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MILITARY HANDBOOK

TRAINING MATERIALS DEVELOPMENT

PART 2 OF 2

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DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362-5101

Training Material Development

1 This military standardization handbook was developed by the Naval Sea Systems Command, Department of Navy in accordance with established procedures

2 This document supplements departmental manuals, directives, and military standards and provides basic and fundamental information on training material development It should provide valuable information and guidance to personnel responsible for developing training materials

3 Beneficial comments and any pertinent data which may be of use in improving this document should be addressed to Commander, Naval Sea Systems Command, SEA 55Z3, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD form 1426) appearing at the end of this document or by letter

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	5-23-I	Percentage grade and qualitative rating	5-23-3

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5 5 TOPICAL OUTLINE

5 5 Topical outline The topical outline presents the goals of the specific course and the order of subject matter presentation to achieve them This section describes the format, content, and development of the elements of a topical outline for curriculum as specified in the military standard

5 5 1 Use The topical outline provides CLOs, a listing of part, section, and topic titles and statements of rationale to explain/justify the training Statements of teachability, when appropriate, must also be included in the topical outline The Instructor Guide is developed from the topical outline, therefore, it is essential to begin with a well constructed and clearly defined topical outline which will ensure adherence to the initial intent of the course throughout the curriculum development cycle

5 5 2 Elements Three elements make up the topical outline They are the cover page, CLOs, and topical outline

(a) Cover The Cover page identifies the document as a topical outline for a specific curriculum
(b) CLOs The CLOs describe the overall knowledge and skills to be attained upon completion of the training as programed by the curriculum
(c) Topical outline The topical outline itself, presents the plan, or outline, to achieve the CLOs by showing when what subject matter is taught to what knowledge or skill level, or both during the training

5 5 3 Development of the cover page The cover page consists of the course long title for which the outline is made and the words "TOPICAL OUTLINE" which serves as the title of the document (see figure 5-5-1) The parts of the page are labeled according to the steps to which they apply

(a) The course title reflects the complete title of the course of instruction without abbreviation The designations MK, MOD, AN/XXX, etc , are considered as parts of equipment, subsystem, and system names are used appropriately in conjunction with the name in the title of the curriculum
(b) EXAMPLES

"AN/SPS-457(V) Radar Maintenance" is a correct title

"SPS-457 Rad Maint " is not a correct title

"457 Radar" is not a correct title

"Commercial Utility Cargo Vehicle (TYPE A), Utility Operator and Maintenance" is a correct title

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"CUCV (TYPE A) OP and MAINT" is not a correct title

Step 1 Course long title Obtain the course long title for the course to be developed from the contracting activity Place the title on the cover page

Step 2 Topical outline Place the heading on the cover page (see figure 5-5-1)

5 5 3.1 CLO development The CLOs reflect the specific skills and knowledge of a job related to an equipment, subsystem, system, or task/function The CLOs represent a guide for learning and teaching achievement as well as a guide for measurement of trainee performance by accurately reflecting those job requirements that can be duplicated in a training environment Documents required for CLOs development are

(a) PPP/TPS based curriculum development

(1) Training path chart for the category of personnel to be trained This document includes the PPP table index, TAC, and TAM
(2) PPP table for the equipment, subsystem, system, task, function or background to be covered in the course
(3) The associated TLA for each PPP to be used in the course

The CLOs are based upon the training levels assigned to the PPP line items indicated on each PPP's TLA The TLA defines the levels of training required according to the category of personnel to be trained and by the TOS Applicability Code Indicators that designate the type of training to be conducted TLA and TOS development and application are discussed in 5 4

(b) Non-PPP based curriculum development

(1) Job Task Analysis Summary (JTAS) containing all the procedural steps, or support equipment required to operate and maintain a specific system, subsystem, equipment or to support a specific task or function
(2) Job Training Task List (JTTL) containing the training tasks to be performed by the trainee and the most appropriate training method for each task

The CLOs are based upon the training levels assigned to the Training Analysis Summary (TAS) as indicated in the JTAS The JTAS defines the level of training required according to the category of personnel to be trained and by the JTTL training methods section that designates the type of training to be conducted JTAS and JTTL development and application is discussed in 5 2

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(c) Such factors as laboratory configuration and capacity, the availability of technical training equipment and its configuration, and previous training received are major concerns in designing curriculum and conducting technical training to achieve the required results Training levels assigned to the TAS or assignment of the TOS applicability indicators should have accounted for a majority of the training constraints The required results are the competent performance of job skills in the job environment to the standard of the job

(d) Completion of the course of instruction implies that the person can perform the knowledge and skills to the TOS levels or TAS training levels identified in the CLOs These levels, skills, and knowledge very closely resemble, if not duplicate, the actual levels, skills, and knowledge used on the job by the graduate of the course

(e) CLOs very closely resemble, or duplicate whenever possible, the actual skills and knowledge required for job performance This includes the job behavior, conditions, and standards Training environment constraints, not testing constraints, determine the degree to which the job requirement skills are pursued in the duplication process for training Therefore, the CLOs express the capabilities a graduate must have to perform his job

(f) CLOs are developed using the applicable TAS or TPS, the referenced PPP, and the applicable descriptive statements in tables 5-5-I, 5-5-II, or 5-5-III The contracting activity is the source of guidance as to category of personnel, type of training to be conducted, and the skills required by the trainee for both job preparation and job performance

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TABLE 5-5-I Coordinate descriptive statements

TRAINING LEVEL		STATEMENT
TO		
	B1	Recognize or recall ideas, phenomena, symbology, and terminology which are prerequisite to the comprehension of
	B2	Comprehend the principles, rules, and concepts necessary to solve given problems and analyze situations
	S	Apply principles, rules, and concepts to solve given problems and perform assigned tasks
F1		State the capabilities and limitations of the (name of subsystem/equipment) required to understand the (name of system/subsystem) and associated documentation
T1		Describe the theory necessary to understand all operational procedures and all maintenance procedures, without going into functional circuit details or program flow diagrams of the
O1		Coordinate all operational and maintenance procedures on the

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TABLE 5-5-II Direct descriptive statements

TRAINING LEVEL	STATEMENT
TO	
B1	Recognize or recall ideas, phenomena, symbology, and terminology which are prerequisite to the comprehension of
B2	Comprehend the principles, rules, and concepts necessary to solve given problems and situations
S	Apply the principles, rules, and concepts to solve given problems and perform assigned tasks
F1	State the purpose, function, and location, and describe the documentation required to understand subsystem capabilities and limitations of the
T1	Describe the theory necessary to understand normal operational tasks, without going into logic, circuits, program flow diagrams, or mechanical component breakdown of the
T2	Describe the theory necessary to understand all operational tasks and all maintenance procedures without going into detailed logic, circuits, individual flow diagrams, or detailed mechanical breakdown of the
O1	Direct normal operational procedures on the
O2	Direct all operational procedures on the
M1	Direct all maintenance on the

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TABLE 5-5-III Perform descriptive statements

TRAINING LEVEL	STATEMENT
TO	
B1	Recognize or recall ideas, phenomena, symbology, and terminology which are prerequisite to the comprehension of
B2	Comprehend the principles, rules, and concepts necessary to solve given problems and situations
S	Apply the principles, rules, and concepts to solve given problems and perform assigned tasks
F1	State the purpose, function, and location, and describe the documentation of the
T1	Describe the theory necessary to support and understand the performance of normal operational tasks without going into logic, circuits, program flow diagrams, or mechanical component breakdown of the
T2	Describe the theory necessary to support and understand the performance of casualty/degraded/abnormal/not full mission capable operational tasks and operational tasks requiring advanced analysis, all preventive maintenance, and documented fault isolation and repair without going into detailed logic, circuit analysis, individual program flow diagrams, or detailed mechanical component breakdown of the
O1	Perform normal operational procedures with supervision on the
O2	Perform casualty/degraded/abnormal/not full mission capable operation procedures and normal operational procedures requiring advanced analysis with supervision on the
P1	Perform preventive maintenance procedures with supervision on the

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TABLE 5-5-III Perform descriptive statements - Continued

TRAINING LEVEL	STATEMENT
C1	Perform, with supervision, documented fault isolation and repair procedures to the authorized maintenance level on the
T3	Describe the theory necessary to support documented fault isolation and repair requiring advanced analysis and undocumented fault isolation and repair, without going into signal or electrical flow, computer instructions, or detailed mechanical component breakdown except for those mechanical or logic elements or circuits unique to the equipment or program of the
C2	Perform fault isolation and repair of faults that cannot be located using procedures contained in prescribed documentation or that require advanced analysis, with supervision on the

Step 1 PPP and TOS level selection

(a) Select the appropriate PPP numbers using the applicable TAC from the appropriate TPC Determine the titles of the PPP tables selected by using the PPP table index This step is not required if the contracting activity provides the applicable PPPs, TOSs, and TLAs required

(b) Obtain the PPP and associated TLA for each PPP selected

(c) Obtain a clean sheet of paper for each PPP to be used in the course Place the name of each PPP at the top of each sheet Vertically list the letters F, T, O, P and C at the left edge of each sheet For background PPP tables list TO (B1, B2, and S)

(d) Locate the appropriate TOS code applicability indicator for each line item of the PPP on the associated TLA for each profile The following list of characters are used as PPP line item numbers to TOS code applicability indicators

R - Replacement/Conversion/ILM training course
A - Advanced training course
B - Both replacement and advanced training course

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0 - Training hardware does not exist at the appropriate facility and operational constraints preclude on board training
1 - Experience is the only means to accomplish the specified training level
2 - Training hardware does not exist to accomplish training at the appropriate facility and on board training is permitted
3 - Training hardware exists to accomplish training at a facility, on board training is permitted, and training is accomplished on board
4 - Training is received by the individual outside of the cognizant training program
5 - Background training is received by the individual as a part of the Navy Training Program

One of the characters is placed in the column adjacent to the specific PPP line item This denotes training levels required of that line item for the specific category or personnel Assignment of a particular character to an TOS code column defines the training required for the line item or indicates that the particular training is received outside of the cognizant training program Only one applicability indicator is in each applicable column block Ensure that the level indicators selected agree with the tasking from the Procuring Activity or the TPC portion of the TPS for the category of personnel concerned

(e) Determine the highest levels of training to be achieved in the curriculum for each PPP line item by noting the TOS column on the TLA in which the appropriate applicability indicator is located Five levels are noted as numbers as they are identified by the numeric portions of the columns labeled with the letters F, T, O, P and C Background and task/function PPP tables utilize TO (B1, B2, and S)

(f) Write the highest numeric value beside each of the corresponding letters listed vertically on the work sheet for each PPP

Step 2 Training statement selection

(a) Refer to tables 5-5-I, 5-5-II, or 5-5-III, as appropriate, for the category of personnel to be trained CLOs are written to the highest TOS level of knowledge (TO [B1, B2], F, T) and skill (TO [S], O, P, C) for each PPP used for subject matter in the curriculum The PPP provides the name of the subject matter added to the statements in tables 5-5-I, 5-5-II, or 5-5-III The TLA provides the level of training by displaying applicability indicators adjacent to each line item The type of training to be received primarily determines which indicator is placed in which level column adjacent to the line item

(b) Write the applicable statements from the table selected in 5 5 3 1 step 2 (a) that are appropriate for the level indicators listed vertically on each PPP work sheet Write the applicable statement

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next to each level indicator Complete this step for each PPP used in the course

Step 3 Level duplication check

(a) Examine the work sheets and write down the titles of all PPPs that have training level statements which read identically Note the training level code (e g , if a T2 appears on more than one of the work sheets then identical statements should exist)
(b) List the names of the associated PPPs to indicate how many times the statement duplication exists The PPP names provide the method to indicate that different subject matter must achieve the same training Duplication of the training level statements is not permitted Adding multiple names to the training level statements is permitted

Step 4 Training level construction

(a) Write the statements from the work sheets with (TO [B1, B2], F1, T1, T2, T3) codes onto a separate sheet of paper arranging them in the (TO [B1, B2], F1, T1, T2, T3) order and adding the names of the PPPs involved These statements represent the highest levels of knowledge presented throughout the work sheets Duplication of training level statements is not permitted Adding multiple names to training level statements is permitted
(b) During the preparation of these statements, the presence of too many modifiers may become evident In that event, some of the modifiers may be deleted on a case-by-case basis If a part of the descriptive statement does not apply, it will require deletion or modification, as necessary, to accurately reflect the objectives of the course In any event, the descriptive statement is used to the maximum extent possible
(c) Write the statements from the work sheets with (TO [S], O1, O2, P1, C1, C2) on a separate sheet of paper arranging them in the (TO [S], O1, O2, P1, C1, C2) order and adding the name of the PPPs involved These statements represent the highest levels of skill presented throughout the work sheets

Step 5 CLO page

(a) Refer to figure 5-5-2, (sheet 1 of 2) to prepare the CLO page(s) The CLOs are actually the statements that have been prepared to reflect the appropriate knowledge and skill training levels of the PPP line items
(b) Place each knowledge (TO [B], F and T) training level statement in the order referred to in 5 5 3 1 step 4 (a) and number consecutively beginning with the number

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(c) Place the skill (TO [S], O, P, C) training statements in the same manner as the knowledge statements but in the order described in 5 5 3 1 step 4 (c) Refer to figure 5-5-2 (sheet 2 of 2) for a complete CLO page

(d) The CLOs may require more than one page to produce a complete listing

5 5 3 2 Development of the outline The outline portion of the topical outline consists of the course title, preface, "TOPICAL OUTLINE" heading, part number and title, section number and title, topic number and title, and topic description and statements of rationale (see figures 5-5-3 and 5-5-4)

Step 1 Part number and title construction Construct the part numbers and titles for all PPPs used in the course according to the examples provided below Record the part numbers and titles at the top of a separate sheet for each for use as the outline development progresses

(a) The first part number and title correspond to the number and name of the first PPP to be addressed in the course The part number is the PPP number and the part title is the PPP title The part is the largest division that may exist in the curriculum because a PPP is the largest element of analysis performed for the identification of skills and knowledge to be learned on an equipment, subsystem, system, task/function, or background information

(1) PPP table number and title

D542, Commercial Utility Cargo Vehicle (TYPE A), Utility

Becomes

(2) Part number and name

D542, Commercial Utility Cargo Vehicle (TYPE A), Utility

(b) Courses that use one PPP will have the PPP number and name appear as the only part number and name in the outline When more than one PPP is used in a course, the order in which the part numbers and titles occur in the outline corresponds directly to the order of usage of the PPPs of the same name and number in the curriculum Multiple part numbers and titles are separated by their respective section and topic numbers, titles, and descriptions (see figure 5-5-3)

(c) Each part of an outline normally covers all required items of a particular PPP to the applicable training levels However, there may be instances where "teachability" dictates the requirements for covering a specific PPP in two or more parts This "splitting" may be desirable when familiarization with a subsystem or equipment is required early in the curriculum to understand related equipment A more complete or higher level coverage of the same subsystem/equip-

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ment may be reserved for later coverage in the curriculum If all coverage of a PPP is provided in the same time frame, the part is not split

(d) Several PPPs may be covered in the same part when the subject of one or more of the PPPs clearly supports the subject of the primary profile The part number and title will reflect the primary profile The purpose of the combination is usually to eliminate the repetition of PPP line items common to a group of PPPs

Step 2 Section number and title selection

(a) Examine the TLA of each PPP named in 5 5 3 2, step 1 Note the training level columns that contain the applicable TOS applicability indicators

(b) List the applicable training level codes (TO [B1, B2, S], F1, T1, T2, T3, O1, O2, P1, C1, C2) vertically in the order indicated, under the part name on each part sheet

(c) Within each part, section numbers and titles are constructed to reflect the sequence and levels according to which the PPP line item categories will be taught The TOS Codes (TO [B1, B2, S], F1, T1, T2, T3, O1, O2, P1, C1, C2) are the training level indicators and their respective statements provide direction on the level of training required to attain each Each section within a part is developed to support specific knowledge training levels, specific skill training levels, or a combination of training levels When supporting background or task/function information, training level codes B1, B2, and S are combined into TOS Code TO

Step 3 Combinations of TOS indicators

(a) Refer to the corresponding PPP line items and determine whether a strong enough item relationship exists between them to support combination of training levels If so, write the combination desired on the corresponding part sheet

(b) Combination of levels within a section occur when a combination of knowledge levels, skill levels, or knowledge and skill levels is supported The section titles for sections other than TO consist of an introductory statement reflecting the highest TOS supported by the section, followed by the title of the PPP table In the event that knowledge and skill coverage is combined within a section, the introductory statement reflecting the highest knowledge TOS and the highest skill TOS (for each type of skill covered) is used to construct the section title

The training levels that may be combined are identified in the definitive statements for the TOS codes being considered for combination The definitive statements for the TOS codes are contained in tables 5-5-I, 5-5-II, and 5-5-III

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Step 4 Section title construction

(a) Construct the section title by selecting the introductory statement from table 5-5-IV that is appropriate for each training level, or level combination, and writing it next to the training level indicator on the part sheet

TABLE 5-5-IV Section title introductory statements

TOS LEVEL	STATEMENT
T0	Consists of the proper name of devices, conditions, knowledge areas (e g , Basic Mathematics, Bearings and Lubrication)
F1	Familiarization with
T1	Introduction to
O1	Basic Operation of the
T2	Theory of the
O2	Operation of the
P1	Preventive Maintenance of the
C1	Basic Corrective Maintenance of the
T3	Advanced Theory of the
C2	Corrective Maintenance of the
T1 + T2	Introduction to and Theory of the
T1 + O1	Introduction to and Basic Operation of the
T2 + O2	Theory and Operation of the
T2 + P1	Theory and Preventive Maintenance of the
T2 + C1	Theory and Basic Corrective Maintenance of the
T3 + C2	Advanced Theory and Corrective Maintenance of the
P1 + C1	Preventive and Basic Corrective Maintenance of the
T2 + P1 + C1	Theory and Preventive and Basic Corrective Maintenance of the

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(b) Add the name of the PPP to the end of the introductory statement Refer to figures 5-5-3 and 5-5-4, section titles

(c) Place the training levels indicated by the newly constructed title in parentheses ( ) immediately following the PPP name in the title (see figures 5-5-3 and 5-5-4) The section title reflects the level(s) of skills and/or knowledge to be achieved upon completion of the topics within the section The number reflects the sequential order in which the sections are to be taught

Step 5 Topic number and title construction

(a) Make a list of topic titles for each section title by writing the statements provided in table 5-5-V and adding the name of the PPP to the end of the statement Use a separate sheet of paper for each topic title list and place several blank lines between the titles in the list This list comprises the model topic titles to be used in the section whose title appears at the top of each separate sheet The separate sheets will be referred to as "Section Sheets" because the section title appears at the top of each sheet

TABLE 5-5-V Topical titles

1	When a Background or Task/Function PPP table is used, the following topic titles are used in the sequence indicated	
	B1	Knowledge of
	B2	Comprehension of
	S	Application of
2	When a System, Subsystem, or Equipment PPP table is used the following topic titles are used in the sequence indicated	
	Knowledge topics	
	Topic 1	General Description of
	Topic 2	Physical Description of
	Topic 3	Functional Description of
	Topic 4	Interface Description of

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TABLE 5-5-V Topical titles - Continued

	Topic 5 Operational Description of
	Topic 6 Maintenance Description of
	Skill topics
	Topic 1 Basic Operation of
	Topic 2 Operation of
	Topic 3 Preventive Maintenance of
	Topic 4 Basic Corrective Maintenance of
	Topic 5 Corrective Maintenance of
3	Knowledge and skill topic title combinations
	Operational Description and Basic Operation of the
	Operational Description and Operation of the
	Maintenance Description and Preventive Maintenance of the
	Maintenance Description and Basic Corrective Maintenance of the
	Maintenance Description and Corrective Maintenance of the
4	Knowledge topic title combinations
	General, Physical, and Functional Description of the
	Physical, Functional, and Interface Description of the
	Functional, Interface, and Operational Description of the
	Interface, Operational, and Maintenance Description of the
5	Skill topic title combinations
	Basic Operation and Preventive Maintenance of the
	Operation and Basic Corrective Maintenance of the
	Preventive and Basic Corrective Maintenance of the

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(b) Within each section, topic numbers and titles reflect the order and grouping of PPP items to be taught in the section The topic title indicates the category in the PPP where the respective PPP items are located These PPP items become the topic objectives, discussion points, and test items later in the development effort The order of the topics follow the order to the PPP categories (see table 5-5-V) The topic number will serve as one of the numerals in the construction of reference numbers for the objective assignment chart later in the development effort

(c) The subject matter within a topic corresponds to the PPP items in the PPP table designated by the part name The PPP items within a topic are closely related because they are in the same category in the PPP The section title, therefore, describes the training level, or levels, to which items in the PPP categories are taught The PPP categories and their respective items are used more than once due to varying levels of training to be achieved as indicated by the section titles

(d) Figure 5-5-3 illustrates a simple, straight forward outline that reflects training levels from the simplest at the start to the most complex at the end and ensures all categories of the PPP are covered

Step 6 Grouping titles under section title

(a) Compare the PPP items in each category to the training level(s) indicated by each section title and determine which category of PPP items will be taught in each section Each of the section titles developed in 5 5 3 2, step 4 represent a training level(s) Every PPP category is not appropriate for every level

(b) Write the category names (topic titles) on the appropriate "Section Sheet" as the determinations are made Each of the section titles will have its own sheet on which to list topic numbers and titles, topic descriptions, and when desired, statements of rationale as the outline development continues

Step 7 Combining topic titles

(a) Examine the PPP items in each category of the PPP to determine if item relationships exists to combine some of the categories The primary considerations are any training constraints and the strength of the relationship between the items in the categories to support category combination

(b) A major consideration for combining categories is the training constraints that exist There is no need to combine categories that cannot be taught and measured for achievement

(c) When combining topic titles, the sequence of the topics as listed in the table 5-5-V is not broken Only when there is no information in a PPP category, may the applicable topic title be deleted from a combination (i e , "Functional and Operational Description of the

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", may exist only if there is no Interface category) For the sake of clarity, no more than three topic titles will be combined For applicable knowledge and skill topic title combinations reference table 5-5-V Figure 5-5-4 illustrates the same topical outline, illustrated in figure 5-5-3, but uses the combination technique in section and topic titles The course represented by both topical outlines will not change in length because of the different number of titles

(d) Complete all section sheets with respective topic titles before proceeding to 5 5 3 2, step 8

Step 8 Topic description construction

(a) To construct the description, read the PPP line item statements within the category indicated by the topic title

(b) Condense the subjects of the line item statements into one or two sentences Write the condensed statement under the appropriate topic title on the section sheet

(c) A topic description is required for each topic number and title constructed in 5 5 3 2, steps 6 and 7 This description is a condensation of the main subject of each PPP category designated by the topic title This description is not the topic learning objective (see figures 5-5-3 and 5-5-4)

(d) Repeat 5 5 3 2, step 8 until all topic titles on all section sheets have a topic description

Step 9 Outline page construction

(a) Refer to figures 5-5-3 and 5-5-4 and use the section sheets constructed in 5 5 3 2, steps 5, 6, and 7

(b) Arrange all of the section work sheets into an order that the subject matter is to be presented

(c) Place the title of the first section work sheet under the part number and title and assign it the number "1"

(d) Using the same section sheet, place the first topic number and title under the section number and title

(e) Place the corresponding topic description under its topic title

(f) A statement of rationale, if used, is placed under the topic description The statement of rationale is not labeled as such and contains any explanation or justification of subject matter flow, training constraints, learning theory, skills acquisition, etc , that the developer feels is required (see figures 5-5-3 and 5-5-4)

(g) Place the second topic number and title under the statement of rationale If no statement of rationale is used, place the second topic number and title two lines below the preceding topic description

(h) Repeat 5 5 3 2, steps 9 (b) through 9 (g) until the contents of all the section work sheets have been transferred to the topical outline pages

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COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
OPERATOR AND MAINTENANCE

TOPICAL OUTLINE

FIGURE 5-5-1 Example topical outline cover page

COURSE LEARNING OBJECTIVES

Upon successful completion of this course, the trainee will have acquired the following knowledge and skills and be able to:

KNOWLEDGE:

1. (Lowest knowledge TOS level statement)
2. (Next lowest TOS level statement)
3. (Etc.)
4. (Etc.)
5. (Highest knowledge TOS level statement)

SKILLS:

1. (Lowest skill TOS level statement)
2. (Next lowest skill TOS level statement)
3. (Etc.)
4. (Highest skill TOS level statement)

FIGURE 5-5-2. Example course learning objectives page. (Sheet 1 of 2)

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COURSE LEARNING OBJECTIVES

Upon successful completion of this course, the trainee will have acquired the following knowledge and skills and be able to:

KNOWLEDGE:

1. State the purpose, function, and location, and describe the documentation of the CUCV (TYPE A).

2. Describe the theory necessary to support and understand the performance of normal operational tasks without going into logic, circuits, program flow diagrams, or mechanical component breakdown of the CUCV (TYPE A).

3. Describe the theory necessary to support and understand the performance of reduced/degraded/abnormal operational tasks and operational tasks requiring advanced analysis, all preventive maintenance, and documented fault isolation and repair without going into detailed logic, circuit analysis, individual program flow diagrams, or detailed mechanical component breakdown of the CUCV (TYPE A).

4. Describe the theory necessary to support documented fault isolation and repair requiring advanced analysis and undocumented fault isolation and repair, without going into signal or electrical flow, computer instructions, or detailed mechanical component breakdown except for those mechanical or logic elements or circuits unique to the equipment or program of the CUCV (TYPE A).

SKILLS:

1. Perform normal operational procedures with supervision on the CUCV (TYPE A).

2. Perform reduced/degraded/abnormal operation procedures and normal operational procedures requiring advanced analysis with supervision on the CUCV (TYPE A).

3. Perform preventive maintenance procedures with supervision on the CUCV (TYPE A).

4. Perform, with supervision, documented fault isolation and repair procedures to the authorized maintenance level on the CUCV (TYPE A).

5. Perform fault isolation and repair of faults that cannot be located using procedures contained in prescribed documentation or that require advanced analysis, with supervision on the CUCV (TYPE A).

FIGURE 5-5-2. Example course learning objectives page. (Sheet 2 of 2)

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Commercial Utility Cargo Vehicle (TYPE A), Utility
Operator and Maintenance

A-234-5678

Preface

The intent of the course is to prepare a trainee to operate, maintain, and repair the vehicle to the highest levels supported by documentation for the vehicle Advanced operating techniques may be difficult to achieve during the training as they are climate and environment dependent All procedures will be closely monitored to insure correct skill development

Topical Outline

PART D542	COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
Section 1	Familiarization with the CUCV (TYPE A) (F1)
Topic 1	General Description of the CUCV (TYPE A)
	The topic contains an overview of what the capabilities and purpose of the vehicle are as well as operating characteristics, terms, abbreviations, symbols, and security requirements
Topic 2	Physical Description of the CUCV (TYPE A)
	The topic contains an overview of all the major components of the vehicle as well as identification of the names, colors, and designations of the controls and indicators for the vehicle
Section 2	Introduction to CUCV (TYPE A) (T1)
Topic 1	Functional Description of the CUCV (TYPE A)
	The topic contains a description of what all the components do as well as how the controls and indicators work for the operator in terms of what they indicate and do

FIGURE 5-5-3 Example topical outline, PPP table sequence
(Sheet 1 of 5)

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Topic 2	Interface Description of the CUCV (TYPE A)
	The topic contains a description of all the equipments that connect to the vehicle which enable it to perform the job specified as well as the vehicle's effect on the equipment connected to it
Topic 3	Operational Description of the CUCV (TYPE A)
	The topic contains a description of the procedures required to operate the vehicle in the course of its normal work with the vehicle operating in 100% working order including the indications required to recognize normal operating conditions
Section 3	Basic Operation of the CUCV (TYPE A) (01)
Topic 1	Basic Operation of the CUCV (TYPE A)
	This topic contains the procedures for pre-operation and normal operation of the vehicle with the indications that allow the recognition of normal operation This is a skill development topic for the trainee
	Application of knowledges learned for the development of requisite job skills is reinforced at this point The trainee should develop some skill at operating the vehicle in normal conditions before proceeding to more difficult levels of operation reduced/degraded capabilities of the vehicle The trainee must understand what "normal" operation is before the introduction of "abnormal" operation Completion of this topic indicates that the trainee is trained to operate the vehicle
Section 4	Theory of the CUCV (TYPE A) (T2)
Topic 1	Functional Description of the CUCV (TYPE A)
	The topic contains a description of how the components, controls, and indicators work to the detail necessary for operation in a degraded/reduced capability environment as well as for the performance of preventive and basic corrective maintenance

FIGURE 5-5-3 Example topical outline, PPP table sequence
(Sheet 2 of 5)

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	This topic starts the training level required for the trainee to be able to operate, maintain, and repair the vehicle according to supporting documentation
Topic 2	Interface Description of the CUCV (TYPE A)
	The topic contains a description of how the equipments connected to the vehicle affect the vehicle and how the vehicle affects the equipment connected to it to the detail necessary for performance of preventive and basic corrective maintenance
Topic 3	Operational Description of the CUCV (TYPE A)
	The topic contains a description of the operational procedures necessary to operate the vehicle with reduced/degraded capabilities as well as the indications to be recognized that indicate when a not normal operation condition exists
Topic 4	Maintenance Description of the CUCV (TYPE A)
	The topic contains a description of documented preventive and basic corrective maintenance procedures
Section 5	Operation of the CUCV (TYPE A) (02)
Topic 1	Operation of the CUCV (TYPE A)
	The topic contains operation procedures for reduced/degraded capabilities of the vehicle and procedures for response to recognition of abnormal operating conditions
Section 6	Preventive Maintenance of the CUCV (TYPE A) (P1)
Topic 1	Preventive Maintenance of the CUCV (TYPE A)
	The topic contains preventive maintenance procedures for the vehicle and recognition of job completion standards for job completion
Section 7	Basic Corrective Maintenance of the CUCV (TYPE A) (C1)

FIGURE 5-5-3 Example topical outline, PPP table sequence
(Sheet 3 of 5)

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Topic 1.	Basic Corrective Maintenance of the CUCV (TYPE A)
	The topic contains corrective maintenance procedures for the vehicle, elementary fault isolation procedures, and recognition of job completion standards for job completion
	The completion of this topic indicates that the trainee has been trained to operate, maintain, and repair the vehicle in accordance with supporting documentation and under supervision
Section 8.	Advanced Theory of the CUCV (TYPE A) (T3)
Topic 1.	Functional Description of the CUCV (TYPE A)
	The topic contains a detailed functional description of how and why each major component works in order to support advanced analysis required in some fault isolation
	This topic starts the training required for the trainee to be able to perform analysis in fault isolation and to perform advanced corrective maintenance procedures with minimal supervision.
Topic 2.	Interface Description of the CUCV (TYPE A)
	The topic contains a detailed functional description of how and why the equipment connected to the vehicle works in order to support analysis in fault isolation
Topic 3.	Operational Description of the CUCV (TYPE A)
	The topic contains a detailed description of operating procedures to include recognition of indications for fault isolation requiring analysis as well as personnel and equipment safety precautions for fault isolation
Topic 4.	Maintenance Description of the CUCV (TYPE A)
	The topic contains a detailed description of corrective maintenance procedures that include fault isolation and repair requiring analysis as well as personnel and equipment safety precautions for maintenance

FIGURE 5-5-3. Example topical outline, PPP table sequence
(Sheet 4 of 5)

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Section 9 Corrective Maintenance of the CUCV (TYPE A) (C2)

Topic 1 Corrective Maintenance of the CUCV (TYPE A)

The topic contains corrective maintenance procedures for the repair of the vehicle including fault recognition and isolation requiring analysis, personnel and equipment safety procedures for maintenance, and vehicle disassembly for the purpose of component replacement Operational tests for maintenance are included as well This is a skill development topic

The completion of this topic implies that the trainee is prepared to operate, maintain, and repair the vehicle to the authorized levels

FIGURE 5-5-3 Example Topical Outline, PPP table sequence (Sheet 5 of 5)

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Commercial Utility Cargo Vehicle (TYPE A), Utility Operator and Maintenance

A-234-5678

Preface

The intent of the course is to prepare a trainee to operate, maintain, and repair the vehicle to the highest levels supported by documentation for the vehicle. Advanced operating techniques may be difficult to achieve during the training as they are climate and environment dependent All procedures will be closely monitored to insure correct skill development

Topical Outline

PART D542	COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
Section 1	Introduction to and Basic Operation of the CUCV (TYPE A) (F1, T1, O1)
Topic 1	General, Physical, and functional Description of the CUCV (TYPE A)
	The topic contains an overview of capabilities, terms, abbreviations, and symbols, a description of the major components, controls and indicators, security requirements, and how the components relationships allow the vehicles to operate
Topic 2	Interface and Operational Description of the CUCV (TYPE A)
	The topic contains a description of the equipments connected to the vehicle as well as their respective effects on each other and the operational procedures for normal operation of the vehicle under normal operating conditions
Topic 3	Basic Operation of the CUCV (TYPE A)
	This topic is concerned with the trainee performance of pre-operational and normal operational procedures on the vehicle This is a skill performance topic
	Completion of this topic implies the trainee has acquired enough knowledge and developed enough skill to operate the vehicle under normal conditions

FIGURE 5-5-4 Example topical outline, combination (Sheet 1 of 3)

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Section 2	Theory of the CUCV (TYPE A) (T2)
Topic 1	Functional and Interface Description of the CUCV (TYPE A) This topic contains a description of the major components and the equipments connected to the vehicle to the detail required for the performance of operation in a degraded/reduced capability environment, preventive and basic corrective maintenance
Topic 2	Operation and Maintenance Description of the CUCV (TYPE A) This topic contains a description of the reduced/degraded operating procedures, preventive and basic corrective maintenance procedures as listed in the supporting documentation for the vehicle
Section 3	Operation and Preventive and Basic Corrective Maintenance of the CUCV (TYPE A) (O2, P1,C1)
Topic 1	Operation and Preventive and Basic Corrective Maintenance of the CUCV (TYPE A) This topic is concerned with trainee performance of reduced/degraded operating procedures, preventive, and basic corrective maintenance procedures for the vehicle This is a skill performance topic Completion of this topic implies that the trainee can operate the vehicle in all environmental conditions under normal or reduced/degraded capability as well as perform the preventive and basic corrective maintenance on the vehicle
Section 4	Advanced Theory and Corrective Maintenance of the CUCV (TYPE A) (C2)
Topic 1	Functional and Interface Description of the CUCV (TYPE A) The topic contains a detailed functional description of how each major component works and how the equipment connected to the vehicle works in order to support advanced analysis required in some fault isolation

FIGURE 5-5-4 Example topical outline, combination (Sheet 2 of 3)

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Topic 2	Operational and Maintenance Description of the CUCV (TYPE A) The topic contains a detailed description of how the operational procedures provide indications for fault isolation, safety precautions used in operational testing for maintenance, and a detailed description of corrective maintenance procedures that include analysis for fault isolation and repair of the vehicle
Topic 3	Corrective Maintenance of the CUCV (TYPE A) The topic contains corrective maintenance procedures for the repair of the vehicle including fault recognition and isolation requiring analysis, personnel and equipment safety procedures for maintenance, and vehicle disassembly for the purpose of component replacement Operational tests for maintenance are included as well This is a skill development topic The completion of this topic implies that the trainee is prepared to operate, maintain, and repair the vehicle to the authorized levels

FIGURE 5-5-4 Example topical outline, combination (Sheet 3 of 3)

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5 6 TOPIC LEARNING OBJECTIVES

5 6 Topic learning objectives The topic learning objectives consist of a list of all learning objectives for a specific curriculum This section provides background information and describes the format, content, and development guidelines of the topic learning objectives for curriculum as specified in the military standard and in DI-ILSS-80081

5 6 1 Use Learning objectives are prepared to reflect the coverage that is to be provided in the topic

(a) PPP/TPS based curriculum development

(1) These learning objectives are prepared by using the PPP items identified by the TLA For some PPP items, the level of coverage required by the TLA may not apply equally to all subitems of that PPP item In this case, learning objectives are developed to reflect only those subitems which apply to the topic Other PPP items may require several learning objectives to adequately reflect the necessary training

(b) Non-PPP based curriculum development

(1) Topic learning objectives provide a complete inventory of the learning objectives for a specific training course The topic learning objectives also provides a cross reference listing of learning objectives to training task numbers (available from the Training Analysis Summary)

(2) Non-PPP based learning objectives shall be developed as specified in 5 2 Additionally some of the general information on learning objectives development found in 5 6 3 1, steps 1 and 3 of this section may be of assistance to the developer

5 6 2 Elements The elements of the topic learning objectives are the cover, topic learning objectives, and profile item-to-topic objective assignment chart

(a) Cover Identifies the document as the topic learning objectives for a curriculum

(b) Topic learning objectives The learning objectives are listed according to part, section, and topics to match the order of the topical outline for the curriculum

(c) Profile item-to-topic objective assignment chart This chart is the part of the topic learning objectives that provides a cross-reference listing between the learning objectives for the curriculum and the PPP Line Items to be taught This cross-reference list is an administrative tool for insuring that a learning objective is written for each PPP line item used at each level indicated in the topical outline

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5 6 3 Development of the cover The cover consists of the course title, course identification, and the words "TOPIC LEARNING OBJECTIVES" (see figure 5-6-1)

(a) Security classification Each topic learning objectives submittal must bear the highest security classification demanded by its contents Classification must be in accordance with the effective edition of the DoD Instruction 5220 22M or OPNAVINST 5510 1, and applicable contracting activity instructions

5 6 3 1 Development of topic learning objectives All learning objectives are definite learning specifications written in behavioral terms which specify exactly what the trainee must be able to do after having received instruction All learning objectives contain three essential elements Behavior, Condition, and Standard Statements The behavior consists of a subject, a performance-oriented verb, and an object, and identifies what the trainee should be able to do upon completion of the topic The condition provides the training level phrase and any other aiding or limiting condition under which the behavior is performed The training level phrase portion of the condition is provided to assist in maintaining the desired training level(s) The handbook specifies the criteria which the demonstration of performance must meet

Military training courses are based on the achievement of skill and knowledge objectives Test measuring devices measure trainee progress The "common threads" through this cycle are the behavior, condition, and standard that are identified by specific job related tasks Learning objectives are developed for two primary functions

(a) They are developed to reflect the behaviors, standards and conditions of the job that give the performance of the job its special characteristics One means of evaluating the achievement of learning objectives and the trainee's ability to demonstrate required behavior is through developing and administering tests These tests for measurement of trainee achievement simultaneously monitor the ability of the learning objectives to reflect the behavior, condition, and standard of specific job related tasks
(b) They are developed to allow a wide range of flexibility for measurement of trainee achievement to meet training conditions Tests for measurement of student achievement are discussed in 5 7

Step 1 Collect required documents

(a) Obtain the course specific topical outline from the contracting activity The topical outline for the curriculum provides most of the information required to develop learning objectives The topic titles indicate the categories of a PPP in which to find the PPP line items that serve as the "basis" for the objective The part number

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and name indicate the number and name of the PPP in which the category can be found The section title indicates the level of training to be achieved when teaching the category of PPP line items

(b) Obtain the PPP named on the topical outline from the contracting activity PPPs, identified by part numbers and names, provide the line items as the source of subject matter The PPP line item is the job specific behavior for the learning objective The section title provides part of the condition for the learning objective and the level of training to be achieved by the learning objective The condition of the job behavior is reflected by the PPP category in which the item is located and the TOS The standard of the job behavior, and therefore the objective, is always implied to be "without error" There are few job related tasks that allow the job completion to be inaccurate or incomplete Deviation from the implied standard is provided by the contracting activity and delineates the depth to which the standard is to be lowered

(c) Obtain the corresponding TLA for each PPP from the contracting activity The TLA for each PPP indicates, via applicability code indicators, the line items that are to be used in the curriculum PPPs, TLAs, and applicability indicators are discussed in 5 3 and 5 4

(d) Obtain the TOS for the category of personnel to be trained from the contracting activity The TOS for the category of personnel to be trained state the conditions of the training levels names in the section titles of the topical outline as discussed in 5 5

Step 2 Location of PPP items

(a) Select a topic title from the topical outline and write it on a clean sheet of paper This sheet will be referred to as the topic sheet One topic title is placed on each topic sheet In the case of combined topic titles, there will be a sheet for each element of the combined title

(b) Locate the part title that is listed above the topic title selected on the topical outline Write the title on the topic sheet This is the title of the PPP to be used for the topic

(c) Identify the training level to be achieved in the topic by using the section title immediately above the selected topic title Write the corresponding TOS code on the topic sheet It's the alphanumeric number in parenthesis in the section title

(d) Obtain the PPP that corresponds to the part name written on the topic sheet Locate the category of PPP line items that corresponds to the topic title written on the topic sheet All of the PPP line items in this category have the potential to become TLOs

(e) Cross reference the PPP line item number (1-2-1a , 2-1-1 , 1-4-2 , etc) to the associated TLA for the PPP being used On the topic sheet, write down the numbers of the PPP line items designated applicable in that category by the TOS applicability indicator for this course PPP line item number to TOS applicability indicator is

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provided by the contracting activity The applicability indicator provided, direct the selection of PPP line items to be used as subject matter for the curriculum When designated by the applicability indicator, the line item also becomes the job behavior for the respective learning objective Only those PPP item numbers with the appropriate applicability indicators are used in the curriculum

Step 3 Topic learning objective construction

(a) Locate and read the TOS for the alphanumeric code written on the topic sheet

(b) Table 5-6-I provides sample condition modifier phrases that may be used to refer to the entire TOS Select the appropriate modifier by using the TOS alphanumeric code Additional condition modifier phrases should be used as appropriate and are discussed in 5 4

(c) Rewrite the PPP line item to reflect a combination of the behavior from the line item and the conditions of the TOS The modifier, when used and selected from table 5-6-I, may be inserted into the PPP line item anywhere that promotes clarity and understanding to the reader (see figure 5-6-2)

(d) The construction of the objective is complete when the PPP line item job behavior is combined with the conditions of the TOS so that the instructor and trainee can understand what is to be achieved in terms of job performance and conditions Any portion of the TOS statement may be used to establish the conditions under which the job behavior is to be performed The result is a job behavior specific, job condition specific, and job standard specific learning objective

(e) If the PPP line items has subitems, then the objective will also have subitems When only one subitem is required it may be written into the stem Separate objectives for each subitem are not written Writing the PPP item to a specific level supports its subitems to the same level

(f) Figure 5-6-2 shows one example from a topic in each section The actual listing will support every PPP line item with a learning objective written to every level indicated by the section title

(g) Complete 5 6 3 1 steps 1 through 3 for each topic listed on the topical outline Proceeding to step 4 is possible only when all topic sheets are completed

Step 4 Topic learning ojectives page completion Transfer the rewritten statements from the topic sheets onto the topic learning objectives page using figure 5-6-2 and the topical outline as a guide The objectives are placed on the pages in the same order as the part, section, and topic title appear in the topical outline The learning objectives are numbered sequentially with Arabic numbers, starting with 1

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TABLE 5-6-I Example supporting condition modifiers

SECTION TITLE TOS LEVEL INDICATOR	SUPPORTING CONDITION MODIFIER
T0	to understand tasks or functions of
F1	to support general watchstanding duties for
T1	to support normal operation of
T2	to support casualty/degraded/abnormal/not full mission capable modes of operation of OR to support operation requiring advanced analysis of OR to support preventive maintenance of OR to support documented corrective maintenance of
T3	to support undocumented corrective maintenance requiring advanced analysis for
O1	in accordance with normal operation procedures for
O2	in accordance with casualty/degraded/abnormal/not full mission capable operation procedures for the
P1	in accordance with preventive maintenance procedures for
C1	in accordance with documented corrective maintenance procedures for .
C2	in accordance with undocumented corrective maintenance methods requiring advanced analysis for

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5 6 3 2 Development of the profile item-to-topic objective assignment chart The Profile Item-to-Topic Objective Assignment Chart (OAC) is a table that consists of nine (9) columns The column headings are "TABLE", "ITEM", "TOS", "VOL", "PART", "SEC", "TOPIC", "L O " and "TEST ITEM NO " (see figure 5-6-3)

Step 1 Collect required documents

(a) Obtain the learning objectives for each topic of the curriculum
(b) Write the numbers and names of the PPP required, as designated by the part numbers and names, on a clean sheet of paper
(c) Obtain the PPPs indicated and their corresponding TLA

Step 2 Construct the OAC The OAC is an administrative tool that reflects the PPP line items and learning objectives used in each topic of the curriculum It is a cross-reference list that provides a listing of all the line items used in a curriculum with the topic specific learning objective number in which the PPP line item is covered to the TOS level indicated by the section title

(a) The "TABLE" column has at least one entry per page and reflects the order in which the PPPs or training task numbers are used in the course
(b) The "ITEM" column lists the applicable PPP line items, in sequential order, from the PPP or training task number identified in the "TABLE" column A PPP line item or training task number is deleted if it is not used in the course The following supports PPP/TPS based curriculum

    (1) A PPP line item or subitem will be listed more than once due to coverage in different parts or coverage at different TOS levels
    (2) When all subitems of a PPP line item are not applicable to the same learning objective, the subitem covered must be listed separately
    (3) When all subitems of a PPP line item are applicable to the same topic specific learning objective, only the PPP line item number shall be listed

(c) The "TOS" column supports PPP/TPS based curriculum and is arranged so the sequence of the TOS listing for any one PPP line item is T0, F1, T1, T2, T3 for knowledge items and O1, O2, P1, C1, C2 for skill items If a PPP item, or subitem, is taught to four training levels (e g , F1, T1, T2, T3), it is listed four times in the order indicated
(d) The "VOL" column lists the volume number once per page if all PPP line items listed in the "ITEM" column of a page are covered in the same volume Where several volume number entries are required, repeated volume entries for a sequence of items is avoided when the

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volume number is clearly implied No entry is made if the instructor guide is not a multi-volume set

(e) The "PART" column lists the part that contains the learning objective if the "PART" number is different than the "TABLE" number Otherwise, no entry is made

(f) The "SECT" column lists the section number that contains the PPP line item or subitem

(g) The "TOPIC" column lists the topic number of the topic in the section that covers the PPP line item or subitem

(h) The "L O " column lists the learning objective number which relates to the PPP line item or subitem

(i) The "TEST ITEM NO " column lists a test item number to create a unique test item number This column remains blank during the development of the topic learning objectives It is filled in during the development of an instructor guide

(j) Complete 5 6 3 2 step 2 for each learning objective listed in the topic learning objectives for the curriculum

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COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
OPERATOR AND MAINTENANCE

A-234-5678

TOPIC LEARNING OBJECTIVES

FIGURE 5-6-1 Example topic learning objectives cover

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TOPIC LEARNING OBJECTIVES

PART D542 COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY

SECTION 1 Familiarization with CUCV (TYPE A) (F1)

TOPIC NO 1 General Description of the CUCV (TYPE A)

TLO 1 State the purpose of the CUCV (TYPE A) equipment to the detail required to support general watchstanding duties

TLO 2 State that the following major components make up the CUCV (TYPE A) to the detail required to perform general watchstanding duties and include the purpose of each

a Engine
b Transmission
c NP208 transfer case
d NP205 transfer case
e Front axle
f Rear axle
g Electrical system
h Wheels/tires
i Frame
j Body
k Painting/rustproofing

TLO 3 Define the abbreviations, terms, and symbols used with the CUCV (TYPE A) to the detail required to support general watchstanding duties

TLO 4 State the operational characteristics and capabilities of the CUCV (TYPE A) in terms of the parameters and limitations as listed in the operating specifications pages of the prescribed technical documentation to the detail required to support general watchstanding duties

FIGURE 5-6-2 Example topic learning objectives page (Sheet 1 of 4)

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TOPIC LEARNING OBJECTIVES

PART D542 COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY - Continued

SECTION 2 Introduction to the CUCV (TYPE A) (T1)

TOPIC NO 1 Physical description of the CUCV (TYPE A)

TLO 1 Describe all the major and associated components of the CUCV (TYPE A) to the detail required to support normal operation Include name, nomenclature, physical appearance, reference designator, location, and construction features

a Engine
b Transmission
c NP208 transfer case
d NP205 transfer case
e Front axle
f Rear axle
g Electrical system
h Wheels/tires
i Frame
j Body
k Painting/rustproofing

SECTION 3 Basic Operation of the CUCV (TYPE A) (01)

TOPIC NO 1 Basic Operation of the CUCV (TYPE A)

TLO 2 Recognize and interpret all indications occurring during the performance of the operating procedures, and perform the appropriate operator actions in proper sequences on the CUCV (TYPE A), in accordance with normal operating procedures

SECTION 4 Theory of the CUCV (TYPE A) (T2)

TOPIC NO 2 Interface Description of the CUCV (TYPE A)

TLO 1 Describe the physical interfaces between the CUCV (TYPE A) and related external equipment required to support degraded/casualty operation Include name, physical appearance, reference designators, location and type of physical connecting interface for each

FIGURE 5-6-2 Example topic learning objectives page (Sheet 2 of 4)

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TOPIC LEARNING OBJECTIVES

PART D542 COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY - Continued

a Multi-purpose tow hooks
b Pintle
c Exterior mirrors
d Brush guards
e Blackout lights
f Slave receptacle
g Trailer wiring
h Diagnostic connector assembly
i Tailgate
j Bumpers
k Seating/passenger restraint
l VRC-43 radio
m VRC-46 radio
n AS-1729 antenna
o Nuclear, Biological, Chemical (NBC) Kit
p Weapons holder
q AN/USQ-70

SECTION 5 Operation of the CUCV (TYPE A) (O2)

TOPIC NO 1 Operation of the CUCV (TYPE A)

TLO 1 Perform tasks for degraded/casualty modes of operation of the CUCV (TYPE A) in accordance with the documented degraded/casualty operating procedures

SECTION 6 Preventive Maintenance of the CUCV (TYPE A) (P1)

TOPIC NO 1 Preventive Maintenance of the CUCV (TYPE A)

TLO 1 Use special tools and test equipment to perform preventive maintenance on the CUCV (TYPE A) in accordance with preventive maintenance procedures in the applicable documentation

SECTION 7 Basic Corrective Maintenance of the CUCV (TYPE A) (C1)

TOPIC NO 1 Basic Corrective Maintenance of the CUCV (TYPE A)

TLO 7 Disassemble, repair, and reassemble the CUCV (TYPE A)

FIGURE 5-6-2 Example topic learning objectives page (Sheet 3 of 4)

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TOPIC LEARNING OBJECTIVES

PART D542	COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY - Continued
	in accordance with documented basic corrective maintenance to the authorized level
SECTION 8	Advanced Theory of the CUCV (TYPE A) (T3)
TOPIC NO 3	Maintenance Description of the CUCV (TYPE A)
TLO 6	Describe authorized methods to isolate faults which cannot be located using procedures contained in the prescribed documentation to support undocumented corrective maintenance requiring advanced analysis for the CUCV (TYPE A)
SECTION 9	Corrective Maintenance of the CUCV (TYPE A) (C2)
TOPIC NO 1	Corrective Maintenance of the CUCV (TYPE A)
TLO 5	Perform fault isolation procedures in accordance with documented corrective maintenance procedures requiring advanced analysis for the CUCV (TYPE A)

FIGURE 5-6-2 Example topic learning objectives page (Sheet 4 of 4)

TOPIC LEARNING OBJECTIVES

A-234-5678

PROFILE ITEM-TO-TOPIC OBJECTIVE ASSIGNMENT CHART

TABLE	ITEM	TOS	VOL	PART	SECT	TOPIC	L O	TEST ITEM NO
D542	1-1-1	F1			1	1	1	
	1-1-2	F1			1	1	2	
	1-1-3	F1			1	1	3	
	1-1-4	F1			1	1	4	
	1-2-1	T1			2	1	1	
	1-4-1	T2			4	2	1	
	2-1-2	O1			3	1	2	
	2-1-3	O2			5	1	1	
	2-2-1	P1			6	1	1	
	2-2-6	C2			9	1	5	
	2-2-7	T3			8	3	6	
	2-2-8	C1			7	1	7	

TABLE	ITEM	TOS	VOL	PART	SECT	TOPIC	L O	TEST ITEM NO

SH132031852

FIGURE 5-6-3. Example profile item-to-topic objective assignment chart.

