScd in support of courses at USCONARC training agencies can be found in Annex Q to CON Reg 350-1, and CON Reg 350-16.

10. Training schedule.

a. The training schedule of the course of instruction is an index to the sequencing of instructional periods and should be prepared based on the completed training analysis information sheets.

b. Training schedules may also contain pertinent data such as time devoted to each period, number of instructors and assistant instructors, platform manhours, and lesson identification data. Local regulations at each USCONARC training agency will prescribe the format and content for developing training schedules.

Important: This section implies but does not make clear that all knowledge tested is must-know.

Appendix E

Testing

Section I - Introduction

1. General. The tests used most often in training situations are usually described in three categories: aptitude tests, diagnostic tests, and achievement tests. An aptitude test attempts to measure an individual's ability to learn in a specific field. A diagnostic test attempts to identify specific student learning problems or determine whether students are progressing satisfactorily towards a particular instructional objective. An achievement test attempts to measure what the student has learned. In the military training situation, the student's aptitude for learning is determined before his arrival, and the testing program is concerned only with what the student is to learn in the course. The discussion in this chapter pertains only to the development of achievement tests, and the term "test" is used throughout this appendix only in the sense of the achievement type of test.

2. Purpose of testing. Many texts enumerate the purposes served by a testing program. Among these are improvement of training, motivation of the students, basis for grades, and basis for selection and guidance. All of these purposes are served by the testing program; but, viewing the test program from the standpoint of the training objective developed as described in appendix C, the purpose of a testing program can be stated in more specific terms: Evaluate student accomplishment of the training objectives as specified in the criteria.

3. Scope. This appendix is the fifth step of the systems engineering process and describes principles applicable to test construction and the development of test outlines, test standards, and test instruments. The latter two subjects are the basic steps required in developing the testing program; and, although they are described in the order in which they generally occur, in actual practice each will often overlap with the other and a later step may cause revision of an earlier step.

Sentence on pg. 6; should be 1st sentence section

Section II - Principles of Test Construction

4. General. There are several principles of test construction that should be kept in mind in developing test outlines and test instruments. While these principles are applied throughout the discussion in this appendix, their significance is such that they are described in this section.

5. Tests must be realistic. The best possible test would require the student to perform each task under actual field conditions and to field-required standards. Limitations in equipment, personnel, time, space, safety requirements, and other factors make it obvious that complete realism is not often practical or even, on occasion, desirable. Thus, any test constructed must be viewed as only an approximation of reality.

6. Tests must provide specific feedback information. In addition to providing information that assists in determining the disposition of students, an effective testing program must provide specific information for continually improving the quality of the training program. While the use of test results is properly a function of training quality control (app F), a major consideration in designing the test is to insure that the test results will provide specific information on training strengths and weaknesses.

7. Tests should be administered and scored as objectively as possible.

a. Ideally, each student in each class should take the test under the same conditions.

b. Tests are objectively scorable when two persons, independently of each other, arrive at the same score for a particular student's performance. Completely objective scoring is not always possible. Application of the "go no-go" principle will aid in obtaining the maximum degree of objectivity because the test is designed to permit scoring of individual items on a right-wrong, pass-fail, did-did not, correct-incorrect basis.

c. The distinction between a score and a grade must be kept clearly in mind. The test produces a score or record of a student's performance. In no sense does the score, of itself, indicate the worth

or value of a performance. Scores are interpreted into grades. The number of scorable items in the test can be any number; e. g., 19, 23, or 34. The intent is to produce a test that will yield an objective record of the student's performance, regardless of the number of scorable items required. When it is necessary to convert a score to a grade for administrative purposes, the translation graph technique explained in FM 21-6 is recommended.

8. The total testing program must be comprehensive. The testing program must provide an evaluation of student achievement on all training objectives. To accomplish such with each class will often be impractical; too much time would be required. The use of alternate test forms with different classes is the means by which each possible version of the training objective is evaluated. There may be a large number of malfunction symptoms that a repairman may encounter with complex electronic equipment. When such is the case, it will be practical to test only a representative sample of the total possible malfunction symptons. The goal is to prepare tests that closely approximate and sample the job requirements. The reasoning is that, if the trainee demonstrates proficiency in the representative tasks contained in the tests, he will be able to perform the infinite versions of that task that will be encountered on the job. The test outline is the basic means used to insure that the tests are comprehensive.

Section III - Preparing the Test Outline

9. Purposes of the test outline. A test outline is prepared for each evaluation planning information sheet identified in the sequenced training analysis information sheets (app C). The test outlines identify specifically what is to be tested about each training objective and in which alternate test each training objective is tested. The amount of detail required in developing tests demands the use of a test outline to insure that all essential parts of each training objective are evaluated in one alternate test or another. The test outlines provide a plan or guide for the orderly development of the tests and insure that the tests do evaluate all or a representative sample of the training objectives.

10. Essential elements of the test outline. A test outline should contain, as a minimum, the following elements of information:

a. Each training objective as arranged or grouped for testing purposes. Insure that the training objectives in the test outline can

be readily identified and related to the training objectives contained in the sequenced training analysis information sheets. Additionally, the training objectives may be coded to relate them to the task inventory.

b. The possible versions of each training objective or combination of training objectives.

c. Notation as to which versions of each training objective are being tested in which alternate test.

11. Steps in developing the test outline. The following basic steps must be taken in preparing the test outline:

a. Arrange and group the training objectives for testing purposes. As already noted, each of the training objectives contained in the training analysis information sheets may represent either a task or, quite often, part of a particular task. This is necessary for instructional purposes because many of the tasks are of such complexity that they can only be learned in parts before the "whole" task can be mastered. When possible, the test must be directed at a whole version of the task, not at the small parts that may have been identified for instructional purposes. Therefore, several training objectives may be combined for testing purposes. Others may not require formal testing because they are inherently tested in other objectives. The test outline must indicate which training objectives (or combinations of training objectives) are to be tested.

b. Identify the possible versions of the training objective. The possible versions of the training objectives selected for testing must be identified and listed in the test outline. For example, the training objective to be tested is that of inventorying classified documents. The "documents register" is the key to the performance of this objective. It gives the individual conducting the inventory a description of each document and the current disposition of each document. There are only three possibilities as to what the register can indicate about the current disposition of a document, but there are four possibilities as to the actual disposition of a particular document. The register may indicate that the document is "in file," "on receipt," or "on destruction certificate." In reality, any of these possibilities may be true; but in addition, the document may be unaccounted for. The possible combinations between what the register indicates (three possibilities) and what is the actual disposition of a document (four possibilities) identify all of the

possible basic versions of the objective. The test outline would identify these 12 basic versions of the objective as illustrated in figure 15.

Task: Inventory classified files.

The register indicates the document is:

1. In file, and it actually is.
2. In file, and it is actually on receipt.
3. In file, and it is actually on destruction certificate.
4. In file, and it is actually unaccounted for.
5. On receipt, and it is actually in file.
6. On receipt, and it is actually on receipt.
7. On receipt, and it is actually on destruction certificate.
8. On receipt, and it is actually unaccounted for.
9. On destruction certificate, and it is actually in file.
10. On destruction certificate, and it is actually on receipt.
11. On destruction certificate, and it is actually destroyed.
12. On destruction certificate, and it is actually accounted for.

Figure 15. Basic Possible Versions of the Task of Inventorying Classified Documents.

c. Preparing sampling plan. A plan for sampling the numerous variations of each of the objectives must be prepared. The complexity and, quite often, the infinite variety of ways in which job tasks are performed demand a scheme of testing that adequately samples

representative versions of the real job tasks. Continuing with the example of the objective of inventorying classified documents, the last step in preparing the test outline is to determine which versions will be tested by which test. Figure 16 illustrates a sampling plan for testing the inventorying of classified documents.

Task: Inventory classified files.

The register indicates the document is:	TEST A	TEST B	TEST C
1. In file, and it actually is.	X	X	X
2. In file, and it is actually on receipt.		X	
3. In file, and it is actually on destruction certificate.	X		
4. In file, and it is actually unaccounted for.		X	
5. On receipt, and it is actually in file.			X
6. On receipt, and it is actually on receipt.	X	X	X
7. On receipt, and it is actually on destruction certificate.			X
8. On receipt, and it is actually unaccounted for.	X		
9. On destruction certificate, and it is actually in file.		X	
10. On destruction certificate, and it is actually on receipt.	X		
11. On destruction certificate, and it is actually destroyed.	X	X	X
12. On destruction certificate, and it is actually accounted for.			X

Figure 16. A Test Outline for the Task of Inventorying Classified Documents (Outline Form).

Each objective to be tested may present somewhat different problems in preparing a test sampling plan, and may require a different approach. For the objective of inventorying classified documents, three basic considerations influenced the development of this plan:

(1) The total number of versions or repetitions tested for any one class must be sufficient to indicate whether or not the students have mastered the objective.

(2) The limitations of time must be considered. Time limitations will frequently prevent testing each class on all possible versions.

(3) The versions selected must be representative of versions typically encountered on the job. Note in figure 16 that task versions 1, 6, and 11 are to be tested on all alternate tests. This was done because on the job most classified documents are actually where the register says they are. It is equally important that the student be tested on his ability to identify documents properly accounted for as well as those unaccounted for or improperly accounted for.

12. Forms of the test outline.

a. Figure 16 illustrated a portion of a test outline in the usual outline form. Figure 17 illustrates the same test outline in matrix form. Either the outline or the matrix form, or a combination of both, may be used.

	Actual Situation			
Register Indicates	In File	On Receipt	On Dest Cert	Unacct For
In File	ABC	B	A	B
On Receipt	C	ABC	C	A
On Destruction Cert.	B	A	ABC.	C

Figure 17. A Test Outline in Matrix Form.

b. Figure 18 shows the relationship between the test outline and sequenced training analysis information sheets, which include the course evaluation concept.

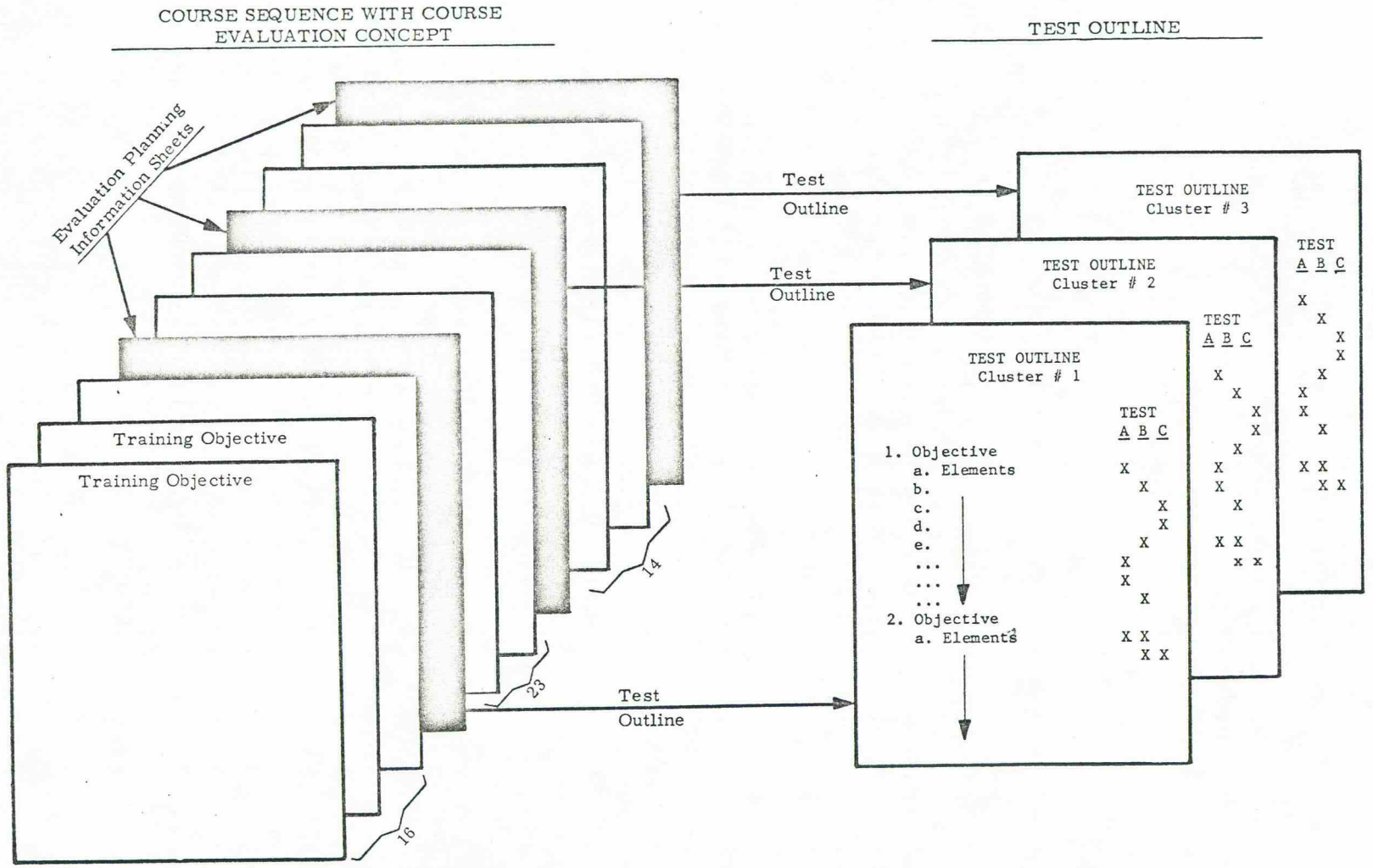


Figure 18. Relationship Between Test Outlines and Training Analysis Information Sheets.

Section IV - Developing Test Standards

13. Training objectives and testing standards. The training analysis produced a set of training objectives denoting the actions to be learned, the conditions under which the actions were to be performed, and the minimum standards required. The conditions and standards contained in these training objectives, while sufficient to guide the development of lesson plans, may not be sufficiently precise for purposes of testing. Each condition and standard stated in the training objective must be examined and possibly modified for measurement purposes. This section describes the kinds of reasoning required in establishing the minimum standard of performance expected of each student on each training objective as measured by the testing program.

14. Basis of test standards. The job-required standards were identified during the job analysis. Quite often these job standards will not be stated in terms precise enough for course testing purposes. Each will require further analysis and definition. The following discussion indicates the kinds of analysis that must occur when identifying the standards for testing purposes:

a. One example of a job standard is the requirement that military stenographers take dictation at 90 words a minute. This job standard of 90 words a minute must be precisely defined for testing purposes in the training course. Typical dictation tests are given at a standard rate of 90 measured words a minute. Office dictation is never at a standard measured rate; typically, it will vary within 2-second time frames from 0 to 200 words a minute. Actual office dictation is in spurts; there are many pauses. Additionally, the average rate of dictation will vary from one dictator to another. Should the test approximate these field conditions, or will a uniform measured rate of dictation be sufficient? Beyond the design of the test situation, other questions must be answered. What constitutes an acceptable transcription--one that is ready for signature and is mailable? What is the job requirement? Perhaps a double-spaced draft with one or two errors is acceptable. How will the transcription be scored? What constitutes an error? How many errors are allowable? How can the transcription be objectively scored? What should be the content of the dictation? (The language used by one dictator will vary from that used by another and will present varying degrees of difficulty.) How are sentence and word complexity to be accounted for? Will neat erasures be acceptable? How many erasures will be allowable? In other words, there are often many

questions that must be answered about the testing standards and conditions before a minimum acceptable standard for test purposes can be defined. The simply stated field standard of 90 words a minute must be further defined before it is usable as a test standard.

b. Another group of job-required tasks will have no quantitatively stated standards such as "90 words a minute" or "solder to military specifications." Inventorying classified documents is one example. The job standard for this task is "be able to account for all classified documents." The same kinds of questions already raised in a above must be answered concerning the minimal acceptable testing standard.

c. A third class of job standards is highly qualitative, such as those for briefings, staff studies, and tactical planning. The effectiveness of the oral communication or briefing is not reducible to elements that can be objectively scored on a right-wrong basis. A number of tactical plans might be good; some may be better; but only one may be best. Evaluation of their worth, however, is judgmental and qualitative rather than quantitative. Care should be taken that evaluation of such intellectual and qualitative training objectives is not overweighted in the direction of the less important aspects of the tasks that are often more easily scored. Even though evaluation of such tasks is inherently judgmental and qualitative, a quantitatively measurable standard for testing purposes must be derived when such tasks are selected for training.

15. Altering job conditions and standards for testing purposes. For testing purposes, it is more appropriate to use the term "standard" in a broader sense. Each version of a training objective, as defined and altered for testing purposes, in effect identifies the testing standards. Establishing a certain number of correct responses as the standard and not identifying the conditions under which the student responds do not properly define the testing standard. The following examples illustrate the various ways in which training objectives may require alteration in order to identify the standard for testing purposes:

a. Example 1.

Training objective:

Task: The student will be able to type manuscript material.

Conditions: Classroom with typing desks equipped with nonelectric typewriters.
Standard: 40 words a minute.

Test standard:

Task: Same.
Conditions: Same.
Standard: A minimum net average of 40 words a minute for 5 minutes of continuous typing from new material representing typical office correspondence. Five standard-stroke words for each error are deducted (list of errors to be scored is attached) from the gross number of words typed within the 5 minutes.

b. Example 2.

Training objective:

Task: The student will be able to unsolder and solder electronic connections.
Conditions: Laboratory and the tools prescribed for the electronics repairman's tool kit.
Standard: Ord MILSPEC 45743.

Test standard:

Task: The student will be required to unsolder and solder terminal post, terminal eyelet, and bifurcated connections.
Conditions: Laboratory and the tools prescribed for the electronics repairman's tool kit.
Standard: Ord MILSPEC 45743.

c. Example 3.

Training objective:

Task: The student will be able to inventory classified documents.
Condition: Classroom.
Standard: Must account for all classified documents.

Test standard:

Task: The student will be required to inventory six simulated classified documents.
Condition: Classroom.
Standard: Must properly account for five of six given simulated documents.

16. Additional factors affecting the development of test standards. Since all the training objectives, as tested, are essential for training, failure on one cannot be compensated for by superior performance on another. The goal of the training is to produce students capable of performing each objective to a predesignated minimum level of competence. Under these conditions, relative grades or class standings are meaningless. The emphasis must be on setting a minimum acceptable testing standard for each training objective. The following additional factors will affect the identification of the minimum testing standard for each objective and must be taken into account in initially setting the test standards and making any subsequent modifications:

OK

Should be 1st ¶ of this section

a. Testing standards should be based on the standards expected of new personnel entering a job, not those expected of experienced jobholders. The mission of the training agencies is to train personnel capable of beginning a job. Since entry standards have not been identified, the training agency, out of necessity, is responsible for developing such standards.

b. It is difficult to establish precise testing standards for tasks that have qualitative job standards, such as oral briefings and staff studies.

c. Successful performance of a task does not necessarily mean that perfection is required on each element of the task. Often the question to be answered is "What are the minimum permissible errors, if any, in the performance of a task?" Some amount of error may be acceptable.

d. Time limitations are legitimate requirements for some job tasks, while others have no built-in required time limits other than what is generally accepted on the job as a reasonable amount of time. Care must be exercised to insure that time limits established for testing purposes are not too restrictive.

e. All tests will have some degree of measurement error. The term "measurement error" refers to the various reasons that prevent any test score from being a precise measure of ability. The mechanics of the test itself may inadvertently confuse some students and prevent their demonstrating their true ability. The students' mental and emotional state may cause them to perform in a manner different from that in which they are capable of performing. Any test standards set should take measurement error into account.

Section V - Design of Test Instruments

17. General. This section describes the considerations involved in designing and validating test instruments. The primary intent is to design a testing program that realistically measures each student's ability to perform the established objectives of the training, which are stated in performance terms. All of the tests must, therefore, be performance-centered. In working toward this basic goal, the testing program must be designed to consume the least possible amount of resources necessary to measure student performance on each training objective and to produce a record of each student's performance, which will later support the quality control of training.

18. Designing test instruments to obtain a record of the students' performance. There are only two basic means of obtaining a record of each students' performance. The approach or combination of approaches required will necessarily depend upon the nature of the training objective to be tested.

a. Student-produced record of performance. From a practical and operational point of view, the preferred test is that which permits the student to produce the record of his performance. This eliminates the need for subject matter experts to score the test; it provides for the most objective form of scoring; and results can be evaluated easily. (App F describes procedures for evaluating the results.) This testing approach will apply to those tasks or training objectives that are primarily intellectual--those with essential elements consisting of decisions, discriminations, choices of approach, and similar requirements. The following example illustrates a test that permits each student to produce the record of his performance. The training objective is that of inventorying classified documents. Paragraph 11 above described the development of the test outline for the objective of inventorying

classified documents and identified six versions as appropriate for testing in any one alternate test. A complete version of a test on inventorying classified documents is included in example 12 (app G). This test, as designed, permits the student to produce the record of his performance. The considerations involved in designing this test are described below.

(1) General test design. An initial consideration is to determine the general design of the test; that is, how can the student be tested as realistically as possible? The student must be confronted with the same type of problem situation as that encountered on the job. For the objective of inventorying classified documents, the incumbent uses a documents register (which describes each document and shows its location); a file of actual documents; a file of receipts (for those documents receipted out to various staff elements); a file of destruction certificates; and any information possessed by the current custodian. This latter source of assistance will have to be denied the student for testing purposes. However, to test realistically, the student must be presented a test problem consisting of a simulated register as well as files of documents, receipts, and destruction certificates.

(2) Design of test problems. A second consideration is the actual design of the simulated documents that will comprise the test problems. Specifically, what kind of errors will be deliberately built into the test situation in order to portray problems typical of those encountered by job incumbents? The various kinds of possible errors are numerous; for example, the wrong document copy number could have been entered in a receipt; one word of a title could be in error; or there could be no signature on a receipt. Errors that have been actually encountered on the job must be used in building the test problems.

(3) Answer sheet design. When conducting an inventory of classified files, the job incumbent has only three basic options regarding each classified document: he may accept accountability; he may accept accountability provided the current custodian makes certain corrections in the document, receipt, destruction certificate, or register (no security violation is involved); or he may refuse accountability. Upon analysis, these three basic options reveal only six possible basic responses to a given document. Since there are no more, an answer sheet can be devised that permits a student to record his decision in one of these six categories with respect to a given document.