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5 7 TESTS FOR MEASUREMENT OF STUDENT ACHIEVEMENT

5 7 Tests for measurement of student achievement The tests for measurement of student achievement section provides tests to measure trainee achievement and ensure instructional quality utilizing job-specific performance tests and knowledge tests This section provides background information and guidelines for designing Performance and Knowledge achievement tests, developing performance tests and constructing knowledge test items as specified in the military standard and DI-ILSS-80091

5 7 1 Use. The purpose of this section is to ensure that all achievement tests are developed to measure the attainment of learning objectives and validate successful course graduate performance Test design determines the physical structure of a test and defines the blueprint to which the test will ultimately be constructed. This requires analysis of course instructional intent and emphasis, and is determined by evaluating course learning objectives and course content To properly design a test, the designer(s) must be thoroughly familiar with the course content and job requirements The following materials are required

(a) Instructor guide The instructor guide (IG) provides CLO, TLO, and course content
(b) Trainee guide The trainee guide (TG) provides content of learning experiences provided in the course.
(c) Instructional media materials Some examples of instructional media materials are self-study workbooks, lecture guides, transparencies, slides, wall charts, exercise controller guides, on-the-job training handbooks for simulation equipment, and technical hands-on training system packets
(d) Reference technical documentation These manuals provide definition of the subject matter

5.7 2 Elements. Test elements consist of performance tests, knowledge tests, and their respective test items. The performance test consists of a proctor guide and job sheets while the knowledge test consists of a proctor guide and examinee test booklets Instructions on the selection and construction of test items are included as guidance and to promote continuity.

5 7 2 1 Test types

(a) Performance test This test measures skill acquisition by demonstration of specific behavior using actual equipment or simulators
(b) Knowledge test This test measures the achievement of theory supporting skill through the use of test items written at the appropriate knowledge and training levels

5 7 2 2 Test frequency

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(a) Progress test This test is designed to determine the degree of achievement of TIOs and CLOs Progress tests are scheduled by the Course Curricula Model Manager (CCMM) at logical intervals in the course

(b) Comprehensive test This test is designed to measure whether the job-specific elements of the course have been attained and retained at the completion of instruction They are scheduled by the CCMM at the completion of a major section of a course and, as required, at completion of a course

5 7 3 General considerations for test development Test construction consists of identifying, selecting, and assembling test items, knowledge tests item sets and performance tests to fit the blue print developed during test design Since test design remains unchanged until curriculum revisions occur, these specifications become the standard against which parallel test versions are constructed Therefore, test construction procedures are applicable to progress, end-of-course, and block comprehensive tests and will contain knowledge/performance components as detailed in the test design

(a) Testing time It is recommended that testing time be limited to 10 percent of the total instructional time allocation The following considerations must be addressed during test construction

(1) Total testing time This time is defined as the time required to administer both performance and knowledge segments of a test to one trainee at the completion of an instructional unit/block (e g , 1) Progress test "A" administered after 16 hours of instruction will not exceed 1 6 hours total, 2) comprehensive test for block (1) is to be administered at the completion of 32 hours of instruction and consists of two performance tests at 30 minutes each, therefore, the knowledge test segment is limited to 2 2 hours)

(2) Number, type, and length of performance exercises The number, type, and length of performance exercises must take into consideration the availability of practice lab equipment and support materials, and expected maximum trainee loading

(3) Knowledge test items These test items must be separated into test sections designated as open-book (reference material required) and closed-book for recall items (no reference material required)

(4) Open-book test section administration A recommended guideline for open-book test administration permits examinee response time of 3 minutes per test item

(5) Closed-book test sections administration A recommended guideline for closed-book test administration permits examinee response time of one minute per non-computational test item and three minutes per step for computational problems

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b Security classification Each test item must bear the highest security classification demanded by its contents Classification shall be in accordance with the effective edition of DoD Instruction 5520 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

(1) Test item examination material must be bound in unclassified volumes or booklets Classified test items must be produced and issued as separate hard-copy items when required Test items that have a character, superscript, subscript, etc which cannot be computer-stored or printed are also designated as hard-copy items

5 7 3 1 Performance test design The goal of many courses, as reflected in the TLOs, is to teach trainees to perform skills needed on the job Therefore, performance testing will constitute a significant portion of the testing for many courses TLOs, which require the demonstration of observable skills, are tested by performance tests Each course having TLOs that require the development of skills shall have Performance Tests prepared and administered

(a) Performance test considerations

(1) Performance tests are simulated work situations in which trainees demonstrate the ability to complete procedures, a product, or a combination of both as required for the performance of a job
(2) Evaluation of performance usually involves the detailed observation and critique of a trainee's performance by an evaluator/instructor The evaluation is supported/directed by checklists or rating scales Checklists and rating scales will be developed to include factors to be evaluated and performance standards for each factor
(3) The performance is observed and evaluated under the conditions and with standards set forth in the TLOs, TOS, and PPP
(4) Ordinarily observing work, measuring completed work, checking operation of equipment after completed assembly, and physical testing of the finished job, are satisfactory methods by which performance tests can be evaluated Skill in using tools, compliance with required safety precautions, and care of equipment can also be checked effectively by performance tests

(b) Rating objective importance Trainee mastery of course skill objectives is assessed through the administration of a performance test For a progress test, the actual number of performance test exercises required depends on the number of skill objectives covered during the specified training/test period For comprehensive tests, however, the number of important skill objectives identified for testing may exceed the number of performance test exercises that can

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be feasibly administered In situations such as this, at least one skill learning objective must be performance tested To establish the skill test design, the skill objectives to be performance tested must be identified and rated as to their relative importance Selection of the objective(s) to be tested must be based on a consideration of the following factors

(1) Skill criticality The criticality of the skill objective to successful job performance (2-critical, 1-moderately critical, 0-not critical)
(2) Skill difficulty The difficulty of the skill objective and the task involved (2-difficult, 1-moderately difficult, 0-easy)
(3) Course relation The degree to which the objective relates to the overall CLO (4-directly related, 3-closely related, 2-moderately related, 1-indirectly related)

Step 1. Obtain a blank Skill Objective Rating Form, (see figure 5-7-1) List all the skill objectives listed on the Profile-to-Topic Objective Assignment Chart (OAC) on the Skill Objective Rating Form in columns (1) and (2) (see figure 5-7-2)

Step 2 Record the skill criticality in column (3), skill difficulty in column (4), and course relation in column (5) Add these numbers and record the sum for each objective in column (6) The objectives with the highest final sum must be performance tested

(c) Objective elements and their criticality identification Each learning objective is further broken down into objective elements These elements are defined by the knowledge and skills addressed in the respective learning objectives Objective elements assist in the selection or development of test items for the purposes of testing a learning objective They are used as a guide to identify specific knowledge or abilities that are contained within an objective Objectives may contain more than one element

Step 1 Obtain a blank Skill Test Design Work Sheet, (see figure 5-7-3) Transfer the skill objective numbers [Skill objectives Rating Form, columns (1) and (2)] with a criticality rating of 3 or greater to column (1) of the Skill Test Design Work Sheet (see figure 5-7-4)

Step 2 Write the corresponding TLO in column (2)

Step 3 Determine which objective elements are contained within the selected objective and circle the number on the Skill Test Design Work Sheet in column (3) Delete the unused elements The work sheet provides a convenient means to record the learning objective and the knowledge elements of each objective and their criticality rating (see figure 5-7-5)

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Step 4 Each element's criticality must be determined to ensure that most critical elements are tested. On a scale of 1 to 3, rate each element's relative importance to the job task based on the following criteria and record the numbers in column (4), one code per element

4(a) Rating 3 - high Understanding of the element has a major impact on successful task completion

4(b) Rating 2 - average Understanding the element has some, but not a major impact on successful task completion

4(c) Rating 1 - low Understanding of the element has little impact on successful task completion

Step 5 Complete steps 1 through 4 for all skill TLOs used in a curriculum This ensures that the most critical elements of the most critical skill objectives are tested

5 7 3 2 Performance test types The performance test consists of a sample work situation in which the examinee performs a task based on a skill CLO or TLO There are two types of performance tests available to measure skill achievement They are process and product The development steps are identical for both types with the exception of the final Evaluation Checklist

(a) Process The process test is best used when measuring achievement of well-defined steps (i e , a procedure that must be performed) The test proctor, having a list of the steps that the procedure requires, evaluates the steps as they are performed by the examinee Since close observation is required by the proctor, a one-to-one testing situation is desirable Examples of skills requiring close observation are alignment, adjustment, or calibration of electrical/mechanical equipment such as a television or an automobile front end

(b) Product The product test is best used when the actual step-by-step skill procedure is of little or no significance Only the end-result, the final product, is evaluated The examinee's product serves as a measure of his performance Examples are plotting, welding, manufacturing a gear to a specification, or completing a prepared form

(c) Combination Some performance tests require a combination of both product and process measurement

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COURSE IDENTIFICATION NUMBER _____ DATE _____

BLOCK NUMBER _____ DESIGNER _____

(1) Part/ Section/ Topic Number	(2) Objective Number	(3) Skill Criticality	(4) Skill Difficulty	(5) Course Relationship	(6) Rating

FIGURE 5-7-1 Example skill objective rating form (blank)

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COURSE IDENTIFICATION NUMBER _____ DATE _____

BLOCK NUMBER _____ DESIGNER _____

(1) Part/ Section/ Topic Number	(2) Objective Number	(3) Skill Criti-cality	(4) Skill Diffi-culty	(5) Course Relation-ship	(6) Rating
D542 1 1	1	0	0	3	3
1-1	2	1	1	4	6
1-2	1	1	1	3	5
1-2	2	2	1	4	7
1-2	3	2	1	4	7
1-3	1	2	2	3	7
1-3	2	2	2	4	8
1-3	3	1	1	4	6

FIGURE 5-7-2 Example skill objective rating form

COURSE IDENTIFICATION NUMBER _____

(1) Skill Objective Identification Number	(2) Skill Learning Objective	(3) Skill Objective Element	(4) Element Criticality Rating (1-3)
		1. Documented Procedures 2. Safety Precautions 3. Diagrams and Charts 4. Equipment Configuration 5. Equipment Interface 6. Job Performance Conditions 7. Troubleshooting Sequence	
		1. Documented Procedures 2. Safety Precautions 3. Diagrams and Charts 4. Equipment Configuration 5. Equipment Interface 6. Job Performance Conditions 7. Troubleshooting Sequence	
		1. Documented Procedures 2. Safety Precautions 3. Diagrams and Charts 4. Equipment Configuration 5. Equipment Interface 6. Job Performance Conditions 7. Troubleshooting Sequence	

FIGURE 5-7-3. Example skill test design work sheet (blank).

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COURSE IDENTIFICATION NUMBER _____

(1) Skill Objective Identification Number	(2) Skill Learning Objective	(3) Skill Objective Element		(4) Element Criticality Rating (1-3)
D542-1-5-2	Recognize and interpret in accordance with normal operating procedures all indications occurring during performance of normal operating procedures and perform the appropriate operator actions in response to these indications in the proper sequence	1	Documented Procedures	3
		2	Safety Precautions	3
		4	Equipment Configuration	2
		5	Equipment Interface	2
		6	Job Performance Conditions	3
		7	Troubleshooting Sequence	1
		1	Documented Procedures	
		2	Safety Precautions	
		3	Diagrams and Charts	
		4	Equipment Configuration	
		5	Equipment Interface	
		6	Job Performance Conditions	
		7	Troubleshooting Sequence	
		1	Documented Procedures	
		2	Safety Precautions	
		3	Diagrams and Charts	
		4	Equipment Configuration	
		5	Equipment Interface	
		6	Job Performance Conditions	
		7	Troubleshooting Sequence	

FIGURE 5-7-4. Example skill test design work sheet.

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	OBJECTIVE ELEMENT	BRIEF DEFINITION	JOB SPECIFIC EXAMPLE	SAMPLE LEARNING OBJECTIVE
GENERAL	Documented Procedures	On-the-job location, identification, or use of information in written instructions for operating, maintaining, or repairing systems and/or equipment.	Use of ODs, OPs, WPs SMPs, COPs, etc.	Identify the publication which contains the SMPs for the XYZ equipment.
GENERAL	Safety Precautions	On-the-job compliance with specific directions to ensure safety of personnel and/or equipment.	High Voltage Warnings, Grounding Instructions, Eye Protection Instructions.	Know which components of the XYZ equipment have condensers that remain charged when the equipment is secured.
GENERAL	Diagrams and Charts	On-the-job location, identification or interpretation of graphic presentations of information.	Blueprints, One-Line Diagrams, Wiring Diagrams, Functional Circuit Diagrams.	Be able to locate applicable component wiring diagrams in documentation for undocumented repairs of the XYZ system.
DISCRETE	Equipment Configuration	On-the-job understanding of the physical/functional and operational aspects of the system/subsystem equipment operation.	Onboard operational events such as a weapons firing countdown and communication/navigation evolutions.	Understand the relationships and required sequence of events from general quarters condition to "fire" in the weapons countdown procedures.
DISCRETE	Equipment Interface	On-the-job understanding of the physical/functional interface relationships among systems/subsystems/equipments.	X-1B Navigation Inputs to Weapons Fire Control System.	Know the requirements and how transmitted for NAV data required by the Weapons Fire Control System.
DISCRETE	Job Performance Conditions	On-the-job identification of prerequisites for job performance.	Tag out, power isolation, and notification requirements.	Describe in detail the required power isolation steps required prior to repair work on the XYZ equipment.
DISCRETE	Troubleshooting Sequence	On-the-job idenfication of steps and sequence of those steps for performing repairs.	Identify, locate, isolate, remove, repair/replace.	Be able to understand navigation computer error analysis in sufficient depth to permit undocumented troubleshooting when required.

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FIGURE 5-7-5. Example objective elements.

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5 7 3 3 Performance test contents Each performance test must contain the following

(a) Proctor guide
  (1) Instructions to the examinee
  (2) Instructions to the proctor
  (3) Evaluation instrument
  (4) Scoring guide

(b) Job sheet
  (1) Introduction
  (2) Equipment
  (3) References
  (4) Job Steps

5 7 3 4 Job sheet development The job sheet is developed before the proctor guide as the information provided by a completed job sheet supports the development of the proctor guide A job sheet guides the examinee during the test performance Job sheet problems must be consistent with but not identical to those used during instruction of the course nor must they introduce unfamiliar material

(a) Introduction Job sheets direct the examinee in the step-by-step performance of a practical job that may be encountered in his eventual job assignment and is therefore used for performance testing (e g , a standard operating procedures or a standard maintenance procedures) Job sheets provide a means for the examinee to apply knowledge obtained during instruction and do not contain any direction to the instructor Each job sheet must require the examinee to use the technical documentation in performing his task just as he would in his ultimate assignment Each job sheet is directly related to a skill performance TLO When documentation is inadequate or incomplete for training, amplifying information may be incorporated in the job sheet

(b) Specific requirements The job sheet title must describe the subject matter of the sheet The job sheet has four sections introduction, equipment, references, and job steps

  (1) Introduction This section clearly and concisely describes the purpose of the Job sheet and explains the trainee benefits that can be expected
  (2) Equipment This section provides a complete list of all equipment required by the trainee for accomplishing the job
  (3) References All publications required to perform the job step portion of the job sheet are listed in this section Each reference must fully identify the document by number, volume, part (as applicable), and complete title

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(4) Job steps. This section consists of either general or discrete step-by-step procedures for performing operation, maintenance, troubleshooting, or repair

Step 1 Select an objective to be tested from the skill Test Design Work Sheet Write the most critical skill elements on a clean sheet of paper in descending order of criticality from most critical to least critical This sheet of paper will serve as the basis for the Proctor Guide and Job Sheet

Step 2 Review the IG, TG, and handouts for content, context, learning experiences provided, and examples used This prevents duplication in the performance test construction

Step 3 Review and write the known constraints on the sheet of paper

Step 4 Develop the job sheet (see figure 5-7-6) The detailed development guidelines are provided in 5 9

5 7 3 5 Performance test proctor guide development The proctor guide must provide instructions to the proctor and the examinee for taking the test The development process follows

Step 1 Instructions to the examinee development Develop the "Instructions to the Examinee" sheet that contains the following (see figure 5-7-7)·

1(a) A description of the test
1(b) An explanation of the job to be performed and exactly what the examinee is required to do
1(c) The level of assistance permitted
1(d) Information on how the score will be determined, including the critical steps which may result in mandatory failure of the test
1(e) A list of available tools, test equipment, and training material
1(f) The allocated time limit and the importance of time to the test score
1(g) Safety precautions which must be observed during the test, with specific warnings about any unusual conditions that exist
1(h) Relationship of the test to the performance objective being tested.

Step 2 Instructions to the proctor development Develop the "Instructions to the Proctor" sheet that contains the following (see figure 5-7-8)

2(a) A brief description of the task to be performed
2(b) A list required of tools, test equipment, and training material

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2(c) Specific instructions describing how to set up the equipment/job performance

2(d) Instructions on any special precautions/procedures that may be applicable

2(e) Additional steps required during the test, possibly including questions to ask at the completion of any key events

2(f) Guidance on the actions to be taken in the event that the examinee does not perform as anticipated For example, if a critical step is improperly performed, local policy will dictate if (1) the step is to be repeated, (2) the examinee should start the test over, or (3) remediation and retesting is in order

Step 3 Evaluation checklist development Develop the "Evaluation Checklist" (see figures 5-7-9 and 5-7-10)

3(a) Using the appropriate Job Sheet, transfer the procedural steps from the Job Sheet in sequential order onto the evaluation Checklist in the Step Description Column

3(b) Review the Skill Test Design Work Sheet and note the most critical skill elements indicated (They will have a criticality rating of 3 or greater)

3(c) Compare the steps listed in the Step Description Column of the evaluation checklist to the most critical skill element and place an asterisk (*) next to the step number that most closely checks this element A step may check more than one element or one element may be checked across more than one step

3(d) The evaluation checklist has the same title as the job sheet

3(e) The problem number indicates the name and number of the problem related on the job sheet

3(f) On the "Rating Scale Evaluation Checklist", indicate a "FAIL" block if, in order to continue the job sheet, the completion of any step requires a score of "2"

3(g) Complete step 3 for all job sheets used for performance tests and problems associated with each job sheet

Step 4 Scoring guide Develop a "Scoring Guide" (see figures 5-7-9 and 5-7-10)

4(a) Provide direction on how to score a performance test Specific guidance must be provided detailing all performance standards and criteria for an objective assessment of acceptable performance

4(b) A scoring guide is developed for each test problem When used with a rating scale evaluation checklist, the scoring guide provides directions on how the various steps are added to yield a score

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4(c) The scoring guide and the scoring criteria must be placed after the evaluation checklist

Step 5 Complete, as appropriate, steps 1 through 4 for each skill topic learning objective listed on the Skill Test Design Work Sheet The result is a performance test bank based on one performance test per skill objective in the curriculum

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JOB SHEET FOR PROBLEM (PART/SECTION/TOPIC)

(TITLE)

A. INTRODUCTION

The introduction clearly and concisely describes the purpose of the Job Sheet and what the examinee is expected to do

B EQUIPMENT

The listing of all equipment required by the examinee for performance of the tasks in the problem

C REFERENCES

All publications required to perform the job step portion of the Job Sheet and includes the document's number, volume, and part, as applicable, with complete title

D JOB STEPS

Consists of discrete or general step-by-step procedures for performing operation, maintenance, troubleshooting, or repair during the performance test

FIGURE 5-7-6 Example performance test job sheet format

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PROCTOR GUIDE FOR EXAMINEE ORIENTATION

A Present the following to the examinee

1. This is a performance test for the _____

2. The exam will consist of _____ problems, and you will have a specified amount of time to complete each problem

3 Prior to the beginning of each problem, I will give you an explanation of the problem and what you are required to do I will also give you a time limit for each problem

4 All test equipment, tools, and materials are readily available to you, but you must determine what you will need to use for the solution of each problem

5. You will be required to leave the area after each problem so I may prepare the next problem.

6. You will be evaluated on your overall knowledge and your practice of safety precautions, so observe all rules I will intervene at any time to prevent or correct the violation of a safety precaution

7 I cannot assist you in your solution; however, I may intervene after a problem begins in order to correct a critical procedural error

8 I will restate or explain the problem at any time if you request me to do so Do the best you can for each problem If you cannot solve the problem, tell me so and we will move on to the next problem

9. I will have to observe you closely, but try not to let this interfere with your normal solution techniques

10 All critical steps must be performed correctly

11 Scoring will be on a "Yes/No" basis

OR

11 Scoring will be on a rating scale of ____ to ____

B Ensure that the examinee understands all of the above items before proceeding to the first problem

FIGURE 5-7-7 Example proctor guide instructions to the examinee

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INSTRUCTIONS FOR PROCTOR GUIDE FOR PROBLEM (PART/SECTION/TOPIC)

A The following tools and test equipment are required, at minimum

1
2
3
4

B Preset the following controls on the _____

1
2
3
4

9
10 Remove part no _____ from the _____ and replace with faulted part

C State the following to the examinee

Step 2 a

Step 2 d

Step 2 e

D Use Evaluation Checklist for Problem # _____

FIGURE 5-7-8 Example instructions for the proctor

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Evaluation Checklist - ← Step 3 d

Examinee Name _____ Date _____

Rate _____ Start Time _____

Problem # _____ ← Step 3 e

Step	Step Description	Step Evaluation	Description of Error or Comment
	"Observation"	Yes No	
1			
2			← Step 3 a
3			
4 *			
			← Step 3 c
16 *			
17 *	Completed Problem in allotted time		Stop time _____ Min

Scoring Guide for Problem # _____

A YES - Steps passed
NO - Steps failed

B All critical steps must be checked Yes
Critical steps - points ← Step 4
Non-critical steps - points

*Critical Step

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FIGURE 5-7-9 Example yes/no evaluation checklist

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Evaluation Checklist - Step 3 d

Examinee Name _____ Date _____

Rate _____ Start Time _____

Problem # _____ Step 3 e

Step	Step Description	Step Evaluation	Description of Error or Comment
	"Observation"	2 1 0	
1			Step 3 a
2			
3 *		FAIL	Step 3 f
4			
			Step 3 c
16 *			
17 *	Completed Problem in allotted time		Stop time _____ Min

Scoring Guide for Problem # _____

A 2 - very good to excellent
1 - fair to good
0 - unacceptable
Step 4 b

B. All critical steps/substeps marked "2" - points

*Critical Step

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FIGURE 5-7-10 Example rating scale evaluation checklist

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5 7 3 6 Knowledge test design TLOs which require the trainee to demonstrate the ability to recall or apply facts, principles, or concepts are primarily tested by a knowledge test Knowledge tests are appropriate in many technical courses for measuring the ability to perform a skill They also measure the trainee's ability to recall, comprehend, analyze, and evaluate technical data Test item types include completion, multiple-choice, matching, true-false, and essay The selection of a test item type to measure the achievement of an objective is based on the level of the knowledge or skill being acquired, the way the knowledge is used on the job, or ease of grading, and not on the test developer's preference for a particular test item type

(a) Rating objective importance All objectives which will be tested must be identified and rated as to their importance to properly measure trainee knowledge attainment Additionally, all objectives will be examined to determine (1) the appropriate test item knowledge level and (2) the number of test items needed To rate the knowledge objectives, select the objective(s) to be tested based on a consideration of the following factors

(1) Knowledge application The degree to which the knowledge applies to actual job performance (3-high application knowledge used during job performance, 2-moderate application knowledge influences job performance, 1-low application knowledge has little influence on job performance)
(2) Knowledge detail The level of detailed knowledge required to perform the associated job task Detailed knowledge is normally required when the associated job task is mentally difficult to perform (2-great detailed knowledge required, 1-some detailed knowledge required, 0-no detailed knowledge required)
(3) Course relation The degree to which the objective relates to the overall CLO (4-directly related, 3-closely related, 2-moderately related, 1-indirectly related)

Step 1 Obtain a blank Knowledge Objectives Rating form (see figure 5-7-11) List all the knowledge objectives listed on the OAC on the Knowledge Objective Rating form in column (1) and (2) (see figure 5-7-12)

Step 2 Record the knowledge application in column (3), knowledge detail (4), and course relation (5) Add these numbers and record the sum for each objective in column (6) The objectives with the highest final sum must be tested

(b) Objective elements and their criticality identification Each objective is further broken down into objective elements These elements are defined by the knowledge and skills addressed in the respective learning objectives Objective elements assist in the selection or development of test items for the purposes of testing a learning objective They are used as a guide to identifying specific

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knowledge or abilities that are contained within an objective Objectives may contain more than one element

Step 1 Obtain a blank Knowledge Test Design Work Sheet (see figure 5-7-13) Transfer the knowledge objective numbers [Knowledge Objectives Rating form, columns (1) and (2)] with a criticality rating of 4 or greater to column (1) of the Knowledge Test Design Work Sheet (see figure 5-7-14)

Step 2 Write the corresponding TLO in column (2)

Step 3 Determine which objective elements are contained within the selected objective and list them on the Knowledge Test Design Work Sheet column (3) Delete the unused elements The work sheet provides a convenient means to record· (1) the learning objective, (2) the knowledge elements of each objective and their criticality rating, (3) the knowledge level to which test items should be written, and, (4) the number and types of items required to test each objective (see figure 5-7-15)

Step 4 Each element's criticality must be determined to ensure that the most critical elements are tested. On a scale of 1 to 3, rate each element's relative importance to the job task based on the following criteria and record the numbers in column (4) One code per element

4(a) Rating 3 - high Understanding of the element has a major impact on successful task completion

4(b) Rating 2 - average Understanding the element has some, but not a major impact on successful task completion

4(c) Rating 1 - low Understanding of the element has little impact on successful task completion

(c) Test item knowledge level determination To determine the appropriate knowledge (K) level of the test items used to test the objective elements, five knowledge levels are used They are RECOGNITION (K1), RECALL (K2), COMPREHENSION (K3), APPLICATION (K4), and ANALYSIS/EVALUATION (K5) Any one of these five knowledge levels may apply and can be used for test items at any level of training Definitions and examples of the knowledge levels are as follows

(1) Recognition (K1) Involves the process of identifying specific terms, facts, rules, methods, principles, procedures, objects, etc from the statements or cues, presented in the test item A test item asking the trainee to identify a particular switch on a piece of equipment by matching its name to a diagram of the switch is a recognition test item

(2) Recall (K2) Involves the process of remembering specific terms, facts, rules, methods, and principles In answering a recall

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test item, the examinee simply draws upon memory and responds exactly as taught A question asking for a definition of a procedure for configuration will usually be a recall item

(3) Comprehension (K3) Involves the understanding of information as shown by interpreting, explaining, translating or summarizing information The act of obtaining specific information from graphs, charts, scales, schematics, manuals, or procedures is a demonstration of comprehension

(4) Application (K4) Involves the ability to use acquired knowledge in a new situation, i e , a situation not specifically demonstrated during instruction, but job related Application questions require examinees to demonstrate knowledge through mental skill exercises such as solving a computational problem, or given a circuit diagram, determining resistance values

(5) Analysis/evaluation (K5) Analysis involves the understanding of the elements of data and relationships among the data that make the meaning of information explicit Evaluation involves the judgment of the value or effectiveness of procedures or solutions based on data, criteria and standards For example, a question that asks the examinee to select the best approach to meet a stated objective would require the examinee to know or determine which options would meet the objective (analysis) and which single option would be best (evaluation)

Step 5 Refer to the training materials (Instructor Guide Discussion Points and Related Instructor Activities) to determine which of the five K type levels will best test each objective Some objectives may be adequately tested by one K level test item, others may require more than one K level

Step 6 Record K levels in column (5) of the Knowledge Test Design Work Sheet

(d) Determination of the number of test items The number of test items per objective must adequately test trainee mastery of the knowledge Generally, the more items used, the more accurate will be the decision regarding trainee competency To simplify this process, use the element breakdown of each objective [column (3), Knowledge Test Design Work Sheet] The following guidelines must be considered

(1) An objective element with a criticality rating of 3 must always be tested

(2) Objective elements with the highest criticality ratings require more test items

(3) For progress tests

(a) A minimum of 2 test items per objective

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(b) At least one test item for each element knowledge level [column (4), Test Design Work Sheet] when more than one level has been designated

(4) For comprehensive tests

(a) A minimum of three test items per objective

(b) Test highest element knowledge level [column (4), Test Design Work Sheet] when more than one level has been designated

(5) The number of test items determined to measure each objective element [column (3), Knowledge Design Work Sheet] must reflect both the relative emphasis placed on that element in the curriculum and the element's importance to the job [refer to column (4) rating, Knowledge Test Design Work Sheet]

Step 7 Record the number of test items in column (7), Test Design Work Sheet

NOTE Test item types will be determined and recorded in column (6) during test construction (see table 5-7-I)

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COURSE IDENTIFICATION NUMBER _____ DATE _____

BLOCK NUMBER _____ DESIGNER _____

(1) Part/ Section/ Topic Number	(2) Objective Number	(3) Knowledge Application	(4) Knowledge Detail	(5) Course Relation-ship	(6) Rating

FIGURE 5-7-11 Example knowledge objective rating form (blank)

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COURSE IDENTIFICATION NUMBER _____ DATE _____

BLOCK NUMBER _____ DESIGNER _____

(1) Part/ Section/ Topic Number	(2) Objective Number	(3) Knowledge Application	(4) Knowledge Detail	(5) Course Relation-ship	(6) Rating
D542-3-1	1	2	2	3	6
3-1	2	1	1	2	4
3-1	3	3	2	4	9
3-2	1	2	1	3	6

FIGURE 5-7-12 Example knowledge objective rating form

COURSE IDENTIFICATION NUMBER _____

(1) Knowledge Objective Identification Number	(2) Knowledge Learning Objective	(3) Knowledge Objective Element	(4) Element Criticality Rating (1-3)	(5) Knowledge Level (k)	(6) Type of Test Item	(7) No. of Test Items
		1. Documented Procedures 2 Safety Precautions 3. Diagrams and Charts 4. Equipment Configuration 5. Equipment Interface 6. Job Performance Conditions 7. Troubleshooting Sequence				
		1. Documented Procedures 2. Safety Precautions 3. Diagrams and Charts 4. Equipment Configuration 5 Equipment Interface 6. Job Performance Conditions 7. Troubleshooting Sequence				
		1. Documented Procedures 2. Safety Precautions 3 Diagrams and Charts 4. Equipment Configuration 5 Equipment Interface 6. Job Performance Conditions 7. Troubleshooting Sequence				

FIGURE 5-7-13. Example knowledge test design work sheet (blank).

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COURSE IDENTIFICATION NUMBER _____

(1) Knowledge Objective Identification Number	(2) Knowledge Learning Objective		(3) Knowledge Objective Element	(4) Element Criticality Rating (1-3)	(5) Knowledge Level (K)	(6) Type of Test Item	(7) No of Test Items
D542-1-1-3	Define the terms and symbols used with the vehicle to the detail required to support general watchstanding duties	1		0			
		2	Safety Precautions	3	K2	TF	3
		3	Diagrams and Charts	3	K3	MA	2
		4		0			
		5		0			
		6	Job Performance Conditions	2	F3	MC	2
		7	Troubleshooting Sequence	1	K1	C	2

	1	Documented Procedures
	2	Safety Precautions
	3	Diagrams and Charts
	4	Equipment Configuration
	5	Equipment Interface
	6	Job Performance Conditions
	7	Troubleshooting Sequence

	1	Documented Procedures
	2	Safety Precautions
	3	Diagrams and Charts
	4	Equipment Configuration
	5	Equipment Interface
	6	Job Performance Conditions
	7	Troubleshooting Sequence

FIGURE 5-7-14. Example knowledge test design work sheet.

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TABLE 5-7-I Relationship between knowledge levels and test item types

Test Item Type	Recognition	Recall	Comprehension	Application	Analysis/ Evaluation
Multiple Choice (MC)	X		X	X	X
True-False (TF)	X		X	X	X
Matching (MA)	X		X	X	
Completion (C)		X	X	X	
Essay		X	X	X	X

Step 8 Conduct a review of the test design work sheet by asking the following questions

8(a) Will measurement of the objectives and elements selected for testing adequately predict future performance?

8(b) Are the number of questions allocated to each objective and element in the proper proportion and at the proper level to predict future performance?

Step 9 If the answers to the questions in Step 8(a) and 8(b), are yes, continue to construct the test following the test design guidelines If either question is answered no, make the required adjustments prior to proceeding

5 7 3 7 Knowledge test contents Every knowledge test must contain the following

(a) Proctor guide

(1) Test instructions for the proctor
(2) Master test booklet

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(b) Examinee test booklet

(1) Cover sheet
(2) Test instructions to the examinee
(3) Test items

5 7 3 8 Knowledge test proctor guide development The proctor guide must provide instructions to the proctor and the trainee for taking the test The development process follows

Step 1 Develop the "Test Instructions for the Proctor" It contains a list of directions that clearly specify the following (see figure 5-7-15)

1(a) Prior to the start of testing

(1) Preparing test area
(2) Instructions for examinees
(3) Time limit allowed for testing
(4) Proctor instructions at test completion

1(b) At the completion of testing

(1) Secure test area
(2) Review, evaluate, or critique test with examinee
(3) Record test results

Step 2 Develop the "Master Test Booklet" It contains test items, a test answer key and a test item cross reference sheet The "Master Test Booklet" is compiled at the completion of test item development

5 7 3 9 Examinee test booklet development The examinee test booklet must provide instructions to the examinee for taking the test The development process follows

Step 1 Develop the test cover sheet identifying the test by title, serial number, and number of items and their applicability It is included in the test booklet The test booklet contains all items for the exam as specified on the cover sheet (see figure 5-7-16)

Step 2 Develop the "Test Instructions to the Examinee" It contains a list of directions that clearly specify the following (see figure 5-7-17)

2(a) How to fill out answer sheet administrative data
2(b) Ramifications of cheating
2(c) Handling of test answer sheets and test support materials

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5 7 3 10 Knowledge test development Knowledge test development consists of developing, selecting, and assembling the test items to form the knowledge section of either a progress or comprehensive test At this point, the type of item to use and the numbers necessary for an adequate sampling are all that remain to be determined The more experienced the instructors or group of subject matter experts, the more subjectivity will be reduced during test development

(a) Types of test items There are five types of test items

(1) Multiple choice (includes situation sets and sequential decision sets)
(2) True-false
(3) Matching (includes matching sets)
(4) Completion
(5) Essay

(b) Selecting the test item category Each of the five types of knowledge test items may be developed as either a closed-book or an open-book test item

(1) Closed-book test item A closed-book item requires no supporting reference document for its proper administration A closed-book item can contain an illustration
(2) Open-book test item An open-book item requires the support of a specified reference document for its proper administration Since the use of an open-book item requires the provision of a reference document during the test, where practical, excerpts from the document should be provided with the test item instead (e g , an illustration in the form of a diagram, table, chart) In this case the item would be designated as a closed-book item

Step 1 Determine the type of test item to be used to test each knowledge objective It is important that items be selected on the basis of their appropriateness for testing the specified objectives The amount of time available for test administration should not have any influence on item selection as test time will be reviewed and adjustments made, if necessary, during final test assembly

Step 2 Select test item types that fulfill the knowledge level requirements recorded on the Knowledge Test Design Work Sheet Refer to table 5-7-I

Step 3 Record the type selected for each element in Column (6) of the Knowledge Test Design Work Sheet Test item deficiencies determined during this step will require development using test item development guidelines

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TEST INSTRUCTIONS FOR THE PROCTOR

1 Prior to the start of testing

a Cover or remove all training aids that could assist the examinees in answering test items

b Have examinees clear their desks of all unrelated testing material

c Inform the examinee of the test time limit, if any

d Provide pencils and scratch paper as necessary

e Read the test instructions to the examinees

f Provide reference documentation if applicable and any instructions for its use

g Carry out any other local instructions as necessary

2 At the completion of testing

a Collect and inventory all testing material

b Review the test with the examinees

c Evaluate any test items challenged by the examinees

d Fill out the test item analysis record for each item

e Carry out any other local instructions as necessary

FIGURE 5-7-15 Example knowledge test instructions for the proctor

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(CIN)

TESTS FOR MEASUREMENT

OF

STUDENT ACHIEVEMENT

(TITLE)

(SERIAL #)

(NUMBER OF TEST ITEMS AND APPLICABILITY)

FIGURE 5-7-16 Example test booklet cover page

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TEST INSTRUCTIONS TO THE EXAMINEE

1 Place your name, rate, class number, and date at the top of your answer sheet

2 There will be no talking between examinees while the test is in progress, nor are you permitted to leave your seat without permission of the proctor. If you have a question, raise your hand and the proctor will come to you

3 If you cheat during a test, your test booklet, answer sheet and all scratch paper will be confiscated by the proctor and you will receive a zero as your grade Disciplinary action will be taken

4 Read each test item carefully Choose the answer you believe to be correct There is only one correct answer to every test item

5 Darken the appropriate box on your answer sheet for each test item If you wish to change your answer, circle the unwanted answer and darken in the appropriate box

6 When you have finished the test, turn in the test booklet, answer sheet, and all scratch paper to the proctor You may then quietly leave the room or remain at your seat while the proctor scores your answer sheet There will be a complete review of the test

7 If there are any questions regarding these instructions, notify the proctor immediately

8 DO NOT WRITE OR MAKE ANY STRAY MARKS IN YOUR TEST BOOKLET

FIGURE 5-7-17 Example knowledge test instructions to the examinee

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Step 4 Select an objective from the Knowledge Test Design Work Sheet (see figure 5-7-13) and select one of the seven elements listed by the objective

Step 5 Using columns (5) and (6) of the Knowledge Test Design Work Sheet, select the knowledge (K) level and type of test item to be written

Step 6 Write the appropriate test item to the designated level Refer to 5 7 3 12 for test item development instructions

Step 7 After all available test items have been developed reviewed, or modified to correct identified discrepancies, they are assembled into appropriate test sections (i e , open-/closed-book sections) A test master copy is retained on file as the permanent test design record and any remaining test item shortfalls are identified

Step 8 After all test items have been selected and recorded, conduct a review of each item to determine its contribution to the overall test If the answer to each of the following questions is yes, there is greater assurance that the test biases will be minimal

8(a) Content validity

(1) Does each item clearly relate to the associated objective/element on the Test Design Work Sheet?
(2) Does the item logically and clearly relate to the curricula?
(3) Does the item relate to future job performance of a course graduate?
(4) Does the answer require the same or similar performance or mental activity required on the job?

8(b) Discriminating power

(1) Will qualified job candidates recognize the key as being the correct answer?
(2) Will the job candidates who are less prepared tend to answer incorrectly?
(3) Will borderline examinees tend to answer correctly about half the time?
(4) Will distractors have some appeal to the less prepared (unqualified) examinees?

Step 9 Estimate the total test administration time by adding the test item response times for each test item (see table 5-7-II) In the event that the total testing time estimate exceeds the time allocated, (see 5 7 3), make final adjustments by the following

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9(a) Replacing open-book items with comparable closed-book items
9(b) Reducing the number of items for lower priority objectives/elements
9(c) Eliminating lower priority objectives from testing purposes

TABLE 5-7-II Estimate test item response times

Test Item Type	Knowledge Level	Estimated Time: Closed-Book Item	Closed-Book Item with Illustration	Open-Book Item
Multiple-Choice	Recognition and Comprehension	1	2	3
	Application and Analysis/Evaluation	3	4	5
True-False	Recognition, Comprehension, Application and Analysis/Evaluation	1	2	4
Matching	Recognition and Comprehension	1	3	3
	Application	3	4	4
Completion	Recall, Comprehension, and Application	1	2	3
Essay Short (1/2 Page)	Recall and Comprehension	5	8	10
	Analysis/Evaluation	10	12	15
Long (2-3 Pages)	Recall and Comprehension	15	20	22
	Analysis/Evaluation	20	22	25

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Step 10 Record any major changes to the test development that deviate from the initial test design on the Test Design Work Sheet

Step 11 Assemble the test items in the order in which the objectives were taught The knowledge test will also be divided into a closed-book section and open-book section if both categories are used At no time should both open- and closed-book items be mixed in one test section or administered at the same time

Step 12 Develop the "Test Item Cross Reference Sheet" (see figure 5-7-18) The Test Bank Reference Data column must contain a four-part number that correlates the test item number to a TLO and PPP table line item, and PPP table or TAS elements This sequence of numbers must match the OAC

5 7 3 11 Test administration guidelines For all progress and comprehensive tests, the following guidelines must be followed in addition to any local instructions

(a) Test booklet must be serialized and inventoried before and after each use
(b) There must be at least two versions of every test
(c) Versions must be sequentially administered
(d) Test results must be provided to the trainee within one training day for purposes of critique and remediation
(e) It is recommended that testing time not exceed 10 percent of the course length

5 7 3 12 Test item development The development guidelines that follow are provided to assist test item writers in either selecting the appropriate type of test item to use or in constructing new test items This section contains examples of appropriate formats for each test item type, describes their utility for testing, and provides guidelines and rules for constructing job-specific test items The multiple-choice and true-false types of test items are currently the most popular in technical training testing These item types are conducive to rapid computer scoring and test results reporting Moreover, a wide range of knowledge and mental skills can be objectively sampled in a prescribed time frame Five types of test items and discussed

(a) Multiple-choice
(b) True-false
(c) Matching
(d) Completion
(e) Essay

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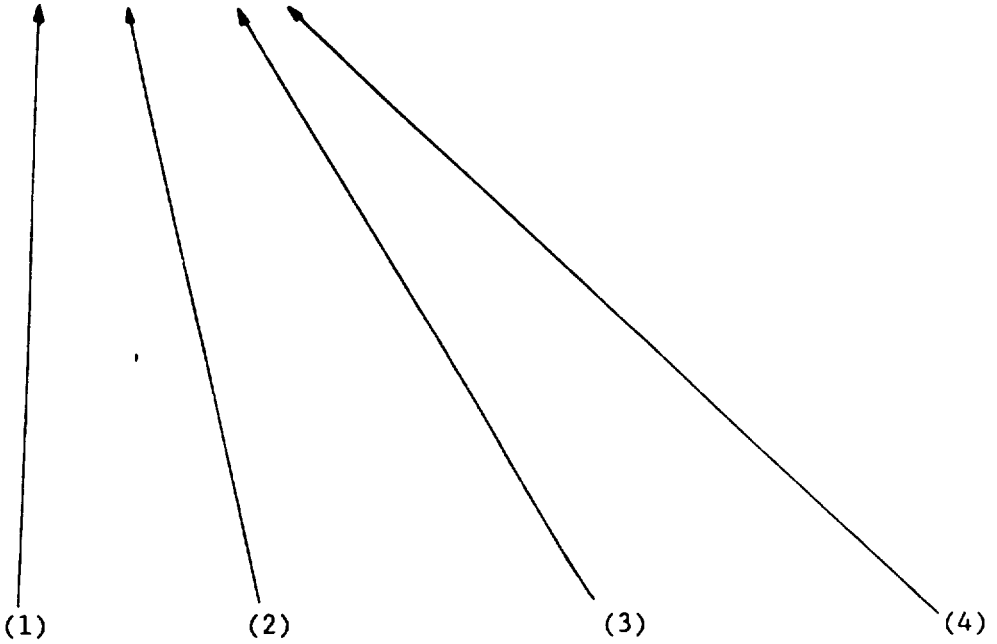
TEST ITEM CROSS REFERENCE SHEET

COURSE IDENTIFICATION NUMBER _____

Test Identification Number _____

Test Item No.	Test Bank Ref Number Data	Test Item No.	Test Bank Ref Number Data
1.	D542-1-3-1/1-2-1/1	15.	
2.	D542-1-3-1/1-2-1/2	16.	
3.	D542-1-4-1/1-3-6/1	17.	
4.	D542-1-4-1/1-3-6/2	18.	
5.	D542-1-4-2/1-3-7/4	19.	
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			



SH132031586

FIGURE 5-7-18. Example test item cross reference sheet

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5 7 3 13 General considerations Only test items that directly relate to the training objective must be constructed The items must measure the knowledge and skills required to function on the job, as defined by the training objective Test items must permit examinees to display their knowledge yet challenge individuals who are minimally qualified Prior to commencing development of job-specific test items, the following general considerations are provided

(a) Develop closed-book test items when the training objective requires that the information be remembered An important consideration in job-specific testing is measuring the examinee's mastery of knowledge in the way that the knowledge is required on the job Before an item is designated a closed-book item, ensure that the knowledge tested is normally known on the job without reference to authorized documentation This is typically the case in immediate or emergency action procedures Some casualty operating procedures and certain safety and security procedures which are critical to preventing personnel injury or equipment damage must also be memorized Questions that probe for understanding (reasons for), and items that require remembering of rules, facts or concepts, are examples of closed-book test items

Example

An unauthorized person attempts to enter an exclusion area
What is the first action taken by the security guard?

(1) Notify Command Duty Officer
(2) Physically detain intruder
(3) Sound security alarm
(4) Log time/data of violation

(b) Develop open-book items when the training objective does not require that the information be memorized When the knowledge element being tested is contained in a step of a documented procedure, which is usually referenced on the job, the test item should be designated as open-book Likewise, when the knowledge is infrequently used and an immediate response on the job is not required, the item should be developed as an open-book item

(c) When feasible, include with the test item any required reference material (e g , a diagram) that must accompany an open-book item This will eliminate the requirement to have the technical reference publication physically available during testing Also, the test item would be designated as a "closed-book" item even though the material does not have to be memorized

(d) Test items may be developed to cover more than one knowledge element as identified in the objective to be tested The following example was developed to measure knowledge of the functional operation and mechanization of the Radio Navigation Set (AN/BRN-3) In addition, the item requires the examinee to locate information in a reference document

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Example

AN/BRN-3 How many bits of orbital data must be collected before the data processor will generate an orbital data interrupt?