(4) Review of test instrument. There is one remaining question that must be answered. An incumbent is not given an answer sheet that lists the options he has available with respect to each document being inventoried. In this one aspect, the test is not realistic. This is acceptable, based on the following:

(a) A student can choose only one of six given responses to each of six different given situations. It is unlikely that he could guess the one correct response for six situations six consecutive times.

(b) It is desirable to train the student to perform the task within the framework of the possible options. In other words, the student should be taught the six alternatives and tested on his ability to apply them.

b. Faculty-produced record of performance. Some training objectives or tasks will not permit the use of a test situation in which the student provides the record of his performance. Knowledgeable faculty members will be required either to observe the student's performance or to inspect a student-produced product in order to obtain the record of the student's performance.

(1) The essential elements of a training objective involving equipment may require the student to perform a series of procedural steps. An observer is required to record each student's performance on each essential element. Such a test situation, requiring operation of an 083 sorter (ADP card processing equipment), is illustrated in example 13.

(2) Some training objectives will require the student to produce a product. For many of these products the record of performance can be obtained only from an inspection of the product by a qualified faculty member. Figure 19 illustrates the essential elements of a welding task.

Weave Bead Welding--Horizontal Position

Student Name_____ Instructor_____

	Correct	Incorrect
Undercutting	_____	_____
Splatter	_____	_____
Slag Inclusion	_____	_____
Heat Penetration	_____	_____

Figure 19. Essential Elements of the Task of Weave Bead Welding in a Horizontal Position.

A student's record of performance on the weave bead welding task is obtainable from an inspection of the student's completed product; specifically, visually examining each essential element and recording the results of the examination.

19. Completing the test instrument. In addition to the test situations and answer sheet, there are other elements needed to complete the test instruments.

a. Test administration. Planning is needed on both what is needed to administer the test and how the test is to be administered.

(1) Preparation for testing. The amount of description necessary to identify what is needed to administer the test will vary considerably, depending upon the test requirements. It is here that requirements of personnel, space, equipment, tools, and other materials are identified. Any special arrangements for equipment must be precisely identified.

(2) Directions to administrators. Administrators must be instructed to tell the students exactly what is expected of them, the purpose of the test, the kinds of help he may expect (if any) where he is to go, what he will be given, what he cannot do (e. g., use notes; confer with other students), and time limitations.

b. Test instruments. The actual test instruments, test problems, and answer sheets, as already discussed, are parts of the completed tests.

c. Directions for scoring. Written directions for scoring the test and determining a total raw score are required. For tests in which students respond on an answer sheet by checking an appropriate response category, very little explanation will be required other than an answer key with the correct answers marked. For tests requiring qualified individuals to produce the record of the performance, more elaborate directions will probably be required; e. g., while a student is being tested on a procedural task, an instructor is observing his progress through the procedures and scoring each step on a did-did not basis. If the student skips one step in the procedure, the instructor will record the omission (score that step as "did not" by making a checkmark on the scoring sheet). If, toward the end of the test the student realizes his error, stops, goes back, corrects his error, again proceeeds through the task, this time successfully, how is the performance to be scored? Should credit be allowed for recognition and correction of an error? What happens on the job? What is expected of the job incumbent? Errorless performance is unquestionably a worthwhile goal; however, the ability to recognize and correct an error may be equally important. The issue here is to produce an accurate record of the performance; i. e., provide for recording "discovery and correction of an error," when applicable.

20. Validating the test. After the initial design work has been completed on each performance test, sufficient draft copies should be prepared in order to perform the following checks:

a. Validity. The first concern is to check the validity of the test. Schools usually have personnel with previous job experience in the particular tasks in question. How realistic is the test? How closely does it approximate the real job task? Does the test identify the essential elements of the task? Validity, or the lack of validity, is established by asking job-experienced personnel to take the test and furnish suggestions. ~~Follow up~~ see quality control

b. Administration. Can students comprehend what the test requires of them? Are the directions misleading? Do the mechanics of the test confuse the student? Unavoidably, any test will always have some degree of ambiguity. The gross errors of ambiguity that will

frequently creep into the test in spite of best efforts can be eliminated by pretesting the test with a small sample of actual students. In one sense, the test is an attempt to communicate. Whether it actually does communicate will not be established until it has been checked with real students. The important issue here is to eliminate as many errors as possible before the test is administered. This tryout of the test instrument with a small sample of students will also indicate the time required to administer the test.

Appendix F

Training Quality Control

Section I - Introduction

1. General. The sixth step in the process is the trial and evaluation, or the quality control, of the instructional system. Training quality control must be viewed as a continual, empirically-based process consisting of analyzing various feedback information and adjusting the instructional system. This appendix defines training quality control and identifies the essential elements of the training quality control process.

2. Objective of training quality control. Training quality control has only one basic objective, that of insuring a predetermined quality of training product through an instructional system that represents the optimum and most efficient mix of instructional resources. Even the most thorough and most professional systems planning and design represents only the "best prediction," or estimate, of what will happen when the instructional system is implemented. What actually happens is the basis of training quality control. The training manager starts with the assumption that systems adjustments, even major ones, will be necessary. The instructional system is developed through job analysis, selection of tasks for training, specification of performance-stated training objectives, development of training materials, and development of measures of proficiency. Quality control continually examines and adjusts, as needed, all elements of this system to produce the desired quality of training with the least possible expenditure of resources.

3. Responsibility. Instructional elements of the training agency are responsible for producing the quality of student performance desired. Insuring that this desired quality is produced is a function that must be assigned to an organizational element that is independent of the instructional elements.

Section II - Sources of Training Quality Control Information

4. Internal sources.

a. Primary. The primary source of internal information concerning the quality of the product of the training system is the test results. The quality of the required product has already been identified. The test results show whether product specifications have been met and, if not, what aspects of the product specifications have not been met.

b. Secondary. A secondary internal source of training quality control information is the comments, opinions, and recommendations of students and the staff and faculty of the training agency.

(1) Personnel among the staff and faculty who have actual job experience can be useful in identifying errors in any element of the instructional system, including errors in the design of the test instruments. After problems in student performance have been identified by the tests, the comments and opinions of the experienced staff and faculty are of value in identifying appropriate corrective actions. Formal audits or observations of the training are particularly effective when specific training problems have been identified by the test results.

(2) Student comments and opinions are of value only as a general supervisory device for identifying possible problem areas. Normally, additional study and analysis of the potential problems indicated by student comments will be needed before appropriate corrective actions can be identified. The students' major contribution to training quality control is their performance, as measured by the tests.

5. External sources.

a. Additions to, or changes in, doctrine, tactics, equipment, personnel structures, and organizations will alter the product required of the instructional system. Such changes are continual and will have continuing impact on the task inventory, tasks selected for training, the stated training objectives, and other elements of the training system. The training requirements exist only to support a larger system. Changes in the larger system dictate changes in the training mission. While some systems are relatively stable and changes are infrequent, others are constantly changing. For example,

in one of the more complex weapon systems, technical changes in the configuration of the equipment average 5,000 a month.

b. Another class of external information relates indirectly to the performance of the graduate in the actual job situation. Included in this category are reports of commanders, liaison and staff visits, combat reports, field tests, mailed questionnaires, interviews with returnees from field assignments, and MOS testing. This latter category of external information must be used with caution, since the information is often generalized and may not represent actual and typical job requirements Army-wide. Further, the problems thus identified may not be resolvable solely through adjustments in the training system.

c. The Military Occupational Information Data Bank (MOIDB) will provide the most definitive and objective data on actual MOS, job, and task requirements. Such information is of considerable assistance both in initially identifying appropriate curriculum content and in making subsequent adjustments to it. The MOIDB information collection system is illustrative of a more formal and systematic approach to collecting MOS and job information. It will be the primary means used for developing and modifying task lists when it is fully operational. The same methodical planning and design effort underlying the MOIDB system must be applied by training agencies when collecting MOS and job data either by mailed information collection efforts or by on-site observation and interrogation.

Section III - Use of Test Results

6. Summary of test results. The first interest of training quality control is the performance of the students as measured by tests. The quality produced by the instructional system must be determined. The emphasis is upon identifying those elements of the training system requiring adjustment in the light of the results obtained. Before determining what adjustments are necessary, the test results must be summarized and interpreted. Three relatively simple kinds of summary information, obtained from the test results, are described in the following. Note that in summarizing the results of the tests, the integrity of training objectives, as selected and combined for test purposes, is kept intact. No attempt is made to summarize student performance on several combined tests for purposes of training quality control.

a. Percent achieving minimum standard. Summary information concerned with identifying the percentage of the students achieving the desired minimum standard is necessary. Figure 20 illustrates summary data on the percentage achieving the standard, which should be prepared from the results of each test.

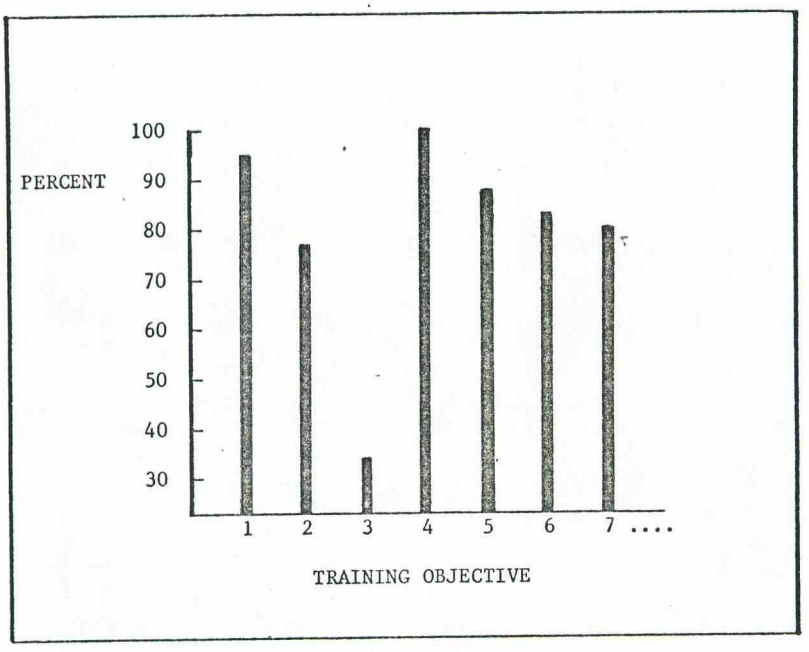


Figure 20. Percent Achieving Minimum Standard.

With such information on each test, major possible problem areas within the training system are readily identifiable. Note that this class of summary information is at a gross level and is aimed at identifying the major areas of the instruction (each training objective as tested) that possibly need corrective action.

b. Analyzing performance errors. A test has been prepared for each training objective. Each test was deliberately designed to produce a detailed record of each student's performance. For example, 40 percent of a class failed to perform a site check while sorting a deck of ADP cards. The site check is one of 13 essential elements on which a record of each student's performance is obtained on a particular test. Note that only the essential elements of the objective are evaluated. (See example 13 (app G) for a complete list of the elements evaluated.) The second kind of summary information to be prepared is the performance of the entire group of trainees on each essential

element tested. This is accomplished by counting the number of students missing or failing to perform satisfactorily each essential element and converting this number into a "percent miss," as illustrated in figure 21.

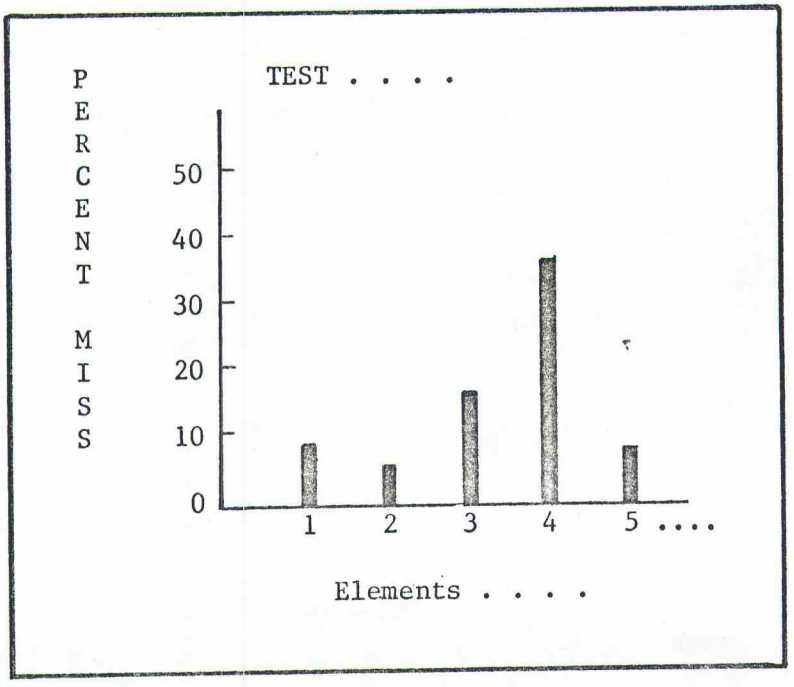


Figure 21. Analysis of Performance Errors.

c. Average student performance. The third kind of summary information is concerned with identifying the typical performance of the students on each test. The average percentage of correct responses or average number of elements correctly performed on each test should be computed and a summary chart prepared. The use of this data will be described and illustrated in paragraph 9 below. This third kind of summary information is useful in monitoring the quality of the training from one class to the next. Increases or decreases in the quality of the training are readily noted. Note that this statistic is a single index figure that is representative of the effectiveness of the training as measured by each test.

7. Interpretation of test results. The summary of the test results provides basic information that must be examined and interpreted. Possible problem areas are highlighted in the percentage of students achieving the desired minimum standard and in student performance on the essential elements of the objective. The question that now must be asked is concerned with the corrective actions needed. Any malfunction

in the instructional system, as denoted by the test results, will be caused by either a deficiency in the training conducted or a deficiency within the tests. While the summary information will often pinpoint the exact location of the problem, in some cases more thorough analysis may be required before the cause of the problem and the appropriate corrective action can be identified. Possible causes of the problem areas denoted by the test summary results are described in the following:

a. Deficiencies in the test instrument. One class of deficiencies will stem from the test instruments.

(1) The design of the test instrument may have inadvertently incorporated features that produced the deficiency. The directions to the students taking the test may have been misleading or ambiguous. The conditions under which the test was administered may have caused the deficiency. The mechanics of the test design and the required method of responding may have confused the students.

(2) The test may not be a valid measure of the requirements of the training objective.

(3) In tests requiring an observer to record the performance of the student, the observers may have been improperly trained. Any test requiring a human observer to record the results of each student's performance is particularly susceptible to a kind of measurement error frequently referred to as rating error. For various reasons an observer will often rate too high or too low, interpret one element differently from another scorer, or relate one element with another and tend to score them both in the same fashion, regardless of the actual performance.

(4) The minimum standard of acceptable performance for each objective may have been set at too high or too low a level. Some legitimate job-required tasks are not precisely definable for measurement purposes. The ability to define a task for measurement purposes is directly related to the kind of task involved. A deficiency indicated by the test results may be caused more by an inability to define the objective than by an inability on the part of the students to perform the objective. Until a better definition of the objective for measurement purposes is obtained, a more appropriate course of action to follow might entail lowering the standards that were initially set for performance.

b. Student performance. When it is clearly evident that the cause of the deficiency does not lie in the test instruments or in the manner in which the tests were administered and scored, then the deficiency must be due to weaknesses within the training conducted. When such is the case, the test results as summarized will directly pinpoint those deficiencies within the training that need corrective action.

(1) Percent achieving minimum standard. The efficiency of the training must be examined in terms of the percentage of students achieving the minimum standards for each training objective. A large percentage of students failing to achieve the minimum required standard indicates a major problem in one or more elements of the instructional system. A low percentage failing to achieve the established standard is the goal of the training system. Theoretically, the goal of the training system is to prepare each student to perform to the minimum standard desired. In practice, something less than 100 percent of the students achieving the desired standard may be acceptable. If 100 percent of the students initially achieve the minimum desired standard on any test, it is probably that overtraining, to an unknown extent, has occurred. The amount of training initially prepared for any particular objective should be deliberately on the conservative side. Otherwise, the extent of overtraining is not readily identified. The objective of the training could well have been achieved with half the effort and expenditure of resources. For this reason, training agencies should not be overly concerned when the initial results of the new training course do not produce the desired minimum standard in every student.

(2) Element performance. When the percentage of students improperly performing a particular element is high, corrective action is indicated. Corrective action may be justified any time the percentage of errors exceeds that which can be attributed to measurement error. The training, as conducted, must be deficient when the miss rate on any particular element is quite high, since it is difficult to reason that there are that many slow or poorly performing students.

8. Reporting test results. A standard form should be developed for reporting the results of the test and noting the corrective actions required. The following information should be included in the form for each test:

a. Date of testing.

b. Number of students tested, course number, and class number.

c. Identification of the particular test (and test version) in relation to the training objective.

d. Percentage of students achieving the established minimum standard.

e. Identification of those elements of the objective having a high miss rate.

f. Conclusions and corrective actions required.

9. Monitoring training quality.

a. The quality of the training must be monitored continually. The dynamic, operating training environment will inevitably require adjustment, on a continual basis, of all elements of the instructional system. The larger system of which the training is a part will be changed from time to time, or new systems will be introduced that will require major adjustments in the supporting elements of the instructional system. The quality and the capabilities of the personnel assigned to the training agencies will change. Sufficient training equipment and even facilities will be lacking from time to time. The quality of the training will inevitably deteriorate unless constantly monitored. The simplest means of monitoring the quality of the training through the test results is to prepare and maintain, for each succeeding class, the average score achieved on each test. Considerable improvement in the quality of the training can be routinely expected from the initial applications of test feedback information to the training system. At some point in time the training will become the optimum possible under the constraints existing. Figure 22 illustrates the experience that may be anticipated from the routine and recurring applications of feedback to the instructional system.

	CLASS NUMBER and AVERAGE PERCENT				
Test Number	1	2	3	4	5
1	48	67	90	91	88
2	58	70	74	79	54
3	41	78	90	92	86
4	76	84	86	83	92
5	89	94	87	88	91
* *	*	*	*	*	*

Figure 22. Average Student Performance.

Note that with about the fifth class on test number 1 the quality of the training has begun to level off. Fluctuations are occurring, but they are somewhat minor and tend to centralize around a certain level. At this point it may be safely assumed that the training is as efficient as it is possible to achieve within the established limitations. If the efficiency of the training is determined to be at an acceptable level, then this index may be used thereafter in place of a more detailed analysis of the performance on each of the elements. If the percentage of average performance drops significantly with a subsequent class, as is illustrated with test number 2, the need for reexamining performance on each of the elements of the task is apparent. This single index figure of the average percentage score achieved on each test is quickly prepared and will save considerable analysis work when used routinely as a means of monitoring the overall efficiency of the training for each training objective.

b. The initial trial implementation of the new instructional system may reveal many deficiencies in the instructional materials, training, test instruments, time allocations, and other elements. Systematic efforts must be made to eliminate these deficiencies through successive trial and revisions. After several classes have completed the new course of training, gross deficiencies in the training will have been eliminated, and it may be assumed that the efficiency of the instructional system is approaching the optimum possible within existing limitations. At this point needed increases or reductions in the available training resources will be readily identifiable. Not until after all possible adjustments in the available instructional resources have been made will sufficient evidence be available with which to support recommended increases or reductions.

Appendix G

Examples

This appendix contains examples 1 through 13, referred to in previous appendixes.

Example 1

Outline of Identification of the Job

Identification of _____
(Job Title, Code Numbers)

_____
(Job Analyst)

_____
(Date Prepared)

1. Job structure.
2. Duty positions.
3. Units and organizations assigned.
4. Related units, organizations, and MOS.
5. Major job requirements.
6. Work environment.
7. Supervision and assistance available.
8. Equipment listing.
9. Major information sources.

Example 2

A Portion of a Task Inventory in Outline Form
(for MOS 2200, Personnel Officer)

Duty positions or duty assignments.

Chief
Branch Chief
Chief, Personnel Records Branch
Military Personnel Officer
Personnel Officer
Platoon Leader
Assistant Personnel Officer
Unit Commander
Executive Officer

Major duty areas.

Organization, Control, and Office Management
Personnel Management
Personnel Actions
Personal Affairs
Records and Reports
Military Pay Operations
Unit Command and Control
Civilian Personnel Operations

Personnel management tasks (one major duty area).

Direct classification and reclassification actions
Review classification and reclassification actions
Interview personnel in classification case
Act as recorder on classification boards
Brief classification board members
Brief commanders on reclassification actions
Check authenticity of reclassification actions
Check for timely classification and reclassification
Prepare directives on classification and reclassification actions
Identify personnel to be tested
Verify completed commander evaluation reports
Initiate MOS evaluation test rosters

Personnel management tasks (Cont)