(e) The equipment, subsystem, or system applicable to the test item should be stated either at the beginning of the item or within the item itself

Example

AN/ABC-3Q. What circuit activates an AXO circuit?

or

What circuit in the AN/ABC-3Q activates the AXO circuit?

(f) Use positive wording in the item stem and distracters when possible If negative wording cannot be avoided, emphasize the negative element by capitalizing it, or by underlining the negative word if it cannot be capitalized

(g) Base distracters upon common misconceptions trainees have with the subject matter The more plausible the distracters, the better the test item will distinguish between those examinees who have and those who have not acquired the knowledge or mental skills being measured

(h) Ensure that all words are spelled correctly Misspelled words can be confusing or misleading and will cause the test to lose credibility

(i) Do not use verbal clues in the item

(j) Developing good test items is both an art and a skill The item writer must become thoroughly familiar with the item formats, their utility, and the development guidelines

5 7 3 14 Multiple-choice test item development. The multiple-choice item is the most versatile of all objective-type item forms Multiple-choice test items can be developed to measure each of the knowledge levels, except recall Moreover, there are a variety of formats within which the multiple-choice test item can be constructed, adding to its versatility The multiple-choice test item consists of two parts. (1) the stem, which contains the problem statement, and (2) the list of possible answers (alternatives) In the standard form of the item there are four alternatives. One of the alternatives, the key, is the correct answer and the other three are distracters. Prior to discussing guidelines for stem and alternative construction, examples of the various multiple-choice item formats and a description of common errors incurred in writing job-specific test items are provided

(a) Stem construction A cardinal rule in test item development is to communicate effectively. Stem construction is to be accomplished in accordance with the requirements that follow Moreover, familiarity

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with the requirements, and employing them as a checklist are effective means of ensuring that multiple-choice cest items are properly written

(1) The stem must include all information, conditions, assumptions, and details required to correctly answer the question without requiring the examinee to reference the alternatives
(2) The item stem must be phrased positively instead of negatively
(3) The stem must reference the equipment, subsystem, or system to which a test item relates This can be done in two ways

(a) What circuit in the AN/ABC-3Q activates the AXO circuit?
(b) AN/ABC-3Q What circuit activates the AXO circuit?

(4) The method listed in (3)(b) must be used only when placement of the equipment name or designator in the test item stem makes the test item grammatically clumsy or difficult to understand
(5) Words, phrases, etc , that pertain to all alternatives must be included in the stem Units of measurement for numerical alternatives may be included in parentheses after the stem (e g , "ohms")
(6) Information not essential to the interpretation of the test item must be omitted
(7) If the test item uses an illustration on a separate illustration form, that illustration must be referenced in the stem by figure number
(8) Question type test items must be complete sentences, punctuated with a question mark at the end of the sentence
(9) A series of seven periods must indicate the response of completion position (regardless of the number of words in the response) within the stem of an incomplete statement type of test item
(10) The response of completion position of an incomplete statement test item must be near or at the end of the stem
(11) Punctuation must precede or follow the completion position in the incomplete statement test item stem, such that all alternatives are grammatically correct if placed in that position of the stem
(12) When the completion position is not at the end of the stem, and punctuation is required after this position, it must appear in the stem after the seven periods
(13) Punctuation required before the completion position must be placed in the stem prior to the seven periods
(14) For standard format items, every effort must be made to prepare stems in question form rather than incomplete statement form An exception is those cases where the question form would make the test item grammatically clumsy or difficult to understand

(b) Alternative construction Each multiple-choice test item must have four alternatives, one correct answer and three distracters The test item writer must exercise special care in designing the distracters for test

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items Distracters must be plausible but clearly incorrect and should fit well with the stem

The difficulty of the item will depend largely upon the distracters Generally, the more closely related the alternatives the more difficult it is for examinees to identify the correct answer Items perform better if each distracter attracts some examinees

Plausible distracters may be easy to develop in certain cases where the test item writer has extensive knowledge of the subject material or where the correct answer is a numerical value A good rule is to develop distracters based upon common misconceptions by trainees and inexperienced job incumbents Another is to prepare distracters based on how examinees might miscalculate or incorrectly manipulate terms, symbols, etc An additional rule is to look at the correct answer and determine how it may be made incorrect For instance, if the correct answer is plus 5 5 millivolt, distracters may be constructed by varying the decimal point, magnitude, or sign (e g , plus 55 mv, plus 6 0 mv, minus 5 5 mv) However, due to equipment design specifications it is generally advisable to consult the reference document in order to generate plausible distracters The following requirements apply to the development of multiple-choice alternatives

(1) The item must have only one correct answer
(2) All alternatives must be closely related The three distracters must be meaningful and not subject to automatic elimination by the examinees because they are irrelevant or unrelated to the question
(3) The use of interrelated answers (e g , "c" is true if "a" and "b" are false) must not be used
(4) Vocabulary must be used which is familiar to the examinees or which can be explained within the limits of the test item
(5) All alternatives must be of approximately the same length and complexity.
(6) The words "always", "never", "simple", etc , must not be used
(7) Alternatives of "all of the above" and "none of the above" must not be used
(8) All alternatives must be expressed in similar form
(9) Negative wording is confusing and must not be used However, negative quantities such as minus voltages or mathematical expressions are acceptable
(10) The punctuation of alternatives must conform grammatically with the structure of the item stem

(a) If the stem is a question (i e , a closed-stem) and the alternatives are complete sentences, each alternative will begin with a capital letter and end with a period Alternatives that are incomplete statements must begin with a capital letter and end without a punctuation mark

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(b) For the incomplete statement (open-stem) test item with the completion position at the end of the stem, the alternatives must begin with lower case letters (except for proper nouns) and end with a period

(11) Within the incomplete statement test item, the wording of the alternatives must match that of the item stem
(12) Alternatives which delineate order or magnitude (e g , microgram, gram or kilogram, and 2 5, 3 0, 3 5, or 4 0) must be arranged in ascending or descending order Algebraic value will determine order, i e , in ascending order the most negative value must be listed first
(13) The position of the keyed answer among the four alternatives must be determined by a random selection process to avoid any patterns which may bias the test Exceptions to this rule are items with alternatives that delineate order or magnitude

(c) Test item forms Multiple-choice test items can be developed either in the form of a complete question or an incomplete statement (called a closed stem) or as an incomplete statement (open stem)

(1) Closed stem This format, by posing a question, has the advantage of forcing the item writer to state the problem clearly in the stem It also reduces the possibility of giving examinees grammatical clues A disadvantage is that it may require lengthier responses A closed stem test item may be written as an incomplete statement with the completion position not at the end of the test item stem Although incomplete statement test items are typically easier to write than complete question stems, these should be utilized sparingly

Example (complete statement)

MTRE Mk 7 Mod 2/4 Which of the following actions is required to remove a hinged type 2 module?

(1) Disconnect hinge plates from the type 2 module
(2) Insert "T" handle into quick release fasteners
(3) Remove all Type 3 modules and connectors
(4) Rotate hold down clamps to vertical position

Example (incomplete statement)

The setting of the AN/ABC-3Q Flip-Flop indicates that intent-to-fire has been energized

(1) B43
(2) C21

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(3) C24
(4) D32

(2) Open stem. This format uses an open-ended stem which is an incomplete statement Each alternative provides a logical conclusion to the stem, completing the sentence Although incomplete statement item stems are typically easier to write than question stems, there is a tendency to avoid conceptualizing the complete question before the alternatives are developed This may result in illogical and unrelated alternatives Generally, the less homogeneous (i e , similar in content) the alternatives, the easier it becomes for examinees to select the correct alternative

Example

MTRE Mk 7 Mod 2/4 When crimping both a stranded and a solid wire in the same contact, the solid wire's position in relation to the stranded wire is

(1) above
(2) below
(3) beside
(4) diagonal to

(d) Test item formats A multiple-choice test item posed as either a question or incomplete statement can be constructed using one of the six different formats that follow

(1) Standard format This particular item format is the most straightforward and the easiest to develop It is typically employed when the examinee is only required to select the correct answer from the four alternatives provided

Example

MTRE Mk 7 Mod 2/4 During the system verification test, what supplies voltages for TVC position sensor tracking?

(1) Minus 20 VDC precision power supply
(2) Self-test DC reference power supply
(3) TVC position sensor AC/DC converter
(4) Missile command module

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(2) EXCEPT format This format is used when there exists three equally correct alternatives which answer the problem posed in the stem The examinee is required to recognize which alternative are correct and select the one which is incorrect The "EXCEPT" in the stem must always be capitalized or underlined This is to focus examinee attention toward isolating the single alternative that does not fit the conditions stated in the stem The "EXCEPT" format item should be used sparingly

Example

SINS Mk 2 Mod 6/7 A specific torquing pattern and associated torque values can be found in the SINS technical manual for all of the following assemblies or components EXCEPT

(1) An azimuth synchro assembly mounted to the stem
(2) A velocity meter mounted to the platform
(3) A replacement gyroscope mounted to the stable platform
(4) A platform stem mounted to the bedplate

(e) Common errors This paragraph provides examples of some common errors that typically occur in multiple-choice items

(1) Do not use similar wording in both the stem and only the correct alternative It suggests the correct answer

Example of an inappropriate test item (error underlined)

What is the purpose of the MARDAN maintenance test set?

(1) Monitors the C P operations
(2) Furnishes power to MARDAN
(3) Functions as a running time meter
(4) Provides static and dynamic testing of MARDAN

(2) Do not state the correct alternative in greater detail than the other alternatives Often it suggest the correct answer

Example of an inappropriate item (error underlined)

PWRSS When all weapon power is removed from the PIP, which of the following statements is true?

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(1) All power is lost to the MCC equipment
(2) The MCC equipment is furnished power from NAV via the MSR
(3) The DCCs have heater power applied
(4) Power from the ship control center may be present in MCC since it only goes through the SHIP JP

(3) Do not use two or more distracters that have the same meaning It eliminates them as useful distracters and simplifies the choice In the following example, alternatives 1 and 2 have the same meaning Thus, the number of plausible distracters is reduced from three to one

Example of an inappropriate item (error underlined)

AN/BRN-5 What is the final step in performing post-maintenance checks?

(1) Secure the front panel to the chassis
(2) Make sure the front panel is secure
(3) Set manual test switch to "OFF"
(4) Rerun the diagnostic tests

(4) Do not have alternatives that are contained in other alternatives It causes confusion for the examinee In the following example, alternative 1 is contained in alternative 2 If alternative 2 is correct then so is alternative 1

Example of an inappropriate item (error underlined)

LCHR. HYD. What is the operating time, in seconds, for the pressurization/compensation blow valve to roll from shut to open?

(1) 1 to 3
(2) 1 to 4
(3) 4 to 6
(4) 9 to 11

5 7 3 15 True-false test item development. The true-false item is posed as a direct statement It essentially represents a two-response multiple-choice item The two alternatives (propositions) are presented in a declarative statement and the examinee must judge its truth or falsity True-false items are ideally suited for measuring fact or opinion They are also useful when there exists only one plausible distracter to the standard format multiple-choice item A basic drawback to the true-false item is that it is susceptible

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to guessing An examinee who does not know the correct answer has a 50 percent chance of responding correctly to the item.

(a) Test item format The true-false item format is straightforward The stem is a direct statement and the two alternatives are labeled "true" or "false"

Example

(TRUE/FALSE) Guidance Subsystem When placing the GA in stowage, GA temperature must be normal prior to securing heater power

(1) True
(2) False

The preceding example item is designed to measure at the recall cognitive level. It is possible to measure at higher cognitive levels with the true-false item, but doing so requires imagination and understanding of the subject on the part of the test item writer The following example item measures understanding (provided this example was not covered in the class, in which case it would be pure recall)

Example.

(TRUE/FALSE) Kinetic energy is stored in a wound spring

(1) True
(2) False

(b) Test item construction The general considerations for developing test items contained in paragraph 5 7 3 13 apply to true-false item development. Additionally, rules for constructing quality true-false items are as follows

(1) The descriptive statement must include all relevant information and conditions required to correctly answer the question
(2) The statement must be concise and clear The proposition which is to be judged as true or false must be evident
(3) The statement must be clearly true or false
(4) The "TRUE/FALSE" identification must precede the item
(5) A false statement must be consistent with a typical misconception
(6) The use of specific determiners (e.g., always, never, none, all may, sometimes) must not be used
(7) Lifting statements verbatim from the curriculum materials or technical documentation must be avoided

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(1) All power is lost to the MCC equipment.
(2) The MCC equipment is furnished power from NAV via the MSR
(3) The DCCs have heater power applied
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5 7 3 15 True-false test item development The true-false item is posed as a direct statement It essentially represents a two-response multiple-choice item The two alternatives (propositions) are presented in a declarative statement and the examinee must judge its truth or falsity True-false items are ideally suited for measuring fact or opinion They are also useful when there exists only one plausible distracter to the standard format multiple-choice item A basic drawback to the true-false item is that it is susceptible

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to guessing An examinee who does not know the correct answer has a 50 percent chance of responding correctly to the item.

(a) Test item format The true-false item format is straightforward The stem is a direct statement and the two alternatives are labeled "true" or "false"

Example

(TRUE/FALSE) Guidance Subsystem When placing the GA in stowage, GA temperature must be normal prior to securing heater power.

(1) True
(2) False

The preceding example item is designed to measure at the recall cognitive level. It is possible to measure at higher cognitive levels with the true-false item, but doing so requires imagination and understanding of the subject on the part of the test item writer The following example item measures understanding (provided this example was not covered in the class, in which case it would be pure recall)

Example

(TRUE/FALSE) Kinetic energy is stored in a wound spring

(1) True
(2) False

(b) Test item construction The general considerations for developing test items contained in paragraph 5 7 3 13 apply to true-false item development. Additionally, rules for constructing quality true-false items are as follows:

(1) The descriptive statement must include all relevant information and conditions required to correctly answer the question
(2) The statement must be concise and clear The proposition which is to be judged as true or false must be evident
(3) The statement must be clearly true or false
(4) The "TRUE/FALSE" identification must precede the item
(5) A false statement must be consistent with a typical misconception
(6) The use of specific determiners (e g , always, never, none, all may, sometimes) must not be used.
(7) Lifting statements verbatim from the curriculum materials or technical documentation must be avoided

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5 7 3 16 Matching test item development The standard matching format consists of two lists containing related words, phrases, or symbols The examinee is required to match elements on one list with associated elements on the other list according to specific instructions The examinee pairs the elements in each list through logical association and records the answer The matching items, commonly referred to as an exercise, are ideally suited for testing topics dealing with recognition, explanation and understanding Generally, a matching exercise is used when it is difficult to develop plausible distracters and the items are homogeneous (i e., closely related or alike)

(a) Test item format There are several variations of the matching exercise, each depends upon the subject matter content, test objective, etc The traditional matching exercise format is specified in this section The matching exercise consists of a stem and two columns listed below the stem The stem provides directions on how the examinee must match the items in the two columns One column represents the stimulus (i e , the questions or problems to be answered), and the other consists of the responses (answers)

Example

Mk 88 Mod 2 FCS using the FCDs in OP XXXX, match the circuit element listed in column B to the signal that it generates (column A) Write the letter representing your response in the blank to the left of each signal in column A You may use a letter in column B once, more than once, or not at all

	COLUMN A	COLUMN B	
___ 1.	DATA CHK NOT OK	A	B10
___ 2	DATA CHK OF	B	B13
___ 3	DRY RUN	C	B16
___ 4	SEQ CONT RST 2	D	B46
___ 5	DATA CHK REQ	E	B49
___ 6	DATA CHK ALM	F	C30
		G	D56

(b) Test item construction The general considerations presented in 5 7 3 13 are applicable to the matching exercise Additionally, rules that should be followed in constructing the matching exercise are provided in the paragraphs that follow

(1) The stem (directions) must clearly specify how the examinees are to match the stimulus (question) and response (answer)

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(2) The stimulus items are always placed in the left-hand column Responses are placed in the right-hand column
(3) When feasible, the response list must consist of single words, numbers, codes, symbols, short phrases, etc
(4) The exercise must be homogeneous Dissimilar items are too easily matched, closely related items (e g , items dealing with a single concept, diagram, etc) provide a better discrimination of knowledge To maximize discrimination, each response must be a plausible answer to every stimulus
(5) The stimulus list must contain between four and eight items The response list shall contain between four and ten items, generally providing one or two more responses (distracters) than the number of stimuli If the test is to be computer-scored, the exercise must not exceed the capability of the answer key
(6) Where possible, arrange the responses (answers) according to some systematic basis (e g , numerical responses may be in ascending or descending order)

5 7 3 17 Completion test item development The completion test item is a free response type item in that examinees must supply the required word, statement, mathematical formula, etc , from memory An advantage of the completion item over the multiple-choice or the true-false types is that it requires knowledge recall rather than the recognition of information Completion items are useful in situations where (1) a computational equation is to be written, (2) an answer must be calculated, or (3) the examinee is required to demonstrate knowledge of definitions or technical terms

(a) Test item format Completion items can be constructed using two basic formats One format simply requires the examinee to state the word or phrase which completes the statement

Example

The station clock and time display tests check the performance of the individual stages of the register designated

The second format (question) is employed when the examinee is required to supply a definition, the term defined, or computational formula

Example

SINS What is the name of the unit which detects angular motion and supplies an output through precession?

(b) Test item construction The general considerations provided in 5 7 3 13 apply to the development of completion item stems In addition, the

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following specific guidelines for constructing completion items should be adhered to

(1) The wording of the test item must be clear and comprehensive enough to allow an examinee who is knowledgeable in the subject area to answer correctly
(2) The missing segment of the incomplete statement item must be important, such as a key element of an equipment, etc
(3) In incomplete statement items, do not omit too many words or the statement will become unclear and the examinees must guess
(4) In computational problems, specify the degree of accuracy (e g , the number of decimal points) of the answer
(5) In incomplete statements, the completion position must appear at the end of the stem
(6) A direct question must be used to test for comprehension of technical terms or knowledge of definitions
(7) Sufficient space must be provided for examinees to write their response

5 7 3 18 Essay test item development The essay test item requires the examinee to answer a question or respond to a specific request with an original written response Essay test items are useful for testing the examinee's ability to think creatively, organize data, develop a solution to a problem, and express thoughts clearly in writing They are not beneficial for testing rote memory or factual recall Essay tests involve a relatively subjective scoring process since many factors may enter into the correctness of a response, depending on the material being tested The essay question must be scored by an individual knowledgeable in the subject area, unless there is only one basic response possible to a given question or requirement

(a) Test item format While an objective test item may cover only one discrete item of knowledge, an essay question can be used to assess learning of a comparatively larger body of information, as well as individual elements within that body An essay item should state clearly and precisely what type of response is required The item writer should, if possible, state the limits for the response by identifying the major points that should be addressed An example of an essay test item with the associated model response follows

Example

STEM

Prior to installation or removal of the Missile Guidance System, it is necessary to purge the system with nitrogen List the connections and valve settings required for each operation

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TEST ITEM MODEL RESPONSE

Connections - Inlet coupling hose connected to ship's nitrogen supply Outlet coupling hose connected to missile

Valve Settings - Pressure regulator valve and pressure valve open

Installation - Purging adapter and drain hose connected to guidance system

Removal - Purging adapter and drain hose connected to umbilical pass-thru box couplings

There are numerous ways to pose the essay item A variant of the essay format presented in the preceding example follows

Example

Describe the steps required to nitrogen purge the Missile Guidance System prior to

(1) Installation
(2) Removal

(b) Test item construction The essay test item is adaptable to measuring a variety of different information or mental processes The essay stem should include at least one of the following elements

(1) Comparison or contrast of items and procedures
(2) A decision for or against system or equipment operation
(3) Application of previously learned background knowledge or principles to new situations
(4) Classification of tasks
(5) Relationships such as causes and effects
(6) Illustration (sketch) of principles learned
(7) Statement of purpose in the selection of method or technique
(8) Criticism of the adequacy or correctness of a diagram or procedure
(9) Inference from data or illustrations presented
(10) Discussion of primary, alternate, and/or emergency procedures
(11) Outline or a listing of steps and methods
(12) Explanation or definition of tasks
(13) Observation from illustration or operation
(14) Analysis of a situation or problem
(15) Evaluation of the appropriateness of a procedure, technique, etc

(c) Model answer or response The essay test item must also contain a model answer or response which is keyed to the question or statement, as

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demonstrated in the initial example This answer or response should identify all of the essential information a knowledgeable examinee should be able to supply The model answer promotes objective scoring of the test item by establishing a standard answer from which to judge all others

5 7 3 19 Criteria for the validation of test item content Once test items have been constructed their content must be validated to ensure they are technically and grammatically accurate and adhere to the guidelines presented in preceding paragraphs The validation process must be conducted by technically qualified subject matter experts other than the test item author The individuals validating the test item must answer the following questions

a Is the item technically accurate and is the correct response keyed?
b Does the item have a direct content match with the objective it was written to measure?
c Does the item measure a critical knowledge element of the task associated with the objective?
d If memorization of the knowledge being tested is required for competent performance on the job, is the item identified as a closed-book item?
e If the knowledge being tested is normally looked up during performance of on-the-job task(s), is the item either identified as an open-book item or is the essential reference material supplied with the test item as an illustration?
f Is the item written at the appropriate knowledge (K) level?
g Is the item written to the appropriate training (T) level?
h Are all words spelled correctly, and is the item grammatically consistent?

If the answer to any of the preceding validation criteria is "NO", correct the discrepancy and revalidate the test item

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5 8 INSTRUCTOR GUIDE

5 8 Instructor guide The IG provides the specific direction for the conduct of training This section describes the format, content, and development guidelines as specified in the military standard and in DI-ILSS-80082

5 8 1 Use The IG is the primary element of every curriculum and provides the basic course programing for the use of all other training elements

5 8 2 Elements The elements of the IG are the front matter, parts, and reference material

(a) Front matter This section identifies the content, usage, changes to, and any other directions necessary for the use of the IG
(b) Parts This section includes the learning objectives to be taught and the outline of discussions, demonstrations, and activities that teach the learning objectives
(c) Reference material This section includes information relative to conducting the instruction

5 8 3 Development The IG is developed to support the training requirements, as reflected in PPP/TPS, or TAS, for all categories of personnel in a training program

(a) PPP/TPS based curriculum development This curriculum is based on PPP and the TPS Development is based on the approved topical outline and topic Learning Objectives

(b) Non-PPP/TPS based curriculum development Non-PPP/TPS curriculum is based on job training tasks This curriculum is prepared when requested by the contracting activity The contracting activity will specify whether certain elements of the PPP/TPS must be developed in conjunction with the curriculum Completion of the job training task information and TAS portion of the manpower, personnel, and Training Analysis Report is discussed in 5 2

(c) Audit trail Develop the necessary PPP/TPS or TAS elements to support the development of the OAC These elements provide an audit trail for positive identification of the training requirements and the ability to monitor the effectiveness of training and training materials

5 8 3 1 Development of front matter The steps for developing the front matter of the IG are described below Each element will be placed in the IG in the order each is listed here

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(a) Cover The cover includes the CIN, the IG volume number, the course classification, if applicable, revision data, the complete course title, authority notice, date of publication and the words, "Instructor Guide" (see figure 5-8-1)

(b) List of effective pages The list of effective pages identifies the change status of all pages in the volume (see figure 5-8-2) It has basically two columns, which are repeated across the page the first column is labeled, "Page No " and is used to identify the pages of the IG, the second column is labeled, "Change in Effect" and identifies the status of each page in the volume as official changes are inserted into an IG The list of effective pages is included for each volume in the set

(c) Letter of promulgation The Letter of Promulgation is normally provided by the contracting activity (see figure 5-8-3) It is located only in the first volume of a multivolume IG

(d) Change record The change record provides space for recording information about each official change inserted in the IG (see figure 5-8-4) The change record identifies the change number, description, the person who made the change, and the date the change was entered In a multivolume IG, a change record is included for each volume in the set

(e) Hazard awareness notice The hazard awareness notice advises the instructor of safety precautions related to both personnel and equipment, as well as how to report hazards not included in the notice (see figure 5-8-5) It has four parts

(1) Documentation statement The documentation statement identifies documentation, such as technical manuals and safety notices, which contain specific safety precautions and preventive measures that apply to a given equipment or procedure

(2) General information statement The general information statement identifies in a broad sense the hazards that exist, whether to persons or equipment, when working with a given equipment (e g , this equipment operates on high voltage which is extremely dangerous and may be fatal)

(3) Specific precautions statement The specific precautions statement identifies specific measures to take in order to meet the general information statement (e g , avoid contact with all red terminal leads These have voltages in excess of 10,000 volts, or All equipment will be tagged out in accordance with , etc)

(4) Hazard report statement This statement identifies procedures for reporting hazards not included in the hazard awareness notice

(5) No hazards There are courses where no hazards exist, except perhaps for paper cuts For these courses, the hazard awareness notice will state "There are no hazards associated with the course" and will include a hazard reporting statement

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(f) Table of contents The table of contents is developed from the approved topical outline and lists the front matter, parts, sections, topics, reference material and the page in the IG on which each is located The table of contents for the first volume of a multivolume set contains a complete listing of the contents of all volumes in the set The remaining volumes contain only the contents of the respective volume (see figure 5-8-6)

(g) How to use the instructor guide This page includes a general description of the composition, function, and use of the IG, as well as directions for curriculum maintenance (see figure 5-8-7) The elements of the how to use the instructor guide are

(1) Composition of the IG This section discusses information relative to the learning objectives, trainee preparation, instructor preparation, and the discussion-demonstration-activity pages

(2) Function of the IG This section discusses what the IG is designed to do, its applications, and its constraints For example, this section might tell the instructor that the course is conducted primarily in the laboratory and the 'lecture' segment needs to stress the application of theory and what trainees need to look for in the laboratory

(3) Use of the IG This section discusses how the IGs will be used and maintained current

(4) Study assignments This section describes the purpose and importance of study assignments

(5) Equipment faults If applicable, this section provides the instructor with specific direction on how to select equipment faults from the fault applicability list The IG will mandate that certain faults be inserted The equipment faults segment of the how to use the instructor guide will provide guidance on whether and how to select faults if additional time permits That is, assign any additional fault from the fault applicability list, but only if time remains for all trainees to complete the additional fault As an alternative, before assigning additional faults from the fault applicability list, review recent change reports and fleet trouble and failure reports relative to the equipment and assign additional faults accordingly

(6) Instruction sheets, examinations, and quizzes This section provides general guidance and directional use of instruction sheets, examinations, and quizzes For example, this section might direct the instructor to ensure that the trainee writes only on designated pages of the trainee guide or that instructors should plan to give daily quizzes to monitor and ensure training comprehension

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(7) Division of course material into functional parts This section describes for the instructor how the course material is divided into parts, topics, etc For example, if a course taught the maintenance of equipment "x", "y", and "z", the course material may be divided into functional parts such that volume 1 addressed equipment in part x, that section 1 of volume 1 relates to theory, section 2 relates to preventive maintenance, and section 3 relates to documented corrective maintenance Further, volume 2 may be divided similarly for equipment "y" and volume 3 for equipment "z"

(8) Training material support program This section describes the procedures which the instructors will complete to submit recommended changes to a course

(9) Security Each IG must bear the highest security classification demanded by its contents Classification must be in accordance with the effective edition of DoD 5220 22 M or OPNAVINST 5510 1, applicable contracting activity instructions This section describes information and procedures pertaining to the handling and safeguarding of classified materials Included are specific direction to the instructor on handling, marking, and stowing a classified IG, direction and provisions to give the trainee regarding handling, transporting, and stowing reference documents or trainee guides, and directions for special security arrangements that might be made if, for example, foreign nationals or contractors were to take a given course

(10) Safety precautions The safety precautions section reemphasizes the need for the instructor to ensure that all safety precautions are followed If there are "training only" safety reminders, these must be stressed in this section

(h) Development of the allocation of instructional time page This page contains a detailed breakdown of the time allocated for classroom and laboratory training (see figure 5-8-8) It also contains totals by part and section, including time allocated for administration (GMT, sick call, etc), testing, and reviews (trainee questions, summary, etc) The allocation of instructional time page contains the complete allocation for all volumes in the set and is located only in the first volume of a multivolume IG The time estimates for this page will be finalized during the pilot course Times will be updated only upon approval of recommendation from the course curriculum model manager or as a result of an approved changed package Whenever a topic time change is recommended both the allocation of instructional time page and the corresponding topic page should be updated with the new time The following note is centered at the bottom of the last allocation of instructional time page

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NOTE

Classroom and laboratory hours shown reflect the time used during curriculum pilot with an actual class size of ____ and a trainee/instructor ratio for laboratory periods/hands on of _____

(i) Inserting the course learning objectives The CLO state in broad terms what the trainee is expected to learn by the end of the course These are developed at an earlier stage in the curriculum development process CLO development is discussed in 5 5 CLO pages are included as front matter in the first volume only They should be grouped and listed in this section as knowledge objectives and skill objectives (see figure 5-8-9)

5 8 3 2 Parts development The parts element is the heart of the IG Here the actual discussion points, instructor and trainee activities, and instructional media materials are integrated to create the basis for the 'package' that the instructor will present The IG is divided into one or more parts with each part covering a PPP table, part of a PPP table, or combination of PPP tables or training analysis summary information The procedures for developing the parts element of the IG are described below Each element and subelement will be placed in the IG in the order each is listed here

(a) Page numbering The pages must be numbered in accordance with tables 5-8-I and 5-8-II

TABLE 5-8-I Example section page numbering

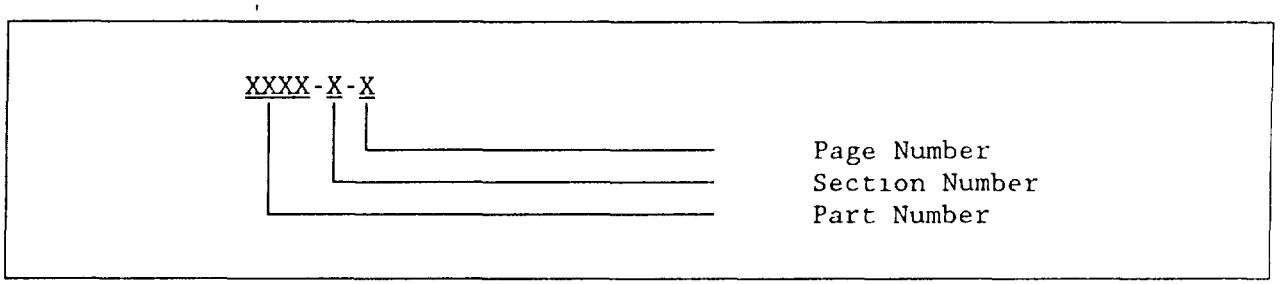

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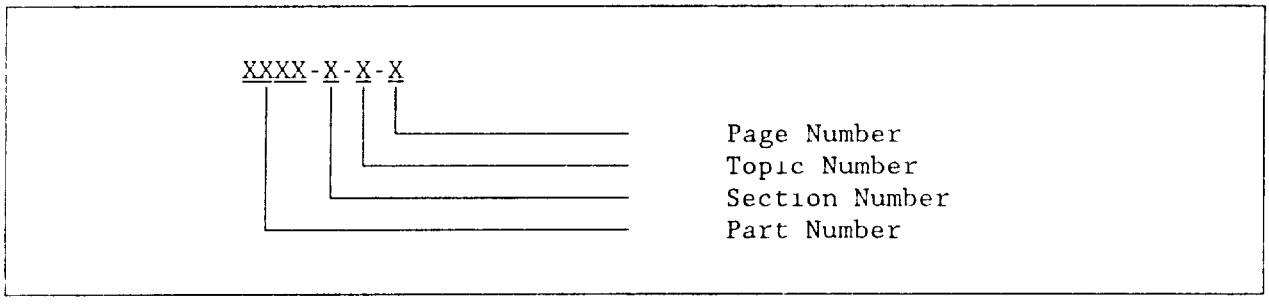
TABLE 5-8-II Example topic page numbering



(b) Tab divider The tab divider is used to separate and identify each part It includes the part number, part title, section titles followed by the TOS level, volume number and the CIN When coverage of a PPP table has been divided into two or more parts, the part number is modified as follows

First part for PPP Table 315 - 315/1
Second part for PPP Table 315 -315/2

When several PPP tables are covered in the same part of a course, the tab divider information statement will read as follows

PART XXX

This part contains information from PPP Tables XXX, YYY, and ZZZ

In this example, XXX will be the primary PPP table and YYY and ZZZ will be supportive PPP tables Page numbers of the IG, as well as identification for loose instructional media materials, must include only the primary PPP table number The OAC will indicate where each applicable PPP item, from tables YYY and ZZZ, is covered in part XXX The part number alone is listed on both sides of the tab itself (see figure 5-8-10) If PPP tables are not used, the information statement shall identify which training tasks numbers TAS were used in the development of the IG

(c) Section page A section consists of section pages and a group of closely related topics required to teach a subject Each section is developed to support a specific TOS or TOS combination to provide a specific level of training Teachability should be carefully considered to ensure that the subject matter will flow smoothly and logically The section page provides the instructor with a table of contents that lists all topics in the section by topic number, title, and page number (see figure 5-8-11) The section titles for TO

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sections consist of the proper names of the devices, conditions, knowledge areas, etc , covered in that section The section titles for sections other than T0 consist of an introductory statement reflecting the highest TOS supported by the section, followed by the title of the subject matter covered In the event that knowledge and skill coverage is combined within a section, the introductory statement reflecting the highest knowledge TOS and the highest skill TOS (for each type of skill covered) is used to construct the section title Following is a list of introductory statements for each training level

TRAINING LEVEL
INTRODUCTORY STATEMENTS

F1	-	FAMILIARIZATION WITH
T1	-	INTRODUCTION TO
O1	-	BASIC OPERATION OF THE
T2	-	THEORY OF THE
O2	-	OPERATION OF THE
P1	-	PREVENTIVE MAINTENANCE OF THE
C1	-	BASIC CORRECTIVE MAINTENANCE OF THE
T3	-	ADVANCED THEORY OF THE
C2	-	CORRECTIVE MAINTENANCE OF THE

(d) Topic page The topic page lists preparation required of the trainee and the instructor prior to undertaking the topic, including references and publications to be studied in connection with the topic The topic pages list Topic Learning Objectives (TLO), which are discussed in 5 6, to be achieved by the trainee in terms of either a specific knowledge which describes the skill or a combination of both (see figure 5-8-12) The topic page also lists the trainee materials (i e , trainee guide or instruction sheets, slides, computer based instruction lessons, transparencies, equipment, publications, etc) required in the presentation of the topic

(1) Topic titles Background, task/function, system, subsystem, or equipment knowledge and skill topics titles are selected as described below

(a) Background and task/function topic titles are prefaced with the terms indicating the T0 sublevel(s) that the topic supports One or more of the following terms is normally used in constructing the title provided the highest level is included

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Preface term	Representative TO sublevel
Knowledge of	B1
Comprehension of	B2
Application of	S

(b) Knowledge topics covering F1, T1, T2, and T3 will normally be developed using the following title structures, in the sequence indicated

Topic 1	General description of
Topic 2	Physical description of
Topic 3	Functional description of
Topic 4	Interface description of
Topic 5	Operational description of
Topic 6	Maintenance description of

This sequence follows that of the PPP categories and is usually effective However, there may be occasions where combination or rearrangement of the topic titles is necessary to increase the effectiveness of presentation or to reflect the combination of knowledge and skill The organization of topics within a section should be carefully examined to ensure the most effective learning sequence

Skill topics covering O1, O2, P1, C1, and C2 will be selected to reflect the type of skill coverage provided by the topic, as shown in the following structures

Topic 1	"Basic operation of "
Topic 2	"Operation of "
Topic 3	"Preventive and basic corrective maintenance of "
Topic 4	"Corrective maintenance of "

(2) Documentation Documentation is limited to F1/T1 coverage and may be covered in a separate topic or may be integrated into any or all of the other F1/T1 topics Documentation provides for the explanation of how a document is made up, what the sections are, and how and when these are used This does not limit the use of any document during operation or maintenance training When teaching operation or maintenance, the instructor does not teach the document, but teaches the operation or maintenance of a system, subsystem, or equipment and how the document relates to operation or maintenance

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(e) Overview of the discussion-demonstration-activity pages The discussion-demonstration-activity (D-D-A) page gives the instructor an outline of the subject matter of the topic discussion points in the sequence that they are to be taught and identifies instructor and trainee activities to be conducted to ensure knowledge comprehension or skill proficiency The D-D-A page has two columns the Discussion Point column and the Related Instructor Activity column A brief description of each follows

(1) Discussion point column The first column on a D-D-A page is the Discussion Point column It lists all major points to be covered in the proper sequence for presentation, including all subheads necessary to ensure the proper level of coverage for each discussion point Discussion points are drawn from, and may be traced to, applicable PPP tables and corresponding PPP line items or the appropriate TAS elements

(2) Related instructor activity column The Related Instructor Activity (RIA) column gives the instructor specific direction relative to reference documents that may be used to prepare to teach the discussion point, instructional media materials, appropriate demonstrations that may be used to clarify discussion points, guidance relative to trainee behavior during presentation of instruction, and other guidance germane to the conduct of training

(f) D-D-A pages The appearance of the D-D-A page varies greatly depending on such factors as whether adequate references are available and whether the topic to be developed supports a skill or knowledge Figure 5-8-13 provides a decision matrix that enables the curriculum developer to make critical decisions in order to develop an appropriate D-D-A page

(1) Input to D-D-A pages The subject matter and the depth to be included in the Discussion Point column has already been identified The PPP line items, identified on the TLA chart, identify the major points to be covered The TLA chart gives the depth to which each point is to be taught The topical outline provides the actual topics All of these documents are used to develop the Discussion Point column The subject matter included in this column must address each item, but only those items identified previously and to the level indicated

(2) Knowledge or skill topic The topical outline should state whether a topic is to support knowledge or skill If it does not, look at the action verbs in the TLOs to determine whether a skill is being taught (skill topic) or whether knowledge about a skill or other information is being taught (knowledge topic) The topic should be one or the other! If both knowledge and skill are addressed in one topic, consider splitting the topic

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into two separate topics If the topic does not classify as either knowledge or skill, take another look at the behavior portion of the TLOs These may need to be redefined

(3) Development of the D-D-A pages where references are adequate The Discussion Point column is intended to guide the instructor's presentation so only key words or phrases are entered in this column to identify what types of data are to be covered To develop this column, outline the objectives Normally, in outlining the objectives, the behavior elements of the objectives are the elements of the outline Subheads and items under the subheads must clearly relate to points on the outline but they should not include technical data entries (see figure 5-8-14)

(4) Development of the RIA column of the D-D-A page The RIA column provides guidance on how to present the discussion points (e g , draw on chalkboard, demonstrate procedure , reference NAVEDTRA XXX XXX) Guidance for completing this column follows

(a) Documentation usage The phrase "Reference " is used to direct the instructor where to locate information needed for preparing to teach a discussion point It is not intended to direct the instructor to use the reference material in the classroom The term "Refer to " is used to direct the instructor when the reference material is actually intended for use in the classroom

(b) Documentation references The document required to support the discussion point is identified by the document number, volume, part, and paragraph, page, or figure number as applicable Paragraph rather than page numbers are used whenever possible After the complete document reference has been provided, partial reference is used in any case where the complete reference is clearly implied

(c) Transparencies/slides Describe what transparencies or slides should be used Provide special direction on how to properly use them if a unique approach is required to teach the lesson Specify use by the phrase "Display Transparency ," or "Display Slide ," or Continue displaying as necessary", listing the part-section-topic sequence number designation

(d) Demonstration/displays Describe what the instructor should demonstrate or display to the trainee and identify any special approach that may be necessary to properly teach the lesson

(e) Diagrams Describe development of a block diagram (e g , Draw on the chalkboard)

(f) Films Describe what film to project and when

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(g) Support materials Identify what support materials should be distributed, how they should be used, or both

(h) Lab/equipment Provide direction to the instructor on equipment start up, lab initialization/termination, or safety precautions that require positive action by the instructor If an exercise controller guide accompanies the topic, refer the instructor to it in this column

(i) Fault isolation exercises Provide directions to the instructor for conduct of the exercises The proper use of fault is discussed in the fault insertion instructor users guide on the fault data sheets List the number of the fault (e g , pre-faulted, non-pre-faulted, and faults inserted by switch panels, software, etc), to be used Identify the applicable fault description document numbers(s) Fault isolation exercises should be sequenced to allow the average trainee to progressively develop the minimum standard of skill in the application of the procedures and techniques described in the knowledge portion of the curriculum If it becomes necessary to use C1 faults as C2 faults, only those indicated as C1 and C2 in the TOS block of the fault applicability list located in the reference material of the IG will be used The following note will be entered in the RIA column This note may be modified as necessary for particular applications, but the intent of the note must be preserved

NOTE

Inform the trainees that the fault isolation exercises will use faults that can be isolated by documented procedures The purpose of the exercises is to develop skills in the application of the authorized techniques provided, therefore, the documented procedures will not be used The faults used are merely a means to accomplish the desired skill development

(j) Instruction sheet Provide direction to the instructor on use of the instruction sheets (e g , direct trainees to perform job sheet 314-1-2-3, refer to diagram sheet 314-1-2-2, distribute information sheet 314-1-2-1, etc) Additionally, when an instruction sheet contains questions, provide direction to reference the answer sheet which provides the correct answers For questions related to faults, only the user's document is referenced when the document contains the correct answers

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(k) Note-taking Provide special instructions for note-taking during presentation of classified material

(l) Review as required This entry is not meant to imply that coverage of the associated discussion point is optional The entry is used to indicate that the amount of review will depend on the class level

(m) Testing Provide direction to the instructor on administration of exams as necessary

(n) Assignments Direct the instructor to inform the trainee to read, study, or complete specific material

(o) Related trainee activity Provide direction for the instructor as to what the trainee should be doing during instruction (e g , refer to , perform step 1 , store classified materials in locker before departing laboratory)

(5) Static data Occasionally, the data within a discussion point is constant and will never change, short of some revolutionary discovery or break-through (e g , the speed of light is 186,000 miles per second) It is probably safe to say that this will not change In situations like these, state the information in the Discussion Point column rather than referring the instructor to a publication and leaving room in the D-D-A page for the instructor to personalize this information For example

(a) Speed of Light 186,000 miles per second
(b) Radar First used by British-1940

(6) Discussion The D-D-A pages are designed to provide instructors with a usable outline for teaching Sufficient outline detail must be provided to lead the instructor smoothly and comprehensively through all portions of each planned presentation to minimize the possiblility of any regressions or omissions of any planned information This outline tells the instructor the "what, where, how, and to whom" for each topic in an IG The D-D-A pages are also designed to make topic revisions and updates as simple as possible by eliminating the need to retype whole segments of topics when a simple change occurs This is why lengthy paragraphs describing each discussion point in minute detail are avoided Thus, if a change in a reference occurs, one need only make a pen and ink change to the personalized information rather than revise the lengthy paragraph Finally the D-D-A pages are designed to ensure that the burden of teaching the subject remain on the instructor - the instructor must master the material in order to teach and must know his technical manuals and reference publications Instructor personalization is the act of annotating the curriculum by the

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individual instructor as required to aid in his presentation of the subject matter During curriculum development, adequate spacing should be provided between discussion points to allow for instructor personalization

(7) Inadequate references In order to develop D-D-A pages as described above, detailed reference publications and technical manuals are needed When these are not available or when the data can be obtained only by going to several technical manuals, the curriculum designer must

(a) Ensure that appropriate higher authority is informed that references are inadequate or nonexistent for training purposes

(b) Develop a reference or provide sufficient detail in the Discussion Point column of the D-D-A page so that a reference is not needed If the reference is inadequate for only one discussion point, it is probably more efficient to simply provide the needed information in the Discussion Point column If the reference is inadequate for several discussion points or the one discussion requires a very detailed, involved explanation, personalize the IG to the required level Either way, it is important to ensure that the fleet concurs with the procedures or explanation given

(8) Development of information sheets Information Sheets provide additional, amplifying, or background information essential to the trainee but absent from or not easily found in the technical manuals or other official documents Information sheet development is discussed in 5 9 Information sheets are referred to in the RIA column as described in 5 8 3 2 f (4)(j)

(9) Development of detailed discussion point A detailed Discussion Point column is only developed when references are inadequate or too numerous to be used effectively To develop the discussion point, outline the objective and fill in the necessary detail to address the objective to the TOS level indicated, (see figure 5-8-15)

(10) Miscellaneous requirements for the D-D-A pages that support a knowledge topic The following requirements apply to all knowledge topics

(a) The subheads and item listings should not exceed four levels, e g , 1

a

(1)

(a)

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If the fourth level is exceeded, increase the number of major discussion points, delete unnecessary points, or give consideration to increasing the number of topics in the PPP category

(b) A "Review and Summary" major discussion point is included in the knowledge topic
(c) A "Testing" major discussion point should be inserted where required
(d) An "Assignment" discussion point is included in all but the last topic in a course and a corresponding entry in the RIA column is required

(11) Skill topic overview A skill topic overview provides guidance to the instructor on how to conduct a laboratory exercise Remember, teaching has already occurred in a supporting knowledge topic In the laboratory, the trainee practices and performs the required skill The major emphasis in a skill topic is what the instructor must do to keep the lab running smoothly and safely so that trainees become proficient in the required skills

(12) Development of job sheets The heart of a skill topic is usually the job sheets which are developed as soon as the skill PPP line items or the appropriate TAS elements have been selected for a particular course and their training levels determined These refer trainees to step-by-step directions on how to perform specific skills and provide check points where instructor input is required Job sheet development is discussed in 5 9 There are occasions where job sheets are not appropriate In the CUCV (type A) example used throughout this handbook, job sheets would be appropriate for the preventive and corrective maintenance objectives, but would be totally inappropriate for the operational objectives Imagine some poor trainee trying to drive a utility truck while following a job sheet! Instead, a checklist for the instructor to follow is appropriate and should be developed as part of a proctor's guide which is discussed in 5 7

(13) Development of the discussion point column of the D-D-A pages for skill topic The first discussion point in a skill topic must be a review and discussion of safety precaution This will remind the instructor to make sure that the trainee observes safety precautions throughout the topic The remaining discussion points are a list of the major behavior elements The outline of the objectives into the major behavior elements serves as a reminder to the instructor as to what comes next

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Therefore, only the major behavior elements need to be listed to sequence the lab (see figure 5-8-16 and 5-8-17)

(14) Development of the RIA column The primary purpose of the RIA column, in a skill topic, is to program the conduct of the lab The amount of direction provided here depends upon the skill being performed and the need for the instructor to check comprehension or completion of steps at critical points during the performance of a job sheet This column tells the instructor when to distribute specific job sheets, which faults to insert in equipment, and what instructions to give trainees Guidance to complete this column follows

(a) Sequence the job sheets in the order they are performed The job sheets should be sequenced in the order the major elements are listed in the Discussion Point column
(b) Record the directions the instructor is to follow to conduct the training provided by the job sheet (e g , insert selected faults with class absent from the lab, or direct the trainees to complete job sheet . ,)

(15) Miscellaneous requirements for the D-D-A pages that support a skill topic The following requirements apply to all skill topics

(a) A "Safety" discussion point must be included as the first discussion point
(b) A "Testing" discussion point must be included if performance testing will be performed The RIA column should refer the instructor to the appropriate proctor's guide Testing is discussed in 5 7
(c) A "Critique" discussion point should be included if instructors are to discuss general observations noted during trainees' performance
(d) An "Assignment" discussion point should be included for all but the last topic in a course

5 8 3 3 Development of reference material The reference material element provides the instructor information about references, equipment, materials, faults that can be inserted into classroom trainers and equipment, and answers to trainee assignments that are used during the course Reference material includes the Master Materials List (MML), the OACs, the Fault Applicability List (FAL), and the answer sheet These are located immediately behind the last topic in the IG For multivolume IGs, the reference material for each volume is located behind the last topic in the last volume. The steps for developing the Reference Material are described below Each element will be placed in the IG in the order each is listed here

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(a) MML The MML is a complete list of all texts, references, equipment, films, graphics, and other material required to support the curriculum (see figure 5-8-18) A description of each column follows

(1) Course List the complete course title without abbreviations
(2) Class Size The statement "As per the Formal Schools Catalog" will be typed here
(3) Texts This is the first heading Under it, list all the text materials (e g , instructor and trainee guides that are used in the course) The texts are identified by Navy no and title To the right, in the columns labeled "Per tr (trainee)", "Per inst (instructor)", and "Per Cl(class)", indicate the number of copies required to conduct the course
(4) References This is the second heading Under it list in alphanumeric order all the documentation used when conducting the course References such as texts, are identified by Navy no and title Again, identify the quantities needed "per trainee, instructor, and class"
(5) Equipment Under the third heading, list all the equipment, special tools, and test equipment required to conduct the course First, list all the actual equipment used to conduct the course Identify each by Mk, Mod, and official name Next, list any test equipment and instructional tools, such as mock-ups and models, necessary to conduct the course Terminals associated with computer based instruction are listed next, then tools and test equipment, which are identified within referenced technical manuals, are referenced but each item is not listed (e g , TM 09-2320-289-30, tools and test equipment) Finally, list all prefaulted modules needed in direct support of the course by part number and ID number The names of the equipment for each group must be listed in alphanumeric order For each equipment listed, identify the quantity required to conduct the course
(6) Films Under this fourth heading list all the films, videotapes and videodiscs used in the course Each will be identified by designator, title, running time, and the quantity needed to conduct a class
(7) Graphics Under this heading, first identify the series number, i e , the CIN assigned to the graphics Then list all the graphics, transparencies, wall charts, photographs, slides, computer based instruction lessons, etc

(a) Transparencies are identified by transparency number (part number, section number, topic number, and the transparency sequence number), title, the number required per class, the source of the transparency, and the figure number from the source

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(b) Slides are identified by slide number (part number, section number, topic number, and the slide sequence number), title, the number required per class, and the source of the slide, and the figure number from the source

(c) Wall charts, photographs, and computer based instruction lessons are identified by a wall chart number (part number, sequence number), title, the number required per class, and the source of the graphic, and the figure number from the source

(8) Support materials Under this heading list all instruction sheets not contained within a trainee guide First, identify the series number, i e , CIN assigned to the instruction sheets Each is identified by identification number, instruction sheet type, title, and the quantity of each required per man, instructor, and class If a trainee guide is used, the entry under this heading is "All Instruction Sheets for this course are contained within Trainee Guide NAVTECHTRA XXX-XXXX "

(9) Other If required, list any other materials not applicable to the other headings

(b) OAC The development of the OAC is discussed in 5 6

(1) Table This column lists the applicable PPP table numbers If the IG is non-PPP/TPS based the training task numbers (TAS) must be listed

(2) Item This column lists the applicable PPP line items in sequential order from the PPP table identified in the "Table" column If the IG is non-PPP/TPS based, the training task numbers (TAS) must be listed

(3) At this point, the additional information is added to the Test Item Number column (see figure 5-8-19) By adding this information, the curriculum designers and curriculum course model managers know that each PPP line item or training task number (TAS) is covered by an objective, exactly where each objective is taught, and which test items measure trainee achievement

(a) Specific guidance for achievement Transfer all data from the OAC developed previously to a form similar to that shown on figure 5-8-19 Then for each objective, record the numbers of the test items that measure attainment of that objective as described by the OAC

(b) General discussion The test item number entered in the Test Item Number column of the OAC, along with the identifying information included in the other columns (table, item, TOS, volume, part, section, topic, and learning objective) create a unique test item reference number for that test item, which is also listed on the Test Item Cross

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Reference Sheet Guidelines for the Test Item Cross Reference Sheet are discussed in 5 7 Many test items may support one learning objective Consequently, eacl test item has a unique number and is traceable to the performance and level dictated by the other entries on that line

(c) FAL The FAL is an aid to the instructor It identifies all the faults that can be inserted into equipment that is taught in the course Using this list, the instructor can then select faults when it is desirable to supplement the training exercises specified in the skill topic(s) The FAL is constructed using the format shown on figure 5-8-20 A description of the columns follows

(1) Part and section These columns identify the location by part and section within the curriculum where the fault is most logically taught
(2) TOS This column identifies the level of training coverage for this equipment for the specific category of personnel (e g , P1, C1, C2, etc)
(3) Equipment This column identifies the equipment that can be faulted Each is listed here by equipment designation
(4) Function faulted This column identifies the equipment function that can be faulted
(5) Fault number This column identifies the fault number associated with the fault An asterisk in this column means that the fault is required for use in the curriculum
(6) Document In this column, the document which describes the procedures to correct the fault is listed The fault procedures referenced may be actual procedures which support C1 level training or such aids as troubleshooting trees or wiring diagrams which support C2 level training

(d) Development of the answer sheet The answer sheet provides the instructor with easy access to the answers to questions on the instruction sheets (see figure 5-8-21) The left-hand column, "Instruction Sheet Type and Number," identifies the instruction sheets which have questions These instruction sheets are listed in the order of their usage within the IG, as shown by the identifying number (e g , job sheet 315-1-2-1, assignment sheet 315-1-3-3, job sheet 315-1-4-1, etc) The right-hand column, "Question Number and Answer," identifies the question number shown on the instruction sheet and the correct answer When questions on instruction sheets do not have discrete answers, this is indicated on the answer sheet When answers are provided, the answer sheet is referenced on the D-D-A page after the reference to the applicable instruction sheet

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5 8 3 4 Assembling the IG The IG may be organized into one or more volumes, depending on the quantity of material How the curriculum material is divided into volumes is a matter of choice within the following limits The parts and topics included in a volume must fit into a 2" binder (approximately 200 sheets) and be sequenced in the order in which they are taught

(a) In keeping with the intent of 5 8 3 3, one could have a course where volume 1 addresses theory and volume 2 addresses operational procedures Or, if a course taught the maintenance of equipment 'x', 'y', and 'z', volume 1 might address the maintenance of equipment 'x', volume 2 equipment 'y', and volume 3 equipment 'z' Also, one could take a four inch stack of curriculum materials, sequenced in the order taught, and divide it at a logical point (part, section, topic) closest to the middle of the stack and place each half in a volume'

(b) When a part exceeds the size of one volume, it is continued into additional volumes with a front tab which lists the part number and the word, "continued" It is not necessary to repeat all elements of the front matter for each volume except where specifically stated

(c) Binders are identified by volume number in Arabic numerals, with the first binder identified as volume 1, and successive binders as volume 2, volume 3, etc The cover of each volume is the same, except for the volume number and change identification

(d) Each IG page is numbered in the lower right-hand corner Front matter pages are numbered consecutively with lower-case Roman numerals The cover and letter of promulgation are not numbered although they will be counted as pages i and iii of the front matter Section and Topic pages are numbered as explained in paragraph 5 8 3 1(a) The reference material pages (MML, OAC, and answer sheet) are numbered with consecutive Arabic numerals in parentheses, i e , (1), (2), (3), etc

(CLASSIFICATION)

(CHANGE)
A-234-5678 VOLUME 1
(REVISION)

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
- OPERATOR AND MAINTENANCE

INSTRUCTOR GUIDE

FEBRUARY 1986

(CLASSIFICATION)

PUBLISHED BY DIRECTION OF THE CHIEF OF NAVAL TECHNICAL TRAINING

FIGURE 5-8-1. Example instructor guide cover.