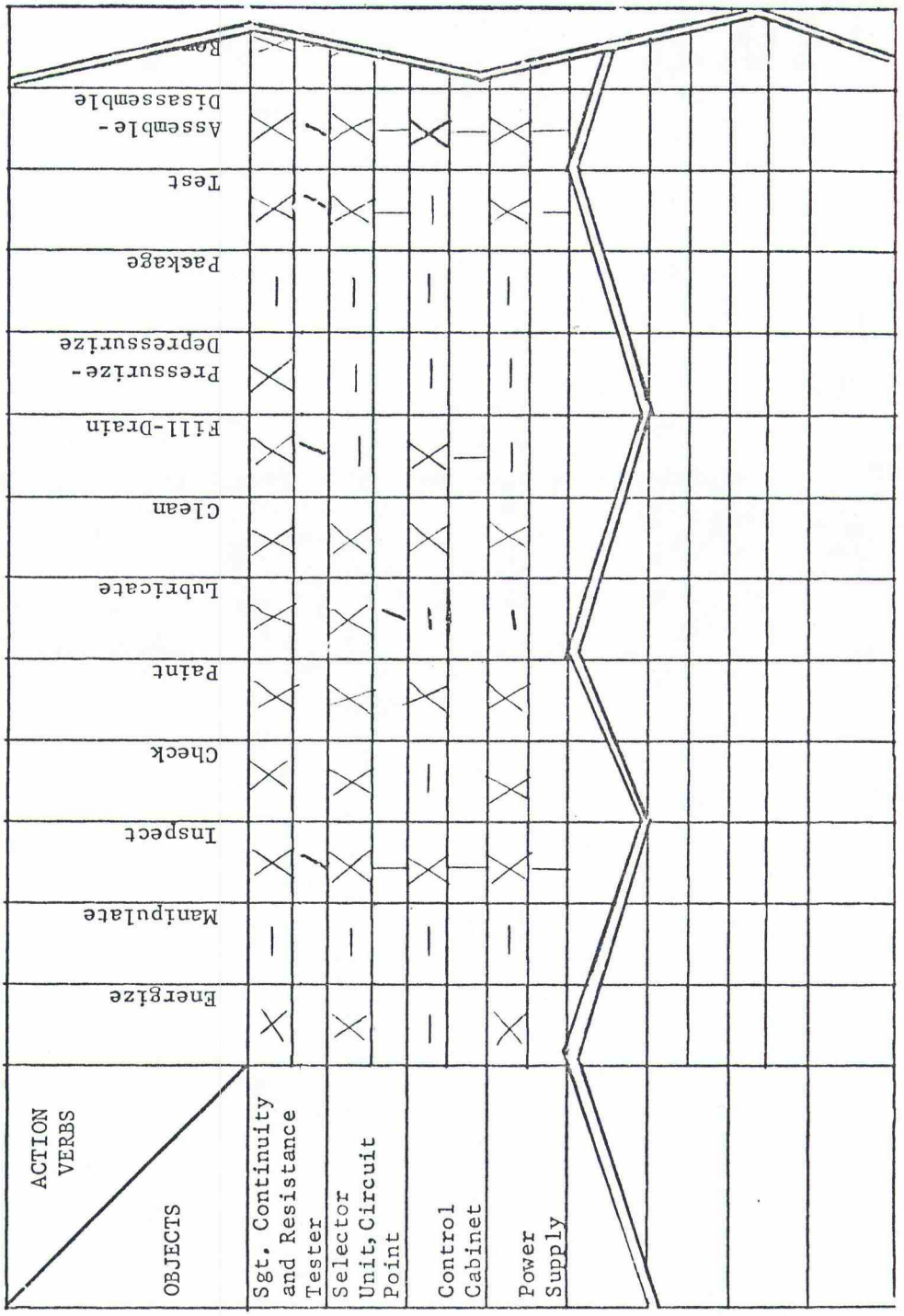
Receive and distribute test aids
Administer MOS tests
Administer classification tests
Score tests
Proctor tests
Insure test scores are posted
Verify awards of proficiency
Follow up MOS test failure actions
Brief personnel on enlisted evaluation system
Direct sample surveys
Verify completed survey forms
Brief personnel on survey form completion
Establish local assignment and reassignment policies
Insure that higher headquarters assignment and reassignment policies are implemented
Recommend personnel assignment and reassignment
Direct personnel assignment and reassignment
Establish local assignment priorities
Insure that assignment priorities are followed
Approve or disapprove requests for reassignment
Recommend approval or disapproval of requests for reassignment
Insure proper utilization of personnel receiving proficiency pay or VRB
Insure submission of surplus report
Act on levies for personnel
Advise commander of effect of levies
Act on requests for deletion or deferment from levies
Take action on requests for concurrent travel
Conduct POR briefings
Plan OJT program for units
Direct OJT program for units
Supervise OJT program for units
Act on applications for service school attendance
Direct preparation, verification, and use of personnel information rosters
Direct preparation, posting, and use of MOS inventory record
Direct preparation of officer requisitions
Direct preparation of enlisted requisitions
Insure posting of permanent promotion
Issue warrants (DD Form 216A) for permanent promotions

Personnel management tasks (Cont)

Approve or disapprove DA Form 2644-R (EM Eligible for Temporary Promotion)
Prepare promotion directives
Distribute promotion allocations
Verify promotion eligibility
Approve lateral appointments
Approve and sign promotion orders
Prepare promotion correspondence
Maintain promotion lists
Record promotion boards
Brief personnel on promotion policies
Monitor reductions in grade
Advise commanders on reduction procedures
Verify date of rank computations
Return unused promotion quotas
Establish officer promotion eligibility dates
Initiate recommendations for officer promotion
Determine security clearance for promotion

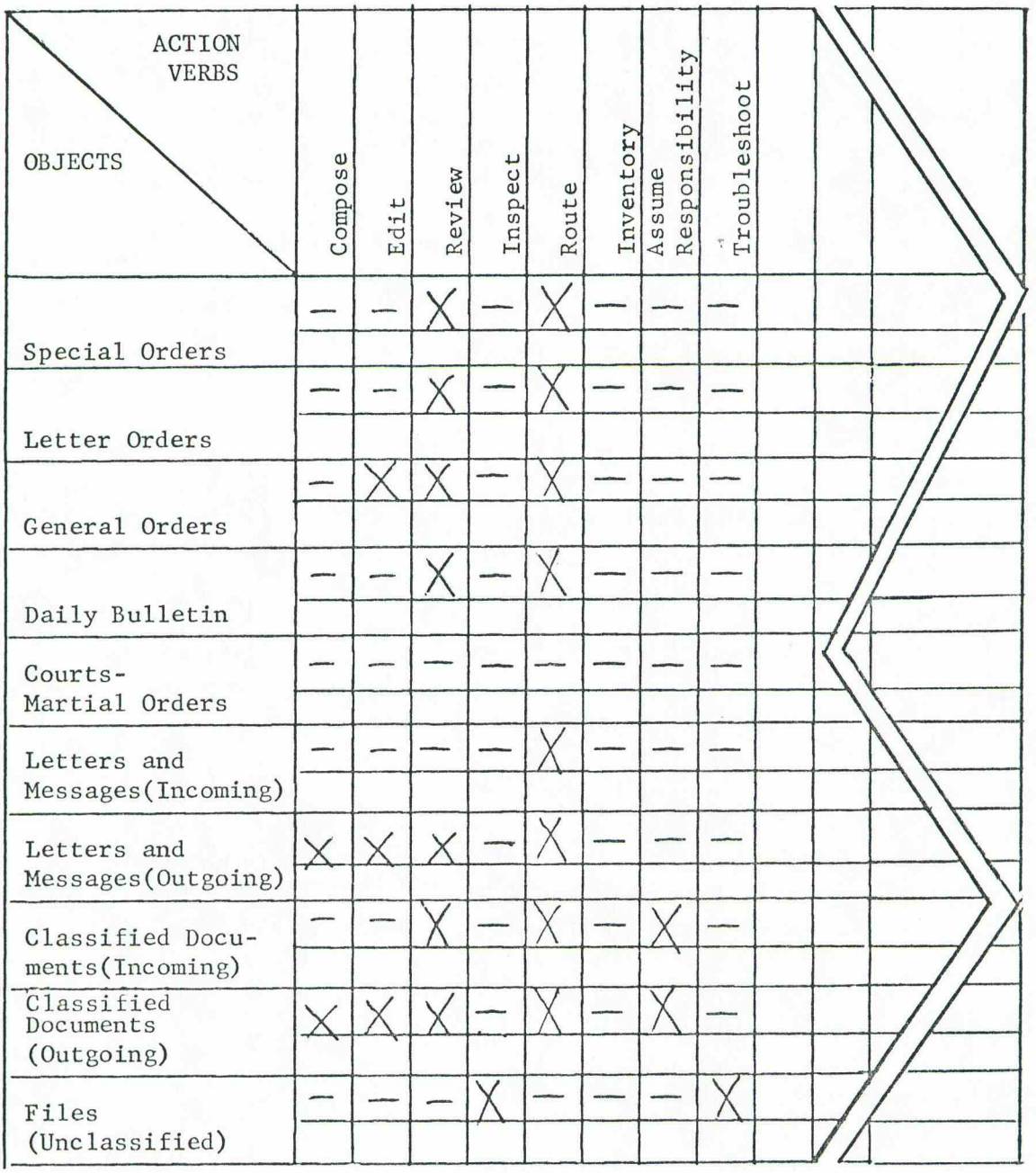
Example 3

A Portion of a Task Inventory in Matrix Form
(for a job dealing with equipment)



Example 4

A Portion of a Matrix Task Inventory
(for a job not dealing with equipment)



ACTION VERBS / OBJECTS	Compose	Edit	Review	Inspect	Route	Inventory	Assume Responsibility	Troubleshoot
Special Orders	—	—	X	—	X	—	—	—
Letter Orders	—	—	X	—	X	—	—	—
General Orders	—	X	X	—	X	—	—	—
Daily Bulletin	—	—	X	—	X	—	—	—
Courts-Martial Orders	—	—	—	—	—	—	—	—
Letters and Messages(Incoming)	—	—	—	—	X	—	—	—
Letters and Messages(Outgoing)	X	X	X	—	X	—	—	—
Classified Documents(Incoming)	—	—	X	—	X	—	X	—
Classified Documents (Outgoing)	X	X	X	—	X	—	X	—
Files (Unclassified)	—	—	—	X	—	—	—	X

Example 5

Standard Job Conditions: Hawk Missile System

Section I - DS Shop Area

1. General: Figure 23 below represents the arrangement of a typical Hawk DS shop area. The building in the center provides office and storage space, work bays, and the direct exchange. The shop and parts vans are parked in close proximity to the shop building. Systems maintenance is performed in the shop bays, and assembly and subassembly maintenance is performed in the shop vans.

2. Range of problems: Items of equipment enter the shop area as major items, assemblies, and subassemblies. Maintenance up to and including piece part repair is performed on these items of equipment and on the test equipment used in the DS shop area.

3. Tools and equipment: As specified in TOE.

a. Shop vans 2, 3, 4, and 5: All work is performed inside the vans. Shop van 5 may not be present and is used infrequently when available.

b. Shop vans 6 and 7: The test equipment from these vans is used within the shop bays. This equipment may be permanently located in the bay area or moved into the bay area for a specific job and returned to the van after use.

4. Job aids and manuals: A minimum of three complete sets of Hawk TM are available at the shop area. Each shop van contains the appropriate manuals. One set is maintained as a reference set, and another set is used to resupply the vans as manuals become shopworn.

5. Environmental conditions: All work is performed in the shop building or in vans.

6. Special physical demands:

a. Long working hours. A normal day is 12 hours, and emergencies require much longer tours of duty.

b. Crowded working conditions in the shop vans.