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LIST OF EFFECTIVE PAGES

Page No.	Change in Effect	Page No.	Change in Effect	Page No.	Change in Effect	Page No.	Change in Effect
Cover, ii	Original	D542-3-1-1 thru		D542-5-1-17, D542-5-1-18	Original		
Letter of Promulgation	Original	D542-3-1-3	Original	D542-6-1-1 thru			
iv thru xv	Original	D542-3-1-4 thru		D542-6-1-30	Original		
Tab		D542-3-1-21	Original	D542-7-1-1 thru			
Part D542	Original	D542-4-1-1 thru		D542-7-1-15	Original		
D542-1-1	Original	D542-4-1-14	Original				
D542-1-1-1 thru D542 1-1-20	Original	D542-4-2-1 thru D542-4-2-26	Original				
D542-1-2-1 thru D542-1-2-15	Original	D542-4-3-1 thru D542-4-3-28	Original				
D542-2-1-1 thru D542-2-1-22	Original	D542-4-4-1 thru D542-4-4-39	Original				
D542-2-2-1 thru D542-2-2-27	Original	D542-5-1-1 thru D542-5-1-14	Original				
D542-2-3-1 thru D542-2-3-18	Original	D542-5-1-15, D542-5-1-16	Original				

FIGURE 5-8-2. Example instructor guide list of effective pages.

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DEPARTMENT OF THE NAVY
CHIEF OF NAVAL TECHNICAL TRAINING
NAVAL AIR STATION MEMPHIS (73)
MILLINGTON TENNESSEE 38054

1 January 1986

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY OPERATOR AND MAINTENANCE

A-234-5678

This Instructor Guide and its related training support material constitute the approved curriculum, developed in accordance with MIL-STD 001379C (NAVY) AND ASSOCIATED DATA ITEM DESCRIPTIONS Deviation from this curriculum is not authorized until approved by the Chief of Naval Technical Training

Corrections and recommended changes are invited and must be submitted in accordance with direction and procedures provided in approved references, via the Course Curriculum Model Manager

This curriculum supersedes all previous curricula for the Commercial Utility Cargo Vehicles (TYPE A), Utility Operator and Maintenance

J E ROPER
Captain, U S Navy
Assistant Chief of Staff for
Instructional Standards and
Academic Programs

FIGURE 5-8-3 Example letter of promulgation

CHANGE RECORD

Number and Description of Change	Entered By	Date

SH132031588

FIGURE 5-8-4. Example instructor guide change record.

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HAZARD AWARENESS NOTICE

All personnel involved in operation or maintenance of transportation vehicles must be thoroughly familiar with the equipment safety precautions contained in the Organization Maintenance Manual for Truck, Utility, Tactical, 3/4 Ton, 4 x 4, M1009 (2320-01-123-2665), TM 9-2320-289-20. In addition, attention is directed to the Accident Prevention Manual, OPNAVINST 5101.2 series.

The equipment emits deadly carbon monoxide gases when in operation which can be fatal to personnel, if inhaled. Extreme caution must be exercised when working with or near this equipment While every practical precaution has been incorporated into this equipment, it is not possible or practical to try to list every condition or hazard that can be encountered

Don't service or adjust equipment alone. Under no circumstances will a person perform maintenance on this equipment without the presence or assistance of another person capable of giving aid. Unless under direct supervision of a qualified person, no person shall operate or maintain equipment for which he is not qualified.

Service equipment in well ventilated spaces only. Under no circumstances will a person operate or perform maintenance on this equipment unless the spaces are adequately ventilated.

Report all hazards. If at any time you detect a hazard, it is your responsibility to report the hazard to ensure that it is corrected. If at any time you detect a "new" or "suspected new" hazard, particularly due to equipment installation, modification, or repair, it is your responsibility to report it through your chain-of-command to ensure that a SAFETYGRAM is submitted to the Naval Safety Center, Norfolk, Va, in accordance with OPNAVINST 5102.1 series This will ensure that this hazard will be investigated, publicized, or corrected, as required.

v

FIGURE 5-8-5. Example instructor guide hazard awareness notice.

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TABLE OF CONTENTS

Section Page

FRONT MATTER

Cover i
List of Effective Pages..... ii
Letter of Promulgation.... iii
Change.. iv
Hazard Awareness Notice... v
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Allocation of Instructional Time.. xii
Course Learning Objectives xiv

VOLUME 1
PART 542 COMMERCIAL UTILITY CARGO VEHICLE (TYPE A) (CUCV)

1. FAMILIARIZATION WITH THE CUCV (TYPE A)..... . .. D542-1-1

1 General Description of the CUCV (TYPE A)..... .. D542-1-1-1

2. Physical Description of the CUCV (TYPE A)... ..... D542-1-2-1

2. INTRODUCTION TO THE CUCV (TYPE A)..... . .. D542-2-1

1. Functional Description of the CUCV (TYPE A) D542-2-1-1

2. Interface Description of the CUCV (TYPE A)..... D542-2-2-1

3. Operational Description of the CUCV (TYPE A)..... D542-2-3-1

3. BASIC OPERATION OF THE CUCV (TYPE A)..... .... D542-3-1

1. Basic Operation of the CUCV (TYPE A) D542-3-1-1

4. THEORY OF THE CUCV (TYPE A)..... D542-4-1

1. Functional Description of the CUCV (TYPE A) D542-4-1-1

2. Interface Description of the CUCV (TYPE A) D542-4-2-1

3. Operational Description of the CUCV (TYPE A) D542-4-3-1

4 Maintenance Description of the CUCV (TYPE A) D542-4-4-1

5. OPERATION OF THE CUCV (TYPE A) D542-5-1

1. Operation of the CUCV (TYPE A) D542-5-1-1

FIGURE 5-8-6. Example instructor guide table of contents. (Sheet 1 of 2)

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TABLE OF CONTENTS - Continued

Section Page

6 PREVENTIVE MAINTENANCE OF THE CUCV (TYPE A)..... .. .. D542-6-1

1. Preventive Maintenance of the CUCV (TYPE A)... . . D542-6-1-1

7. BASIC CORRECTIVE MAINTENANCE OF THE CUCV (TYPE A).... .... . D542-7-1

1. Basic Corrective Maintenance of the CUCV (TYPE A).. . . D542-7-1-1

VOLUME 2
PART D542 COMMERCIAL UTILITY CARGO VEHICLE (TYPE-A)

8 ADVANCED THEORY OF THE CUCV (TYPE A) D542-8-1

1. Functional Description of the CUCV (TYPE A) .. D542-8-1-1

2 Interface Description of the CUCV (TYPE A). D542-8-2-1

3. Operational Description of the CUCV (TYPE A) D542-8-3-1

4. Maintenance Description of the CUCV (TYPE A).. ... . D542-8-4-1

9 CORRECTIVE MAINTENANCE OF THE CUCV (TYPE A) D542-9-1

1 Corrective Maintenance of the CUCV (TYPE A) .. . D542-9-1-1

REFERENCE MATERIAL

Master Material List .... (1)

Profile Item-to-Topic Objective Assignment Chart .... ( )

Fault Applicability List . ... ( )

Answer Sheet . . .. ( )

FIGURE 5-8-6. Example instructor guide table of contents. (Sheet 2 of 2)

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HOW TO USE THE INSTRUCTOR GUIDE

COMPOSITION OF THE INSTRUCTOR GUIDE

This Instructor Guide provides an instructor with the information required to prepare for, and instruct in, the topics assigned As an introduction to each topic, the instructor shall display his/her NAME and TOPIC TITLE on the chalkboard The instructor will also inform the trainees of the topic learning objectives, establish classroom procedures (questioning, notetaking, breaks, etc), and motivate the trainees by emphasizing the importance of the topic At the end of each day of instruction, the instructor will assign the trainees any materials required in preparation for the following day Each topic within this Instructor Guide contains the following

1. Topic learning objectives These objectives are written to reflect the training level(s) of Personnel Performance Profiles (PPP) that the topic supports The objectives are derived by applying elements of the Training Objective Statements (TOS) to the elements for the PPPs.

2. Trainee Preparation This portion assigns the study and review material that the trainee must complete to prepare for this topic It contains detailed assignments in reference publications and diagrams, including support materials, and is assigned at the end of each day of instruction The instructor must review the Trainee Preparation portion of topics planned for the following day and make study assignments accordingly

3 Instructor Preparation This part of the topic page contains

   a. A reminder to review assigned trainee material.

   b. A list of all reference materials required by the instructor to prepare to instruct the topic

   c. A list of all training materials required for the topic, including references, equipment, support materials, and test equipment

4. Discussion-Demonstration-Activities This page is divided into two columns, as follows

   a Discussion Point This column outlines the subject matter to the depth necessary to support the training level(s) of the corresponding topic learning objective Also, sufficient space is provided for instructor personalization

   b. Related Instructor Activity In this column are listed specific instructor activities, excluding oral discussion, which will aid in trainee learning The Related Instructor Activity Column provides the instructor specific instructions relative to reference documents, instructional media material, and guidance relative

FIGURE 5-8-7. Example how to use the instructor guide. (Sheet 1 of 4)

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HOW TO USE THE INSTRUCTOR GUIDE - Continued.

to trainee behavior during presentation of instruction. These activities carry the same number as the discussion point to which they are related. As with the discussion points, space is left for the instructor to add personalizing notes. The phrase "Reference . ." is used to help the instructor locate information applicable to a particular discussion point and to be used to prepare for the material to be covered It is not intended to direct the instructor to use that reference material in the classroom. The term "Refer to .." provides direction for the instructor when the reference material is actually intended for use in the classroom If there is no related instructor activity for a discussion point, the space is left blank and the number omitted.

FUNCTION OF THE INSTRUCTOR GUIDE

The Instructor Guide expands the approved topic outline into a content format that will service as an effective plan for instruction. It provides room for instructors to add individual notes. The form of the instructor guide facilitates preparation, minimizes deviation from the approved plan for the topic, and lessens the need for rewriting material already contained in the outline. As the instructors prepare to teach the topic for the first time, they may write in the technical data, information, or notes to be used to do a professional job of instruction As instructors gain experience teaching a topic, they may modify and improve the data written in

All theory discussions must relate to practical work. The design theory of an equipment may be interesting to the instructor, but the trainee must learn how to keep the equipment in proper operating condition. The trainee must bypass all unnecessary knowledge and concentrate on learning to perform the necessary maintenance techniques required by these equipments Any activity that does not contribute directly to training in the operation and maintenance of these equipments is wasted effort, regardless of how interesting it may seem to be. A thorough understanding of the equipment theory is necessary in order that the practical work on the equipment may be accomplished The reason for the theory is to assist the trainee in doing practical work

An Instructor Guide without the instructor's personalization is maintained in appropriate school offices and has several administrative functions. The Officer-in-Charge and the course supervisors will use it as a guide in determining the kind and depth of the material taught, and as a reference in monitoring the effectiveness of instruction Each instructor will use it as a reference to determine what the trainees have learned prior to, and will learn subsequent to the topic, so that the instructor can gauge the level and direction of instruction

When approved by the Chief of Naval Technical Training, this Instructor Guide becomes the master plan for instruction.

FIGURE 5-8-7. Example how to use the instructor guide. (Sheet 2 of 4)

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HOW TO USE THE INSTRUCTOR GUIDE - Continued.

USE OF THE INSTRUCTOR GUIDE

When issued to an instructor, this guide becomes his/her personal property subject only to the regulations that govern classified matter. Each instructor will make handwritten entries in the spaces provided. Personalized topics may be passed on to a relieving instructor, however, they are to be used only for reference purposes in developing a personalized Instructor Guide.

Changes to this guide are made by direction of the Chief of Naval Technical Training through recommendations by the school and from the results of the training evaluation program. All changes shall ensure effective trainee comprehension and fulfillment of topic learning objectives.

STUDY ASSIGNMENTS

Study assignments are provided in the Instructor Guide. One of the objectives of the training is learning to intelligently use the technical manuals associated with the equipments. Training effectiveness depends on conscientious and consistent use of the assignments and schematics in the pertinent technical manuals. All completed assignments should be reviewed with the trainees at the first opportunity.

EQUIPMENT FAULTS

The Fault Applicability List in the Instructor Guide lists the faults/fault insertion devices required in this course. When desirable, additional faults may be selected from the Fault Applicability List in the Guide.

INSTRUCTION SHEETS, EXAMINATIONS, QUIZZES

Instruction Sheets, consisting of Information Sheets, Job Sheets, Assignment Sheets, Problem Sheets, and Diagram Sheets are an integral part of the course and new trainees achieve the topic learning objectives. It is necessary to see that these activities are accurately completed.

Answers to questions on these sheets are provided on the Answer Sheet at the back of each Instructor Guide

Students should be instructed to write only on Trainee Name Page, Job Sheets, Diagram Sheets, and Problem Sheets. At the end of the course, the instructor will collect Trainee Guides or Instruction Sheets. New Trainee Name Pages, Job Sheets, Diagram Sheets, and Problem Sheets will be reproduced and inserted so the Trainee Guides and Instruction Sheets may be used in the next course.

Quizzes and Examinations are administered to monitor trainee comprehension at the completion of significant areas of instruction.

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FIGURE 5-8-7. Example how to use the instructor guide. (Sheet 3 of 4)

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HOW TO USE THE INSTRUCTOR GUIDE - Continued

DIVISION OF COURSE MATERIALS INTO FUNCTIONAL PARTS

The course material in this Instructor Guide has been divided into parts to support PFP tables as assigned by the corresponding Table Assignment Charts. It has been further divided into sections to support instruction on theory, operation, preventive maintenance, and corrective maintenance. The sequence of instruction is based on an analysis of the tasks for the trainee performance and on the requirements for prerequisite knowledge or skills required for instruction on the more complex equipments.

TRAINING MATERIAL SUPPORT PROGRAM

The Training Material support Program has been established for the purpose of improving the curriculum and other training material. It is each instructor's responsibility to become familiar with this program as outlined in the applicable management documentation. You are to submit all of your suggestions for improvement through a Change Recommendation as outlined in the applicable management documentation. These suggestions should include discrepancies found or any comments that you feel will improve training. There will be no changes in this curriculum until authorized by the Chief of Naval Technical Training.

SECURITY

In the event that classified information is added to this Instructor Guide as a result of instructor personalization, the Instructor Guide shall be marked and handled in accordance with the regulations of the latest edition of the Department of the Navy Supplement to the DoD Information Security Program Regulation OPNAVINST 5510.1.

SAFETY PRECAUTIONS

Voltages present in the equipment are extremely dangerous. The delicacy of some equipment and the stringent ventilation requirements for solid-state electronic circuits must be continuously stressed. Safety must be a part of each day of training so that the trainee will develop safe working habits. Practice and Teach Safety!

FIGURE 5-8-7. Example how to use the instructor guide. (Sheet 4 of 4)

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ALLOCATION OF INSTRUCTIONAL TIME

Volume No.	Part No.	Section No.	Topic No.	Classroom Hours	Laboratory Hours	Parts Totals
1	D542	1	1	0.50	-	
			2	2.00	-	
			Section Total	2.50	-	2.50
		2	1	0.50	-	
			2	1.00	-	
			3	1.00	-	
			Section Total	2.50	-	2.50
		3	1	0.50	4.00	
			Section Total	0.50	4.00	4.50
		4	1	5.00	-	
			2	0.75	-	
			3	2.00	-	
			4	2.75	-	
			Section Total	10.50	-	10.50
		5	1	0.50	4.00	
			Section Total	0.50	4.00	4.50
		6	1	0.50	4.00	
			Section Total	0.50	4.00	4.50

FIGURE 5-8-8. Example allocation of instructional time. (Sheet 1 of 2)

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ALLOCATION OF INSTRUCTIONAL TIME - Continued.

Volume No.	Part No.	Section No.	Topic No.	Classroom Hours	Laboratory Hours	Parts Totals
		7	1	0.50	8.00	
			Section Total	0.50	8.00	8.50
2	D542	8	1	3.00	-	
			2	2.25	-	
			3	1.75	-	
			4	3.00	-	
			Section Total	10.00	-	10.00
		9	1	1.00	16.00	17.00

Instructional Time Total	64.50
Testing Time Total	5.50
Administrative Time Total	6.00
Review Time Total	4.00
Course Total	80.00

NOTE

Classroom and laboratory Hours shown reflect the time used during curriculum pilot with an actual class size of __ and a student/instructor ratio for laboratory periods of ____.

FIGURE 5-8-8. Example allocation of instructional time. (Sheet 2 of 2)

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COURSE LEARNING OBJECTIVES

Upon successful completion of this course, the trainees will have acquired the following knowledge and skills and be able to:

Knowledge:

1. State the purpose, function, and location and describe the documentation of the CUCV (TYPE A).
2. Describe the theory necessary to support and understand the performance of normal operation without going into logic, circuits, program flow diagrams, or mechanical component breakdown of the CUCV (TYPE A).
3. Describe the theory necessary to support and understand the performance of all operational tasks and, all preventive and basic corrective maintenance without going into detailed logic, circuit analysis, individual flow diagrams, or detailed mechanical component breakdown of the CUCV (TYPE A).
4. Describe the theory necessary to understand and to support corrective maintenance requiring advanced analysis and the use of approved, undocumented methods of repair for the CUCV (TYPE A).

Skills

1. Perform normal operational procedures with supervision on the CUCV (TYPE A).
2. Perform all operational procedures with supervision on the CUCV (TYPE A).
3 Perform preventive maintenance procedures with supervision on the CUCV (TYPE A)
4. Perform documented fault isolation and repair procedures with supervision on the CUCV (TYPE A).
5. Perform approved, undocumented corrective maintenance procedures, with supervision, to the authorized repair level for the CUCV (TYPE A).

FIGURE 5-8-9. Example course learning objectives.

DOD-HDBK-292-2

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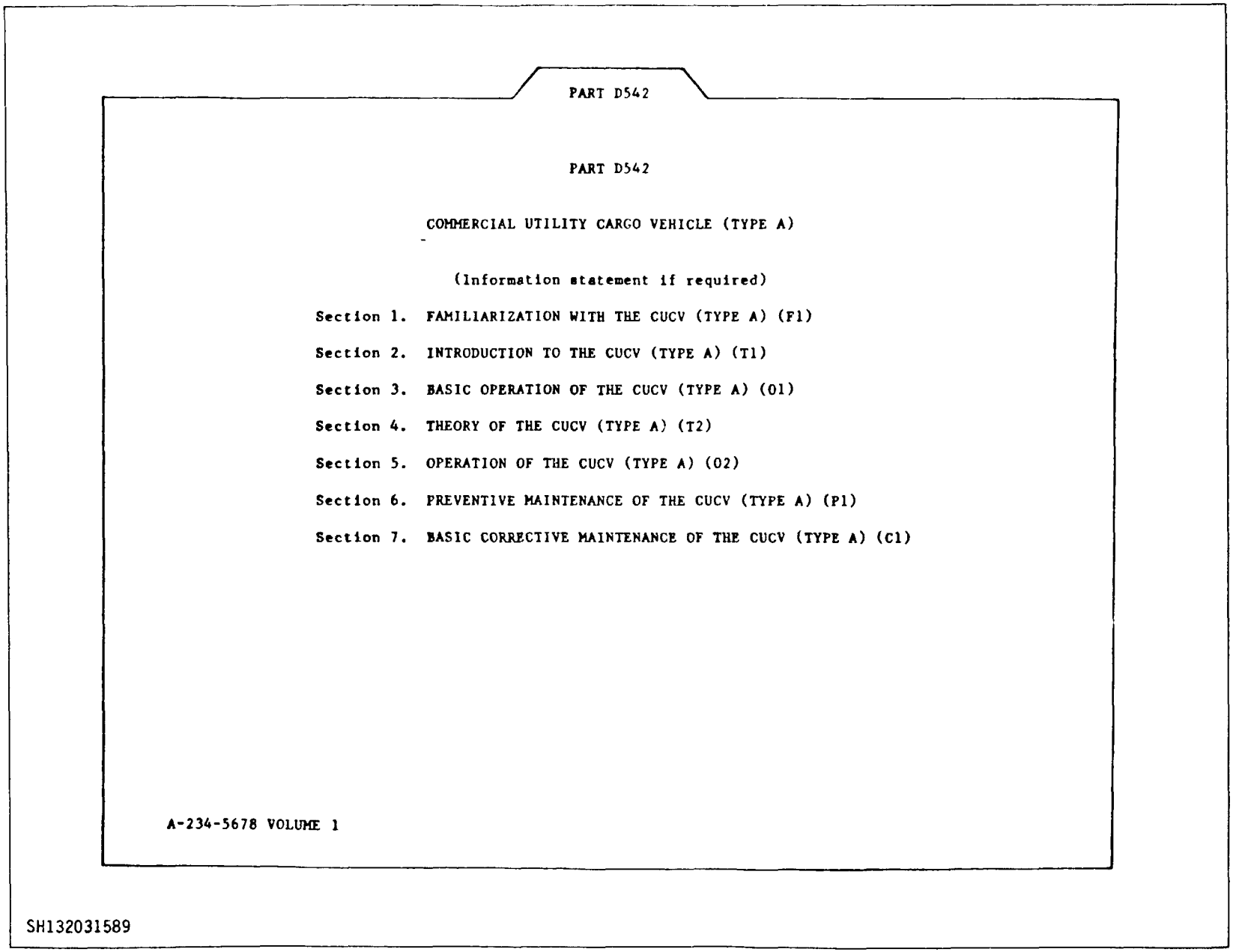

FIGURE 5-8-10. Example tab divider.

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Section 4: THEORY OF THE CUCV (TYPE A)

Topic No.	Topic Title	Page
1	Functional Description of the CUCV (TYPE A)	D542-4-1-1
2	Interface Description of the CUCV (TYPE A)	D542-4-2-1
3	Operational Description of the CUCV (TYPE A)	D542-4-3-1
4	Maintenance Description of the CUCV (TYPE A)	D542-4-4-1

FIGURE 5-8-11. Example section page.

Topic 4: MAINTENANCE DESCRIPTION OF THE CUCV (TYPE A)

Topic Learning Objectives

Upon successful completion of this topic, the trainee will be able to:

1. Define the maintenance policy for the CUCV (TYPE A) required to support preventive maintenance as the requirement for periodic performance of tasks to minimize equipment malfunctions.

   a Servicing - scheduled/not scheduled inspections, cleaning, fueling, lubrication, corrosion control and any other functions in support of full mission capability.

   b Operation checks

      (1) Pre-maintenance procedures
      (2) Performance checks
      (3) Degradation/deterioration checks
      (4) Quality Assurance checks

   c Progressive maintenance-periodic refurbishment of components or assemblies in order to maintain levels of performance reliability.

2. Define the maintenance policy for the CUCV (TYPE A) required to support corrective maintenance as the checks and procedures used to locate and correct malfunctions.

   a. Authorized repair responsibility - correction of malfunctions to the authorized maintenance level.

   b. Fault Isolation - location of faults to the level of available spares and authorized repair level.

      (1) Equipment operational checks and tests.
      (2) Fault isolation tests and procedures.

   c. Analytical procedures - isolation of faults, using authorized methods not contained in prescribed maintenance documentation.

   d. Post-maintenance procedures - procedures performed after repair including quality assurance checks.

3. Describe the use of special tools and test equipment required to support preventive and basic corrective maintenance of the CUCV (TYPE A) as prescribed in applicable maintenance documents.

4. Describe preventive maintenance procedures for the CUCV (TYPE A). Include recognition and interpretation of all indications, records, reports, and instructions.

5. Describe the alignment, adjustment, and calibration procedures for the CUCV (TYPE A) required to support preventive and basic corrective maintenance.

D542-4-4-1

FIGURE 5-8-12. Example topic page. (Sheet 1 of 3)

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Topic 4: MAINTENANCE DESCRIPTION OF THE CUCV (TYPE A) - Continued.

6. Describe operational tests for maintenance of the CUCV (TYPE A) required to support preventive and basic corrective maintenance. Include the operational tests' names, uses, and procedures.

7. Describe the recognition and interpretation of all malfunction indications for the CUCV (TYPE A) required to support basic corrective maintenance.

8. Describe the documented fault isolation procedures contained in prescribed maintenance documentation for the CUCV (TYPE A) required to support basic corrective maintenance.

9. Describe the procedures to disassemble, repair, and reassemble the CUCV (TYPE A) to the authorized maintenance level required to support basic corrective maintenance.

10. Describe post-repair procedures for the CUCV (TYPE A) required to support basic corrective maintenance.

11. Describe personnel and equipment safety precautions to be observed when performing CUCV (TYPE A) preventive and basic corrective maintenance as defined by the applicable documentation.

Trainee Preparation

A. Trainee Support Material:

1. Study Information Sheets D542-4-1-1 through D542-4-1-4.

2. Study Diagram Sheet D542-4-1-1.

B. Reference Publications:

1. None

C. Reference Drawings:

1. None

Instruction Preparation

A. Review Assigned Trainee Material

B. Reference Publications:

1. TM 9-2320-289-20, Chapters 3 through 15

2. Chilton's Truck and Van Repair Manual, 1984

C. Training Materials Required:

1. Trainee Guide

2. Publications:

a. TM 9-2320-2389-20

b. Chilton's Truck and Van Repair Manual, 1984

FIGURE 5-8-12. Example topic page. (Sheet 2 of 3)

DOD-HDBK-292-2

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Topic 4: MAINTENANCE DESCRIPTION OF THE CUCV - Continued.

3. Transparencies:

   a. D542-4-4-1

   b. D542-4-4-2

   c. D542-4-4-3, CH.1 *

   d. D542-4-4-4

   e. D542-4-4-5

   f. D542-4-4-6

4. Lecture Guide:

   a. LG-AL-OM-1

5. Wall Charts:

   a. D542-5

   b. D542-6

FIGURE 5-8-12. Example topic page. (Sheet 3 of 3)

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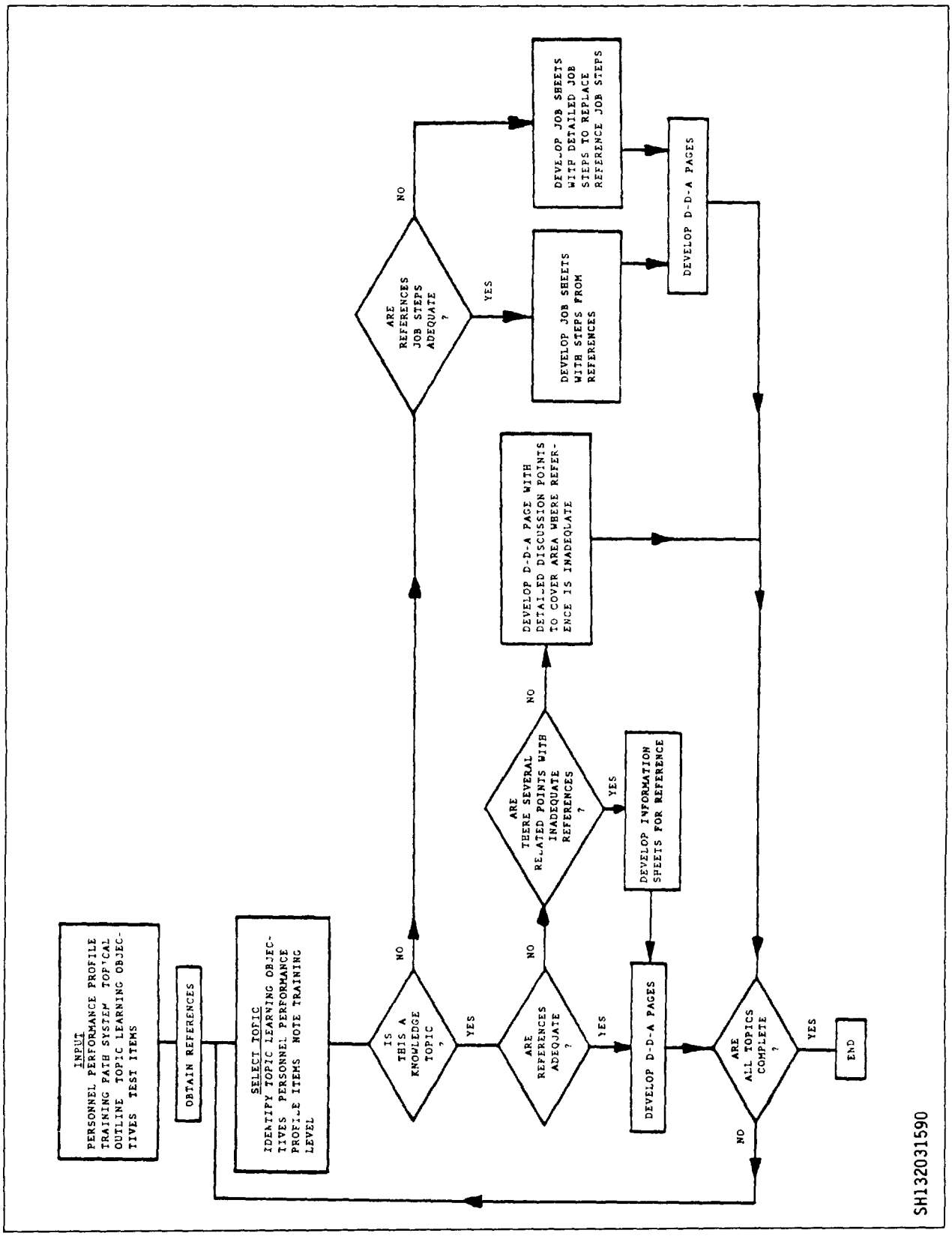

FIGURE 5-8-13. Decision matrix.

INSTRUCTOR GUIDE

4 THEORY OF THE CUCV (TYPE A) A-234-5678 VOLUME 1
Topic 4. MAINTENANCE DESCRIPTION OF THE CUCV (TYPE A)

DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
1. Safety precautions	1. Reference TM 9-2320-289-20; page 2, Warning "a"; page 4, Warning "b".
2. Reference documentation	
a. TM 9-2320-299-201, Organization Maintenance Manual for Truck, Utility, Tactical, 3/4 ton, 4 x 4, M1009.	
(1) General	(1) Refer to Chapters 1 and 2.
(2) Troubleshooting	(2) Refer to Chapter 2, Section 4.
(3) Preventive Maintenance	(3) Refer to Chapter 3.
(4) Repair	(4) Refer to Chapters 5 through 15.
b. Chilton's Truck and Van Repair Manual, 1984	
(1) M1009 specific chapter	(1) Refer to Chilton's Truck and Van Repair Manual, 1984, paragraphs T1 through T85.
(2) Unit repair chapters	(2) Refer to paragraph 2, Contents.
3. Basic troubleshooting procedures	
a. Symptom recognition	
(1) Engine	(1) Display transparency D542-4-4-1. Refer to TM 9-2320-289-20, paragraphs 2 through 4.

D542-4-4-4

FIGURE 5-8-14. Example D-D-A pages with adequate references. (Sheet 1 of 3)

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(2) Transmission	(2) Display transparency D542-4-4-2.
(3) Electrical system	
(4) Axle and propeller shaft	
(5) Steering/wheels/tires	(5) Refer to paragraphs 5 through 9.
(6) Brake	
(7) Body	
(8) Combination	
b. Fault isolation	
c. Use of Symptom Index	
d. Specified checks	
e. Use of Troubleshooting indexes.	e. Refer to Chilton, paragraphs U111 and U225. Stress that these indexes will be used only after troubleshooting in accordance with the applicable technical manual has failed to identify the problem.
4. Review and Summary	
5. Assignment	5. Make study assignments if required.

FIGURE 5-8-14. Example D-D-A pages with adequate references. (Sheet 2 of 3)

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INSTRUCTOR GUIDE

3 BASIC OPERATION OF TPE CUCV (TYPE A) A-234-5678 VOLUME 1

Topic 1. BASIC OPERATION OF THE CUCV (TYPE A)

DISCUSSION POINI	RELATED INSTRUCTOR ACTIVITY
1. Safety precautions	1. Reference TM 09 2320-289-103 paragraphs 2 through 6.
2. Pre-operational	2. Demonstrate operation of the CUCV (TYPE A).
a. Locate controls	
b. Checkout procedures	
3. Operation	3. Prepare the CUCV for operation by the trainee.
	a. Refer to the CUCV (TYPE A) Proctor Guide, Checklist D542-3-1-1.
	b Review the operational procedures that the trainees will be required to perform without the aid of any documentation.
	c Verify that the trainee observes safety precautions while performing operation of the CUCV (TYPE A).
	d. Direct trainee to operate the CUCV (TYPE A).
	e. Critique operation to check for trainee understanding.
4. Review and summary	
5. Assignment	5 Make study assignments if required.

D542-3-1-3

FIGURE 5-8-14. Example D-D-A pages with adequate references. (Sheet 3 of 3)

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DISCUSSION POINT	-	RELATED INSTRUCTOR ACTIVITY
15. Wheel alignment		
1. Steering wheel position alignment		1. Reference Chilton's Truck and Van Repair Manual, 1984, paragraphs U252 and 4.
2. Camber angle		2. Display transparency D542-8-1-1.
a. Definition - the amount that the front wheels are inclined outward or inward at the top.		
b. Angle		b. Refer to Chilton, paragraph U253, Wheel Alignment Chart.
(1) Recommended		
(2) Maximum		
c. Measurement procedure		c. Refer to Information sheet D542-8-1-1.
3. Caster angle		
a. Definition - the amount that the knuckle support pivot tilts toward the front or rear of the vehicle.		a. Display transparency D542-8-1-2.
(1) Negative caster angle - when tilt is toward the front of the vehicle.		

FIGURE 5-8-15. Example D-D-A pages with inadequate references. (Sheet 1 of 3)

DOD-HDBK-292-2

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DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
(2) Positive caster angle - when tilt is toward rear of the vehicle.	
b. Effect	
(1) Negative caster angle causes the truck to steer away from the direction it tends to go.	
(a) It tends to steer up on a crowned road.	
(b) It tends to steer into a cross wind.	
(2) Positive caster angle causes the truck to steer into the direction it is tending to go.	
(a) It tends to steer down off a crowned road.	
(b) It tends to steer away from a cross wind.	
c. Measurement	
(1) Measured in degrees positive (+) or negative (-).	
(2) Methods for determining correct caster angle.	

D542-8-1-4

FIGURE 5-8-15. Example D-D-A pages with inadequate references. (Sheet 2 of 3)

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INSTRUCTOR GUIDE

8 ADVANCED THEORY OF THE CUCV (TYPE A) A-234-5678 VOLUME 2

Topic 1. FUNCTIONAL DESCRIPTION OF THE CUCV (TYPE A)

DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
(a) Determine correct caster angle with alignment equipment.	(a) Display transparency D542-8-1-3.
(b) Determine correct caster angle from specification charts.	(b) Display transparency D542-8-1-4.

D542-8-1-5

FIGURE 5-8-15. Example D-D-A pages with inadequate references. (Sheet 3 of 3)

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Topic 1. BASIC CORRECTIVE MAINTENANCE OF THE CUCV (TYPE A)

DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
1. Safety precautions	1. Reference TM 9-2320-289-20, page 2, Warning "a"; page 4, Warning "b".
2. Fault Isolation No. 1	2. Remove the thermostat and install Fault No. D542-7, Thermostat a. Direct trainee to perform Job Sheet D542-7-1-1, steps 1 through 3. Correct answers are provided on the Answer Sheet. b. Reinstall thermostat
3. Fault Isolation No. 2	3. Remove fuel filter and install Fault No. D542-3, Fuel Filter. a. Direct trainee to perform Job Sheet D542-7-1-1, steps 4 through 6 Correct answers are provided on the Answer Sheet. b. Reinstall fuel filter.

FIGURE 5-8-16. Example skill topic D-D-A pages. (Sheet 1 of 2)

DOD-HDBK-292-2

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DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
4. Fault Isolation	4 Prepare CUCV (TYPE A) for faulty condition. a. Select a fault from the following NOTE The following faults must be used for every class. However, when desirable to supplement the specified training exercise, additional faults may be selected from the Fault Applicability. (1) Faulty distributor cap, Fault D542-1. (2) Faulty throttle cable, Fault D542-5. b. Insert selected casualty with class absent from lab. c. Direct the trainee to perform Job Sheet D542-7-1-2. Verify that the trainee observes safety precautions and answers all questions correctly for the selected faults Correct answers are provided on the Answer Sheet d. Critique problems to check for trainee understanding e. Repeat instructor activity 3.a through 3.d. for remaining faults.

D542-7-1-2

Figure 5-8-16. Example skill topic D-D-A pages. (Sheet 2 of 2)

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DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
5. Documented Corrective Maintenance	5. Prepare CUCV (TYPE A) for faulty condition. a Select a fault from the following NOTE The following faults must be used for every class. However, when it is desirable to supplement the trainee exercise, additional faults may be selected from the Fault Applicability List. (1) Disconnected distributor wire, K143. (2) Faulty thermostat, Fault D542-7 (3) Air in brake line U-301. (4) Cracked distributor cap, Fault D542-1. (5) Wheels out of alignment (6) Loose steering linkage, S419, S430.

D542-7-1-3

FIGURE 5-8-17. Example skill topic D-D-A pages for the use of generalized job sheets. (Sheet 1 of 2)

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DISCUSSION POINT	RELATED INSTRUCTOR ACTIVITY
	b. Direct the trainee to perform Job Sheet D542-7-1-3. Verify that the trainee observes safety precautions and answers all questions correctly. Correct answers are provided on the answer sheet.
	c. Critique problems to check for training understanding.
	d. Repeat instructor activities 4.a through 4.d. for remaining faults
6. Review and summary.	
7. Assignment.	7. Make study assignments.

FIGURE 5-8-17. Example skill topic D-D-A pages for the use of generalized job sheets. (Sheet 2 of 2)

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MASTER MATERIALS LIST

COURSE: Commercial Utility Cargo Vehicle (TYPE A), Utility Operator and Maintenance

CLASS SIZE As per the Formal Schools Catalog

A. Texts

Doc No	Title	Per Tr	Per Inst	Per Cl.
A-234-5678, VOLUMES 1 and 2	Commercial Utility Cargo Vehicle (TYPE A), Utility Operator and Maintenance Instructor Guide. Prepared by Chief of Naval Technical Training		1	
A-234-5678	Commercial Utility Cargo Vehicle (TYPE A), Utility Operator and Maintenance Trainee Guide Prepared by Chief of Naval Technical Training	1	1	

B. References

Doc. No	Title	Per Tr.	Per Inst	Per Cl
TM 09-2320-289-10	Operational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 x 4, M1009	1	1	
TM 09-2320-289-20	Organizational Maintenance Manual for Truck, Utility, Tactical, 3/4 Ton, 4 x 4, M1009	1	1	
TM 09-2320-289-30	Direct Support Maintenance Manual for Truck, Utility, Tactical, 3/4 Ton, 4 x 4, M1009	1	1	
	Chilton's Truck and Van Repair Manual, Chilton Book Company, 1984	1	1	

(1)

FIGURE 5-8-18. Example master materials list. (Sheet 1 of 5)

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MASTER MATERIALS LIST - Continued

C Equipment

Item No.	Nomenclature	Part No	Unit Cost	FSCM	Tech Ref.	Per Tr	Per Inst	Per Cl
1.	Commercial Utility Cargo Vehicle (TYPE A) 3/4 Ton 4 x 4	M1009						5
2.	Engine Components (Roll-Around Cart)							1
3.	Tools and test equipment				TM 09-2320-289-20			5
4.	Tools and test equipment				TM 09-2320-289-30			5
5.	Transmission (Cut-Away)							1
6.	Prefaulted Module	12345						5
7.	Prefaulted Module	12346						5
8.	Prefaulted Module	12347						5
9.	Prefaulted Module	12348						5
10.	Prefaulted Module	12349						5
11.	Prefaulted Module	12350						5
12.	Prefaulted Module	12351						5
13.	Prefaulted Module	12352						5
14	Prefaulted Module	12353						5

(2)

FIGURE 5-8-18. Example master materials list. (Sheet 2 of 5)

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MASTER MATERIALS LIST - Continued.

Item No.	Nomenclature	Part No	Unit Cost	FSCM	Tech Ref.	Per Tr	Per Inst.	Per Cl.
15.	Prefaulted Module	12354						5
16.	Prefaulted Module	12355						5
17.	Prefaulted Module	12356						5
18	Prefaulted Module	12357						5
19.	Prefaulted Module	12358						5

D. Films/Videotapes/Videodiscs

Designator	Title	Running Time	Per Cl
MN-8124A	STE/ICE Troubleshooting	20 min	1

E Graphics

Slides and transparencies are A-234-5678 series

1. Transparencies

Transparency No	Title	Per Cl	Source	Figure No
D542-4-4-1	Engine	1	Original transparency prepared by AV 1	
D542-4-4-2	Transmission	1	Original transparency Prepared by AV 1	
D542-4-4-3	Cooling Fan	1	TM 09-2320-289-20	7-9

(3)

FIGURE 5-8-18. Example master materials list. (Sheet 3 of 5)

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MASTER MATERIALS LIST - Continued.

Transparency No	Title	Per Cl.	Source	Figure No.	
D542-4-4-4	Blackout Domelight	1	TM 09-2320-289-20	8-30	
D542-4-4-5	Brake Assembly	1	TM 09-2320-289-20	11-7	
D542-4-4-6	Suspension Bumpers	1	TM 09-2320-289-20	11-34	
D542-8-1-1	Camber Angle	1	Original Transparency prepared by AV 1		
D542-8-1-2	Caster Angle	1	Original Transparency prepared by AV 1		
D542-8-1-3	Determine Caster Angle with equipment	1	Original Transparency prepared by AV 1		
D542-8-1-4 CH.1	Determine Caster Angle from specification charts	1	Original Transparency prepared by AV 1		*

2. Slides

Slide No.	Title	Per Cl.	Source
D542-8-4-1	Pitman Arm	1	Original slide prepared by AV 1
D542-8-4-2	Exploded View of New Process 208 Transfer Case	1	Original slide prepared by AV 1
D542-8-4-3	Exploded View of New Process 205 Transfer Case	1	Original slide prepared by AV 1

FIGURE 5-8-18. Example master materials list. (Sheet 4 of 5)

DOD-HDBK-292-2

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MASTER MATERIALS LIST - Continued

3. Wall Charts

Wall Chart No	Title	Per Cl.	Source	Figure No.
D542-1	Instrument Control Panel	1	TM 09-2320-289-10	7-1
D542-2	Fuse Panel	1	TM 09-2320-289-10	8-3
D542-3	Starter Solenoid	1	TM 09-2320-289-20	8-9
D542-4	Headlight Dimmer Switch	1	TM 09-2320-289-20	8-14
D542-5	Diesel Piston Assembly	1	Original Wall Chart Prepared by AV 1	
D542-6	Windshield Wiper System	1	Original Wall Chart prepared by AV 1	

F. Support materials

Instruction Sheets. All instruction sheets (i e , Diagram Sheets, Job Sheets, etc) are A-234-5678 series

Identification No.	Instruction Sheet Type	Title	Per Tr.	Per Inst.	Per Cl.

(All instruction sheets for this course are contained within Trainee Guide A-234-5678)

(5)

FIGURE 5-8-18. Example master materials list. (Sheet 5 of 5)

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PROFILE ITEM-TO-TOPIC OBJECTIVE ASSIGNMENT CHART

TABLE	ITEM	TOS	VOL	PART	SECT	TOPIC	L O	TEST ITEM NO
D620	1-3-1							
	a	T1	2		1	3	1	1
	a	T2			3	3	1	
	b(1)	T1			1	3	2	
	b(1)	T2			3	3	1	1,2
	thru							
	b(3)							
	b(4)	T1			1	3	2	
	b(4)	T2			3	3	1	
	b(5)	T1			1	3	2	
	c	T1			1	4	1	
	c	T2			3	3	2	
	d(1)	T1			1	4	2	
	d(1)	T2			3	3	3	1,2,3
	thru							
	d(4)							
	d(5)	T1			1	4	2	
	d(5)	T2			3	3	3	
	1-3-2	T1	1	D600	1	3	3	1,2,3
	1-3-2	T2	2		3	3	4	
	1-4-1	T1			1	4	4	1
	1-4-1	T2			3	4	1	1

TABLE	ITEM	TOS	VOL	PART	SECT	TOPIC	L.O.	TEST ITEM NO
	1-4-2	T1			1	4	5	1
	1-4-2	T2			3	4	2	1,2
	1-5-1	T1			1	5	1	1
	1-5-2	T1			1	5	2	1
	1-5-2	T2			3	5	1	1
	1-5-3	T1			1	5	3	1,2
	1-5-3	T2			3	5	2	1,2
	1-5-7	T1			1	5	3	1
	1-5-7	T2			3	5	3	1
	1-6-1	T2			3	6	2	1
	1-6-2	T2			3	6	3	1,2
	1-6-3	T2			3	6	4	1
	1-6-4	T2			3	6	5	1
	1-6-6	T2			3	6	6	1,2,3
	1-6-11	T2			3	6	7	1,2
	1-7-1	T1			1	2	5	1
	2-1-1	O1			2	1	1	
	2-1-1	O2			4	1	1	
	2-1-2	O1			2	1	2	
	2-1-2	O2			4	1	2	
	2-2-1	P1	1		2	1	2	
	2-2-1	P1	2		5	1	1	

(7)

SH132031591

FIGURE 5-8-19. Example profile item-to-topic objective assignment chart.

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FAULT APPLICABILITY LIST

PART	SECT	TOS	EQUIPMENT	FUNCTION FAULTED	FAULT NO.	DOCUMENT
D542	7	C1	CUCV (TYPE A)	Distributor cap	D542-1*	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Glow plug	D542-2	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Fuel filter	D542-3*	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Fuel tank	D542-4	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Throttle cable	D542-5*	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Muffler	D542-6	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Thermostat	D542-7*	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Starter	D542-8	TM 9-2320-289-20
D542	7	C1	CUCV (TYPE A)	Differential cover	D542-9	TM 9-2320-289-20
D542	9	C2	CUCV (TYPE A)	Rear brake drum	D542-10	TM 9-2320-289-20
D542	9	C2	CUCV (TYPE A)	Power booster assembly	D542-11	TM 9-2320-289-20
D542	9	C2	CUCV (TYPE A)	Master cylinder	D542-12*	TM 9-2320-289-20
D542	9	C2	CUCV (TYPE A)	Rear shock absorber	D542-13	TM 9-2320-289-20
D542	9	C2	CUCV (TYPE A)	Power steering pump	D542-14*	TM 9-2320-289-20
D542	9	C2	CUCV (TYPE A)	Engine	D542-15	TM 9-2320-289-20
D542	9	C1/C2	CUCV (TYPE A)	Relay	D542-16	TM 9-2320-289-20

NOTE 1 The PART and SECT columns indicate the most appropriate location within the curriculum to use the fault

NOTE 2: The asterisk in the Fault No column indicates that this fault is required for use in the curriculum.

NOTE 3: Faults approved for dual use (C1 as C2) are noted in the TOS column.

(8)

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FIGURE 5-8-20. Example fault applicability list.

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ANSWER SHEET

Instruction Sheet Type and Number	Question Number and Answer
Assignment Sheet D542-4-1-1	1. To enable a smooth flow of fuel throughout the system. 2. Crankcase 3. The pistons must be free from wear and able to move freely within their sleeves.
Assignment Sheet D542-4-1-2	1. Indicates a short in the motor 2. Indicates a faulty relay 3. 1/2 - 1/4" 4. Alternator
Assignment Sheet D542-4-1-3	1. Ensure that steering linkages and front suspension systems are aligned correctly and that all worn parts have been replaced. 2. The symptoms for improper wheel alignment and faulty power steering systems are similar. Since improper wheel alignment is more common, it should be checked first. 3. To pump fluid (oil) throughout the power steering system. 4. The system would be bled when there is air in the oil system.

(10)

FIGURE 5-8-21. Example answer sheet. (Sheet 1 of 2)

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ANSWER SHEET - Continued.

Instruction Sheet Type and Number	Question Number and Answer
Job Sheet D542-7-1-1	1.a Faulty thermostats, radiator leakage, broken or cracked hoses, low level of water in radiator, etc.
	1 b Check coolant system and oil cooler system for leaks.
	Check belts - missing damaged or slipping.
	Check Thermostat.
	Check radiator for damage.
	2 a None
	2.b Ensure there is proper ventilation.
	3.a Faulty thermostat
	4.a Engine
	4.b Ensure there is fuel in the tank
	Check fuel filter.
	Check fuel lines.
	Check fuel for contamination.
	5.a Check starting procedures.
	Check glow plugs.
	Check glow plug control system.
	Check for fuel to injector pump.
	5.b Ensure proper ventilation.
	6.a Contaminated fuel

(11)

FIGURE 5-8-21. Example answer sheet. (Sheet 2 of 2)

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5 9 TRAINEE GUIDE

5 9 Trainee guide The TG is a collection of training materials that will enable trainees to learn the skills and knowledge needed to master a given subject This section describes the format, content, and development guidelines for TGs as specified in the military standard and in DI-ILSS-80083

5 9 1 Use The TG provides the trainee with those materials, i e , instruction sheets, which enhance the trainee's acquisition of those knowledge and skills needed to gain mastery of a given subject The TG instruction sheets provide an instructional outline of supplemental information to the technical documentation, study questions, problems, job performance procedures, and self-study assignments

5 9 2 Elements The elements of the TG are the front matter and instruction sheets

(a) Front matter The front matter identifies the TG and describes use and content
(b) Instruction sheets Instruction sheets provide the trainee supplementary information needed to successfully complete a course

5 9 3 Development Development is based on the requirement to support an IG The TG is developed when deemed necessary because of the number of separate Instruction Sheets

5 9 3 1 Development of front matter The front matter of the TG identifies the document, its content and usage, changes to the document, and hazard warnings on the equipment The steps for developing the front matter of the TG are described below Each element will be placed in the TG in the order listed here

(a) Cover The cover includes the CIN, the TG volume number (if this is a multivolume set), the complete course title, authority notice, date of publication, the words, "Trainee Guide" and if required, the security classification and revision data (see figure 5-9-1)
(b) Trainee name page The trainee name page provides space for the trainee to enter his name and class number (see figure 5-9-2)
(c) List of effective pages The list of effective pages lists the change status of all pages in the volume (see figure 5-9-3) It has basically two columns which are repeated across the page the first column is labeled, "Page No " and is used to identify the pages of the TG The second column is labeled, "Change in Effect" and identifies the status of each page in the volume As official changes are inserted into a TG, the list of effective pages is updated In a multivolume set, a List of effective pages is included for each volume in the set

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(d) Letter of promulgation The letter of promulgation is normally provided by the contracting activity (see figure 5-9-4) It is located in the first volume of a multivolume TG

(e) Change record The change record provides space for recording information about each official change inserted in the TG (see figure 5-9-5) The change record identifies the change number, description, person who made the change, and the date the change was entered In a multivolume TG, a Change Record is included for each volume

(f) Hazard awareness notice The hazard awareness notice advises the trainees of safety precautions related to both personnel and equipment, as well as how to report hazards not included in the notice (see figure 5-9-6) Generally, the material in the hazard awareness notice is the same for all TGs, except for special considerations relating to specific equipment and it is identical to the hazard awareness notice included in the applicable IG It has four parts, the documentation, the general information, the specific precautions, and the hazard reporting statements Specific information on the parts of the hazard awareness notice was discussed in 5 8 1 5

(g) Table of contents The table of contents lists the front matter and instruction sheets, with their specific titles which identify the subject of the instruction sheet, contained in the TG and the page on which each is located (see figure 5-9-7) The instruction sheets are listed beneath an entry that identifies the IG part which the sheet supports The table of contents for the first volume of a multivolume set contains a complete listing of all volumes Subsequent volumes contain only the contents of the respective volumes

(h) Development of the how to use your guide The how to use your guide page includes a general description of the composition, function, and use of the TG (see figure 5-9-8) The elements of the how to use your guide are described below

(1) Trainee guide This paragraph contains introductory statements about the use of the TG For example, if the TG is classified upon filling in certain assignment or job sheets, this paragraph would state that the TGs must be properly safeguarded or, if students were not to write in the TG or could write only on certain pages, this paragraph would specify on which pages they are allowed to write

(2) Other publications This paragraph identifies TGs which are superseded as a result of this TG and identifies any other references or publications which may be helpful in completing the course

(3) Presentation of course material This paragraph includes a general description of the purpose, composition, and use of the TG

(4) Written and performance tests This paragraph describes the testing program for the course From this paragraph, trainees

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should have a general idea of the types of tests they will be given to assess their comprehension of stated objectives

(5) Safety precautions This paragraph reemphasizes the need for the trainee to observe all safety precautions as stated in the hazard awareness notice If there are "training only" safety reminders, these should be listed here

(6) Security Each TG shall bear the highest security classification demanded by its contents Classification must be in accordance with the effective edition of DoD 5220 22-M or OPNAVINST 5510 1, applicable contracting activity instructions This paragraph describes information and procedures pertaining to the handling and safeguarding of classified materials This includes directions on handling, transporting, and stowing TGs

5 9 3 2 Development of instruction sheets Instruction sheets provide trainees supplementary information needed to successfully complete a course There are five types of instruction sheets Each will be discussed in the 5 9 3 3 through 5 9 3 7

(a) Instruction sheet layout Instruction sheets are printed on only one side of the paper The blank backs of each page are not numbered and must have the words "This page intentionally left blank" printed in the middle of the page.

(b) Instruction sheet identification Each instruction sheet is titled as to type (e g , assignment sheet, information sheet) and is identified with a four-element compound number (see table 5-9-I)

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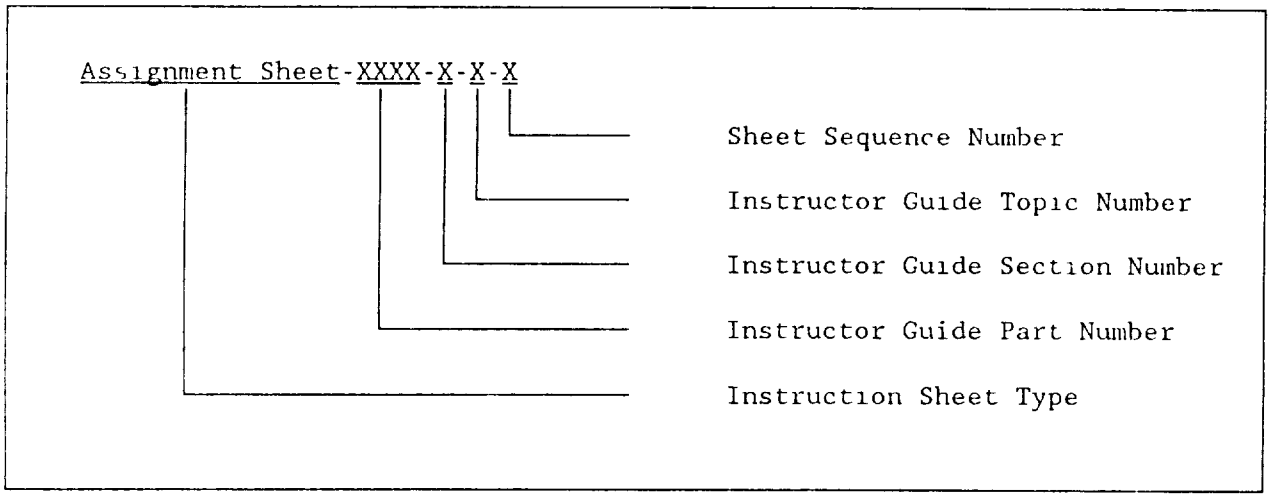
TABLE 5-9-I Example instruction sheet identification



The first instruction sheet used within a specific topic is assigned the sheet sequence number 1, the second instruction sheet is number 2, etc The statement "FOR TRAINING USE ONLY" must be printed in the lower middle of the page

5 9 3 3 Assignment sheet Assignment sheets direct the trainee to required reading material and may include questions on the assignments The assignment sheet is used to simplify the trainee's search for relevant data and direct his efforts to extract appropriate information (see figure 5-9-9) Information may be contained in a number of manuals, in different areas of a manual, or in instruction sheets Therefore, assignment sheets are needed to identify the exact location of the required data This may include identification of the paragraph, page, figure, or diagram numbers, and the applicable area of a figure, diagram, or Information Sheet The title of an assignment sheet should describe the subject matter of the sheet By guiding the trainee to proper information sources, the assignment sheets also help to prepare the trainee for future job tasks that require researching and locating data required for operation and maintenance Assignment sheets also maximize the effectiveness of the trainee's study by giving clear statements of topic learning objectives and study questions that direct the trainee's thinking and their search for relevant data and knowledge Each assignment sheet is divided into three sections, TLOs, study assignments, and study questions

(a) Topic learning objectives The TLOs are identical to the applicable objectives in the IG These objectives are listed under the appropriate heading on the assignment sheet If several assignment sheets are developed to support one topic, only those TLOs directly related to the subject of the assignment sheet must be listed

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(b) Study assignment Each study assignment is listed (e g , read NAVEDTRA XXX, study diagram XXX, complete problem sheet XXX) For each assignment, the document is identified by name, paragraph, page, figure, and diagram numbers as required Paragraph number, rather than page number, must be used whenever possible When only portions of documents are applicable to the assignment, these portions are identified Specific study instructions, including preferred sequence of study are included

(c) Study questions Study questions are developed to direct the trainee's thinking, to ensure that they understand what they have studied, and to test their ability to apply the information to the needs of the job The questions included in this section should promote decision-making similar to that required in the job assignment Questions designed only to determine whether a trainee has read the assignment should not be included nor should questions that allow direct lifting of an answer from the study material When study questions with discrete answers are given, these answers are provided for the instructor on the answer sheet in the IG Questions must be developed in the formats discussed in 5 7

5 9 3 4 Diagram sheet Diagram sheets provide the trainee with copies of special course material such as diagrams, schematics, or illustrations (see figure 5-9-10) These sheets may provide information shown by a chalkboard sketch, instructional media material such as a transparency or slide, or provide any diagram or schematic the curriculum designer may deem important for the trainee's use The purpose of these sheets is to eliminate the need for trainees to copy such information during the course of instruction Thus, the loss of many training manhours spent copying diagrams and simplified schematics is prevented through the use of the Diagram Sheets They also improve instructional effectiveness which might otherwise be lost by trainees' divided attention during training and then later referencing incomplete diagrams and misunderstood concepts Diagram sheets must not be provided where material exists in available reference documentation and the use of this documentation, will suffice

(a) General format When necessary, a diagram sheet is developed to provide illustrative material to the trainee and may support other instruction sheets It is organized in any reasonable manner Diagram sheets may range from a simplified schematic to foldout schematics or block diagrams Generally, diagrams should be large enough for the trainee to make pertinent notations, such as tolerance, waveforms, or special characteristics Each diagram sheet title should describe the subject matter of the sheet

5 9 3 5 Information sheet Information sheets provide additional, amplifying, or background information essential to the trainee's thorough technical understanding (see figure 5-9-11) They are developed when information is not found in technical manuals or other official documentation, when the informa-

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tion is located in several manuals, or when the information in the documents is incomplete, incorrect, or at an oversimplified level from a training standpoint They also can be used if the information contained in technical documentation is too advanced for the presentation, in a format that does not support the topic sequence, or would be time consuming beyond the established course/topic times The information sheet has three sections introduction, references, and information A brief description of each follows

(a) Introduction This section provides a general explanation of how or why an understanding of the material covered will benefit the trainee

(b) References This section identifies all publications used to develop the information sheet Each reference fully identifies the document by number, volume, part, and complete title, as applicable

(c) Information This section is written clearly and to a level consistent with the course content to ensure full understanding by the trainee Reference is made, as applicable, to information in technical manuals or other approved publications by citing specific paragraphs, figures, tables, etc This section provides one of three types of data information on new concepts, background information, or clarifying information

(1) Information on new concepts New concepts include devices, circuits, components, or techniques that are relatively new in a particular field The technical manuals must presume an understanding of the fundamentals of most innovations and, may not completely explain or describe new concepts The information sheet bridges the gap between what the trainee knows and what the technical manual presumes Some examples of subjects that may be in an information sheet are special integrated circuit components, unique symbols, or terminology The information sheet dealing with new concepts includes explanations and descriptions to provide the trainee with an understanding of the necessary fundamentals, parameters, and application When new symbols, abbreviations, or terms are used, the information sheet may take the form of the glossary, providing the user with a reference for accurate definitions

(2) Background information For practical reasons, technical manuals must assume a certain level of background knowledge by trainees in principles, concepts and in other required disciplines In actuality, the background knowledge of trainees varies widely The information sheet dealing with background data is developed to ensure that all trainees start at an equal level of knowledge on such subjects as mathematics, transistors, magnetic amplifiers, pulse modulation, moving target indication, acceleration meters, resolvers, synchroservos, etc Such data should not be so extensive as to constitute an individual

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instruction course A brief description of underlying fundamentals should be sufficient

(3) Clarifying information Occasionally, data in a technical manual is unclear, oversimplified, or inadequate for training In such cases the information section is developed to provide the necessary data in a concise, comprehensible form suitable for training

(4) General formatting. The information section of an information sheet is written clearly and to a level consistent with the course content to ensure full understanding by the trainee Reference is made, as applicable, to information in technical manuals or other approved publications by citing specific paragraphs, figures, tables, etc

5.9 3 6 Job sheet The job sheets are developed as soon as the skill PPP line items have been selected for a particular course and their training levels determined Job sheets direct the trainee in the step-by-step performance of a practical job that may be encountered in the job assignment (e g , a standard operating procedure or a standard maintenance procedure), and should include self-test questions The use of self-test questions following each job step in the job sheet can provide numerous benefits such as effective utilization of trainee time for the majority of trainees while others are performing the job steps on the equipment, practice in making the same decisions that may be required in the job assignment, and more thorough evaluation of both trainee performance and accomplishment of TLOs

(a) General requirements Job sheets provide a means for the trainee to apply knowledge obtained during instruction and do not contain any direction to the instructor Each job sheet must require the trainee to use the technical documentation in performing the task just as it would be performed in the job assignment When documentation is inadequate or incomplete for training, amplifying information may be incorporated in the Job Sheet

(b) Specific requirements The job sheet title must describe the subject matter of the sheet The job sheet has four sections introduction, equipment, references, and job steps (see figure 5-9-12)

(1) Introduction This section clearly and concisely describes the purpose of the job sheet and explains the trainee benefits that can be expected

(2) Equipment This section provides a complete list of all equipment required by the trainee for accomplishing the job

(3) References All publications required to perform the job step portion of the job sheet are listed in this section Each reference must fully identify the document by number, volume, and part, as applicable, and complete title

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(4) Job steps This section consists of either general or discrete step-by-step procedures for performing operation, maintenance, troubleshooting, or repair

A major job step development consideration, where appropriate, is "Activities" This step directs the trainee to record, for example, a meter reading or oscilloscope waveform, or prepare a brief statement indicating a pertinent condition of the equipment The information recorded must provide a means of evaluating the trainee's efforts, and may provide the trainee with information that they will be required to analyze on completion of the job. The trainee must not be required to enter data which is not pertinent to the task being performed If the job is one that requires trainee analysis of gathered data, the job step should include questions requiring short sentences or short phrases indicating the trainee's ability to provide the proper analysis

A second major consideration is "Categories " The mechanics of developing the job steps depend on the effectiveness of the job instructions listed in the technical manual Depending on the contents of the technical manual, job steps will fall into one of three general categories that will determine development procedures as follows

In each of the following categories, provide sufficient space under each job step that requires the trainee to record information

Category 1 If technical manual instructions are complete and accurate

(a) Refer trainee to appropriate paragraphs in the technical manual
(b) List the job steps in numerical order Each job step will require completion of one or more instructions (or steps) in the technical manual
(c) Group technical manual instruction to permit recording useful data or checking of job progress by the instructor Data entry will be directed by later job steps in numerical order Provide space for data entry
(d) Include as a job step the return of equipment to its original condition
(e) As appropriate, direct analysis of recorded data with a question or series of questions after each job step

Category 2 If technical manual instructions are incomplete or erroneous

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(a) Follow the same directions for job steps that appear in item category 1, as applicable
(b) Report the problem via official channels

NOTE. It is undesirable to deviate from the technical manual instructions or sequence The following procedures will be approved only after a detailed technical review has been completed by higher authority

(c) Where an instruction (or step) in the technical manual is in error, develop a job step that provides the correct procedures and supersedes the technical manual instruction
(d) When instructions necessary for training are lacking or inadequate, develop the correct procedures for the task as separate job steps in the appropriate sequence
(e) Where additional procedures are required to supplement technical manual instructions, provide the necessary job steps
(f) If some technical manual instructions are not in the proper sequence, design job steps that provide directions for selecting the instructions from the manual in the appropriate sequence
(g) Reference applicable portions of the technical manual (text, illustration, diagrams)

Category 3 If job steps are for troubleshooting practice, they should include as a minimum the following trainee entry requirements

(a) Record the trouble symptoms that are apparent from the front panel
(b) Identify the unit (drawer, assembly, or other) in which the malfunction occurs
(c) Identify the state (or module) in which the malfunction occurs
(d) Identify the part that caused the malfunction and describe the failure (open, shorted, leaky, etc)

(5) Self-tests Self-test questions, included as applicable following each job step, are developed to exercise the decision-making requirements that a trainee may face at his actual job assignment These questions constitute an open-book test, with the trainee permitted to use the technical manuals and other course materials in seeking answers Test question development guidelines are discussed in 5 7 In general, when developing self-test questions, the following principles must be considered

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(a) Questions must be easily understood, grammatically correct, and easily graded by the instructor
(b) Content must always be technically correct and have direct application to the equipment
(c) Questions that permit answers from pure memory or from course material must be avoided in favor of questions requiring analysis and thought similar to that required in the actual job situation
(d) As far as possible, each question must measure how well the trainee can apply the knowledge gained and how well he can use the information provided in the technical manual and in other course material
(e) When answers to job sheet questions are not documented elsewhere, as in a fault users manual, they will be provided on the answer sheet in the IG The answer sheet shall be referenced on the D-D-A page under the RIA

5 9 3 7 Problem sheet Problem sheets present practical problems requiring analysis and decision-making similar to what a trainee may encounter in the actual job assignment (see figure 5-9-13) The problem sheet is an effective method of engaging the trainee in problem solving, emphasizing the fundamentals of logical thinking, and giving practice in the application of knowledge to practical situations A problem sheet is needed when the subject matter of a course requires the ability to solve a problem in a logical manner Typical examples of such reasoning situations are troubleshooting problems Often, sufficient equipment is not available in the laboratory, or laboratory activity must be supplemented The mental ability and orderly reasoning processes required for solving troubleshooting problems can be exercised and applied on a paperwork problem presented by a problem sheet Where discrete answers exist for problems, they are provided on the answer sheet in the applicable Instructor Guide

(a) General formatting A problem sheet may be organized in any reasonable manner that promotes problem-solving abilities Each problem sheet title should describe the subject matter of the sheet Each sheet provides a clear statement of the problem, the conditions and parameters affecting the problem, and the directions and procedures for the solution to the problem A problem sheet is not to be used for testing, a makework device, a substitute for laboratory activity, or a do-it-yourself training method

5 9 3 8 Assembling the TG The TG may be organized into one or more volumes, depending on the quantity of material How the material is divided into volumes is a matter of choice within the following limits The front matter and instruction sheets included in a volume must fit into a 2" binder (approximately 200 sheets) and the instruction sheets must be sequenced in the order in which they are taught

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(a) In keeping with the intent of 5 9 3.8, one could have a course where volume 1 addresses theory and volume 2 addresses maintenance Or, if a course taught the theory and maintenance of equipments "x", "y", and "z", volume 1 might address the materials related to equipment "x", Volume 2 equipment "y", and volume 3 equipment "z" Or if the volume of material was too great to place all the material associated with equipment "x" in one volume, one might put all the material related to theory into volume 1 and the material related to maintenance into volume 2.

(b) When a part exceeds the size of one volume it is continued in additional volumes The binders are identified by volume number in Arabic numerals The cover of each volume will contain the same information, except for the volume number and change identification The first volume of a multivolume set contains a table of contents for all the volumes in the set. Each succeeding volume contains a Table of Contents for that volume only

(c) Each TG page is numbered in the lower right-hand corner Front matter pages are numbered consecutively with lower-case Roman numerals The cover, trainee name page, and letter of promulgation are not numbered although they will be counted as pages i, ii, and iv of the front matter Instruction sheets are assembled, following the front matter, in the order in which they are referred in the applicable IG, and are numbered consecutively through each individual volume of the TG with Arabic numerals in the lower right-hand corner of each page

5 9 3 9 Composition of instruction sheets without a TG Whenever a TG is not required, usually when the different types of instruction sheets total less than 25 separate pages, instruction sheets must be distributed separately without front matter Each instruction sheet distributed without a TG will be listed in the IG on the appropriate topic pages and in the MML under "Support Materials" Instruction sheets distributed separately will be fully identified by the CIN, Instruction sheet type and number and the sheet number (sheet 1 of 2) The composition of the instruction sheet will be as described in 5 9 3 3 through 5.9 3 7 except that the following items will be omitted when instruction sheets are not distributed with a TG (1) Volume identification from the running head, (2) the designation "TRAINEE GUIDE" from the running head, and (3) the Arabic page number from the lower right-hand corner (see figure 5-9-14)

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(CLASSIFICATION)

(CHANGE)
A-234-5678 (VOLUME)
(REVISION)

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
OPERATOR AND MAINTENANCE

TRAINEE GUIDE

Published by Direction of the Chief of Naval Technical Training

(CLASSIFICATION)

FIGURE 5-9-1 Example trainee guide cover

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TRAINEE GUIDE A-234-5678

TRAINEE NAME PAGE

TRAINEE GUIDE

Name _____

Class No _____

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FIGURE 5-9-2 Example trainee name page

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TRAINEE GUIDE A-234-5678

LIST OF EFFECTIVE PAGES

Page No	Change in Effect	Page No	Change in Effect	Page No	Change in Effect
Cover, iii	Change 2				
Letter of Promulgation	Original				
v	Change 2				
vi	Orignial				
vii thru ix	Change 1				
1 thru 3	Original				
4, 4a	Change 1				
4b thru 4e	Change 2				
5 thru 20	Original				

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FIGURE 5-9-3 Example trainee guide list of effective pages

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DEPARTMENT OF THE NAVY
CHIEF OF NAVAL TECHNICAL TRAINING
NAVAL AIR STATION MEMPHIS (75)
MILLINGTON, TENNESSEE 38054

1 January 1986

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY OPERATOR AND MAINTENANCE

A-234-5678

This Instructor Guide and its related training support material constitute the approved curriculum, developed in accordance with MIL-STD-001379C (NAVY) and associated data item descriptions Deviation from this curriculum is not authorized until approved by the Chief of Naval Technical Training

Corrections and recommended changes are invited and must be submitted in accordance with direction and procedures provided in approved references, via the Course Curriculum Model Manager

This curriculum supersedes all previous curricula for the Commercial Utility Cargo Vehicle (TYPE A), Utility Operator and Maintenance

J. E. Roper

E ROPER
Captain, U S Navy
Assistant Chief of Staff for
Instructional Standards and
Academic Programs

FIGURE 5-9-4 Example trainee guide letter of promulgation

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TRAINEE GUIDE A-234-5678

CHANGE RECORD

Number and Description of Change	Entered By	Date

v

SH132031594

FIGURE 5-9-5 Example trainee guide change record

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TRAINEE GUIDE A 234-5678

HAZARD AWARENESS NOTICE

All personnel involved in operation or maintenance of transportation vehicles must be thoroughly familiar with the equipment safety precautions contained in Organization Maintenance Manual for Truck, Utility, Tactical, 3/4 ton, 4 x 4 M1009 (2320-01-233-2665), TM 9-2320-239-20 In addition, attention is directed to the Accident Prevention Manual, OPNAVINST 5101 2 Series

The equipment emits deadly carbon monoxide gases when in operation which can be fatal to personnel, if inhaled Extreme caution must be exercised when working with or near this equipment While very practical precaution has been incorporated into this equipment, it is not possible or practical to try to list every condition or hazard that can be encountered

Don't service or adjust equipment alone Under no circumstances will a person perform maintennace on this equipment without the presence or assistance of another person capable of giving aid Unless under direct supervision of a qualified person, no person shall operate or maintain equipment for which he is not qualified

Service equipment in well ventilated spaces only Under no circumstances will a person operate or perform maintenance on this equipment unless the spaces are adequately ventilated

Report all hazards If at any time you detect a hazard, it is your responsibility to report the hazard to ensure that it is corrected If at any time you detect a "new" or "suspected new" hazard, particularly due to equipment installation, modification, or repair, it is your responsibility to report it through your chain-of-command to ensure that a SAFETYGRAM is submitted to the Naval Safety Center, Norfolk, VA in accordance with OPNAVINST 5102 1 series This will ensure that this hazard will be investigated, published, or corrected, as required

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FIGURE 5-9-6 Example trainee guide hazard awareness notice

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TABLE OF CONTENTS

Part	Page
FRONT MATTER	
Cover	i
Trainee Name Page	ii
List of Effective Pages	iii
Letter of Promulgation	iv
Change Record	v
Hazard Awareness Notice	vi
Table of Content	vii
How to Use Your Guide	ix
D542 Commercial Utility Cargo Vehicle (TYPE A),	
Information Sheet D542-1-1-1 - Terms and Abbreviations	1
Assignment Sheet D542-1-1-1 - Terms and Abbreviations	4
Information Sheet D542-1-2-1 - Major Components	5
Diagram Sheet D542-1-2-1 - Physical Description	3
Diagram Sheet D542-1-2-2 - Interface Description	9
Assignment Sheet D542-1-2-1 - Physical Description	10
Assignment Sheet D542-2-1-1 - Functional Description	11
Assignment Sheet D542-2-2-1 - Interface Description	12
Assignment Sheet D542-2-3-1 - Operational Description	13
Job Sheet D542-3-1-1 - Basic Operation	14
Information Sheet D542-4-1-1 - Functional Engine	17
Information Sheet D542-4-1-2 - Function of Electrical System	21
Information Sheet D542-4-1-3, CH 1 - Function of Transfer Case	25
Diagram Sheet D542-4-1-1 - Engine Components	27
Assignment Sheet D542-4-1-1 - Functional Description	28
Assignment Sheet D542-4-1-2 - Transmission	30
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FIGURE 5-9-7 Example trainee guide table of contents (Sheet 1 of 2)

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FIGURE 5-9-7 Example trainee guide table of contents (Sheet 2 of 2)

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TRAINEE GUIDE A-234-5678

HOW TO USE YOUR GUIDE

TRAINEE GUIDE

This publication is now in your custody and is for your use while learning theory of operations, adjustment, alignment, and maintenance of the Commercial Utility Cargo Vehicle (TYPE A), Utility

You may not mark any pages in this book except for Job Sheets, Diagram Sheets, Problem Sheets, and Trainee Name Page

Upon completion of this course of instruction return this Trainee Guide to your instructor

OTHER PUBLICATIONS

Reference publications, TM 9-2320-289 10/20/34 series, contain most of the information needed for this equipment but were not prepared for training use

This Trainee Guide was prepared to guide your training on this equipment and prepare you to use the equipment documentation in maintaining the Commercial Utility Cargo Vehicle (TYPE A), Utility

Several other pertinent publications will be referred to frequently during the course

PRESENTATION OF COURSE MATERIAL

The course material on the Commercial Utility Cargo Vehicle (TYPE A) Utility is divided into Sections and Topics, presented in a logical sequence Adjustment, alignment, troubleshooting, and efficient use of maintenance aids (documentation and test equipment) are stressed The knowledge and skills to be acquired are stated for each topic so that you can check your progress

Assignments in TM 9-2320 289-10/20/34 series, and other publications are given for study The effectiveness of this Trainee Guide depends upon the conscientious accomplishment of the reading and study assignments in the reference publications

WRITTEN AND PERFORMANCE TESTS

A testing program consisting of written and practical performance tests will be administered by the instructor

SAFETY PRECAUTIONS

Carbon monoxide, generated when the equipment is operating, is extremely dangerous and can be fatal if inhaled Read the safety precautions carefully and be aware of potential danger when working on the equipment Practice safety while learning and while maintaining equipment Take the time to be safe

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FIGURE 5-9-8 Example how to use your guide (Sheet 1 of 2)

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TRAINEE GUIDE A-234-5678

HOW TO USE YOUR GUIDE - Continued

SECURITY

In the event that classified information is added to this Trainee Guide as a result of trainee notes, the Trainee Guide shall be marked and handled in accordance with the regulations of the latest edition of the Department of the Navy Supplement to the DOD Information Security Program Regulation (OPNAVINST 5510 1)

x

FIGURE 5-9-8 Example how to use your guide (Sheet 2 of 2)

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TRAINEE GUIDE — CHANGE 1
A-234-5678
Sheet 1 of 1

ASSIGNMENT SHEET D542-4-1-3, CH 1

FUNCTIONAL OPERATION OF POWER STEERING SYSTEMS

A TOPIC LEARNING OBJECTIVES

Upon successful completion of this topic, you will be able to

1 Describe the functional operation of all major and associated components and functional sections of the CUCV (TYPE A) to the detail required to support degraded/casualty/abnormal/not full mission capable operation, preventive and corrective maintenance of power steering systems Include, when appropriate, the methods of control, operational inputs, and outputs of each

a Engine
b Transmission
c NP208 Transfer case
d NP205 Transfer case
e Front axle
f Rear axle
g Electrical system
h Wheels/tires
i Frame
j Body
k Painting/rustproofing

B STUDY ASSIGNMENT

1 Read Chilton's Truck Van Repair Manual, 1984, Chilton Book Company, 1984, paragraphs T75 through T78 and paragraphs U227 through U229

C STUDY QUESTIONS

1 What maintenance procedures are to be completed before attempting any maintenance on the power steering?

2 Why is it important to have the vehicle's wheels properly aligned * before doing any maintenance checks on the power steering? *

3 What is the function of the power steering pump?

4 At what times would you bleed the power steering system?

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FIGURE 5-9-9 Example assignment sheet with change

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Sheet 1 of 1

DIAGRAM SHEET D542-7-1-1

FRONT AXLE SHAFT AND RETAINER

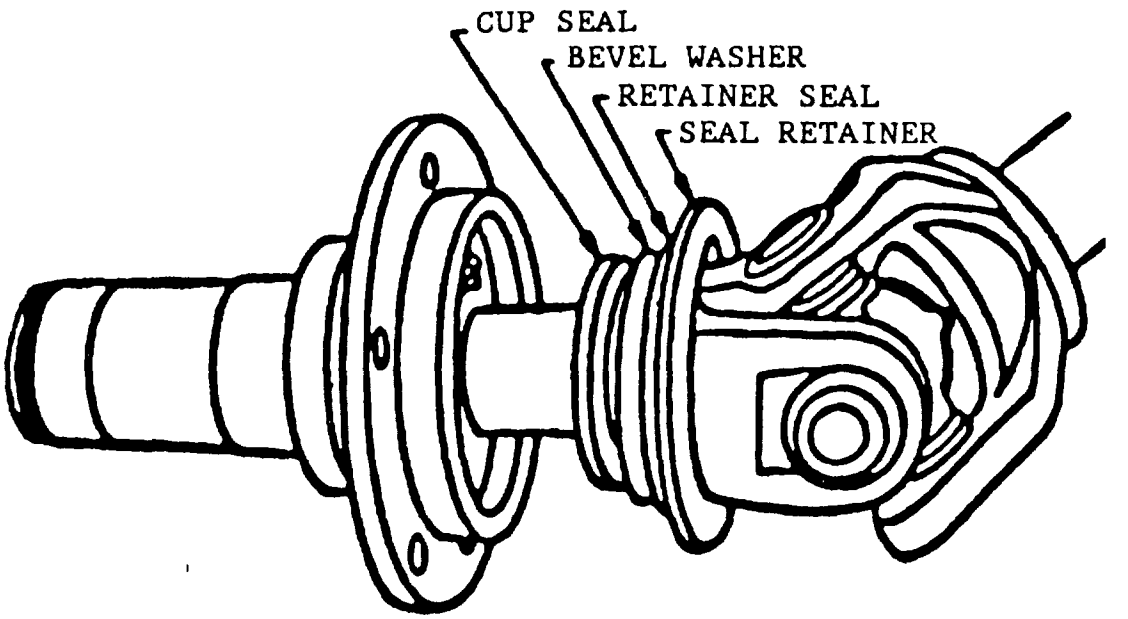

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FIGURE 5-9-10 Example diagram sheet

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Sheet 1 of 1

INFORMATION SHEET D542-4 4-2

PITMAN ARM

A INTRODUCTION

1 This information sheet is designed to provide you with an understanding of the physical and functional characteristics of the Pitman Arm

2 This information sheet defines how the Pitman Arm is inspected

B REFERENCES

1 None

C INFORMATION

1 The Pitman Arm is a lever which is mounted on the steering box and joined to the steering linkage by means of a clamp bolt Its purpose is to turn the front wheels The Pitman Arm is made of galvanized steel and fits neatly over the Pitman Shaft It is secured to the shaft by means of the clamp bolt

2 The procedure to inspect and repair the Pitman Arm is as follows

	INSPECT		REPAIR PROCEDURE
a	Worn bushings	-	replace bushings
b	Breakage	-	replace Pitman Arm
c	Excessive wear	-	replace Pitman Arm
d	Bends in arm	-	replace Pitman Arm

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FIGURE 5-9-11 Example information sheet

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Sheet 1 of 3

JOB SHEET D542-7-1-1

FAULT ISOLATION PROCEDURES FOR THE
COMMERICAL UTILITY CARGO VEHICLE (TYPE-A), UTILITY

A INTRODUCTION

1 This job sheet will help you become proficient at troubleshooting the CUCV (TYPE A) to the faulty component using applicable references

B EQUIPMENT

1 CUCV (TYPE A)

2 Test Equipment

a STE/ICE Vehicle Test Meter

3 Tools

a Basic hand tools

b Special Tool Set, Organizational Maintenance

C REFERENCES

1 TM 9 2320-289-20, Organizational Maintenance Manual for Truck, Utility, Tactical, 3/4 Ton, 4x4, M 1009

2 Chilton, Chilton's Truck and Van Repair Manual, 1984

D JOB STEPS

Step 1 A recent operator of the CUCV (TYPE A) reports that the engine overheats when the vehicle has been driven for more than 30 minutes

a What are the possible causes for engines overheating?

_____

_____

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FIGURE 5-9-12 Example job sheet (Sheet 1 of 3)

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TRAINEE GUIDE A-234 5678
JOB SHEET D542-7-1-1 Sheet 2 of 3

b What inspections would you make before starting the CUCV (TYPE A)?

_____

_____

c Conduct the inspections on the CUCV (TYPE A) that you identified in step 1 b and record the results

_____

_____

INSTRUCTOR CHECK _____
SAT

Step 2 Based on the information provided by your instructor, perform all pre-start operational checks and inspections

a In what major component does the fault probably exist?

_____

b What pre-start operational checks and inspections will you perform?

_____

c Perform the pre-start operational checks and inspections Record the results below

_____

d What operational checks and inspections will you make with the engine running to determine why the engine is over heating?

_____

INSTRUCTOR CHECK _____
SAT

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FIGURE 5-9-12 Example job sheet (Sheet 2 of 3)

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TRAINEE GUIDE A-234-5678
JOB SHEET D542-7-1-1 Sheet 3 of 3

Step 3 Start the CUCV (TYPE A) and perform operational checks and inspections

a What safety precautions must you observe before starting the equipment?

_____

_____

INSTRUCTOR CHECK _____
SAT

b Record the results of the inspections you made with the engine running

_____

_____

Step 4 Isolate Fault

a What is the probable fault?

_____

INSTRUCTOR CHECK _____
SAT

Step 5 Stop the CUCV (TYPE A), return the vehicle to normal

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FIGURE 5-9-12 Example job sheet (Sheet 3 of 3)

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Sheet 1 of 2

PROBLEM SHEET D542-4-4 1
TROUBLESHOOTING THE CUCV (TYPE A)

A INTRODUCTION

This problem sheet will help you become proficient at troubleshooting the CUCV (Type A), using the authorized technical documentation

B REFERENCES

1 TM 9-2320-289-20, Organizational Maintenance Manual for Truck Utility, Tactical, 3/4 Ton, 4x4, M 1009

2 Chilton's Truck and Van Repair Manual, 1984, Chilton Book Company, 1984

C PROBLEM

Using the authorized technical documentation, list in a logical order the troubleshooting steps required to isolate the problem

D GIVEN

Each CUCV (TYPE A) malfunction can be identified and isolated using the authorized technical documentation

E INITIAL CONDITIONS

An operator of a CUCV (TYPE A) reports that his vehicle will start but will not continue to idle

F REQUIRED RESPONSES

1 Locate the symptom index

_____

2 Locate the symptom

_____

3 Where are the recommended tests and inspections located?

_____

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FIGURE 5-9-13 Example problem sheet (Sheet 1 of 2)

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TRAINEE GUIDE A-234-5678
PROBLEM SHEET D542 4-4-1 Sheet 2 of 2

4 Locate the "Troubleshooting and Diagnosing" chapter

_____

5 Once the problem has been identified list the technical documentation and the steps required to correct the problem

_____

_____

_____

_____

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FIGURE 5-9-13 Example problem sheet (Sheet 2 of 2)

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A 234-5678
Sheet 1 of 1

ASSIGNMENT SHEET D542-4-1-2

FUNCTIONAL OPERATION OF THE TRANSMISSION

A TOPIC LEARNING OBJECTIVES

Upon successful completion of this topic, you will be able to

1 Describe the functional operation of all major and associated components and functional sections of the CUCV (TYPE A) to the detail required to support degraded/casualty/abnormal/not full mission capable operation, preventive and corrective maintenance of the transmission Include, when appropriate the methods of control, operational inputs, and outputs of each

a Engine
b Transmission
c NP208 Transfer case
d NP205 Transfer case
e Front axle
f Rear axle
g Electrical system
h Wheels/tires
i Frame
j Body
k Painting/rustproofing

B STUDY ASSIGNMENT

1 Read Chilton's, Truck Van Repair Manual, 1984, Chilton Book Company, 1984, paragraphs T86 through T98 and paragraphs U240 through U262

C STUDY QUESTIONS

1 What maintenance procedures are to be completed before attempting any maintenance on the transmission?

2 Why is it important to have the vehicle's transfer cases properly aligned before doing any maintenance checks on the transmission?