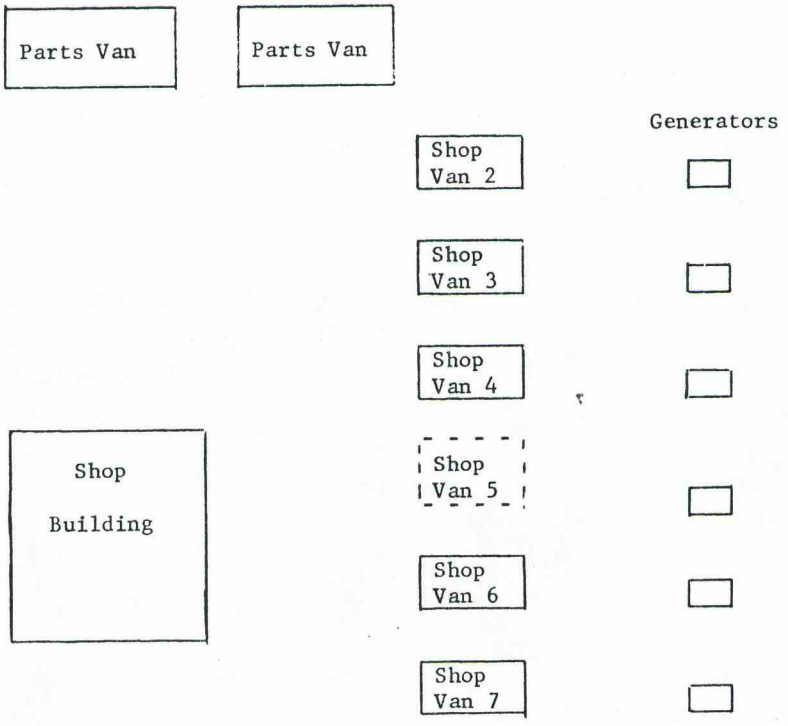


Figure 23. Layout of a Typical HAWK Direct Support Shop Area.

Section II - Firing Battery

7. General: DS maintenance personnel must perform maintenance at the artillery battery site when it cannot be performed by organizational maintenance personnel.

8. Range of problems: Generally, repair is limited to changing out assemblies. Limited systems maintenance and piece part repair are performed on site.

9. Tools and equipment: Organizational test equipment is available but is operated by the organizational personnel. The support maintenance personnel travel to the site in a truck and usually take their own test equipment and tools. Also, they transport assemblies between the shop and the site. Many of the assemblies are classified, and special handling is required. The support repairman must estimate the probable malfunction from information provided and select the tools and equipment that must be transported to the site.

10. Job aids and manuals: TM are carried by the support repairman to the site. These manuals are classified and require special handling.

11. Environmental conditions: Repairs on the missile and the BCC are performed under shelter. The missile shelter has an overhead covering only. All other repairs are performed while exposed to the elements. Cold hands and heavy clothing hinder performance during cold weather.

12. Special physical demands: Ability to withstand cold and wet conditions. Long working hours and travel between shop and site produce fatigue. Light is usually provided by flashlight when repairs are made at night.

Example 6

Standard Training Conditions

Hawk Continuous Wave Radar Repair

1. General: The training area consists of shop buildings that house the continuous wave (CW) acquisition radars and the high-power illuminators, classrooms, and laboratories that contain the test equipment normally housed in shop vans 2 and 3.

2. Range of problems:

a. In shop buildings--

(1) Operate receiver test set, transmitter test set, signal generator test set, and target simulator test set.

(2) Perform daily, weekly, and monthly checks on CW acquisition radar and high-power illuminator.

(3) Isolate malfunction to assembly and replace defective assembly. Limited amount of fault isolation to the piece part. No piece part replacement performed.

b. In laboratories--

(1) Operate CW pulse and microwave consoles.

(2) Locate malfunctioning piece parts in receiver test set, signal generator test set, and target simulator test set. No piece part replacement performed on these items.

(3) Locate the malfunctioning piece part in CW acquisition radar and high-power illuminator assemblies. Actual replacement of the defective piece part is required on a representative sample but not on all of the problems.

3. Tools and equipment: CW acquisition radar and high-power illuminator, spare assemblies, equipment contained in shop vans 2 and 3, tool kit, OMTE, TS-505, PSM-6, and USM 50C.

4. Job aids and manuals: One complete set of Hawk system TM for each student.

5. Environmental conditions: Enclosed shop area, air-conditioned classrooms, and air-conditioned laboratories.

6. Special physical demands: None.

Example 7

A Training Objective Recorded on a Training Analysis Information Sheet

Training Analysis Information Sheet

File Number _____

1. Course: Hawk CW Radar Repairman Date: _____

2. Training Objective (action, conditions, and standard):

   ACTION*: The student will perform daily transmitter check on Hawk illuminator.

   CONDITIONS*: See standard training conditions for Hawk CW radar repairman.

   STANDARD*: TM 9-1430-511-12/1, table 8. Student must clear all personnel from the antenna area during performance of the check.

3. Learning Analysis:

*Elements of the training objective are listed separately for illustrative purposes.

Example 8

In this example the requirement of the objective and the criterion are identical.

Training Objective	Criterion
The student will adjust the output voltages of the -250 volt power supply in the simulated support shop conditions specified in the standard description. Outputs must be within +10 percent of the prescribed value.	The student will adjust the output voltages to within +10 percent, the prescribed value when given a -250 volt power supply chassis and a work request specifying that output voltages are out of tolerance. Work will be performed in a simulated support shop.

Example 9

Observe the difference between the standards in this example. The performance accomplishment if the trainee can maintain the pace for 5 minutes.

Training Objective	Criterion
The student will type manuscript material under classroom conditions that simulate an office environment at a rate of 40 words a minute on a standard nonelectric typewriter.	The student will type manuscript material that he has not seen previously, under classroom conditions. The minimum standard will be a net average of 40 words a minute for 5 minutes of continuous typing on a standard nonelectric typewriter. One word a minute will be deducted from the gross average for each error.

Example 10

Observe the restriction that has been placed on the task in this example.

Training Objective	Criterion
The student will navigate on foot between two selected points with the aid of a map and compass during daylight hours, over wooded and hilly terrain with no impassible obstacles, during wet or dry weather within the time limit established by the field commander.	The student will navigate on foot between two selected points approximately 2 miles apart using a map and compass during daylight hours, over wooded and hilly terrain with no impassible obstacles, during wet or dry weather. The student must arrive at the destination within 1-1/2 hours during dry weather or within 2 hours during wet weather.

Example 11

A Partially Completed Training Analysis Information Sheet

Training Analysis Information Sheet

File Number: 101-31L20

1. COURSE: Radio Relay and Carrier Repair DATE: 1 July 1967

2. Training Objective (task or action, conditions, and standards):

In a practical exercise classroom containing appropriate TM and applicable tools and test equipment, the student will be able to locate the defective stage in the sending circuit of Telegraph Terminal, TH-5/TG, using the results of the output frequency test, the output level test, the send bias test, and the test equipment listed in paragraph 30, TM 11-5805-246-35, in accordance with the standards outlined in paragraphs 3-10 and 28-31.

3. Learning Analysis (List and describe in the form they will be learned by the students):

a	b	c	d	e	f	g
Learning Element	References	Methods of Instruction	Media	Training Equipment Material	Facility	Estimated time
1. Determine probable defective stages. a. Use block and schematic diagrams, and output test results to determine the probable defective stages. (TM contains all the required diagrams.) b. Output test results.	TM 11-5805-246-35.	C,PE.	TV,PI, Worksheet, Trouble Shooting block diagram, training literature.	Telegraph Terminal TH-5TG: Multimeter TS-352/U; Dummy Plug; Screwdriver.	Classroom lab type w/TV.	2 hrs

a	b	c	d	e	f	g
Learning Element	References	Methods of Instruction	Media	Training Equipment Material	Facility	Estimated time
(1) Normal output level of 0 dbm + 2 assures that oscillator, output amplifier, and switching circuits are working but does not assure that the oscillator is on frequency.						
(2) No output is due to a defect in the oscillator, the output amplifier, or switching circuits and can be further localized by signal tracing.						
(3) Abnormal output levels, other than no output, are due to a defect in either the oscillator or the output amplifier.						
(4) Normal mark output frequency (1,325 cps $\pm$ 2) indicates that the oscillator is working properly.						
*	*	*	*	*	*	*

a Learning Element	b References	c Methods of Instruction	d Media	e Training Equipment Material	f Facility	g Estimated time
2. Clear trouble by adjustment. a. Perform output frequency adjustment by adjusting C30 in the osc. stage over a range of 16 cps and will change both the mark and space frequencies at the same time.	TM 11-5805-246-35.	C,TV,PI,PE	TV; PI worksheet	Telegraph Terminal TH-5/TG; Multimeter TS-352/U; Dummy Plug Screwdriver.	Classroom, lab type, w/TV; Two instrs	2 hrs
* *	*	*	*	*	* *	

Example 12

A Test That Allows the Student to Produce the Record of His Performance

1. The test illustrated in this example is concerned with the training objective of inventorying classified documents.

2. The test for this training objective requires the student to account for six simulated documents. The student is given an extract of a document register and files of documents, receipts, and destruction certificates in one handout--a single sheet of paper, 21 inches by 16 inches in size, as depicted in figure 24. The four parts of the handout illustrated in figure 24 are enlarged in figures 25, 26, 27, and 28.

SECRET
For Training - Otherwise Unclassified
DEPARTMENT OF THE ARMY
HEADQUARTERS THIRD UNITED STATES ARMY
FORT MCPHERSON GEORGIA 30330

AJPA 2 October 1964

SUBJECT: Control of Sensitive Material (U)

TO: Commanding General
11th Infantry Division
Camp Jones, Georgia 30312

1. (U) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

2. (S) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

3. (S) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

a. XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXC.

b. XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

4. (C) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

FOR THE COMMANDER:

James A. Godfrey
JAMES A. GODFREY
CPT, AGC
Asst AG

GROUP 4
Downgraded at 3 year intervals
Declassified after 12 years

Copy 1 of 2 copies
Page 1 of 1 page

3AS 217-13
SECRET
For Training - Otherwise Unclassified 12D 601 64

SECRET
For Training - Otherwise Unclassified
DEPARTMENT OF THE ARMY
Headquarters, 15th Armored Division
Fort Hood, Texas 76544

AKA-O 17 September 1964

SUBJECT: HE Ammunition (U)

TO: Commanding General
3d Armored Division
Fort Knox, Kentucky 40120

1. (C) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

2. (S) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

a. XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXC.

b. XCXCXCXCXCXCXCXCXCXCXCXC.

c. XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXC.

3. (S) XCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCXCX.