3 What is the function of the power piston?

4 At what times would you change the oil filter?

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FIGURE 5-9-14 Example job sheet without a trainee guide

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5 10 TRAINING MATERIAL OUTLINE

5 10 Training material outline The Training Material Outline (TMO) provides detailed recommendations with justification for instructional media materials, in relation to each topic listed on the outline The TMO defines the content of the training package This section describes the format, content, and development guidelines of the TMO as specified in the military standard and DI-ILSS-80084

5 10 1 Use Submission of the TMO provides the proposed media content and type, curriculum and training path system applicability, estimated completion time, and the rationale for the proposal When approved by the contracting activity, the TMO becomes the master plan for production of instructional media materials

5 10 2 Elements The elements of the TMO are the individual outline pages

5 10 3 Development determination The TMO is developed around the curriculum designer's determination of a legitimate need for instructional media materials to support formal or informal training The following paragraphs are intended to assist in determining the need for instructional media materials

(a) Determining need for instructional media materials The purpose of presentation media is not to eliminate the human element in the classroom, but to supplement it Each medium has its own unique application to learning Some approaches are better than others, but selection is often based on the curriculum developer's judgement Instructional media materials reinforce or supplement training provided in the formal environment They may be used separately, with other instructional media materials, or with an IG Contractors recommending audio-visual materials should compare costs of the various approaches and weigh the applications, advantages, and disadvantages In comparing costs of various media, it is important to recognize that certain costs are necessary regardless of the technique or media selected In general, these baseline costs include classroom and laboratory space and their supporting logistics, instructors, the first set of operating equipment plus necessary tools, test equipment, and stimulation, and copies of technical manuals and procedural documents normally required in operating and maintaining the tactical equipment Refer to table 5-10-I to assist in deciding what materials are needed

(b) Media Checklist Once the developer has determined a need for instructional media materials, the following questions will help determine whether the decision is justified and what instructional media materials are required Each individual proposal for instructional media materials must be checked against table 5-10-II Note that the basic decisions reached are simple

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(1) Audio-visual materials are/are not needed
(2) If single visuals are required, a decision is made as to whether a wall chart, slide or transparency should be developed
(3) If multiple visuals are required, another path is invoked to made additional decisions
(4) If motion is required, still another path is invoked to make further decisions

The questions are not all inclusive nor are all situations covered These tables apply specifically to knowledge presentation materials required to support training

TABLE 5-10-I Application, advantages, disadvantages, and cost considerations

1 Programed materials

Application

Programed printed materials may be used as the primary vehicle for guiding a trainee through a self-paced course of instruction They may be self-contained, but are more commonly designed to make full use of existing technical manuals and other resource material by programing the trainee to those resources at the appropriate times Instruction of subjects which require only still visual presentation are adaptable to this form of instructional media Programed printed materials have their greatest application in subjects that require the development of good reading skills If marginal reading skills can be tolerated in subsequent job performance, these materials may be augmented by audio recordings

Advantages

1 Each trainee can proceed at a rate in accordance with his particular abilities and interests

2 Learning may be accomplished at any convenient time and place and can be repeated or restudied as desired

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TABLE 5-10-1 Application, advantages, disadvantages, and cost considerations - Continued

3 As a result of the program development process, materials are organized and sequenced in a proven, advantageous manner for learning

4 The difficulty and conceptual level of the material may be adapted to varying trainee populations

5 Cost per trainee is quite low, if used for stable subjects in high volume

6 The trainee receives immediate reinforcement when his responses are correct

Disadvantages

1 It takes longer to write material in programed instruction format and perform the validation trials, thus raising the initial cost compared to other printed materials

2 It is difficult to use programed materials for reference The format does not lend itself to the easy access of information

3 The required organization of material can discourage independent inquiry

4 Programed materials rely heavily on the reading ability of the trainee

Cost considerations

The initial cost for development, including writing and validation of programed printed materials is significantly higher than nonprogramed printed materials Maintenance costs depend on the revision requirements, but will normally be higher than for nonprogramed materials However, these materials present the lowest cost mode of self-paced instruction They may be augmented by audio and by still or motion visuals to achieve a fully effective multi-media program

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

2 Audio

Application

Audio tapes may be used for large groups but are most advantageous when used for individualized instruction They are useful in preserving information for future reference and also for augmenting other media such as programed workbooks and visual aids

Advantages

1 Tapes provide alternate information sources for trainees with low reading skill levels

2 Tapes permit the rearrangement of sound materials through editing, thus enabling the side-by-side comparison of material

3 Tape playback units can be small and portable

4 The auditory component or conditions of actual tasks may be preserved for future reference and analysis

5 If desired, the presentation time can be shortened by running the tape at a slightly higher speed for listening, or by removal of dead time within and between words If the material requires "true" reproduction (e g , SONAR classification tape), speeding up the tape would cause distortion of the audio

6 Trainee constructed response is possible with recorders for later analysis and interpretation

7 Exact timing of presentations is possible

8 Tapes may be erased and reused

Disadvantages

1 No capability of providing a visual or tactile experience

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

2 High susceptibility to outside distraction if earphones are not used

3 Fixed rate of information flow, therefore, adjustments to learner's rate are generally impracticable

Cost considerations

When recordings are produced locally with existing recorders the cost is very low Audio tape recorders are quite inexpensive

3 Wall charts

Application

WCs are part of formal curricula used to visually present information to the trainee and aid the instructor in his presentation They are normally programed by an Instructor Guide

Advantages

1 They require fewer environmental adjustments than projected visuals

2 They are not dependent upon availability and operability of projection equipment

Disadvantages

1 WCs rely heavily on the effectiveness of an available instructor

2 In large quantities, they are more difficult to use and store in comparison to projected visuals

Cost considerations

WCs are primarily an inexpensive medium Development and implementation costs are relatively low because of the minimal expense of the materials utilized Maintenance and duplication are relatively inexpensive

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

4 Slide presentations

Applications

Slide presentations may be used as stand-alone products, supporting informal training, or as part of formal curricula

1 Slide presentations included with formal curricula are intended to supplement or reinforce the discussion points within a topic Used as such, the slides may be programed from the following

a Instructor guide The Related Instructor Activity (RIA) column of the Instructor Guide directs when to show the slide, while the instructor provides the related information

b Lecture guide The Lecture Outline within the Lecture Guide provides the instructor with a key point outline keyed to each slide in the sequence of the presentation

c Audio cassette The Audio Cassette contains all of the narration required to support the slides as well as audible or inaudible tones to program slide advancement

2 Slide presentations used in the informal training environment are essentially stand-alone presentations used to present a complete subject within a self-contained package These presentations are programed from the following

a Lecture Guide in the same format as that used in formal training, except that the presentation is usually administered by a subject matter expert vice an instructor

b Audio Cassette in the same format as that used in formal training In this case, the presentation may be used for group or individual instruction For individual instruction, all of the pertinent information/instructions for the viewer are contained on the cassette

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

Advantages

Slide presentations have the following advantages as an instructional medium

1 The full range of photographic techniques (stop action, selected depth of field, microphotography, air brushing, etc) is available

2 Examinations may be incorporated into the medium

3 Slide sequence may be rearranged easily to meet specific needs

4 Program update is easily accomplished without extensive changes or expensive equipment

5 Slides can be made with any 35mm camera, enabling local productions

6 The size of the 35mm slide makes storage relatively simple

7 The projected image can be seen by large groups

Disadvantages

The limitations of this medium are

1 Motion cannot be shown

2 For group use, the room must be partially darkened for good visibility

3 The instructor cannot provide additional visual data as with a transparency

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

Cost considerations

Individual slides are relatively inexpensive to produce The major cost of slide presentations is development of the audiovisual concept of the program itself Wall charts, transparencies, and other single visual media do not require the planning and coordination necessary to build an entire slide presentation

5 Motion picture presentations

Applications

Films are most effective with moderate to large groups Generally, they serve as a secondary vice primary medium Some subjects can be taught entirely with films, but these cases are rare

Advantages

Films have the following advantages as instructional media

1 They provide alternate information channels for trainees with low reading skills

2 They provide continuity of action, showing events as they actually occur

3 "Front seats" can be provided Demonstrations can be shown, using all necessary equipment, showing all of the actual steps Everything can be shown at the right angle, aspect, and speed for best analysis and learning

4 Skills can be learned by watching a task performed on film and subsequently practicing the task

5 Dangerous or expensive procedures can be shown

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

Disadvantages

The limitations of this medium are

1 Darkness is required, precluding note taking

2 Films are fairly expensive to produce

3 Updating is relatively complex and expensive

Cost considerations

Films are a relatively expensive medium, not only in terms of projection devices required but in total development and production costs. They must be developed specifically to the learning needs and levels of the target population

6 Vidoetape presentations

Applications

1 Stand-Alone The stand-alone presentation may be used in either formal or informal training They are designed to support a central theme by developing several major points in a continuous flow of information They do not generally require any specific programing Where applicable, they may be programed from Instructor Guides or Self-Study Workbooks

2 Programed The programed presentations are also designed to support a central idea by developing major points in a continuous flow of information They differ from stand-alone materials in that the central idea behind the Videotape (VT) supports unique training needs that cannot be met adequately through any other media The programing media for these presentations are

a Self-Study Workbook The Self-Study Workbook is, in effect, a self study learning package that requires little or no assistance to complete It may or may not use VTs, slides, or other materials to assist the learning process

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

b Instructor Guide The related Instructor Activity column of the Instructor Guide tells the instructor when and where to show the VT in supporting specific discussion points

3 Specialized The Specialized presentations are programed by an Instructor Guide to support formal training needs They present one or a related series of segments Each should be designed to illustrate a single concept or idea Specialized VTs should only be developed when motion or a complex operation is difficult to present using transparencies or other conventional media

Advantages

VT presentations have all of the advantages listed for 16mm motion pictures Section 5 15 In addition, they have the following unique advantages when used as instructional media

1 The immediate search and playback capabilities permits greater utilization as part of individualized learning efforts, such as provided by Self-Study Workbooks

2 The familiarity of the average trainee with the equipment minimizes distracting novelty effects

3 VTs are relatively inexpensive to duplicate, either one-time or in large quantity

Disadvantages

Disadvantages of this medium include

1 Equipment is generally more expensive and complex than comparable motion picture devices

2 There are tape size and format differences that make VTs incompatible with some types of video playback equipment

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

Cost considerations

Development of high quality videotaped studio productions requires a large and highly skilled staff As technology continues to grow, excellent results are being obtained using hand-held cameras and mobile studios Original productions require a significant amount of preliminary design work long before actual taping begins In comparison with 16mm motion pictures, VT presentations are more expensive to develop initially

7 Realia

Application

Realia is especially useful in teaching system, subsystem, or equipment operation, maintenance, or task and funcitons It is used for this purpose, in both the tactical environment (on-the-job training) and in the school environment Realia also lends itself to demonstrations

Advantages

Realia creates a conducive learning situation by visually and functionally duplicating tactical environment reality Although the emotional atmosphere may be substantially different, training with realia offers the best chance for maximum transfer of learning to the job situation

Disadvantages

1 In training with realia, there may also be a hazard to personnel and equipment

2 For on-the-job training applications, realia has a prime operational mission which can create scheduling conflicts for its training function

Cost considerations

1 For complex equipment or systems, the inital cost of procurement and installation is high

2 Realia costs approximate the cost of tactical equipment

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

8 Stimulators

Application

Stimulators have wide application in the area of operation skill practice Stimulators are also useful in creating the training environments for some forms of maintenance skills

Advantages

1 Stimulators greatly multiply the usability of training hardware that requires signal/data inputs from outside sources

2 Stimulators can generate error and casulaty signals that would be difficult to generate using realia

Disadvantages

1 Stimulators frequently involve the use of expensive data processing equipment

2 Stimulators often require the use of special operating and maintenance skills

Cost considerations

Stimulator costs can vary from a few dollars for simple electronic signal generators to thousands for complex computers

9 Hardware simulators

Application

Hardware simulators are used to provide trainee practice in performing system, subsystem, or equipment operational and maintenance procedures

Advantages

Hardware simultors are used in place of realia when

1 The realia is not available for training functions

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TABLE 5-10-I Application, advantages, disadvantages, and cost considerations - Continued

2 The simulator is much more cost-effective

3 The simulator has training characteristics not available in the realia

4 The simulator affords safety to the operator and equipment which is not available when using the realia

Disadvantages

Realistic interface with the trainee is limited largely to the interface components of hardware, i e , the control panel or the dials, indicators, switches, etc, designed for operator interface Internal interface, such as entering cabinets or drawers to replace or adjust components, is not normally possible with simulators.

Cost considerations

1 Sometimes, the cost of designing, producing, and maintaining a simulator is greater than procuring and using the realia

2 Simulator costs vary from the inexpensive for simple front panels, to almost as much as the tactical hardware itself When projected acquisition and maintenance costs approach the cost of realia, the safety and training advantages available in the simulator must be carefully weighed against the advantage of realism available only in live hardware

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TABLE 5-10-II. Media decision checklist. (Sheet 1 of 2)

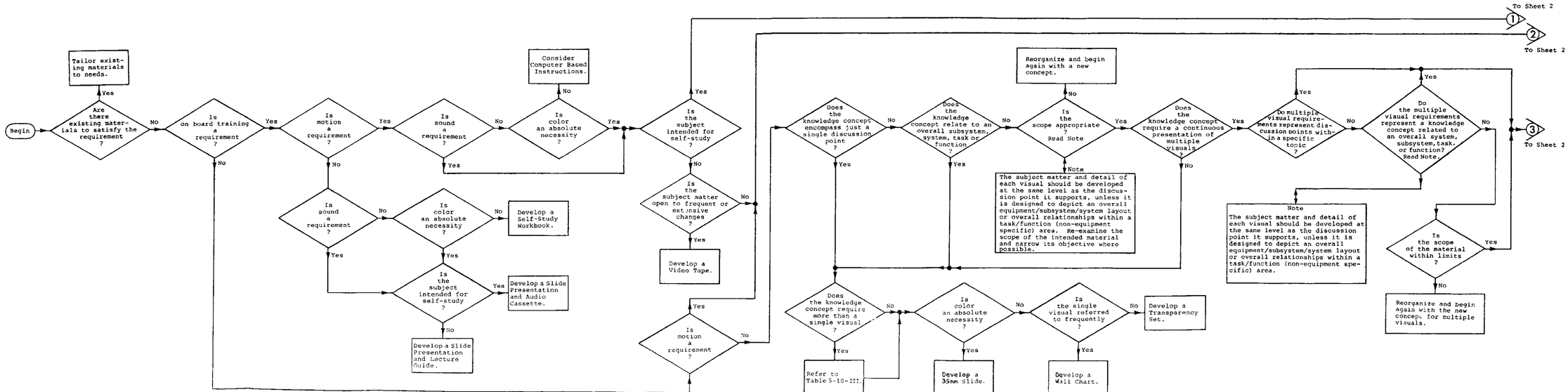

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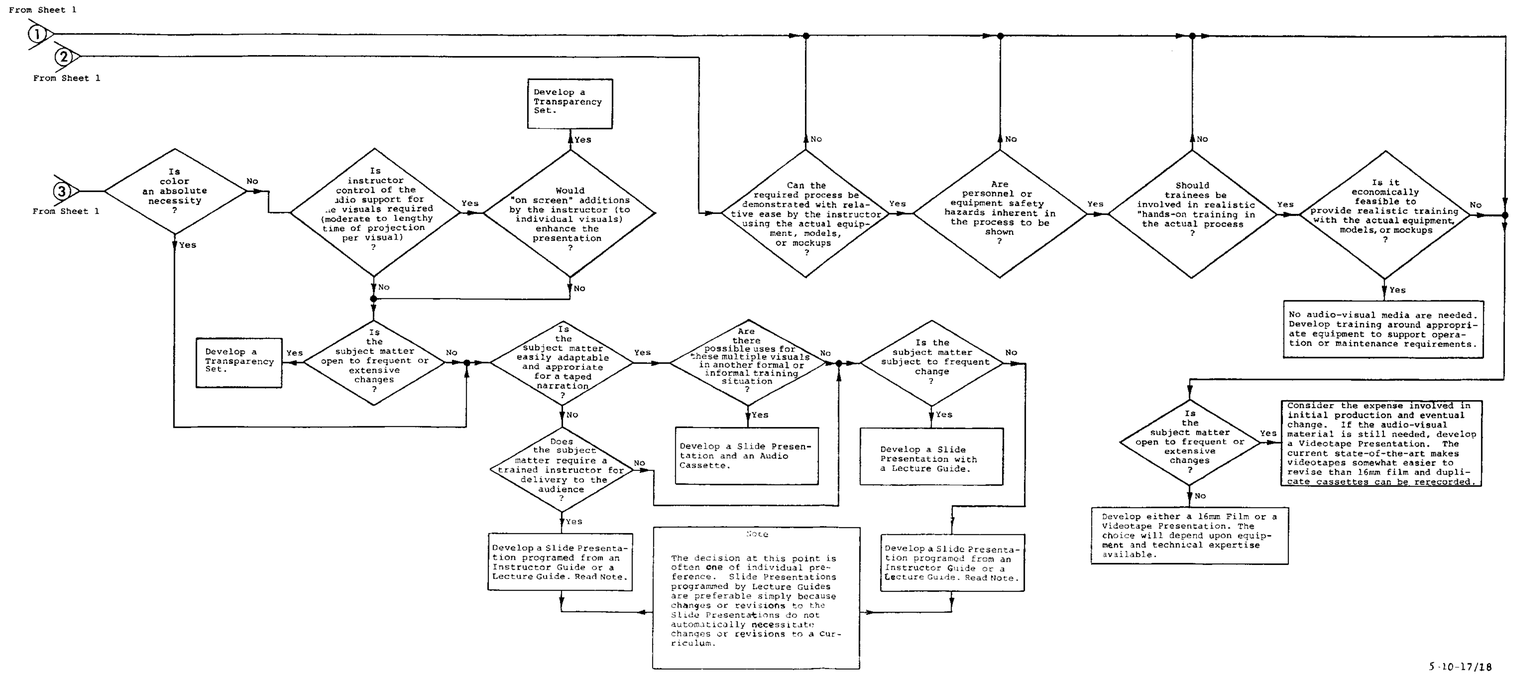
TABLE 5-10-11. Media decision checklist. (Sheet 2 of 2)



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(c) Determine presentation sequence Determine the subject presentation sequence as one of the first steps in the process The approved TMO describes the sequence of major sections Sections may be sequenced as shown in table 5-10-III, or may run from "simple to complex," "cause to effect," or any other approach that fits the particular need

TABLE 5-10-III Examples of presentation sequence

1 Sequencing may be based on the logical order of events, such as

a Turn power on
b Allow equipment to warm up for 30 minutes
c Proceed with calibration check

2 Sequencing may be based on the importance of the action, such as

a Connect test leads before turning equipment on
b Apply power
c Proceed with calibration check

3 Sequencing may be based on the degree of knowledge required, such as

a The Internal Combustion Engine
(1) Mechanical operation
(2) Lubrication
(3) Electrical
(a) Coil
(b) Distributor
1 Rotor
2 Points
(c) Spark Plugs

5 10 3.1 Development process The following paragraphs and examples are intended to assist in the development process

(a) Content The outline pages must contain the following information (see figures 5-10-1 and 5-10-2)

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(1) Training material outline "TRAINING MATERIAL OUTLINE", on the top of the page, identifies the document
(2) Proposed title The first "Proposed Title" is preceded by the letter A, the second by the letter B, etc
(3) Lesson number "Lesson Number" is where the actual number of the lesson is placed The lesson number is constructed of

(a) Course identification number The CIN identifies the activity responsible for the course and its assigned number The CIN will be provided by the contracting activity For proposals related to informal training, "Not Applicable" must be entered in the outline
(b) Part number This number refers to the number of the part in an Instructor Guide (IG), for which the proposed instructional media material supports
(c) Section number This number refers to the number of the section, in an IG, for which the proposed instructional media material supports
(d) Topic number This number refers to the number of the topic, in an IG, for which the proposed instructional media material supports

(4) Media type "Media Type" identifies the proposed instructional media material type For the purpose of this handbook, instructional media material types must be limited to those referred to in 5 11 through 5 22
(5) Training path system applicability For both formal and informal training, the applicable Training Path System (TPS) must be identified by the associated Training Path Chart (TPC) number
(6) Personnel performance profile/training objective statements applicability This area identifies the Personnel Performance Profile (PPP) and Training Objective Statements (TOS) for which the instructional media materials are applicable The entry consists of

(a) PPP table Identifies the number of the PPP table for which the instructional media materials are proposed
(b) Item Identifies the applicable PPP table line item
(c) TOS Identifies the TOS supporting the PPP line item

(7) Training environment This area identifies the instructional setting, formal or informal, in which the proposed instructional media materials are to be used
(8) Associated training material This area identifies all associated materials required to accomplish the training for which the proposed instructional media materials support

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(9) Justification The basic reason, or need for instructional media materials must be briefly explained

(10) Media content This area provides a summary of the proposed instructional media material content

(11) Estimated completion time This is a projected estimate of the time required for an individual to complete the actions of an instructional media material For example, if the media type is a videotape presentation, the estimated completion time is the videotape running time If the media type is a Self-Study Workbook, the estimated completion time is the Self-Study Workbook developer's best estimate of the amount of time a trainee will spend in completing the Self-Study Workbook (completing the reading assignments, work sheets, tests, etc)

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TRAINING MATERIAL OUTLINE

A Proposed Title Commercial Utility Cargo Vehicle (TYPE A), Utility Field Applications

Lesson Number A-234-5678, Part D542, Section 2, Topic 1

Media Type: Specialized Videotape Presentation

TPS Applicability Construction Mechanic (TPC-CM1)

PPP/TOS Applicability	PPP Table	Item	TOS
	D542	2-1-1	01

Training Environment Formal, Group-Paced

Associated Training Material None

Justification Trainees have experienced difficulty visualizing the supporting equipment for the basic vehicle and the versatility that is available Training assets do not exist for live demonstrations and space limitations preclude the use of mockups

Media Content This Specialized Videotape will visually demonstrate the various versions of the vehicle and the options available All special equipment packages will be demonstrated

Estimated Completion Time Four minutes

FIGURE 5-10-1 Example training material outline page for formal training requirement

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TRAINING MATERIAL OUTLINE

A Proposed Title Commercial Utility Cargo Vehicle (TYPE A), Utility Emergency Driving Training

Lesson Number Not applicable

Media Type Self-Study Workbook (SSWB)

TPS Applicability Construction Mechanic (TPC-CM1)

PPP/TOS Applicability	PPP Table	Item	TOS
	B076	1-2-1	TO
		1-2-2	TO
		1-2-3	TO
		1-2-4	TO
		1-2-5	TO
		1-2-6	TO
		1-2-7	TO
		1-2-8	TO
		1-2-9	TO
		1-2-10	TO

Training Environment Informal, Self-Paced

Associated Training Material None

Justification Prospective drivers have experienced difficulty visualizing the emergency equipment and associated emergency vehicle operation requirements Assets exist for live demonstrations only after the prospective drivers have attained the prerequisite knowledge

Media Content This SSWB will provide information and assignment sheets designed to provide the inexperienced driver with the knowledge requirement prerequisites prior to beginning the performance of emergency driver training

Estimated Completion Time 12 hours

FIGURE 5-10-2 Example training material outline page for informal training requirement

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5 11 WALL CHART

5 11 Wall chart A wall chart (WC) is a component of knowledge presentation media This section describes the format, content, and development guidelines for WCs prepared to support curricula as specified in the military standard and in DI-ILSS-80089

5 11 1 Use. WCs are provided as part of formal curricula to visually present information to the trainee and aid the instructor in his presentation Usage is normally programed by an IG, as described in 5 8

5 11 2 Elements The elements of a WC are the printed visual of a prepared diagram or pictorial placed on a paper, cloth, or plastic medium

5 11 3 Development process WC development is based on the approved TMO Guidelines for preparing the TMO are contained in Section 5 10 WCs are perhaps one of the easiest forms of instructional media to develop Remember though, because of their bulk and storage problems, it is important to firmly establish the need for the chart during initial course planning

(a) Initial instructional media materials design Once the need for WCs has been established and the developer has a good idea of the size and type required, the initial design work begins The following paragraphs outline the development requirements for WCs

(b) Visualization strategy The subject matter and detail of each WC should be developed at the same level as the discussion point it supports, unless it is designed to depict an overall system/subsystem/equipment layout, or portions of a system/subsystem/or equipment All applicable interface should be shown WCs may be required to show organizational or functional relationships within a specific task/function, non-equipment specific, area (see figure 5-11-1) ' Follow a strategy similar to that used in selecting illustrations and tables for technical manuals when choosing visuals for use with curricula Unnecessary duplication of figures and tables from technical manuals should be avoided Some selection criteria are

(1) Select only those visuals which require special emphasis by the instructor to bring out important discussion points in the Instructor Guide
(2) Supplement rather than replace the spoken word
(3) Make every effort to avoid a cluttered view

(c) Determine visual objectives Visual objectives are statements of one central thought or theme to be derived from a single visual and its programing medium, and should be developed next These differ from training objectives For example, a significant visual objective might be "provide cutaway view of gears to indicate input-output relationships " State the reason for developing the visual Note

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the visual objectives in outline form to assist in later program design or write them on a rough storyboard illustration card

(d) Artwork considerations The following paragraphs disclose sources of artwork, development of original art, and marking requirements

(1) Artwork sources The preferred sources of artwork for WCs are technical manuals Line drawings, schematics, photographs, block diagrams, logic diagrams, flow diagrams, etc , should be selected When suitable materials are not available in technical manuals, original art should be developed The technical manual artwork is prepared to the designated technical manual specification Minor modifications to a technical manual figure may be required (e g , minor subject matter changes, addition or deletion of callouts, etc), to make the figure adequate for training (see figure 5-11-2) Possible sources include photographs and cutaways of the actual equipment, line drawings, and schematics from technical manuals However this art should be reviewed for suitability as a WC For instance, too much data on the illustration may make the WC difficult to read This may be corrected by deleting any unnecessary data Procedures and processes to be shown should be based on the applicable technical manuals and verified by subject matter experts before beginning final production

(2) Original artwork development When suitable materials are not available in technical manuals, original art should be developed For example, in the absence of adequate technical manual illustrations, it may be necessary to develop a detailed interface diagram for a complex system Possible sources include photographic enlargements of actual equipment, line drawings, cutaways, etc

(3) Dimensions The final image size for WCs may vary The developer must ensure that artwork prepared for WCs, when dimensioned to its final size, will retain good viewing characteristics WC height must normally not be greater than 36 inches, though under certain circumstances up to 42 inches is permissable, with no length restrictions Size of the WC should adequately support the training environment Reduced size WCs must be used for review with full size WCs provided for actual classroom use

(4) Markings All lettering, lines, captions, and callouts will be included in the original art within the copy boundary lines Identification callouts must be located as near as possible to the identified part, consistent with presentable layout (see figure 5-11-3) Legends or remote keying with numbered callouts should not be used Abbreviations should be used only when

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absolutely necessary to conserve space, but never in titles Each WC must have the following markings

(a) A title located in a clear unobscured area of the WC Title lettering height must be not less than 1/2 inch, bold face print, no abbreviations
(b) The proper security classification on the top and bottom of the image area Each WC must bear the highest security classification demanded by its contents Classification must be in accordance with the DoD Instruction 5520 22-M or OPNAVINST 5510 1, applicable contracting activity instructions No marking on unclassified WCs
(c) The complete WC identification number inscribed in the upper right-hand corner of the chart
(d) The WC reference number must be placed in the lower left-hand corner of the chart (when applicable)

5 11 3 1 Content and format The following information and examples are provided to assist in production

(a) Title The complete title of the subject matter must be used with no abbreviations
b WC identification number The components of the WC identification number are described and expanded upon below (see table 5-11-I) If a WC is used more than once in a curriculum, it must not be identified with a new number for each use WCs are numbered consecutively When a WC is deleted, its number is no longer used Components of the WC identification number are

(1) Course identification number The CIN must identify the activity responsible for the WC and the assigned number
(2) Personnel performance profile table number This number is the number of the PPP table which the WC supports PPP table numbers will be assigned by the Government and are furnished by the contracting activity
(3) Sequence number This number identifies the order in which the WCs are to be used in the lesson/course
(4) Change number This number identifies the sequential number of the change, as assigned by the course curricula model manager as part of any normal change process

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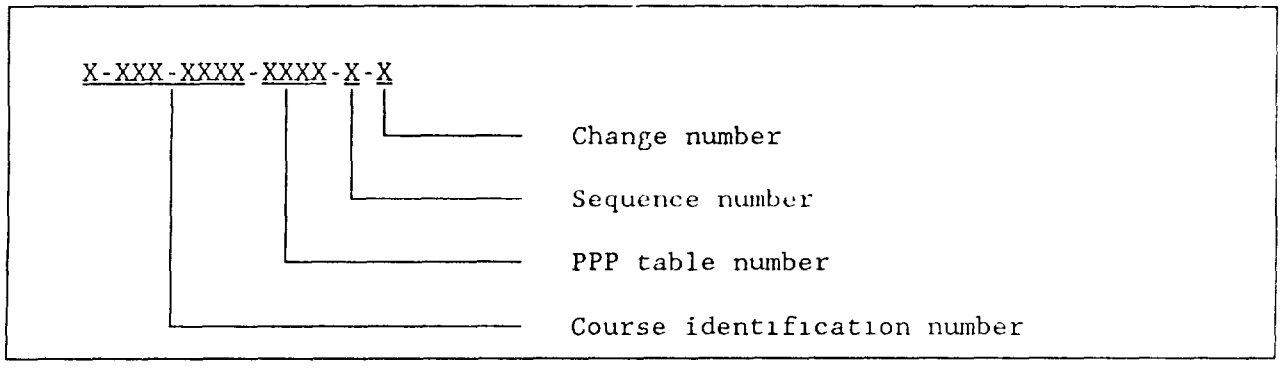
TABLE 5-11-I Example wall chart identification number



(c) Wall chart reference number The components of the WC reference number are described and expanded upon below (see table 5-11-II) The WC reference number, when applicable, is placed on the lower left side of the WC Its elements are

(1) Weapon system/equipment number This number is an 11 character designation consisting of the DoD nomenclature of the related end item (e g , an F-14B would be F-14B000000)

(2) Work unit code number This number is a five digit code that identifies the system, subsystem, component, or part of the end item Work unit codes are provided by the contracting activity For cases where no work unit code number has been assigned, zeros shall be entered in this area

(3) Serial number This is a four digit number indicating the serial number, in the order of presentation, of the WC with respect to the system/subsystem, component, or part of the end item ,described by the work unit code number (e g , 0001, 0002, etc)

(4) Revision letter This letter, if applicable, is a one character alpha code indicating the revision status of the WC For example, the first revision to a WC would be indicated by an A, the second by a B, the third by a C, etc The letters "I", "O", "Q", "S", and "Z" must not be used, to avoid confusion with the numbers one, zero, five, and two

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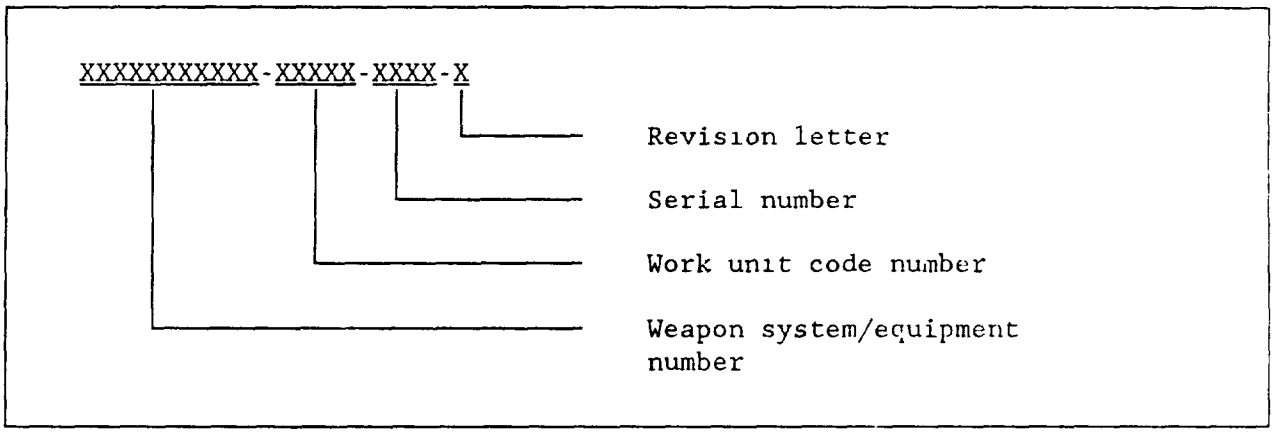
TABLE 5-11-II Example wall chart reference number



5.11 3.2 Quality assurance All WCs must present a clear image with sharp, unbroken lines and lettering at a distance of 20 feet Materials for WCs will be of sufficient size, and weight, and durable enough for the intended purpose Actual or reduced size WCs will be used for review with full size WCs provided for actual classroom use A reduced size paper copy will be provided with the final WC which can be used during surveillance of the curriculum material

5 11 3 3 Preservation and packaging Unless directed by contracting activity instructions, good commercial practices apply to the packaging of WCs for shipment

5 11 3 4 Shipping. All materials should be packaged for acceptance by common or other carrier for safe transportation, at the lowest rate, to the point of delivery Cartons must be able to withstand storage, rehandling, and reshipment without repackaging Material must be packed in cartons with fillers or thicknesses of corrugated board added to hold the material tight and stable The outside of each shipping carton must have a label clearly affixed to one end Unless otherwise directed by the contracting activity, the label will clearly identify type of material being shipped, contract or order number, identification number, quantity in carton, number of each carton and total number of cartons (carton 1 of 3, etc) and name of material preparing activity

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INTERNATIONAL TRAFFIC SIGNS/MARKERS

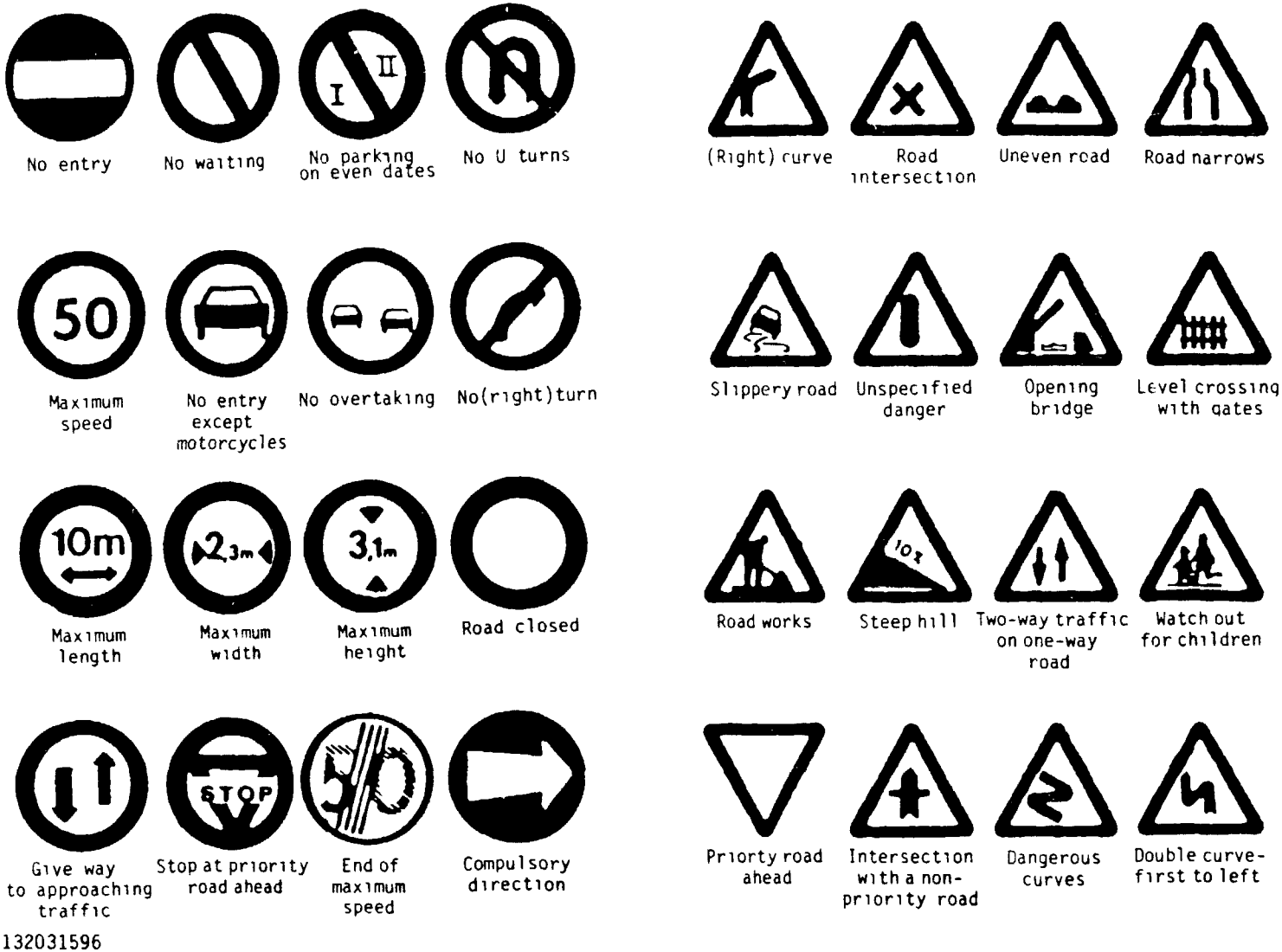

FIGURE 5-11-1. Example non-equipment related wall chart.

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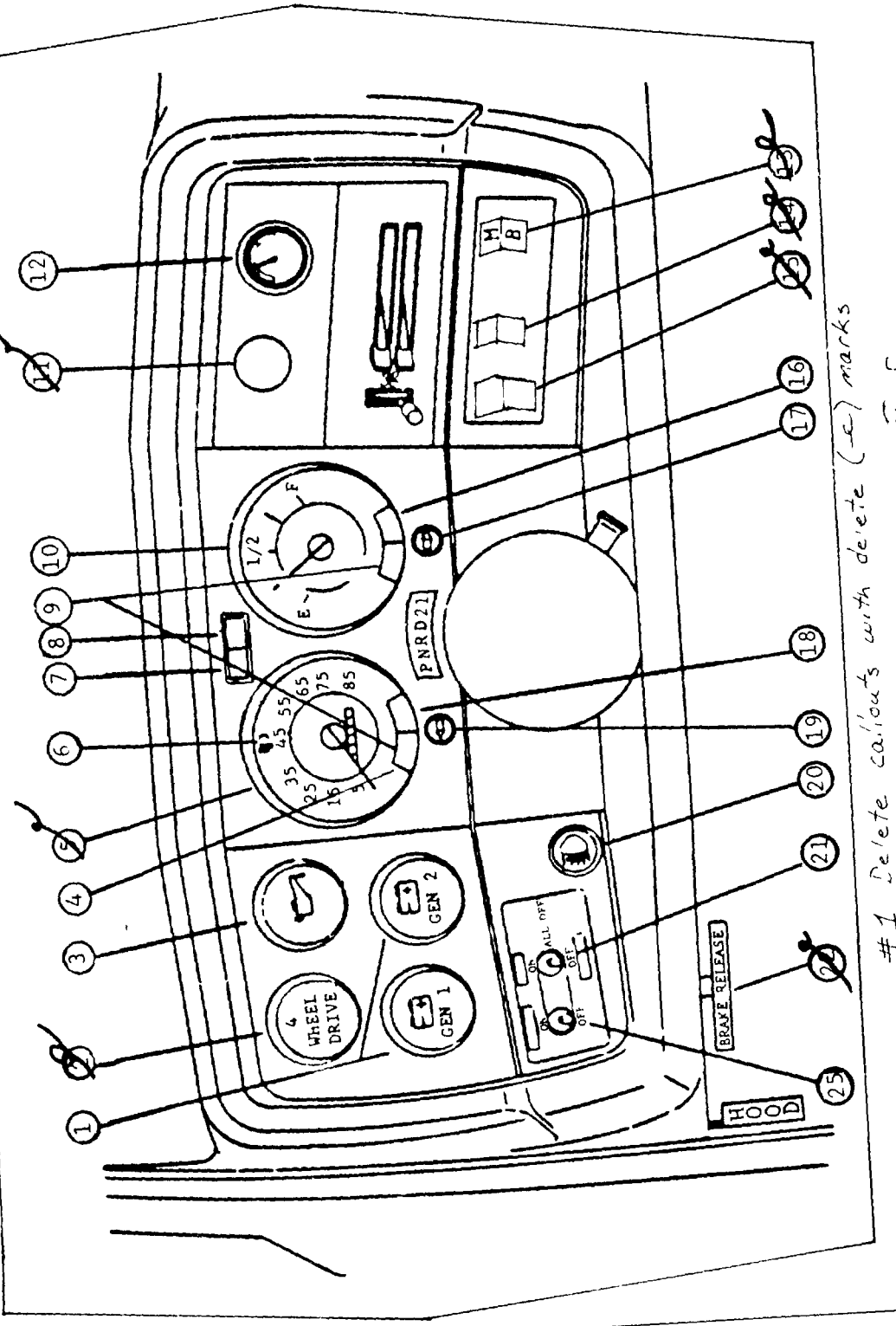
A-234-5678-117-2-3-1

COMMERCIAL UTILITY CARGO VEHICLE M1008 - INSTRUMENTS, CONTROLS, AND GAGES



#1 Delete callouts with delete (~~) marks

#2 Use proper nomenclature vice (Ref) for callouts (list enclosed)

SH132031597

FIGURE 5-11-2. Example rough wall chart art.

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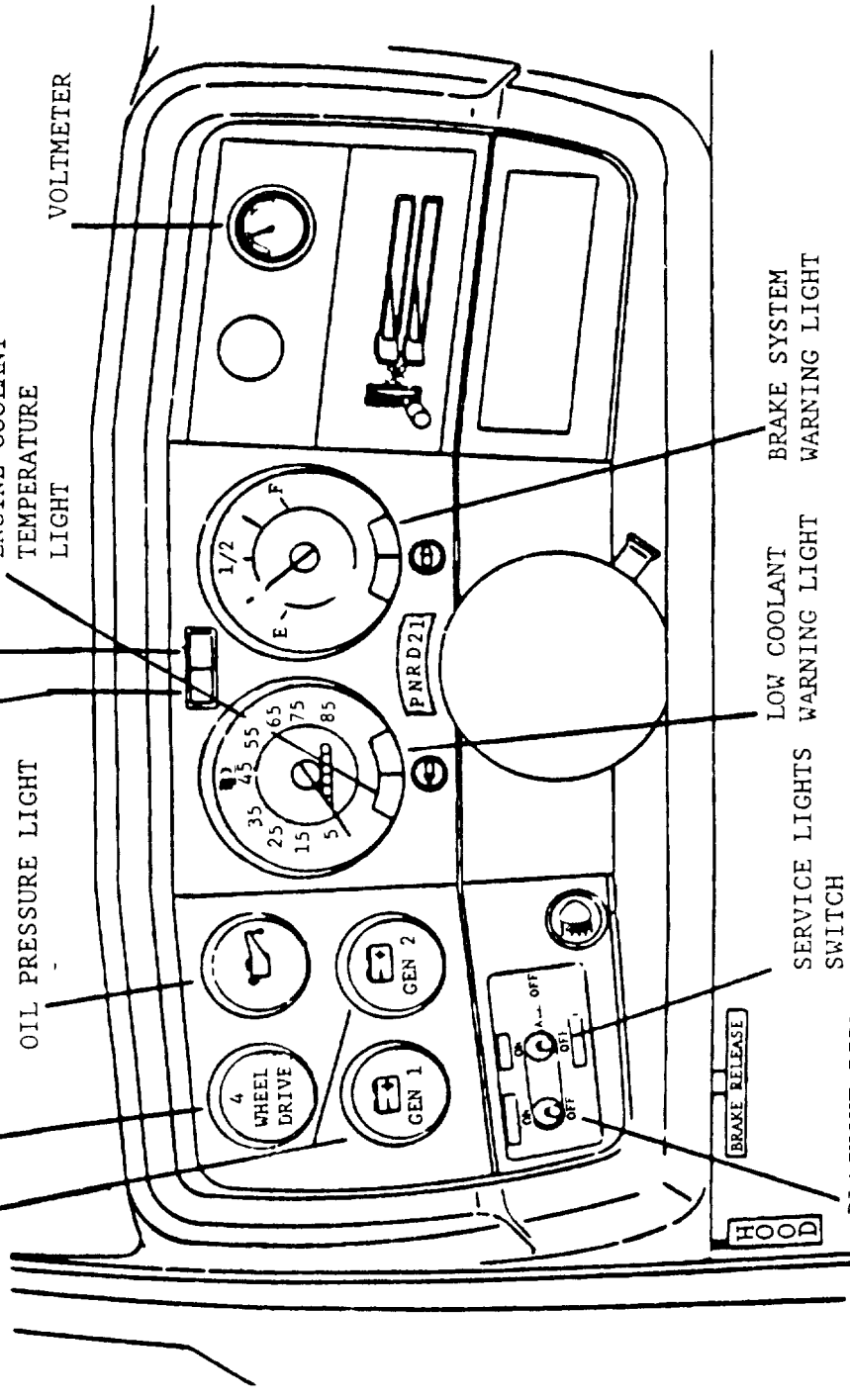
(CLASSIFICATION) A-234-5678-D542-2-1

COMMERCIAL UTILITY CARGO VEHICLE M1008-INSTRUMENTS, CONTROLS, AND GAGES



(REFERENCE NUMBER) (CLASSIFICATION)

FIGURE 5-11-3. Example equipment related wall chart.

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5 12 SLIDES AND TRANSPARENCIES

5 12 Slides and transparencies Slides and transparencies are a component of knowledge presentation media This section describes the format, content, and development guidelines for slides and transparencies prepared to support curricula as specified in the military standard and in DI-ILSS-80088

5 12 1 Use Slides and transparencies are used to reinforce or supplement training provided in the formal environment They may be used separately, with other instructional media materials, or with an IG Slides or transparencies enhance the formal learning situation by presenting visual information to the trainee and aiding the instructor in presentation Additionally, slide presentations are excellent vehicles for formal or informal remediation, accelerated instruction or to fill gaps that occur within or between courses Transparency usage is normally programed by an IG, as described in 5 8 Slides may be programed by an IG, lecture guide, or audio cassette Lecture guides and audio cassettes are discussed in 5 13 and 5 14, respectively

5 12 2 Elements The elements of slides and transparencies are the mounting and subject matter

(a) Mounting The mounting must provide sufficient support for the slide or transparency
(b) Subject matter The subject matter must provide the trainee with a visual aid supplying additional amplifying information essential for a better understanding of the curriculum

5 12 3 Development Development of slides and transparencies is based on the approved TMO, which is discussed in 5 10 The need for slides and transparencies is determined during initial instructional media materials selection

(a) Initial instructional media materials design Once the need for slides or tranparencies has been established and the developer has a good idea of the information required, the initial design work begins The following steps are typical of most initial design work
(b) Determine visualization strategy The subject matter and detail of each visual should be developed at the same level as the discussion point it supports, unless it is designed to depict an overall system/subsystem/equipment layout, or portions of a system/subsystem/or equipment All applicable interface should be shown Complete standard nomenclature should be used In some cases, visuals may be required to show organizational or functional relationships within a specific task/function, non-equipment specific, area Follow a strategy similar to that used in selecting illustrations and tables for technical manuals when choosing visuals for use with curricula Unnecessary duplication of figures and tables from technical manuals should be avoided. Some selection criteria are

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(1) Select only those visuals which require special emphasis by the instructor to bring out important discussion points in the IG
(2) Supplement rather than replace the spoken word
(3) Make every effort to avoid a cluttered view

(c) Determine visual objectives Visual objectives are statements of one central thought or theme to be derived from a single visual and its programing medium, and should be developed next These differ from training objectives For example, a significant visual objective might be "provide cutaway view of gears to indicate input-output relationships " State the reason for developing the visual Note the visual objectives in outline form to assist in later program design or write them on a rough storyboard illustration card

(d) Determine sources of visuals Technical manuals are the preferred sources of artwork for non-motion visuals Line drawings, schematics, photographs, block diagrams, logic diagrams, flow diagrams, etc , should be selected When suitable materials are not available in technical manuals, original art should be developed Possible sources include line drawings, cutaways, etc For the more complex presentations, consider photographs of the actual training site, using actual equipment Photographic enlargements of actual equipment are another excellent source The original artwork should include all lettering, lines, captions, symbols, and identification markings within the copy boundary lines Procedures and processes to be shown, however, should be based on the applicable technical manuals and verified by subject matter experts before beginning final production

(e) Determine types of visuals The types of visuals used should be based on the complexity and level of the subject matter For example, if theory is being discussed, use visuals consisting mainly of equipment orientation photographs, charts, graphs, flow diagrams, block diagrams, logic diagrams, etc If maintenance, operation, or repair of a particular equipment is discussed, use more detailed photographs of the actual hardware (complete with cutaways and callouts), and schematics

(f) Artwork types

(1) Photographs Photographs must identify the system, subsystem, equipment, hardware, etc for which the training is being conducted Photographs must be properly exposed and processed in sharp focus, free of dust, spots, scratches, streaks, or other defects

(2) Cutaways Cutaways must identify equipment in a manner such that a panel or plate appears to have been removed in order to observe the interior of the equipment Identification lines, letters, and symbols must be located as near as possible to the identified part, consistent with a presentable layout

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(3) Line drawings Line drawings must present a picture of the subject when the drawing can present information better than a photograph The weight of lines may vary to show contract or emphasize significant points A curve may be emphasized with a heavy line while the axis and grid lines are rendered relatively inconspicuous in less heavy lines

(4) Schematic diagrams Schematic diagrams must be used to identify electronic circuits The weight of lines must vary to show contrast or emphasize significant points Schematics must be maintained to permit clear, sharp, and proper contrast of the slides when projected

(g) Develop rough storyboard illustration cards Once visual objectives have been determined, storyboard illustration cards should be developed (see figure 5-12-1) The storyboard illustration card is exactly what the name implies A completed card "tells a story" to the particular audio-visual specialist who develops the final product Think of the storyboard illustration card as a convenient means of providing rough visual data, audio and narration information, artist or camera instructions, audio production information and certain other desired data for one frame or visual on one form The amount of information that goes on the card is dependent upon the type of product being designed Figure 5-12-2 provides an example of a rough storyboard illustration card from one frame of information in the initial design of a slide program It could be used for slides programed from an audio cassette or a lecture guide Any convenient form that will convey the message to the audio-visual specialist is sufficient

(h) Rough art development The developer does not have to be an artist to produce the rough art for storyboard illustration cards If the rough storyboard card is merely a means of communicating with the graphics specialist who will do the final artwork, simple stick figures represent people quite well Rough block drawings or paste-ups are sufficient to show equipment (see figure 5-12-3) Consider the suggestions and guidelines offered below when doing the rough art on the storyboards

(1) Avoid excessive detail For example, if the storyboard illustration card represents a slide, place no more than 15 to 20 words or 20 to 30 data items on the visual Line drawings should not be cluttered Too much information - or a "busy" graphic - is often worse than no graphic at all

(2) Use more than one visual if the concept behind the visual objective is too complex or the equipment is too detailed Convey the concept in smaller segments Develop a summary visual to tie the segments together for the viewer

(3) Use uniform layout and adequate spacing between lines and lettering in order to maintain visual clarity Remember that,

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although this is a production consideration, the artist must be able to work within the requirements specified by the designer

(4) Include enough direction for the artist to convey the visual objective For example, if a certain element within a piece of equipment should be highlighted by color or callout, tell the artist

(5) Set the scene for the photographer if the visual requires camera work Provide sufficient information and written instructions for the photographer to determine the theme of the photograph

(6) Remember that the artist or photographer is very seldom a subject matter expert in the field for which the audio-visual materials are being prepared Items that a subject matter expert tends to take for granted can cause expensive delays or mistakes in the final production phase

(i) Script development When the instructional media production includes sound, as in sound-slides, a narrator's script is developed It can be very simple for a slide presentation used with an audio cassette Audio cassette development is discussed in 5 14

(j) Sequence storyboard cards Once the storyboard illustration cards for multi-visual presentations are complete, organize them in their tentative sequence for presentation Rearrange them later if an improved sequence becomes evident Number the storyboard cards in sequence so that they may be keyed later to the programing medium For example, a card or frame number that represents an ultimate slide number would be entered in the lecture guide opposite the appropriate discussion point

(k) Programing media development The programing media for slide presentations are developed from the storyboard illustration cards The following paragraphs provide preparation guidelines and examples for developing draft lecture guides

(l) Lecture guide preparation The lecture guide contains an outline of the major sections, key topics, and discussion points which are numerically keyed to a set of 35 millimeter (mm) slides stored in plastic slide holders at the back of the guide When used to support on board training, the transparency will be programed by a lecture guide The draft should be assembled by extracting both the visual and lecture outline from the sequenced storyboard illustration cards Lecture guide development is discussed in 5 13

(m) Security classification Each slide or transparency must bear the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

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Security classification must be clearly evident on each classified slide and transparency at the top and bottom within the projected image area in a matter that does not detract from the viewable area The proper security classification will also be at the top and bottom of the mounting Security markings must be in full capitals of the boldface type that is at least as large as the full capitals of slide and transparency text No security classification marking will be required on unclassified slides and transparencies or mounting

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SCENE/FRAME NO _____

SCENE/FRAME SYNOPSIS _____

NARRATION/SCRIPT _____

PREPARED BY _____

ART DIRECTION _____

CAMERA DIRECTION _____

AUDIO NOTES _____

DATE _____

SH1320315 98

FIGURE 5-12-1 Example single scene storyboard card (blank)

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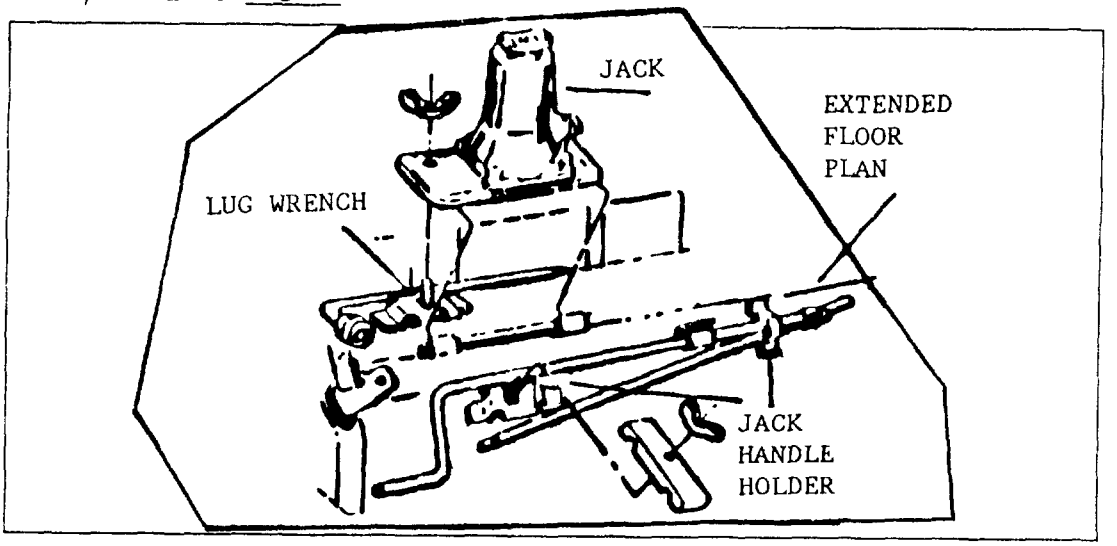
SCENE/FRAME NO 17



SCENE/FRAME SYNOPSIS Line art to jack truck for tire change

ART DIRECTION Use enclosed figure from manual enlarge callouts

NARRATION/SCRIPT N/A

CAMERA DIRECTION N/A

AUDIO NOTES None required For use with IG

PREPARED BY C M Lewis

DATE 7/22/85

SH132031599

FIGURE 5-12-2 Example rough storyboard illustration card for proposed slide presentation

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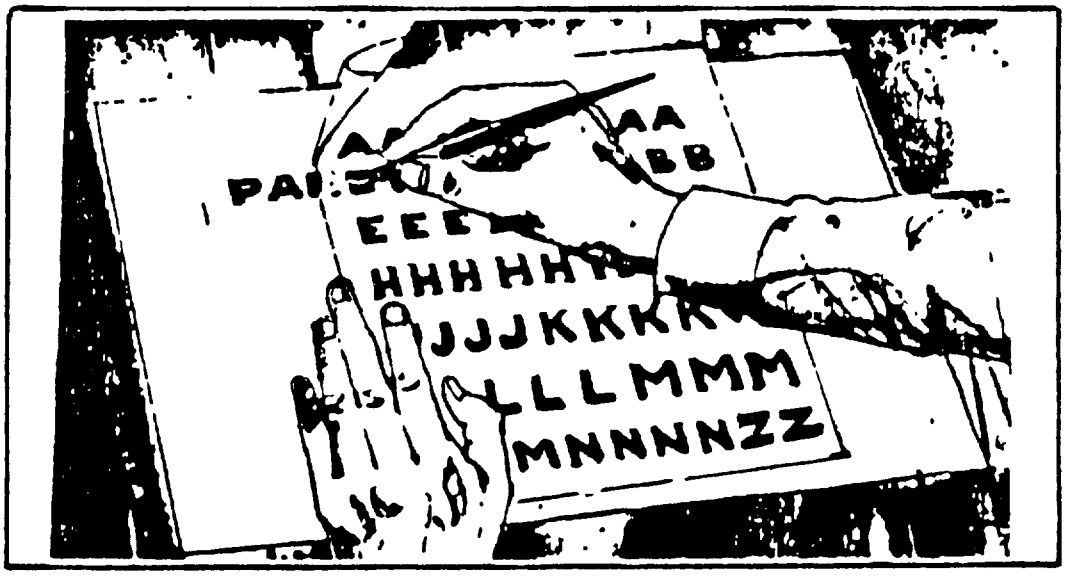
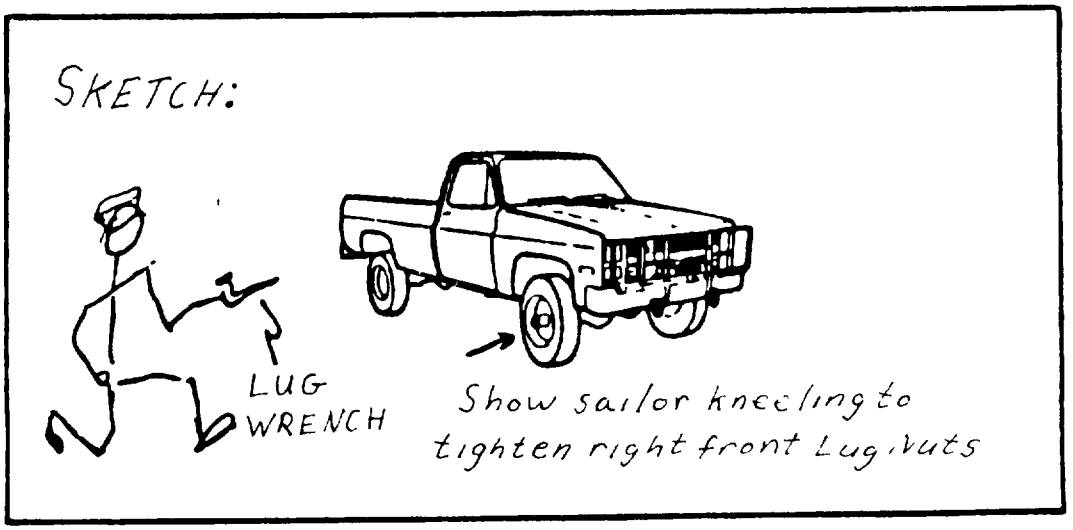
DRY TRANSFER





SKETCH-PASTE UP COMBINATION

JH132031600

FIGURE 5-12-3 Examples of rough storyboard art (Sheet 1 of 2)

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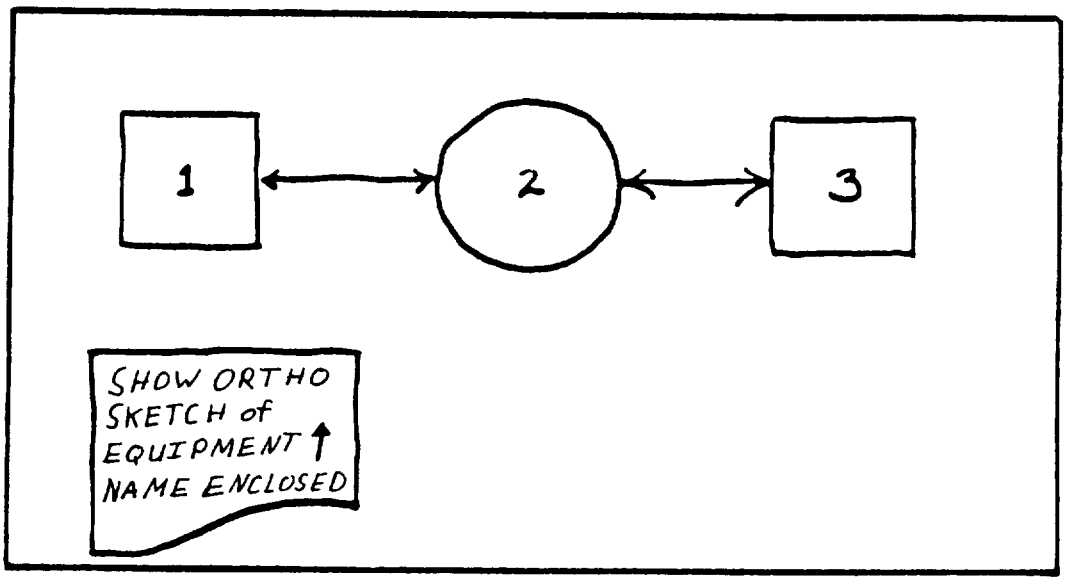
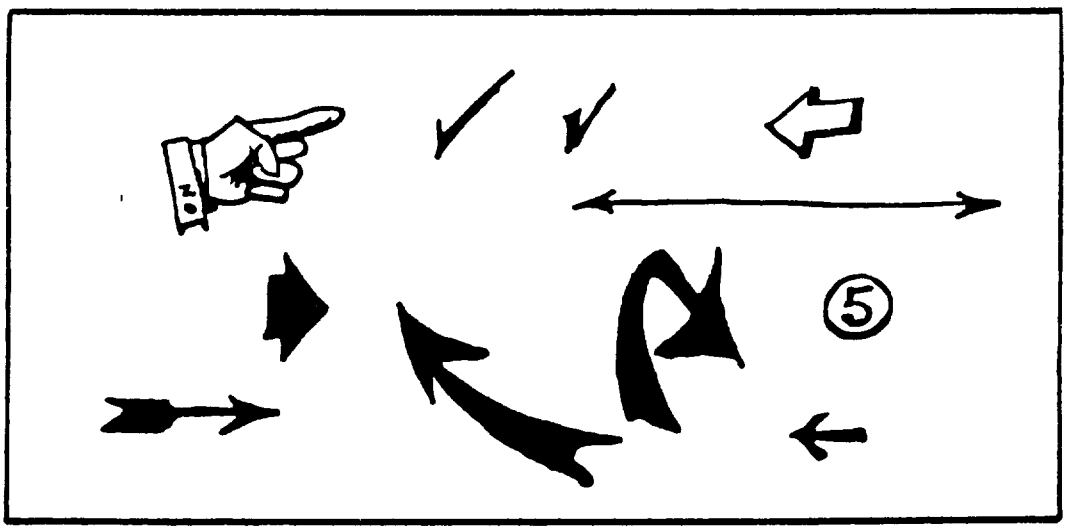
ROUGH EQUIPMENT FLOW DIAGRAMS





CALLOUT CONVENTIONS

FIGURE 5-12-3 Examples of rough storyboard art (Sheet 2 of 2)

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5 12 3 1 Development of 35mm slides Slide presentations are developed on the basis of the approved TMO, as described in 5 10 Initial development procedures are described in 5 12 3 through 5 12 3(m) The following paragraphs discuss the slide development requirements

(a) Slide types

(1) Subject slide Subject slides identify the subject (title) of a slide presentation

(2) Subject matter slide Subject matter slides provide the trainee with additional visual amplification of the curriculum or subject matter programed from a lecture guide or an audio cassette

(b) Final artwork development Final slide art should be based on the slide presentation storyboards created during initial design It provides rough art and visualization concepts for each slide The graphics specialist should be able to use the initial designer's stick figures, rough block drawings, and directions on the storyboard frames to grasp the designer's visual objective When the storyboard fails to adequately convey the designer's main reason for developing the visual, the graphics specialist and the original designer should confer with one another Revising the rough art is much less expensive and time consuming than redoing finished materials Consider the following suggestions once the message of the rough art is clear

(1) The artwork should blend into the particular program for which the slide is designed without sharp contrast Color is an excellent means of emphasizing key elements, differentiating specific areas, and enhancing aesthetic appeal No more than five clearly distinguishable color tones should be used on any one slide, as this generally results in unsatisfactory visual clarity Light colors on dark backgrounds and dark colors on light backgrounds provide the best mix

(2) Excessive background or two fields of bleed on all sides of the original artwork enhance the photographic reproduction process For example, when preparing a master copy frame, extend the background colors beyond the limits of the camera's focal area to prevent sharp contrasts at the edges

(3) Excessive detail should be avoided when designing individual slides Limit the number of words to between 15 and 20 and the number of data items to between 25 and 30 Use uniform lettering and adequate spacing

(4) All titles and callouts should be in bold face print Keep them as brief and as large as possible -- but in no case smaller than 32 point

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(5) Varied line weights show contrast or emphasize significant points For example, a curve on a graph may be emphasized with a heavy line while the axes and grid lines appear less conspicuous if done with lighter lines Use the following line widths, where practical, to provide this type of contrast

(a) Graph curve -- 4 point
(b) Coordinate axes -- 2 point
(c) Grid lines -- 1 point

Line widths should be reduced only where necessary, such as when presenting complex schematics Use line widths that will maintain the slide's visual clarity

(c) Content and format Specific content and format guidelines for 35mm slides are described in the following paragraphs, with examples, to assist in this process

(1) Photographic reproduction Final slides may be composed of photographic proofs shot to final slides, as well as copystand photographs of line art and illustrations Remember that all pieces of equipment used in the instructional program should be clearly identified Ensure that the equipment is clean and free of visual defects, such as scratches, streaks or dust What looks perfectly normal in the work environment may not look good in a photograph

(2) Title The complete title of the subject matter should be used with no abbreviations Abbreviations may be used only when there is accepted common usage The title of the slide must be placed at the bottom of the slide mount and centered

(3) Slide number for slides used with instructor guides The slide number for slides used with Instructor Guides is assigned in accordance with figure 5-12-4 It consists of the following

(a) Course identification number The CIN is an eight-digit number which identifies the activity responsible for the course and for assigning its number For slides used with instructor guides, the CIN is place on the upper right-hand side of the mount (see figure 5-12-5) The revision letter and change number should be entered under the last digit of the CIN when applicable

(b) Revision letter The revision letter, a one character alpha code, identifies the revision to the slide and, when applicable, is placed below the last digit in the CIN The letters "I", "O", "Q", "S", and "Z" are not used in order to avoid confusion with the numbers, one, zero, five, and two

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(c) Change number The change number, one to two digits, identifies the change status of the slide and, when applicable, is placed under the revision letter If the slide has not been revised, the change number is placed under the last digit of the CIN

(d) Part number The part number, four digits, identifies the part number of the instructor guide which the slide supports

(e) Section number The section number, one digit, identifies the section of the instructor guide which the slide supports

(f) Topic number The topic number, one-digit, identifies the topic in the instructor guide which the slide supports

(g) Sequence number The sequence number, one digit, identifies the order in which the slides are presented

(4) Slide reference number for slides used with instructor guides The slide reference number, when applicable, is placed on the lower left side of the slide mount (see figure 5-12-6) Its elements are

(a) Weapon system/equipment number The weapon system/equipment number is an eleven character designation consisting of the DoD nomenclature of the related end item For example, the related end item could be an F-14B aircraft The weapon system/equipment number would be F - 14B000000 Note that six zeros have been added to complete the eleven character field

(b) Work unit code number The work unit code number is a five digit code that identifies the system, subsystem component or part of the end item Work unit codes are provided by the contracting activity For cases where no work unit code number has been assigned, zeros should be entered in this area

(c) Serial number The serial number is a four digit number indicating the order of slide presentation with respect to the system, subsystem, component, or part of the end item described by the work unit code number The first slide prepared for the end item described work unit code XXXXX is 0001, the second is 0002, the third slide is 0003, etc

(d) Revision letter The revision letter, if applicable, is a one character alpha code indicating the revision status of the slide For example, the first revision to a slide would be indicated by an A, the second by a B, and the third by a C, etc The letters "I", "O", "Q", "S", and "Z" must not be used to avoid confusion with the numbers one, zero, five, and two

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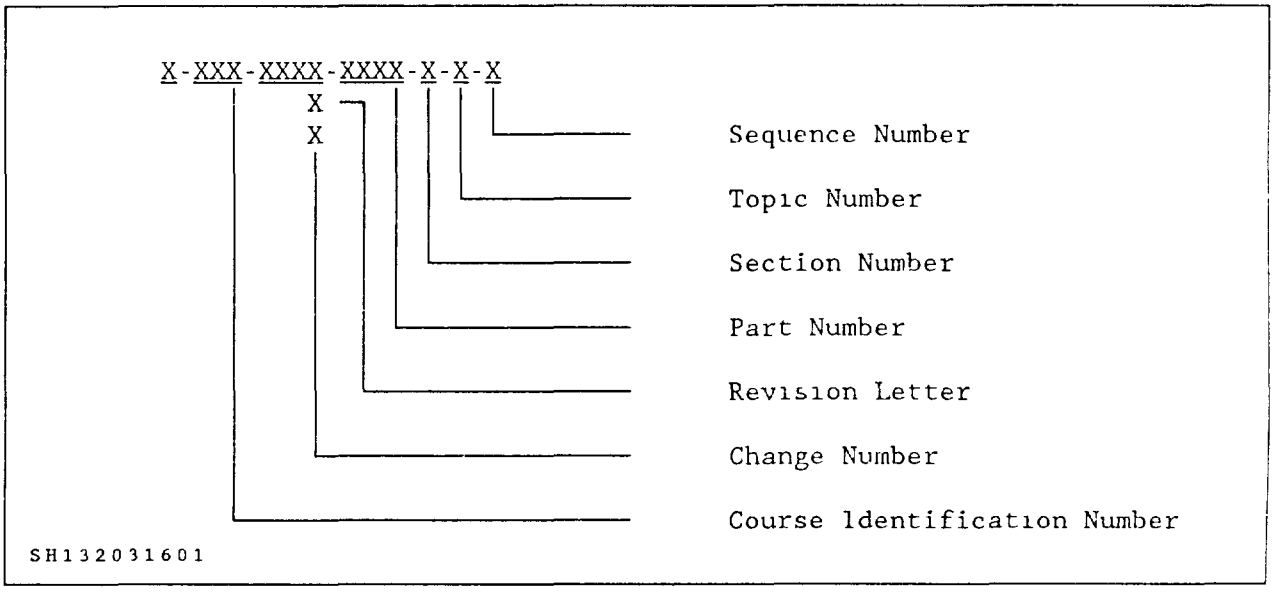

FIGURE 5-12-4 Example slide/transparency identification number (instructor guide)

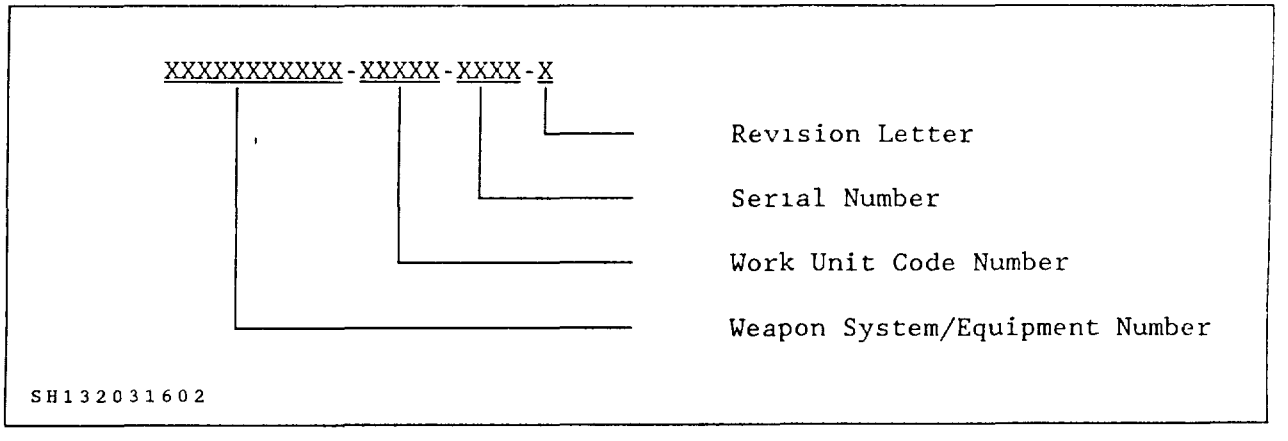

FIGURE 5-12-5 Example slide/transparency reference number (instructor guide)

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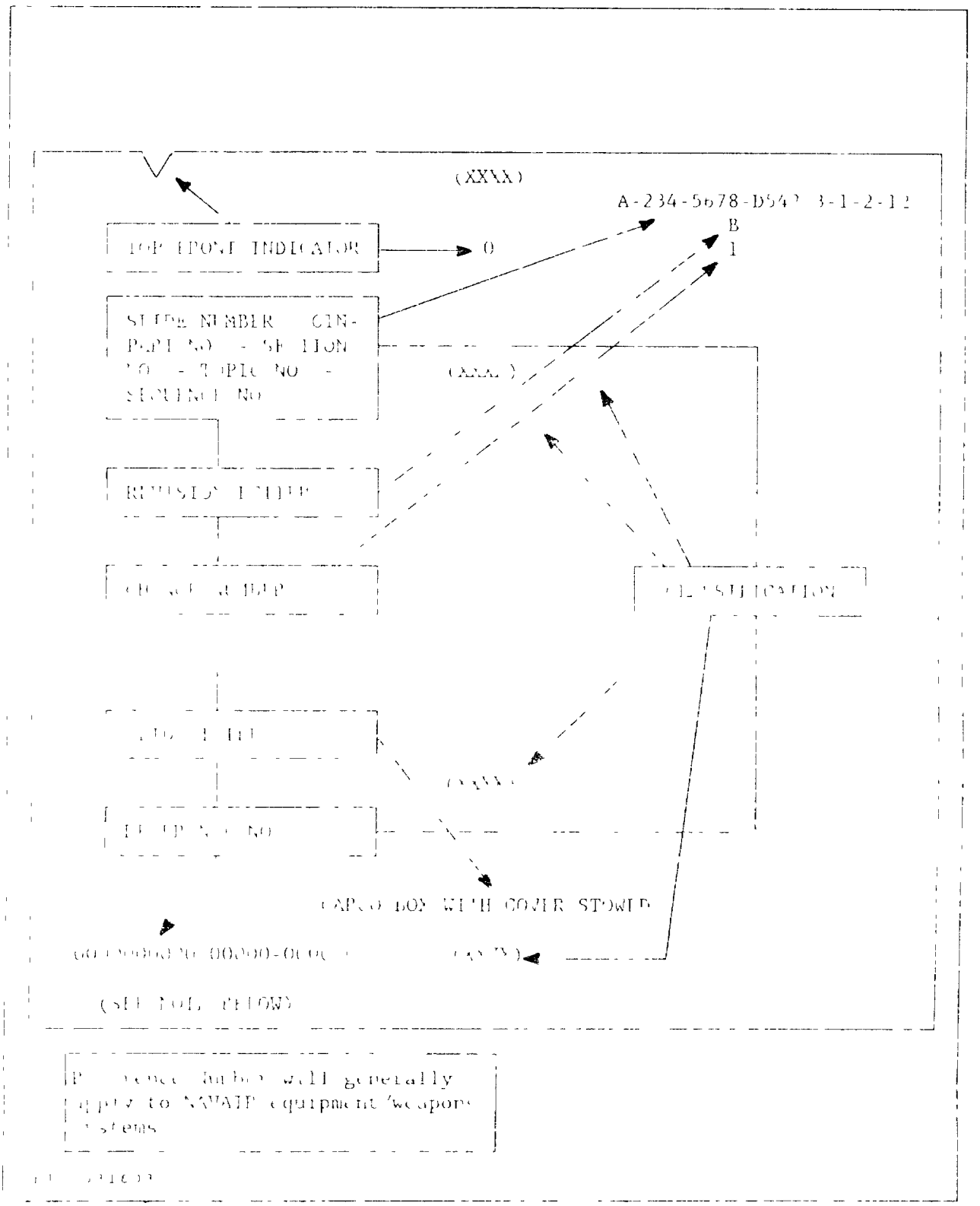

FIGURE 5-12-6 Example slide mount identification (instructor guide)

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(5) Slide number for slides used with lecture guides or audio cassettes This number is assigned in accordance with table 5-12-I It identifies the programing medium, system/subsystem category, system/subsystem modifier, and sequence number For slide presentations prepared for systems/subsystems not covered by table 5-12-I, the contracting activity will provide the appropriate designators The slide number for slides used with lecture guides or audio cassettes is placed on the upper right-hand side of the mount (see figure 5-12-7)

(6) Mounting Slide mounts provide positive locking support for the slide Insert the film portion of the slides securely to prevent them from coming apart during handling, shipping, or storage Marking on the mount must identify the proper method of inserting the slide in the projector for viewing The mount must be appropriately marked to indicate top and front side to facilitate projector loading (e g , notch in slide, color code or the letter "O" at top front of slide, thumb mark in lower left-hand corner of slide) The size of the slide must be 2 inches by 2 inches in a rigid, standard cardboard mount or equivalent

(7) Slideholders Slideholders must have the capacity to contain 20 slides in individual plastic pockets so that each slide and slide number is visible

5 12 3 2 Quality assurance The quality of slide presentations will be ensured by appropriate reviews conducted during development Draft materials will be evaluated to ensure that they meet the TMO requirements, the requirements of this section and all other contracting activity provisions

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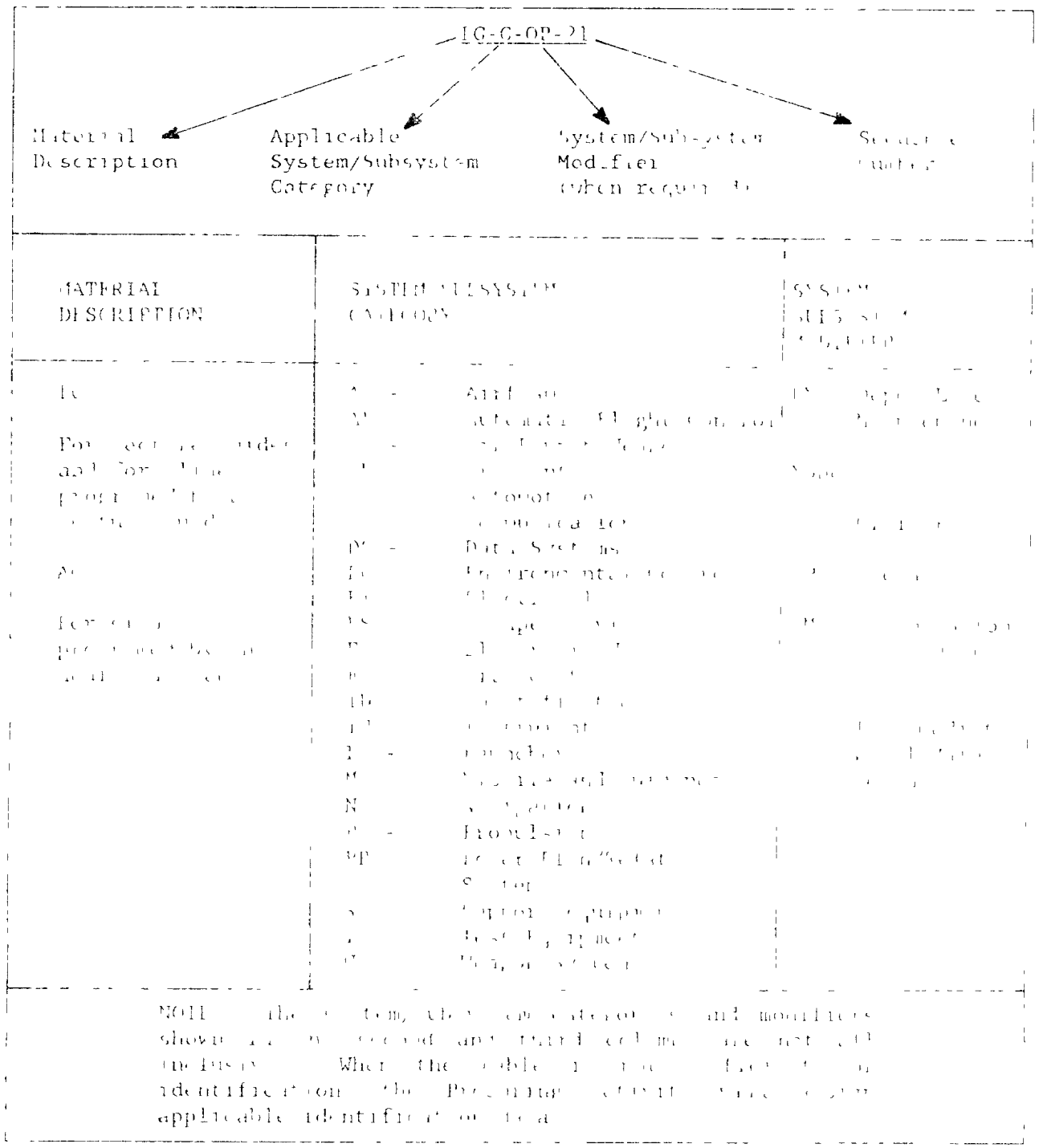
TABLE 5-12-I Identification data for slides used with lecture guides or audio cassettes



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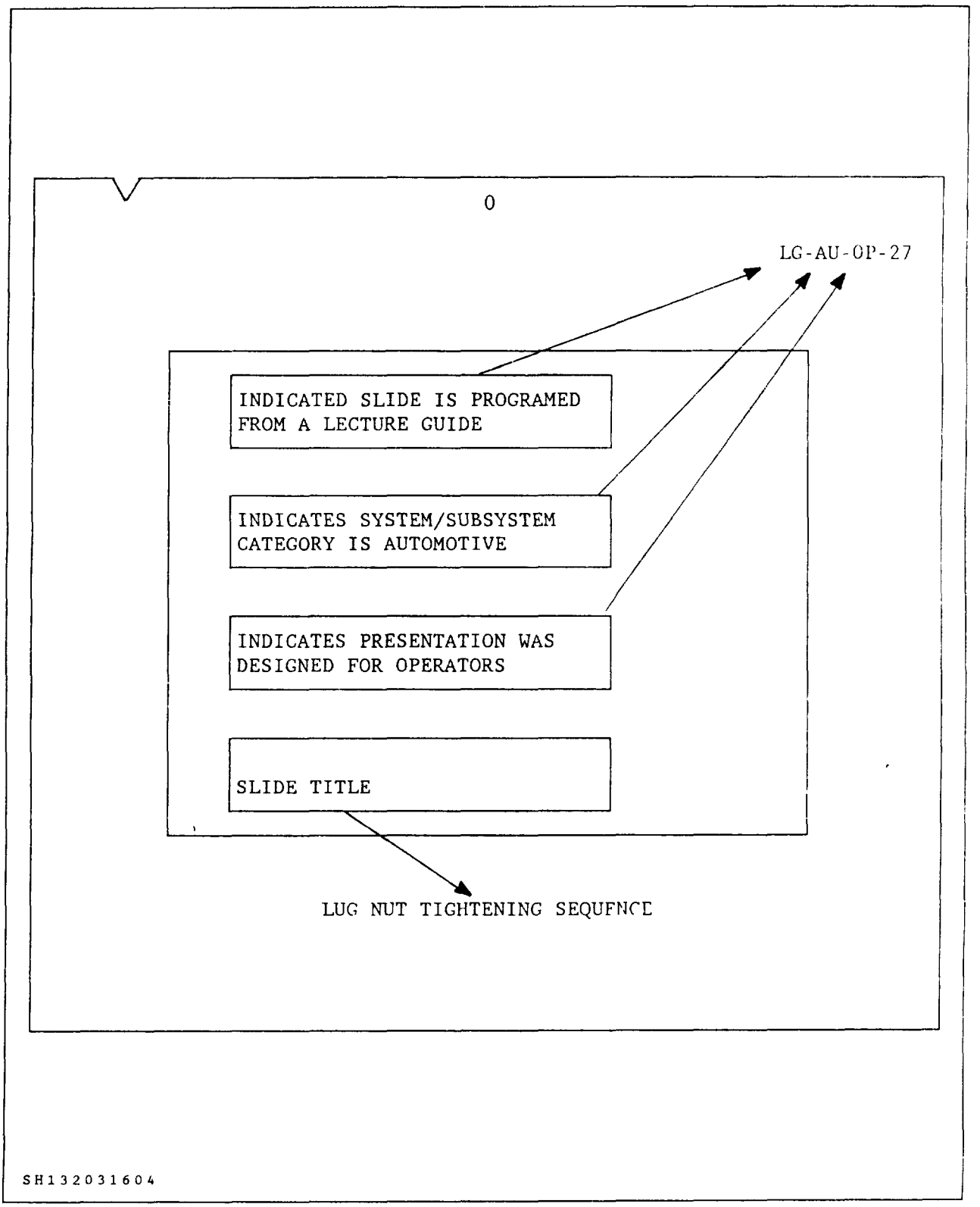

FIGURE 5-12-7 Example mount for slide used with a lecture guide or audio cassette

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5 12 3 3 Development of transparencies Transparencies are projected visuals on acetate Transparency presentations are developed on the basis of the approved TMO, as described in 5 10 Initial developing procedures are described in paragraphs 5 12 3 through 5 12 3(m) The following paragraphs discuss the unique transparency development requirements

(a) Transparency types

(1) Title transparency The title transparency must identify the title of the course The title must be placed in middle portion of the critical viewing area and centered The title must be in bold face type and must be clearly legible when projected

(2) Subject matter transparency Subject matter transparencies provide the trainee with visual amplification of the curriculum or subject matter and are generally programed by an Instructor Guide

(b) Final art development Final transparency art should be based on the technical manual figures or storyboards created as original artwork design The storyboard provides rough art and visualization concepts for original artwork conversion to slides Use the initial designer's stick figures, rough block drawings, and directions on the storyboard cards to grasp the designer's visual objective Confer with the original designer when the storyboard fails to adequately convey the designer's main reason for developing the visual Revise the rough art when required, as it is a much less expensive and time consuming process than redoing finished materials Consider the following suggestions once the message of rough art is clear

(1) Avoid excessive detail in designing individual transparencies Use uniform lettering and adequate spacing

(2) Make all titles and callouts in bold face print Keep them as brief and as large as possible

(3) Artwork is normally limited to line drawings Due to the significantly higher cost of producing colored and oversized transparencies, the contracting activity must approve their use prior to development

(4) Use varied line weights to show contrast or emphasize significant points For example, a curve on a graph may be emphasized with a heavy line while the axes and grid line appear less conspicuous if done with lighter lines Use the following line widths, where practical, to provide this type of contrast

(a) Graph curve -- 4 point
(b) Coordinate axes -- 2 point
(c) Grid lines -- 1 point

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(5) Reduce line widths only where necessary, such as when presenting complex schematics Use line widths that will maintain the transparencies visual clarity
(6) Submit overlays as a complete set, consisting of the base transparency with the overlays attached Attach the overlays as follows

(a) Attach the first overlay to the left side of the base transparency
(b) Attach the second overlay to the bottom of the base transparency
(c) Attach the third overlay to the right side of the base transparency
(d) Attach the fourth overlay to the top of the base transparency

c Content and format Specific content and format guidelines for transparencies are described in the following paragraphs, with examples, to assist in this process

(1) Image size The final image size for overhead transparency artwork will be no greater than 7-3/8 by 9 inches Ensure that artwork prepared for overhead transparencies, when dimensioned to this final image size, will retain good viewing characteristics
(2) Title The transparency title must identify the title of the subject matter, no abbreviations The title must be placed at the bottom of the mounting and centered
(3) Transparency number The transparency number must be placed in the upper right-hand corner of the transparency above the critical viewing area Transparency numbers are assigned in accordance with figure 5-12-4 A transparency number consists of

(a) Course identification number The CIN identifies the activity responsible for the course and its assigned number The CIN is placed on the upper right-hand side of the transparency image area, above the critical viewing area The revision letter and change number should be entered under the last digit of the CIN when applicable
(b) Revision letter The revision letter, a one character alpha code, identifies the revision to the transparency and, when applicable, is placed below the last digit of the CIN The letters "I", "O", "Q", "S", and "Z" must not be used in order to avoid confusion with the numbers one, zero, five and two
(c) Change number The change number, one or two digits, identifies the change status of the transparency and, when

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applicable, is placed under the revision letter If the transparency has not been revised, the change number is placed under the last digit of the CIN

(d) Part number The part number, four digits, identifies the part number of the instructor guide which the transparency supports

(e) Section number The section number, one digit, identifies the section of the Instructor Guide which the transparency supports

(f) Topic number The topic number, one digit, identifies the topic in the instructor guide which the transparency supports

(g) Sequence number The sequence number, one digit, identifies the order in which the transparencies are presented

(4) Transparency reference number The transparency reference number, when applicable, is placed on the lower left-hand side mounting (see figure 5-12-5) Its elements are

(a) Weapon system/equipment number The weapon system/equipment number is an eleven character designation consisting of the DoD nomenclature of the related end item For example, the related end item could be an F-14B aircraft The weapon system/equipment number would be F - 14B000000 Note that six zeros have been added to complete the eleven character field

(b) Work unit code number The work unit code number is a five digit code that identifies the system, subsystem, component or part of the end item Work unit codes are provided by the contracting activity For cases where no work unit code number has been assigned, zeros should be entered in this area

(c) Serial number The serial number is a four digit serial number indicating the order of presentation of the transparency with respect to the system, subsystem, component, or part of the end item described by the work unit code number The first transparency prepared for the end item described work unit code XXXXX is 0001, the second is 0002, the third slide is 0003, etc

(d) Revision letter The revision letter, if applicable, is a one character alpha code indicating the revision status of the transparency For example, the first revision to a transparency would be indicated by an A, the second by a B, and the third by a C, etc The letters "I", "O", "Q", "S", and "Z" must not be used to avoid confusion with the numbers one, zero, five, and two

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(d) Mounting The mounting must provide a sufficient support for the transparency The mounting must provide for positive locking to prevent the transparencies from coming apart during handling, shipping, and storage Figure 5-12-8 is an example of transparency and mounting markings

5 12 3 4 Quality assurance All transparencies must present a clear image with sharp, unbroken lines and lettering at a distance of 20 feet The quality of transparencies will be ensured by appropriate reviews conducted during development Draft materials will be evaluated to ensure that they meet the TMO requirements, the requirements of this section and all other contracting activity provisions A paper copy will be provided with the final transparency which can be used during surveillance of the curriculum material

5 12 3 5 Shipping All materials should be packaged for acceptance by common or other carrier for safe transportation, at the lowest rate, to the point of delivery Cartons must be able to withstand storage, rehandling, and reshipment without repackaging Material must be packed flat in cartons with fillers of thicknesses of corrugated board added to hold the material tight and stable The outside of each shipping carton must have a label clearly affixed to one end Unless directed otherwise by the contracting activity, the label will clearly identify the type of material being shipped, contract or order number, transparency identification number, quantity in carton, number of each carton and total number of cartons (carton 1 of 3, etc), and name of the materials contracting activity

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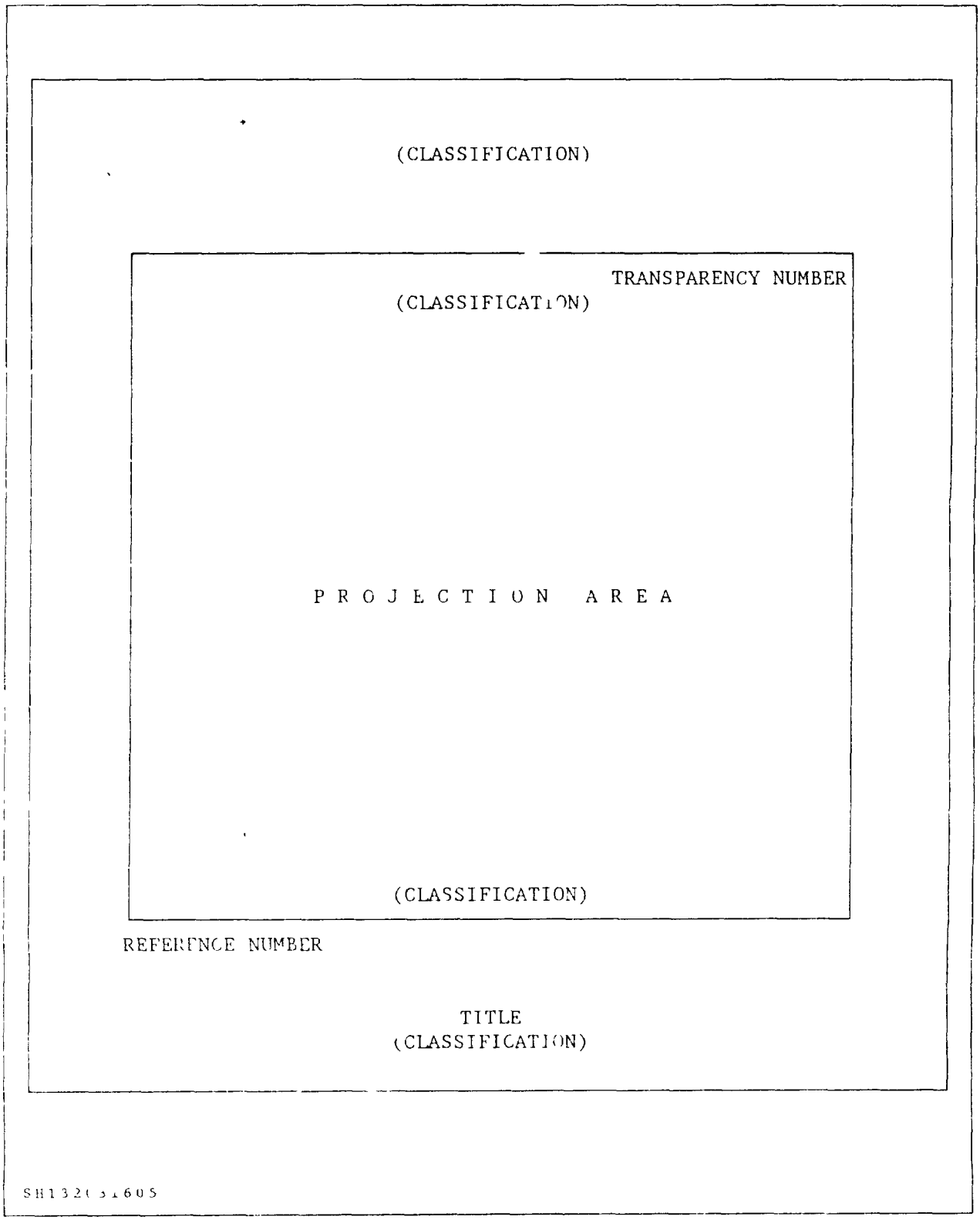

FIGURE 5-12-8 Example transparency/mount markings

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5 13 LECTURE GUIDE

5 13 Lecture guide A lecture guide is a component of a slide presentation Slide presentations may be used to reinforce or supplement formal training They may be used separately, with other instructional media materials, or with an IG Production guidelines for slides are discussed in 5 12 This section describes the format, content, and development guidelines for lecture guides prepared to support curricula as specified in the military standard and in DI-ILSS-80085

5 13 1 Use Lecture guides provide guidance for the presentation of slide programs (without audio cassettes) and contain an outline of the major sections, key topics, and discussion points which are numerically keyed to a set of 35mm slides Slide presentations with lecture guides are normally used in the formal training environment but can also be used as stand-alone informal materials

5 13 2 Elements The elements of the lecture guide are the front matter and lecture outline

(a) Front matter The front matter identifies the lecture guide and describes the usage and content
(b) Lecture outline The lecture outline pages should be keyed to the individual slides of the slide presentation for which the lecture guide has been prepared

5 13 3 Development Development of the lecture guide is based on the approved TMO, which is discussed in 5 10 The draft should be assembled by extracting both the visual and subject matter outline from the sequenced storyboard illustration cards The need for a lecture guide is determined during initial instructional media materials selection

(a) Initial instructional media materials design Once the need for a slide presentation has been established and the developer has a good idea of the information required, the initial design work begins The overall development process for slide presentations begins with storyboard construction In the case of slide presentations developed for use with an instructor guide, there is no real requirement for the storyboard, since the instructor will fulfill the narrative support requirement for the slides Use of the storyboard cards for initial development makes sense, however, since they allow the "story" to unfold using lesson discussion points instead of a narrative The following steps are typical of most initial design work
(b) Visualization strategy The subject matter and detail of each visual should be developed at the same level as the discussion point it supports, unless it is designed to depict an overall system/subsystem/equipment layout or portions of a system/subsystem/or equipment All applicable interfaces should be shown Standard, complete

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nomenclature should be used In some cases, visuals may be required to show organizational or functional relationships within a specific task/function, non-equipment specific, area Follow a strategy similar to that used in selecting illustrations and tables for technical manuals when choosing visuals for use with curricula Unnecessary duplication of figures and tables from technical manuals should be avoided Some selection criteria are

(1) Select only those visuals which require special emphasis by the instructor to bring out important discussion points in the instructor guide
(2) Supplement rather than replace the spoken word
(3) Make every effort to avoid a cluttered view

(c) Determine visual objectives Visual objectives are statements of one central thought or theme to be derived from a single visual and its programing medium, and should be developed next These differ from training objectives For example, a significant visual objective might be "provide cutaway view of gears to indicate input-output relationships " State the reason for developing the visual in the first place Note the visual objectives in outline form to assist in later program design or write them on a rough storyboard illustration card

(d) Develop rough storyboard illustration cards Once the visual objectives have been determined, storyboard illustration cards should be developed (see figure 5-13-1) The storyboard illustration card is exactly what the name implies A completed card "tells a story" to the particular audiovisual specialist who develops the final product Think of the storyboard illustration card as a convenient means of providing rough visual data, audio and narration information, artist or camera instructions, audio production information and certain other desired data for one frame or visual on one form The amount of information that goes on the card is dependent upon the type of product being designed Figure 5-13-2 provides an example of a rough storyboard illustration card for one frame of information in the initial design of a slide program

The developer does not have to be an artist to produce the rough art for storyboard illustration cards If the rough storyboard card is merely a means of communicating with the graphics specialist who will do the final artwork, simple stick figures represent people quite well Rough block drawings or paste-ups are sufficient to show equipment Consider the suggestions and guidelines offered below when doing the rough art on the storyboards (see figure 5-13-3)

(1) Avoid excessive detail For example, if the storyboard illustration card represents a slide, place no more than 15 to 20 words or 20 to 30 data items on the visual Line drawings

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should not be cluttered Too much information - or a "busy" graphic - is often worse than no graphic at all

(2) Use more than one visual if the concept behind the visual objective is too complex or the equipment is too detailed Convey the concept in smaller segments Develop a summary visual to tie the segments together for the viewer

(3) Use uniform layout and adequate spacing between lines and lettering in order to maintain visual clarity Remember that, although this is a production consideration, the artist must be able to work within the requirements specified by the designer

(4) Include enough direction for the artist to convey the visual objective For example, if a certain element within a piece of equipment should be highlighted by color or callout, tell the artist

(5) Set the scene for the photographer or cameraman if the visual requires live camera work Provide sufficient information and written instructions for the photographer or cameraman to determine the theme of the photograph

(6) Remember that the artist or photographer is very seldom a subject matter expert in the field for which the audio-visual material are being prepared Items that a subject matter expert tends to take for granted can cause expensive delays or mistakes in the final production phase

(e) Determine sources of visuals Technical manuals are the preferred sources of artwork for non-motion visuals Line drawings, schematics, photographs, block diagrams, logic diagrams, etc , should be selected When suitable materials are not available in technical manuals, original art should be developed Possible sources include photographs of actual equipment, line drawings, cutaways, etc Procedures and processes to be shown, however, should be based on the applicable technical manuals and verified by subject matter experts before beginning final production

(f) Determine types of visuals. The types of visuals used should be based on the complexity and level of the subject matter For example, if theory is being discussed, use visuals consisting mainly of equipment orientation photographs, charts, graphs, flow diagrams, block diagrams, logic diagrams, etc If maintenance, operation, or repair of a particular equipment is discussed, use more detailed photographs of the actual hardware (complete with cutaways and callouts), and schematics

(g) Sequence storyboard cards Once the storyboard illustration cards for multi-visual presentations are complete, organize them in their tentative sequence for presentation Rearrange them later if an improved sequence becomes evident Number the storyboard cards in sequence so that they may be keyed later to the programing medium For example, a card or frame number that represents an ultimate slide

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number would be entered in the lecture guide opposite the appropriate discussion point

5 13 3 1 Front matter development The steps for developing the front matter are

(a) Cover The cover page should be developed to contain lecture guide identification data, slide presentation title and subtitles, contracting activity identification (optional), and classification statements if applicable (see figure 5-13-4) The lecture guide is identified by an alphanumeric designation and may be obtained from table 5-13-1

(1) Security requirements Each element of the lecture guide or slide presentation bears the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

(b) Table of contents The table of contents should be prepared to provide a listing of lecture guide contents and page numbers (see figure 5-13-5)

(c) Reference publications page The reference publications page should be prepared to provide a listing of the publications used to develop the lecture guide (see figure 5-13-6)

(d) How to use the lecture guide The "How to Use the Lecture Guide" section should be prepared to provide a general description, security requirements, composition, function and use of the lecture guide (see figure 5-13-7)