FOR THE COMMANDER:

Chester W. Cook
CHESTER W. COOK
Colonel, AGC
Adjutant General

Copy furnished:
✓CG 12th Inf Div

GROUP 3
Downgraded at 12 year intervals
Not automatically declassified

Copy 3 of 4 copies
Page 1 of 1 page

15AD-S-2401
SECRET
For Training - Otherwise Unclassified 12D 604 64

DOCUMENT FILE

12D 602 64 AG Classified 5 Oct 64 SP4 Clark

Letter, AEILC-P, HQ USACOMZEUR, 26 Sep 64, Air-Ground Operations (U), copy 1 of 4 copies, 1 page, S, w/1 Incl (#1 - 15), List of Items (U), 2 pages, S//
//////////////////////////NOTHING FOLLOWS//////////////////////////

ACofS, G4
5 Oct 64
Peter G. Finch
Peter G. Finch

DA FORM 1203 CLASSIFIED DOCUMENT MAIL CONTROL RECORD AND RECEIPT 1

12D 603 64 AG Classified 7 Oct 64 SP4 Clark

1st Ind, AKM-P, 14th Inf Div (Mech), 30 Sep 64, Nuclear Weapons Components (U), Cys 1 and 2 of 3 cys, 2 pages, S w/Letter, [illegible], 12th Inf Div, same subj, 18 Sep 64, copy 1 of 3 cys, 3 pages, SRD//
//////////////////////////NOTHING FOLLOWS//////////////////////////

ACofS, G4
7 Oct 64
Peter G. Finch

DA FORM 1203 CLASSIFIED DOCUMENT MAIL CONTROL RECORD AND RECEIPT 1

RECEIPT FILE

DESTRUCTION OF CLASSIFIED RECORDS				AG Classified Section 12th Infantry Division		17-64	1
12D 204 64	S	1	Message, SX 2473, copy 2 of 4 copies, 1 page, S	3 Jan 64	HQ USAREUR	Multiple	205-04
12D 214 64	S	1	Letter, AGCS-GA, Air Defense Operations (U) copy 1 of 4 copies, 1 page, S	15 Jan 64	12th Inf Div	USARADCOM	201-48
12D 326 64	S	2	Message, AENAC 13475, copies 1 and 2 of 4 copies, 1 page, S	26 Mar 64	XVIII Abn Div	Multiple	205-04
12D 585 64	S	1	1st Ind, AEIAC-PL, Foreign Armies Orientation (U) copy 5 of 6 copies, 1 page, S w/Letter, AGCS-PC, same subj, 12th Inf Div, 3 Sep 64, copy 4 of 6 copies, 3 pages, S	25 Sep 64	USACOMZEUR	12th Inf Div	1303-06
12D 605 64	S	1	Letter AGAS, Report of Inspection, 2/67 Infantry (U), copy 2 of 3 copies, 3 pages, S	12 Oct 64	III US Army Corps	12th Inf Div	504-19
12D 652 64	S	2	Message, AEAIS-PS, SX 7396, copies 2 and 3 of 4 copies, 1 page, S	22 Oct 64	HQ USAREUR	Multiple	205-04
12D 606 64	S	2	Letter, AGCS-II, Preliminary Study - Division Staff Organization (U), copies 1 and 2 of 4 copies, 4 pages, S	18 Oct 64	HQ USAAGS	12th Inf Div	207-13
//////////			//////////NOTHING FOLLOWS//////////				

28 Oct 64 JOSEPH E. METZGER, 1LT, AGC *Joseph E. Metzger*
28 Oct 64 JOSEPH E. METZGER, 1LT, AGC *Joseph E. Metzger*
28 Oct 64 LYONS L. LETTERMAN, 2LT, AGC *Lyons L. Letterman*

DA FORM 546

DESTRUCTION CERTIFICATE FILE

HEADQUARTERS POLICY
Continuous receipt required
for SECRET and above

⋮	⋮			⋮		⋮		⋮
12D 601 64	5 Oct 64	S	1	Letter, AJPA, Control of Sensitive Material (U), copy 1 of 2 copies, 1 page, S	[illegible]	[illegible]	File	
12D 602 64	5 Oct 64	S	1	Letter, AEILC-P, Air-Ground Operations (U) copy 3 of 4 copies, 1 page, S w/1 Incl (#1-15), List of Items (U), 2 pages, S	COMZEUR	26 Sep 64	G4	
12D 603 64	7 Oct 64	S RD	2	1st Ind, AKM-P, Nuclear Weapons Components (U) Cys 1 and 2 of 3 cys, 2 pages, S, w/Letter, AGCS-[illegible], 12th Inf Div, same subj, 18 Sep 64, copy 1 of 3 cys, 3 pages, SRD	14th Inf Div (Mech)	30 Sep 64	G4	
12D 604 64	10 Oct 64	S	1	Letter, AGAS, Treatment of Registered Mail (U), copy 3 of 4 copies, 1 page, S	III US Army Corps	5 Oct 64	File	
12D 605 64	18 Oct 64	S	1	Letter, AGAS, Report of Inspection, 2/67 Infantry (U), copy 2 of 3 copies, 3 pages, S	III US Army Corps	12 Oct 64	~~File~~ [illegible]	Destroyed on Dest Cert # 17-64, 28 Oct 64.
12D 606 64	22 Oct 64	S	2	Letter, AGCS-II, Preliminary Study - Division Staff Organization (U), copies 1 and 2 of 4 copies, 4 pages, S	USAAGS	18 Oct 64	File	
⋮	⋮			⋮		⋮		⋮

DA FORM 455 MAIL AND DOCUMENT REGISTER

DOCUMENT REGISTER (EXTRACT)

FBH 614 7/67 5C

Figure 24. Test Situation for Inventorying Classified Documents (actual size is 21 inches by 16 inches).

PREPARED AT THE USA AG SCH, SEP 64

SECRET
For Training - Otherwise Unclassified
DEPARTMENT OF THE ARMY
HEADQUARTERS, THIRD UNITED STATES ARMY
FORT MCPHERSON, GEORGIA 30330

IN REPLY REFER TO
AJPA

2 October 1964

SUBJECT: Control of Sensitive Material (U)

TO: Commanding General
12th Infantry Division
Camp Jones, Georgia 30312

1. (U) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx.

2. (S) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx.

3. (S) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcx.

a. Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc.

b. Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx xcxcxcxcxcxcxcxcxcxcxcxcxcxcx.

4. (C) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx.

FOR THE COMMANDER:

James A. Godfrey
JAMES A. GODFREY
CPT, AGC
Asst AG

GROUP 4
Downgraded at 3 year intervals
Declassified after 12 years

Copy 1 of 2 copies
Page 1 of 1 page

SECRET
For Training - Otherwise Unclassified

3AS 21843 12D 601 64

SECRET
For Training - Otherwise Unclassified
DEPARTMENT OF THE ARMY
Headquarters, 15th Armored Division
Fort Hood, Texas 76544

AKA-O

17 September 1964

SUBJECT: HE Ammunition (U)

TO: Commanding General
3d Armored Division
Fort Knox, Kentucky 40120

1. (C) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcx.

2. (S) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx.

a. Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc.

b. Xcxcxcxcxcxcxcxcxcxcxcxcxcxc.

c. Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcx xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc.

3. (S) Xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxcxc xcxcxcxcxcxcxcxcxcx.

FOR THE COMMANDER:

Chester W. Cook
CHESTER W. COOK
Colonel, AGC
Adjutant General

Copy furnished:
✓CG 12th Inf Div

GROUP 3
Downgraded at 12 year intervals
Not automatically declassified

Copy 3 of 4 copies
Page 1 of 1 page

SECRET
For Training - Otherwise Unclassified

15AD-S-2401 12D 604 64

DOCUMENT FILE

Figure 25. Document File. (See fig 24.)

NUMBER	FROM	DATE RECEIVED	CLERK	FILE	SUSPENSE DATE
12D 602 64	AG Classified	5 Oct 64	SP4 Clark		

SUMMARY (Type file number, source, date and subject or short title)

Letter, AEZLG-P, HQ USACOMZEUR, 26 Sep 64, Air-Ground Operations (U) copy 3 of 4 copies, 1 page, S; w/1 Incl: #1 - (S), List of Items (U), 2 pages, S//
////////////////////////////////NOTHING FOLLOWS////////////////////////////////

ROUTING	TO	TO	TO	TO	TO
	ACofS, G4				
	DATE: 5 Oct 64	DATE	DATE	DATE	DATE
	PRINTED NAME: Peter G. Finch	PRINTED NAME	PRINTED NAME	PRINTED NAME	PRINTED NAME
	SIGNATURE: Peter G. Finch	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE

ACTION TAKEN

REMARKS

DA FORM 1 SEP 58 1203 (6-PART) PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

CLASSIFIED DOCUMENT MAIL CONTROL RECORD AND RECEIPT (AR 380-5)

1

NUMBER	FROM	DATE RECEIVED	CLERK	FILE	SUSPENSE DATE
12D 603 64	AG Classified	7 Oct 64	SP4 Clark		

SUMMARY (Type file number, source, date and subject or short title)

1st Ind, AKM-P, 14th Inf Div (Mech), 30 Sep 64, Nuclear Weapons Components (U), Cys 1 and 2 of 3 cys, 2 pages, S w/Letter, AGCS-GD, 12th Inf Div, same subj, 18 Sep 64, copy 1 of 3 cys, 3 pages, SRD//
////////////////////////////////NOTHING FOLLOWS////////////////////////////////

ROUTING	TO	TO	TO	TO	TO
	ACofS, G4				
	DATE: 7 Oct 64	DATE	DATE	DATE	DATE
	PRINTED NAME: Peter G. Finch	PRINTED NAME	PRINTED NAME	PRINTED NAME	PRINTED NAME
	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE

ACTION TAKEN

REMARKS

DA FORM 1 SEP 58 1203 (6-PART) PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

CLASSIFIED DOCUMENT MAIL CONTROL RECORD AND RECEIPT (AR 380-5)

1

RECEIPT FILE

Figure 26. Receipt File. (See fig 24.)

DESTRUCTION OF CLASSIFIED RECORDS (AR 380-5)

* Not used when custodian personally destroys documents.

HEADQUARTERS OFFICE: AG Classified Section, 12th Infantry Division

DESTRUCTION REC. ORD NO.: 17-64

PAGE NO.: 1

CONTROL, LOG OR FILE NUMBER	CLASS SYM	NO. OF CYS	DESCRIPTION (Type, file reference, unclassified subject or short title, number of pages, copy numbers, etc.)	DATE OF DOCUMENT	ORIGINATING AGENCY	ADDRESSEE	DESTR AUTH X AR 345-210 / AR 345-215
12D 204 64	S	1	Message, SX 2473, copy 2 of 4 copies, 1 page, S	3 Jan 64	HQ USAREUR	Multiple	205-04
12D 214 64	S	1	Letter,AGCS-GA,Air Defense Operations (U) copy 3 of 4 copies, 1 page, S	15 Jan 64	12th Inf Div	USARADCOM	201-48
12D 326 64	S	2	Message, AENAC 13475, copies 1 and 2 of 4 copies, 1 page, S	26 Mar 64	XVIII Abn Div	Multiple	205-04
12D 589 64	S	1	1st Ind, AEZAG-PL,Foreign Armies Orientation(U) copy 5 of 6 copies, 1 page, S w/Letter, AGCS-PC, same subj, 12th Inf Div, 3 Sep 64, copy 4 of 6 copies, 3 pages, S	29 Sep 64	USACOMZEUR	12th Inf Div	1303-06
12D 605 64	S	1	Letter,AGAS,Report of Inspection, 2/67 Infantry(U),copy 2 of 3 copies, 3 pages, S	12 Oct 64	III US Army Corps	12th Inf Div	504-19.1
12D 652 64	S	2	Message,AEAID-PS, SX 7396, copies 2 and 3 of 4 copies, 1 page, S	22 Oct 64	HQ USAREUR	Multiple	205-04
12D 606 64	S	2	Letter,AGCS-IZ,Preliminary Study - Division Staff Organization(U), copies 1 and 2 of 4 copies, 4 pages, S	18 Oct 64	HQ USAAGS	12th Inf Div	207-13
//////////	//////	//////	//////////////////////NOTHING FOLLOWS//////////////////////	//////////	//////////	//////////	//////////

	DATE	TYPED NAME	SIGNATURE
I HAVE THIS DATE PREPARED THE ABOVE-LISTED DOCUMENTS FOR DESTRUCTION.	28 Oct 64	TYPED NAME OF CUSTODIAN: JOSEPH E. METZGER,1LT,AGC	Joseph E. Metzger
* I HAVE VERIFIED ABOVE LISTING OF DOCUMENTS, PLACED THEM IN A CONTAINER AND DELIVERED IT TO AUTHORIZED DESTRUCTION OFFICER.	DATE	TYPED NAME OF PERSON VERIFYING LISTING	SIGNATURE
☐ I HAVE RECEIVED A CONTAINER; ☒ I HAVE DESTROYED ABOVE-LISTED DOCUMENTS.	DATE: 28 Oct 64	TYPED NAME OF RECIPIENT/DESTR OFF: JOSEPH E. METZGER,1LT,AGC	SIGNATURE: Joseph E. Metzger
I HAVE WITNESSED DESTRUCTION ☒ OF ABOVE-LISTED DOCUMENTS ☐ OF A SEALED CONTAINER ASSERTED TO CONTAIN ABOVE-LISTED DOCUMENTS.	DATE: 28 Oct 64	TYPED NAME OF PERSON WITNESSING DESTRUCTION: LYONS L. LETTERMAN,2LT,AGC	SIGNATURE: Lyons L Letterman

DA FORM 1 OCT 53 546 — PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. — GPO 832-150

DESTRUCTION CERTIFICATE FILE

Figure 27. Destruction Certificate File. (See fig 24.)

CONTROL, LOG OR FILE NO.	DATE REC'D	CLAS	NO. OF CYS	DESCRIPTION (Type, File Reference, Unclassified Subject or Short Title, No. of Pages, Copy Numbers, etc.)	ORIGINATING AGENCY	DATE OF DOCUMENT	ROUTED TO	REMARKS (Disposition, Dest'n Cert No. and Date, Custodian Signature, etc.)
*	*		*	* * *		*	*	*
*	*		*	* * *		*	*	*
*	*		*	* * *		*	*	*
12D 601 64	30Oct64	S	1	Letter, AJPA,Control of Sensitive Material (U), copy 1 of 2 copies, 1 page, S	3d Army	20ct64	File	
12D 603 64	50ct64	S	1	Letter, AEZLG-P, Air-Ground Operations (U) copy 3 of 4 copies, 1 page, S w/1 Incl: #1-(S), List of Items (U), 2 pages, S	COMZEUR	26 Sep 64	G4	
12D 603 64	70ct64	S RD	2	1st Ind, AKM-P, Nuclear Weapons Components (U) Cys 1 and 2 of 3 cys, 2 pages, S; w/Letter, AGCS-GD, 12th Inf Div, same subj, 18 Sep 64, copy 1 of 3 cys, 3 pages, SRD	14th Inf Div (Mech)	30 Sep 64	G4	
12D 604 64	10 Oct 64	S	1	Letter, AGAS, Treatment of Registered Mail (U), copy 3 of 4 copies, 1 page, S	III US Army Corps	90ct64	File	
12D 605 64	18 Oct 64	S	1	Letter, AGAS, Report of Inspection, 2/67 Infantry (U), copy 2 of 3 copies, 3 pages, S	III US Army Corps	12 Oct 64	~~File~~ gem	Destroyed on Dest Cert # 17-64, 28 Oct 64.
12D 606 64	22 Oct 64	S	2	Letter, AGCS-IZ, Preliminary Study - Division Staff Organization (U), copies 1 and 2 of 4 copies, 4 pages, S	USAAGS	18 Oct 64	File	
*	*		*	* * *		*	*	*
*	*		*	* * *		*	*	*
*	*		*	* * *		*	*	*

DA FORM 1 JUL 62 455 REPLACES EDITION OF 1 JAN 57, WHICH IS OBSOLETE. * U.S. GOVERNMENT PRINTING OFFICE 1962 O—648510

MAIL AND DOCUMENT REGISTER (AR 380-5) PAGE NO.

DOCUMENT REGISTER (EXTRACT)

Figure 28. Document Register Extract. (See fig 24.)

Example 13

A Test Requiring an Observer to Produce the Record of the Student's Performance

NOTE: There are six possible versions or combinations of the job-required task of operating an 083 sorter. These six possible versions are alpha sorting, numeric sorting, card counting, block sorting, selection by sorting, and selection by rejection. The test illustrated in the following paragraphs examines performance of numeric sorting, card counting, and block sorting and is the "A" version.

1. Directions for preparing for, and administering, the test.

a. Preparation for the test.

(1) Place a deck of 250 cards with punched information on each 083 sorter.

(2) Insure that the machine is on and warmed up.

(3) Depress all suppression keys.

(4) Set edit and edit stop and sort test switches in the ON position.

(5) Set the card count switch in the OFF position.

(6) Reset the card count indicator.

(7) Set sort selection switch in an erroneous position.

b. Administration of the test.

(1) Issue the student the "Directions to Students" (para 2 below).

(2) Direct the student to read the entire problem before beginning.

(3) Observe the student's performance. Record the student's performance on the scoring sheet (para 3 below). Score the

student's performance as he proceeds through the steps. If after a reasonable time the student is unable to proceed, score that step "NO," help the student only on that step, and allow the student to proceed.

(4) Insure that the student gives his card count orally at the end of the problem. If incorrect, score item 12 "NO." After completion of the test, determine the reason for the incorrect card count and correct the error.

2. Directions to students: "A" test version, 083 sorter.

a. General instructions. This is a graded examination. All work in this examination must be your own. You are not authorized to communicate in any way with other students, give or receive assistance, refer to notes, make a record of your answers, or pass on information about the examination to other students. Any conduct contrary to the above will be the basis for appropriate disciplinary action.

b. Special instructions.

(1) The deck of cards placed on the machine is the deck you will work with on this problem.

(2) Insure that your machine is operating properly.

(3) If you think it is appropriate, you may accomplish more than one step in the same operation.

(4) Using the block sort method, sort the cards as follows:

(a) Sort columns 26 through 28 numerically:

Column 28 minor.
Column 27 intermediate.
Column 26 major.

(b) Card count all cards.

(5) Upon completion of the operation outlined above, assemble your cards in proper order and return the entire deck to the instructor, informing him of your card count.

(6) Leave the machine on.

c. Material required. A deck of cards to be sorted will be supplied by the instructor.

d. Time limit. There is no time limitation. However, if you are not able to proceed after a reasonable time at any step of the operation, the instructor will assist you and you will be evaluated accordingly.

3. Directions for scoring "A" version, 083 sorter test.

* * * * * * *

STUDENT NAME _____ STUDENT NUMBER _____ DATE____

1.	Cards joggled before being placed in hopper.	YES	NO
2.	Cards placed properly in hopper.	YES	NO
3.	Suppression keys checked.	YES	NO
4.	Sort test switch in SORT position.	YES	NO
5.	Edit and edit stop switches in OFF position.	YES	NO
6.	Sort selection switch set properly for each sort.	YES	NO
7.	Sort brush set on proper column for blocking.	YES	NO
8.	Sort brush set on proper column for minor sort.	YES	NO
9.	Sort brush set on proper column for intermediate sort.	YES	NO
10.	Cards removed properly from machine.	YES	NO
11.	Sight check performed.	YES	NO
12.	Card count made at beginning and end of operation.	YES	NO
13.	All cards in correct sequence when returned to instructor.	YES	NO

Instructor _____

* * * * * * *

Appendix H

References

1. Ammerman, Harry L., A Model of Junior Officer Jobs for Use in Developing Task Inventories. Technical Report 65-10, HumRRO Division No. 5, Air Defense, Washington, D. C., The George Washington University, 1965.

2. Ammerman, Harry L., Development of Procedures for Deriving Training Objectives for Junior Officer Jobs. Technical Report 66-3, HumRRO Division No. 5, Air Defense, Washington, D. C., The George Washington University, 1965.

3. Archer, Wayne B., and Dorothy A. Frunchter, The Construction, Review, and Administration of Air Force Job Inventories. Technical Documentary Report PRL-TDR 63-21. Austin, Texas, Psychological Research Service, 1963.

4. Chamberlin, Paul E., "Analyzing Qualitative Training Requirements," Training Requirements Analysis. Randolph Air Force Base, Texas, Air Training Command, 1964, pp. 11-33.

5. Development of Instructional Systems: Procedures Manual. U. S. Army Security Agency Training Center and School, Fort Devens, Massachusetts, 1967.

6. Eckstrand, Gordon A., Current Status of the Technology of Training. Technical Report AMRL-TR-64-86. Wright Patterson Air Force Base, Ohio, Behavioral Sciences Laboratory, Aerospace Medical Research Laboratories, Air Force Systems Command, 1964.

7. Fruchter, Benjamin, Robert E. Morin, and Wayne B. Archer, Efficiency of the Open-Ended Inventory in Eliciting Task Statements from Job Incumbents. Technical Report 63-8, Lackland Air Force Base, Texas, 6570th Personnel Research Laboratory, Aerospace Medical Division, 1963 (Defense Documentation Center AD 418980).

8. Instructional Systems Engineering. ATC Manual 52-10, Air Training Command, Randolph Air Force Base, Texas, 1967.

9. Morsh, Joseph E., Joseph M. Madden, MAJ USAF, and Raymond E. Cristal. Job Analysis in the United States Air Force. Technical Report 61-113, Lackland Air Force Base, Texas, Personnel Laboratory, Wright Air Development Division, Air Research and Development Command, 1961 (Defense Documentation Center AD 259389).

10. Proceedings of the Engineering Systems for Education and Training Conference. Jointly sponsored conference by the Department of Defense, the U. S. Office of Education, and the National Security Industrial Association. National Security Industrial Association, Washington, D. C., 1966.

11. Rundquist, Edward A., Course Design and Redesign Manual for Job Training Courses (First Edition). Research Report JRR 66-16 (Revised), U. S. Naval Personnel Research Activity, San Diego, California, January 1967.

12. Smith, Robert G., Jr., An Annotated Bibliography on the Design of Instruction Systems. Technical Report 67-5, Washington, D. C., The George Washington University Human Resources Research Office, 1964.

13. Smith, Robert G., Jr., Controlling the Quality of Training. Technical Report 65-6, Washington, D. C., The George Washington University, Human Resources Research Office, 1967.

14. Smith, Robert G., Jr., The Design of Instructional Systems. Technical Report 66-18, Washington, D. C., The George Washington University, Human Resources Rearch Office, 1967.

15. Smith, Robert G., Jr., The Development of Training Objectives. HumRRO Research Bulletin 11, Washington, D. C., The George Washington University Human Resources Research Office, 1964.

(ATIT-TNG-CT)

FOR THE COMMANDER:

OFFICIAL:

DAVID W. GRAY
Major General, GS
Chief of Staff

SIDNEY GRITZ
Colonel, AGC
Adjutant General

DISTRIBUTION:
A1; Bb; E1; F
Ch
USAADGRU
AF Inst of Tech
AU
NAWC
Sr Army Rep, USMC Educ Cen,
USMC Sch
Ch, Rgn Mpr Surv Ofc
USAR: None
ARNG: None

Copies furnished:
A2; D1 (except USAINTS, MTMTS,
& USARAL); E2; E3; H
DCSOPS, DA
DCSPER, DA
ACSI
ACSFOR

11485