5 13 3 2 Lecture outline development The lecture outline page(s) should be developed in such a way as to provide direction for the presentation of slides and an outline of the subject matter to be discussed (see figure 5-13-8) When a slide presentation is programed by an IG, the lecture outline consists of one or more lesson topics in outline format, subdivided into discussion points of sufficient detail to support completion of the topic learning objectives Each slide in the slide presentation should be keyed to its appropriate part of the lecture outline The lecture outline page(s) contain slide number sequence, major section headings, topics within the major sections, discussion points in outline form, and arrows indicating slide sequence timing Slide holders must be utilized to hold mounted slides, in individual pockets of plastic, so that each slide and slide number is visible The slide holders must be placed in the back of the lecture guide

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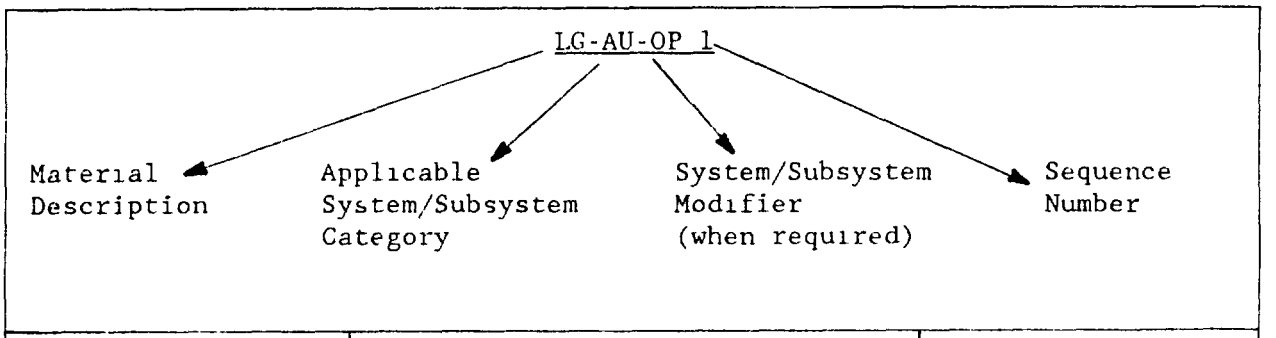
TABLE 5-13-I Lecture guide identification data



MATERIAL DESCRIPTION	SYSTEM/SUBSYSTEM CATEGORY	SYSTEM/ SUBSYSTEM MODIFIER
LG For Lecture Guides and for slides programed by a Lecture Guide	A - Airframe AF - Automatic Flight Control AL - Air Launch Weapons AR - Armament AU - Automotive C - Communications DS - Data Systems EC - Environmental Control EI - Electrical ES - Escape/Survival EW - Electronic Warfare F - Fire Control ID - Identification IN - Instruments L - Launcher M - Missile and Guidance N - Navigation P - Propulsion PP - Power Plant/Related Systems S - Support Equipment T - Test Equipment W - Weapon System	DM Depot Level Maintenance None SSBN O Officer OP Operator OM Organization Level Maintenance T Intermediate Level Maintenance

NOTE The system/subsystem categories and modifiers shown in the second and third columns are not all inclusive When the table is not sufficient for identification, the Procuring Activity will assign applicable identification data

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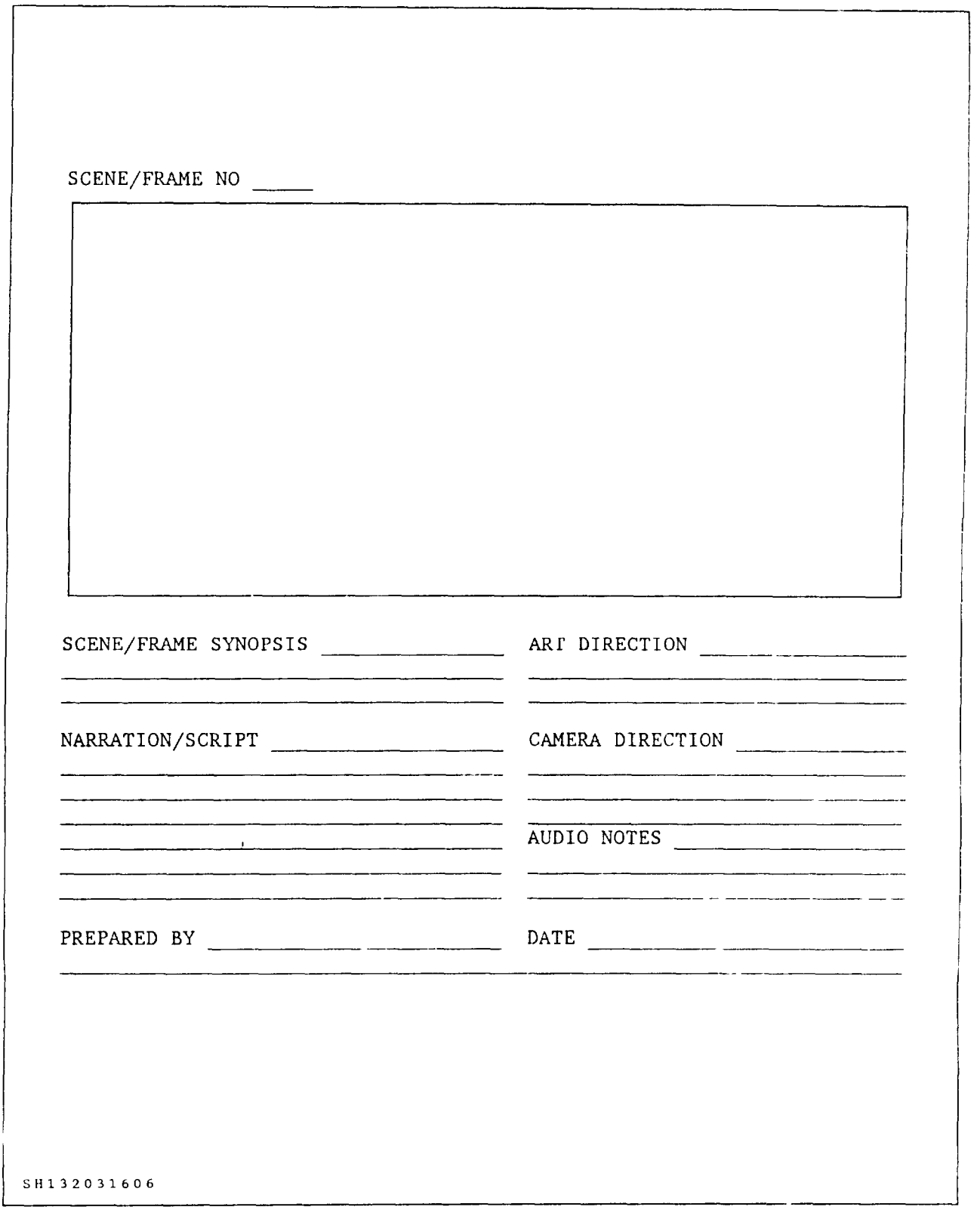

FIGURE 5-13-1 Example single scene storyboard card (blank)

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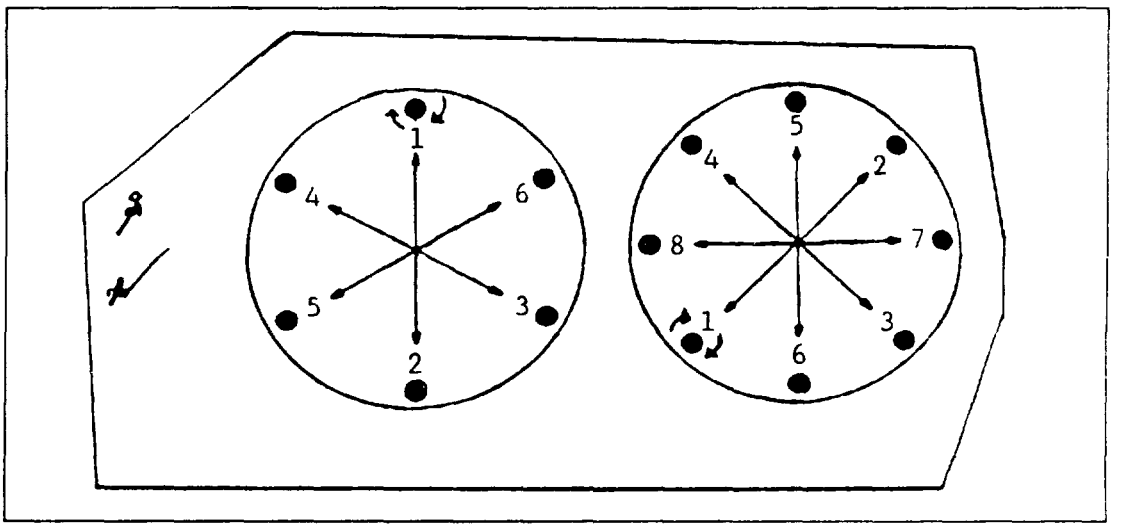
SCENE/FRAME NO 24



SCENE/FRAME SYNOPSIS LINE ART
Smooth enclosed figure from manual

ART DIRECTION Add arrow on one lug nut to show clockwise rotation, as drawn

NARRATION/SCRIPT None required - use IG Discussion Points
3 Lug nut tightening - turn clockwise
a 6 lug wheel
b 8 lug wheel

CAMERA DIRECTION N/A

AUDIO NOTES None required

PREPARED BY T P Smith

DATE 7/11/85

SH132031607

FIGURE 5-13-2 Example rough storyboard illustration card for lecture guide

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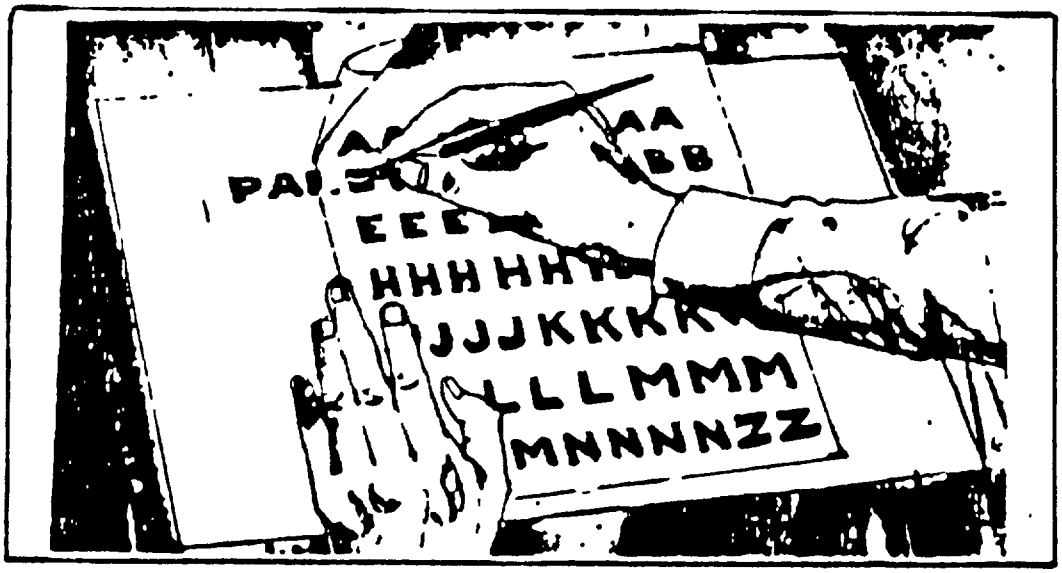
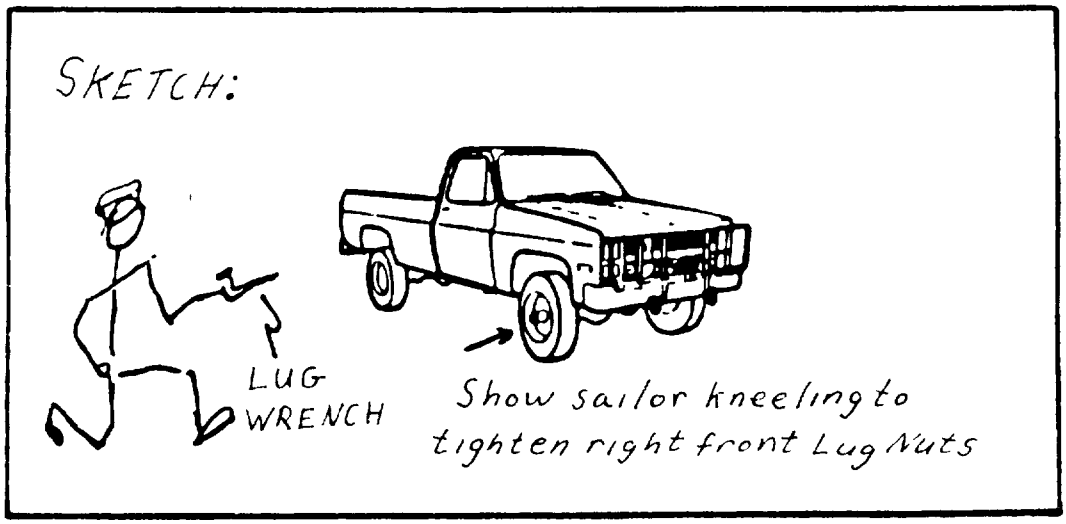
DRY TRANSFER





SKETCH-PASTE UP COMBINATION

SH132031608

FIGURE 5-13-3 Examples of rough storyboard art (Sheet 1 of 2)

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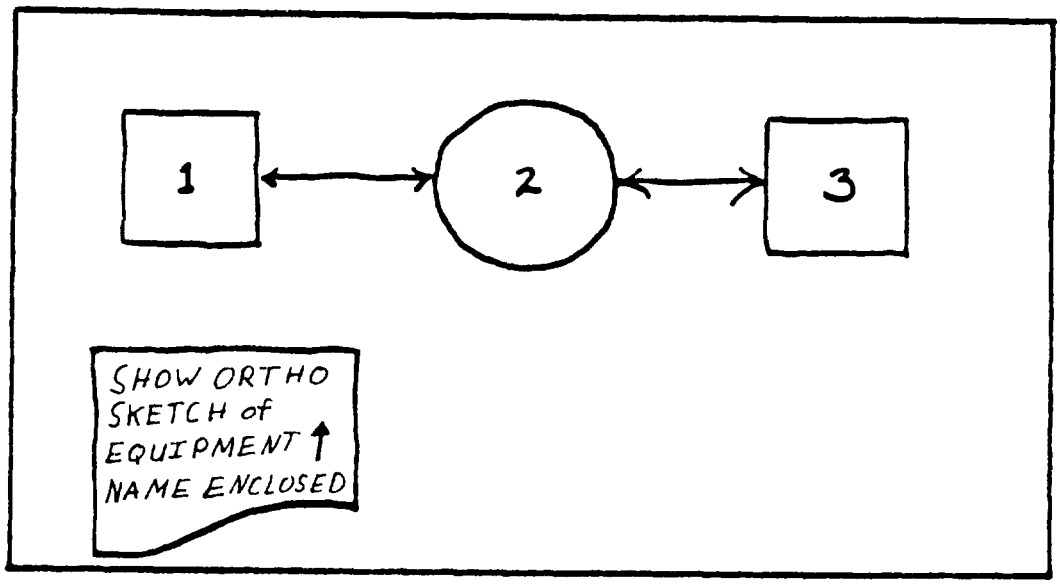
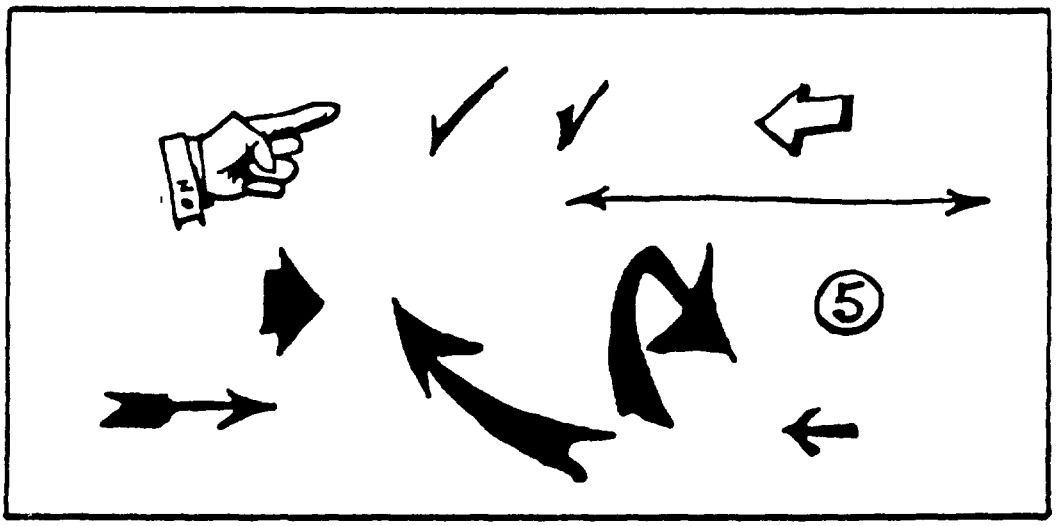
ROUGH EQUIPMENT FLOW DIAGRAMS





CALLOUT CONVENTIONS

SH132031608

FIGURE 5-13-3 Examples of rough storyboard art (Sheet 2 of 2)

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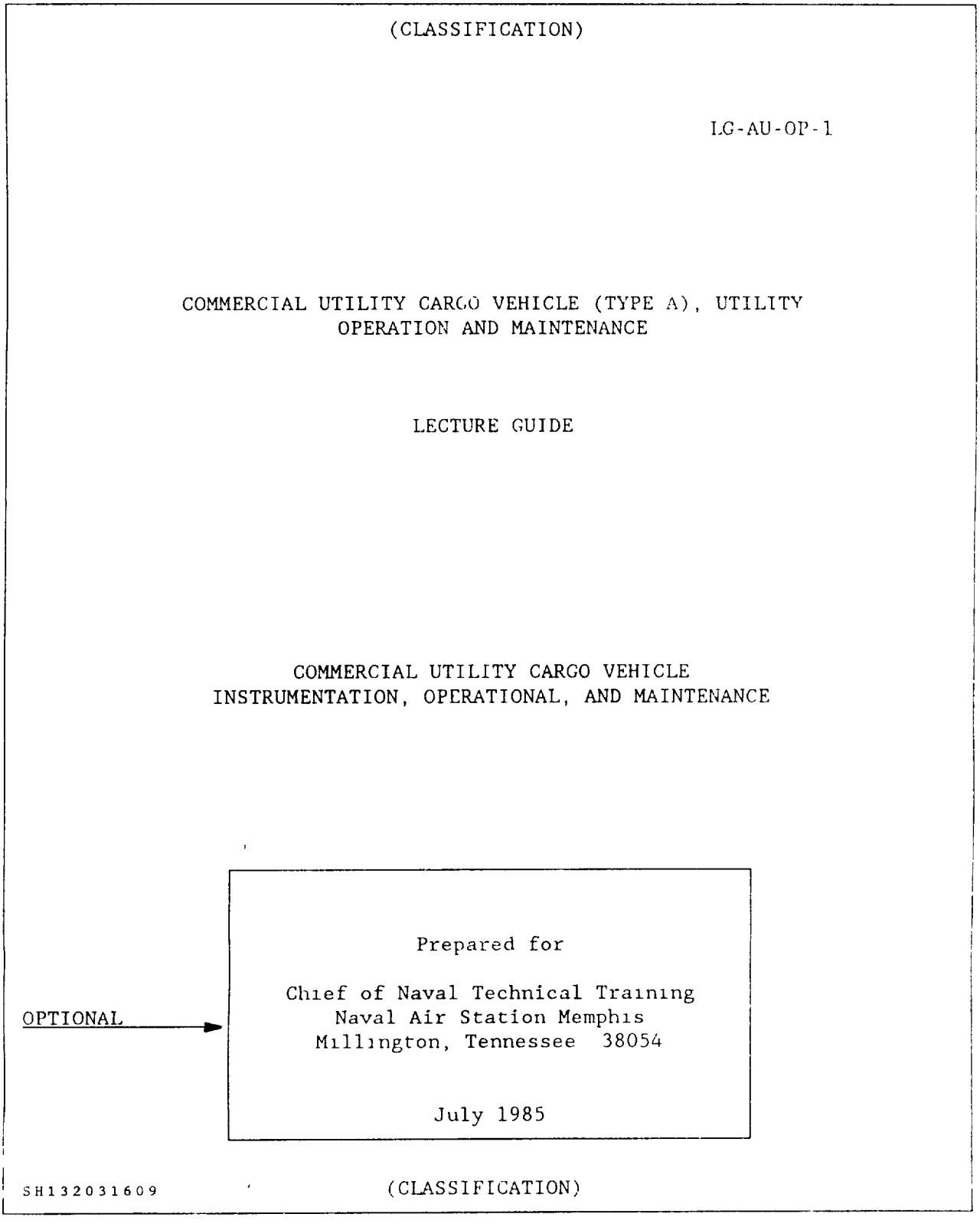

FIGURE 5-13-4 Example lecture guide cover page

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LG-AU-OP-1

LECTURE GUIDE

TABLE OF CONTENTS

Section Number	Title	Page
1	Introduction	1
2	Instrument Panel Lights, Gages, and Controls	1
3	Preoperation Checks	2
4	Road Maintenance	5
5	Preventive Maintenance	7

FIGURE 5-13-5 Example lecture guide table of contents

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LG-AU-OP-1

LECTURE GUIDE

REFERENCE PUBLICATION

Publication Number	Publication Title
TM 9-2320-289-10	Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, 4x4, M1008 (2320-01-123-6827)

FIGURE 5-13-6 Example lecture guide reference publication page

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LG-AU-OP-1

LECTURE GUIDE

HOW TO USE THE LECTURE GUIDE

This Lecture Guide does not replace formal training nor supersede any publication, rather it is an aid to ensure minimum coverage of all pertinent information pertaining to the operation and operator related maintenance of the Commercial Utility Cargo Vehicle (TYPE A), Utility

The material in this guide consists of the Lecture Outline accompanied by 35mm slides The Lecture Outline contains the slide numbers, topics and discussion points The slides are numbered sequentially beginning with slide 1 Adjacent to each slide number is the topic to be covered and the discussion points pertinent to the material shown on the slide The discussion points listed are considered the minimum coverage requirement and should be expanded upon by the lecturer as dictated by the requirements and experience of the attendees The 35mm slides are contained in plastic slide holders in the back of this Lecture Guide

The lecture may be selectively used for review of various features of the Commercial Utility Cargo Vehicle (TYPE A), Utility The Lecture Guide covers

1 Introduction

2 Instrument Panel Lights, Gage, and Controls

3 Preoperational Checks

4 Road Maintenance

5 Preventive Maintenance

This Lecture Guide does not attempt to cover these areas completely Instead, special attention is given those areas that have proven troublesome in the past

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FIGURE 5-13-7 Example how to use the lecture guide page

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LG-AU-OP-1

LECTURE GUIDE

LECTURE OUTLINE

Slide Number	Topic	Discussion Points
		Road Maintenance (Cont)
14	← Parking	1 Parking a Level ground b Transmission c Emergency brake set d Wheels blocked
15	← Tire Removal	2 Spare tire a Location b Access
16	← Tire Removal	3 Tools a Location b Access
17	← Tire Removal	4 Tools required a Axle jack b Jack handle c Lug wrench
18	← Tire Removal	5 Jack positioning, rear axle a Raise jack to below axle b Position

5

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FIGURE 5-13-8 Example lecture outline page for lecture guide

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5 14 AUDIO CASSETTES

5 14 Audio cassettes An audio cassette within the context of this handbook is a component of a slide presentation This section describes the format, content, and development guidelines for audio cassettes

5 14 1 Use Audio cassettes provide supporting narrative information for slide presentations and incorporate electronic synchronization signals to manually or automatically advance the slides. Slide presentations programed by an audio cassette are designed primarily for use in independent study, and should require no interpretation or explanation of material by an instructor

5 14 2 Elements The elements of an audio cassette are the audio-script, data sheet, and audio cassette

(a) Audio-script A written narrative of the audio cassette
(b) Data sheet An outline of the presentation
(c) Audio cassette A broadcast-quality tape

5 14 3 Development The basis for an audio cassette is the slide presentation requirement in the approved TMO, which is discussed in 5 10, that will be programed from an Audio Cassette The overall development process begins with the creation of slide presentation storyboards A completed storyboard illustration card "tells a story" to the particular audio-visual specialist who develops the final product The storyboard illustration card is a convenient means of providing rough visual data, audio production and narration information for one frame on one form The amount of information on the card is dependent upon the type of production being designed Figure 5-14-1 provides an example of a rough storyboard illustration card for one frame of information in the initial design of a slide program It could be used for slides programed by an audio cassette Any convenient form that can convey the message to the audio-visual specialist is sufficient Audio Cassette draft products include an audio-script and a data sheet

5 14 3 1 Audio-script development A workable draft for the final audio cassette is an audio-script and, if applicable, a data sheet to assist in the overall slide presentation The basis of the script is the storyboard illustration cards The audio-script is a written version of the audio cassette and, when completed, becomes the narrator's tool for recording the master cassette Materials should be written short, concise, and conversational When completed, the audio-script will consist of the following

(a) Cover page A cover page must identify the document as an audio-script It must contain the complete title of the subject matter (see figure 5-14-2), the name of the activity the document has been prepared for, and the proper audio cassette identification data (see table 5-14-I)

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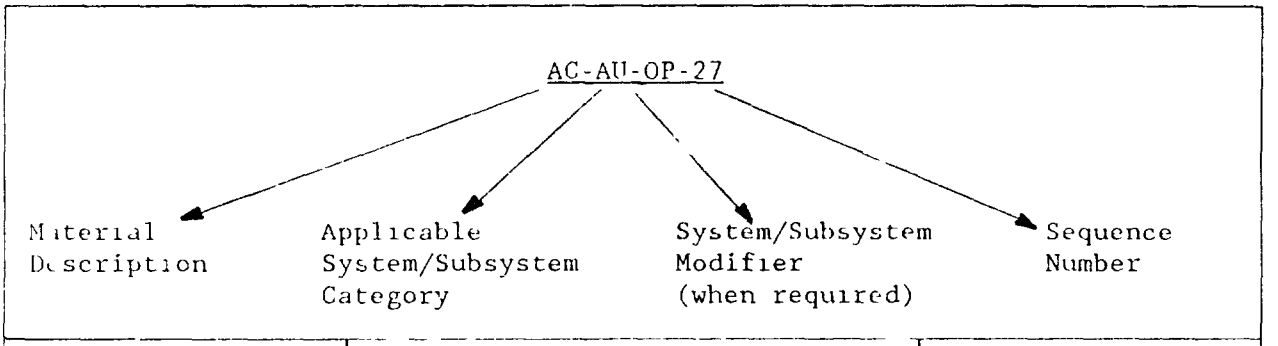
TABLE 5-14-I Audio cassette identification data



MATERIAL DESCRIPTION	SYSTEM/SUBSYSTEM CATEGORY	SYSTEM/ SUBSYSTEM MODIFIER
AC For Audio Cassettes and for slides programed by an Audio Cassette	A - Airframe AF - Automatic Flight Control AL - Air Launch Weapons AR - Armament AU - Automotive C - Communications DS - Data Systems EC - Environmental Control EI - Electrical ES - Escape/Survival EW - Electronic Warfare F - Fire Control ID - Identification IN - Instruments L - Launcher M - Missile and Guidance N - Navigation P - Propulsion PP - Power Plan/Related Systems S - Support Equipment T - Test Equipment W - Weapon System	DM Depot Level Maintenance None SSBN O Officer OP Operator OM Organization Level Maintenance T Intermediate Level Maintenance

NOTE The system/subsystem categories and modifiers shown in the second and third columns are not all inclusive When the table is not sufficient for identification, the Procuring Activity will assign applicable identification data

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(b) Data sheet The data sheet states the learning objectives and briefly outlines the content of the presentation It also describes any unique requirements of operator actions necessary to use the slide presentation For example, the data sheet would specify the use of a special tape player/slide projector for automatic slide advance In the absence of the required equipment for automatic advance, slide advance is dependent on the operator, therefore, instructions concerning starting point and slide advance cues are provided A data sheet should provide unique requirements when there are sufficient special requirements, unless operational requirements are specifically requested by the contracting activity (see figure 5-14-3)

(c) Audio-script pages For sound-slide presentations, write the narrative to a maximum of 30 seconds for each frame Discuss only what is presented on the visual Do not wander from what is presented on the screen, as the viewer may easily become confused The narrative must be placed directly opposite the slide it supports Each narrative section must carry the same slide sequence number as the slide presentation Additionally, any music or sound effects are indicated on the audio-script When finally assembled, the reader is able to track the visual and other critical data with relative ease Figure 5-14-4 is an example of a typical audio-script page

5 14 3 2 Audio cassette development Audio cassettes must provide an effective media for the presentation of subject matter to be learned by the trainee Audio cassettes can be used as a supplement to support a given topic or used as a stand-alone element The following additional recommendations are furnished to assist in the development of high quality materials

(a) Narration Only qualified narrators should be used for the final product The narrator's voice should be suitable to the material being recorded

(b) Master copies The master tape and all subsequent duplicates must be recorded on two tracks Voice, music, sound effects, and an audible slide advancement tone (600 Hz) go on track number one The inaudible tone (1000 Hz), for automatic slide advancement, goes on track number two Tapes copied from the master tape should be duplicated at the standard cassette player speed of 1-5/8 inch per second (IPS)

(c) Audio cassette labels All cassettes must be properly labeled in accordance with table 5-14-5

(d) Composition of audio cassettes Audio cassettes must be of broadcast-quality tape, housed in a high impact plastic casing, and compatible with state-of-the-art players

(e) Music and sound effects Music and sound effects should be limited to that necessary to the presentation

(f) Documented releases All audio cassette presentations must be legally and properly prepared Written permission or release from liability must be obtained prior to recording any person except those persons supporting the preparing activity for whom the audio cassette is being

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produced This applies to contractor and military personnel as well as from professional actors Music and sound effects also require licensing from the agency holding the original materials except for materials originated by the preparing activity

5 14 3 3 Audio cassette production The following information is provided to assist in production

(a) Submittal for record and duplication The submission for record and duplication is made upon completion of the contract or when requested by the contracting activity The submittal for duplication is made to the contracting activity, as provided in the contract, or upon request

(b) Security classification Each element of the audio cassette must bear the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and the applicable contracting activity instructions

(c) Quality Assurance The quality of programed audio cassette presentations is ensured by reviews conducted after each stage of development Draft materials are evaluated to ensure that they meet the TMO requirements, the requirements of this chapter and all contracting activity provisions

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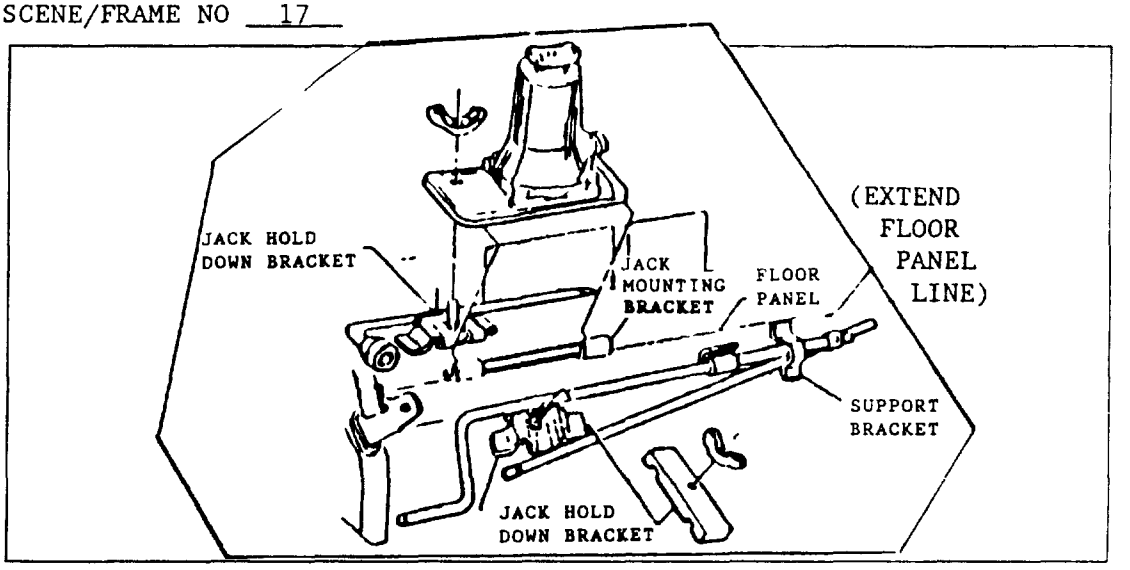
SCENE/FRAME NO 17



SCENE/FRAME SYNOPSIS Line art. Tools required to jack truck for tire change

ART DIRECTION Use enclosed figure from manual - enlarge callouts

NARRATION/SCRIPT N/A

CAMERA DIRECTION N/A

AUDIO NOTES None required For use with IG

PREPARED BY C M Lewis

DATE 7/22/85

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FIGURE 5-14-1 Example of rough storyboard illustration card for proposed slide presentation

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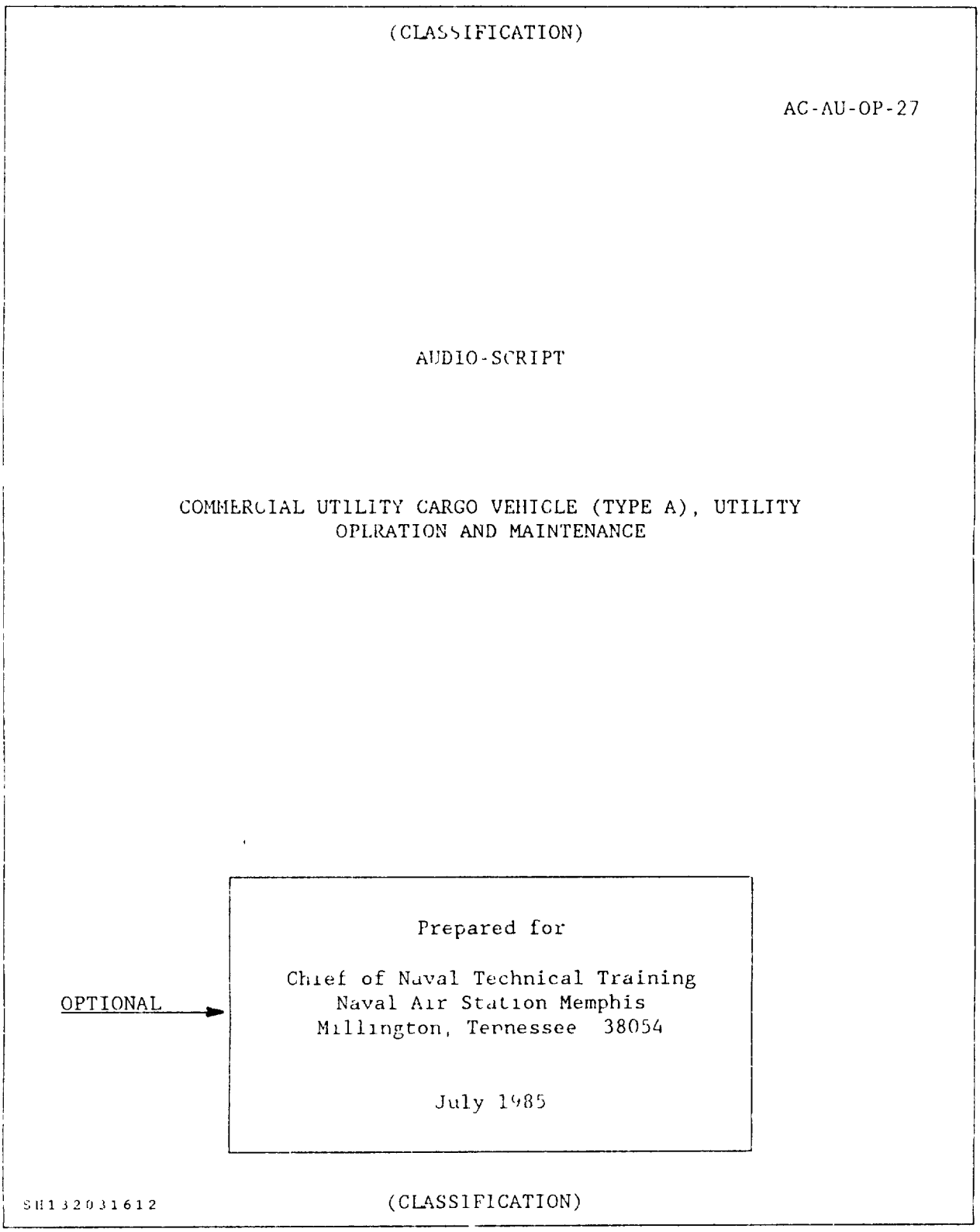

FIGURE 5-14-2 Example audio-script cover

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AC-AU-OP-27

DATA SHEET

A LEARNING OBJECTIVES

Upon completion of this slide presentation, you will be able to

1 Describe the tasks to be performed as well as the tools and equipment required to perform a tire change in support of basic corrective maintenance

2 Describe the special tools or equipment required to perform a tire change in support of basic corrective maintenance

3 Describe the procedure to be performed for a tire change in support of basic corrective maintenance

This media material consists of twenty nine (29) 35mm slides and an Audio Cassette It provides a basic description of the operational characteristics of the Commercial Utility Cargo Vehicle (TYPE A), Utility and the actions required for basic corrective maintenance

B PROJECTOR/RECORDER OPERATION

1 Arrange and load slides in sequential order into the slide projector tray

2 Load the Audio Cassette into the recorder

3 Turn the projector on and advance to the first slide Focus After a sharp projected image is attained - start audio

a If the projector/recorder has an automatic slide advance, no further adjustment is necessary, with the exception of the volume

b If the projector does not have an automatic advance, the Audio Cassette has an audible tone to cue the operator to advance the slide manually

4 The last slide will visually instruct the operator to rewind the Audio Cassette

FIGURE 5-14-3 Example audio cassette/slide presentation data sheet

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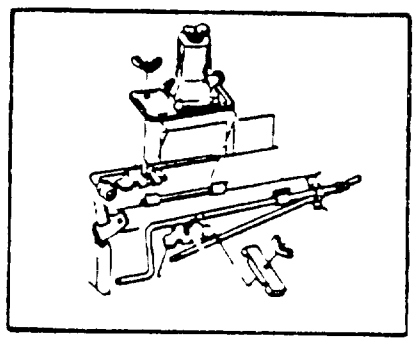
AC-AU-OP-27

AUDIO-SCRIPT

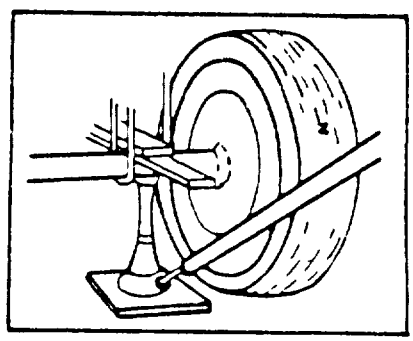
Slide No 16

consists of the axle jack, the jack handle, and the lug wrench



Slide No 17

Raise the jack to just below axle height and slide it into position



Slide No 18

Be sure the base of the jack is sitting on solid ground - and at a right angle to the axle

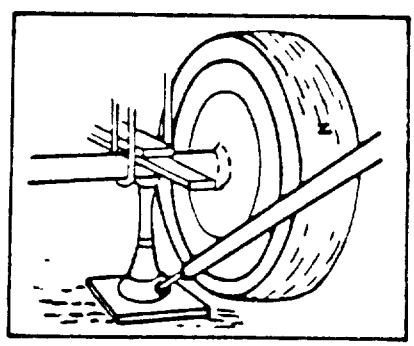


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FIGURE 5-14-4 Example audio-script page

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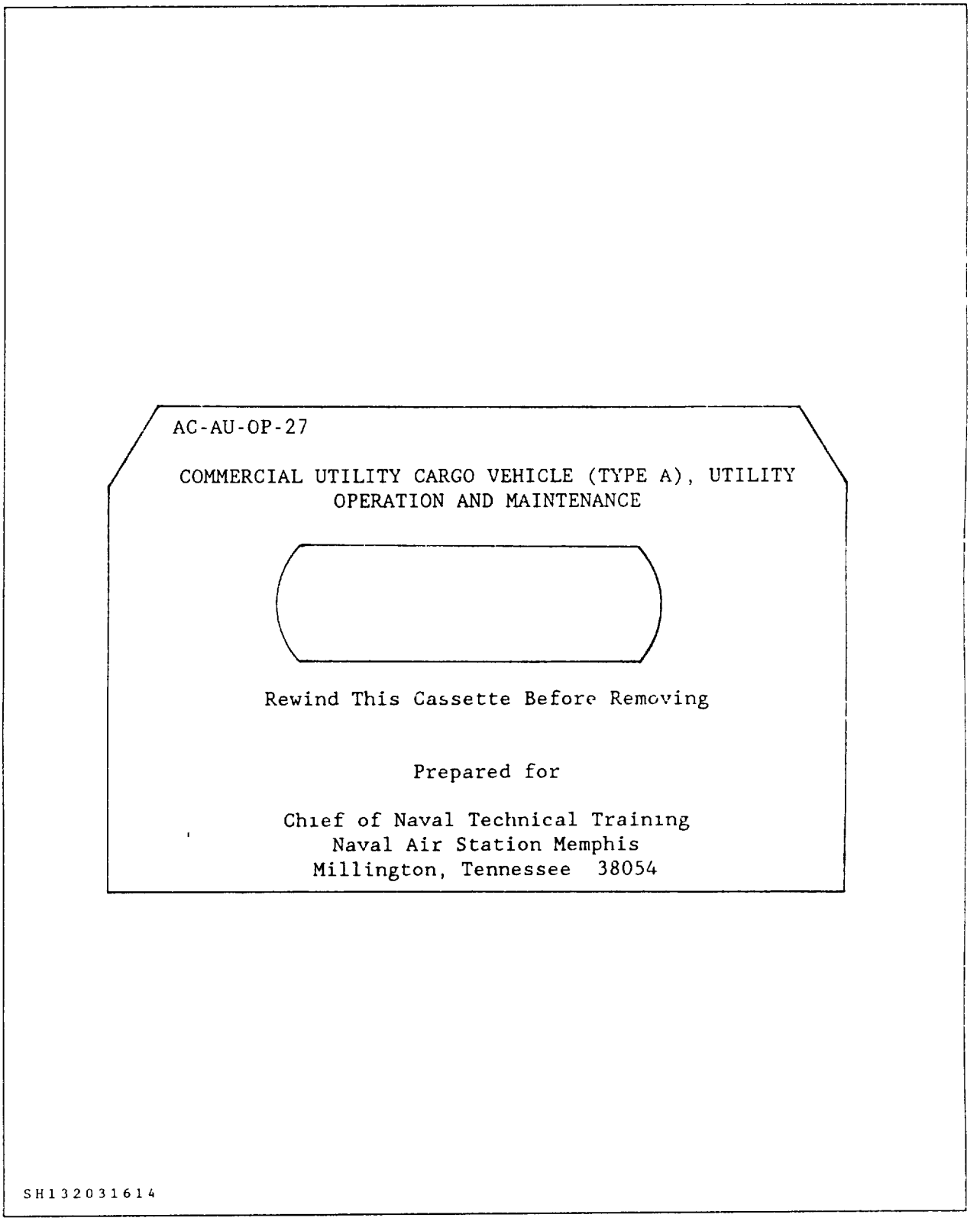

FIGURE 5-14-5 Example audio cassette label

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5 15 MOTION PICTURE PRESENTATIONS

5 15 Motion picture presentations. A motion picture within the context of this handbook is a component of curricula This section describes the format content, and development guidelines for 16mm motion picture presentations

5 15 1 Use Motion pictures, 16mm, provide a means of conveying information by use of moving pictures and sound Films are most effective with moderate to large groups When used with curricula, they are generally programed by an instructor guide The programing media, instructor guide, is discussed in Section 5 8

5 15 2 Elements The elements of a motion picture presentation are the storyboard-script and the film A data sheet should also be prepared to provide a synopsis of the film's key points for the instructor

5 15 3 Development The approved TMO serves as the basis to develop motion pictures This media must only be developed after other less expensive forms have been determined inadequate or less effective Guidelines for developing and submitting the TMO are described in 5 10 The following paragraphs provide suggestions and examples for developing and assembling the storyboards and script that make up the preliminary plan for a motion picture presentation

(a) Determine subject presentation strategy The subject should be presented in accordance with the following guidelines

(1) The subject matter should be presented in units which are easily understood For example, when a procedure is being demonstrated, group the steps into clearly recognizable parts of an entire process When information is being conveyed, group the details into major points which can be readily summarized

(2) The film should be as concise as possible The only objective is to help the trainee grasp a concept or observe complex motion which cannot be clearly visualized from an overhead transparency or other conventional media materials

(b) Determine development strategy Devise a strategy that considers scheduling logistics, hardware, and personnel availability for live shots, and production constraints For example, many technical training motion pictures are made on location in the training facility for which the presentation is being developed Schedule all live filming sequences around the training, if possible, on a not-to-interfere basis Consider using animation or mock-ups to depict basic concepts or dynamic motion that cannot be readily seen by trainees

5 15 3 1 Initial storyboard-script development A storyboard-script provides a book-like representation of the audio and visual information that will be

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presented by the motion picture It should contain sufficient detail so that the approach may be reviewed before production, allowing the storyboard-script to function as a viable final production plan

(a) Storyboard pages Prepare storyboard pages so that when viewed in the storyboard-script, they face the corresponding script pages (see figure 5-15-1) The same general storyboard development scheme should be followed as that described for initial design of instructional media materials, (see 5 12 2 7) with one major exception, motion In this case, capitalize on the motion picture advantage of motion The single frame storyboard card (see figure 5-15-2) is a useful development tool, although the final storyboard-script will be more comprehensive If the original development was done on single frame storyboards, transfer the information to the storyboard pages in the storyboard-script (see figure 5-15-3) Each card should be representative of a scene vice a single frame Convey the theme of the scene to the film director by the rough visual and the included directions Identify the type of visual desired (graphic, 16mm file footage, special effects, animation, live scenes, etc) so the film director can work to the developer's visual objectives The artwork does not have to be professional quality Use stick figures, paste-ups, rough sketches, or any other convenient means of expressing thoughts that the film director can understand Number each storyboard card in the sequence it should appear in the motion picture, so that the information may readily be transferred later to the storyboard-script

(b) Script pages The script pages must provide a verbal description of the scene, camera directions, and audio requirements The script is the blueprint for the production of the motion picture The script must contain, as well as adequately and intelligently impart, all information needed by those who must use the script for preproduction functions such as location requirements, stage directions, stage properties, artwork, stock footage, special effects, etc Prepare script pages so that, when viewed in the storyboard-script, they face the corresponding storyboard pages (see figure 5-15-1) If the original development was done on single frame storyboard cards, transfer the information to the script pages in the storyboard-script

The audio portion of a motion picture presentation may be composed of narration, music, and sound effects A motion picture is very dependent on audio to convey the intended message The script provides more than narration information Figure 5-15-4 shows a script page Note that the page includes space for scene, camera, and audio information During initial development, it may be more convenient to use the single scene storyboard card to keep the script and visual information together It may be easily transferred to the

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Storyboard-Script at a later time Script development considerations include

(1) Write the narration for delivery in a clear, precise, and conversational manner suitable for the intended audience
(2) Include music and sound effects throughout the tape if they are required to enhance the visualization and narration Remember, however, to record and mix them at a level that will not be distracting or detract from the narration
(3) Keep ambient sounds at a minimum unless they are an integral part of the subject matter A Film of a jet aircraft landing without the sound of jet engines would not be very believable

(c) Storyboard-script assembly The storyboard and script pages must be assembled so that, when viewed in the completed storyboard-script, they face one another (see figure 5-15-1) This allows the reader to track the entire presentation, scene by scene

(d) Final storyboard-script edit Once the storyboard-script has been assembled, the materials should be edited for adequate sequencing, narration updates, and insertion of appropriate visual or aural cues Include visual/aural cues in the storyboard-script where necessary to enhance the presentation Plan the use of cues carefully to avoid overloading any portion of the presentation The final storyboard-script consists of a cover page, storyboard pages and script pages The following paragraphs and examples are provided to assist in the process

5 15 3 2 Final storyboard script development The final storyboard script consists of a cover page, storyboard pages and script pages The following paragraphs and examples are provided to assist in the process

(a) Cover page The following information should be included on the Cover page (seee figure 5-15-5)

(1) The course identification number identifies the activity responsible for the course and its assigned number It will be furnished by the contracting activity
(2) The volume number must identify the number of the volume only if there is more than one Multiple volumes must be used when the content exceeds the capacity of a single binder
(3) The printed words "Storyboard-Script", identify the document
(4) The motion picture title shall identify the complete title of the subject matter
(5) The authority notice identifies the activity that authorized the publication of the motion picture

(b) Storyboard The following information must be included on the storyboard pages

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(1) Storyboard identification
(2) Motion picture title
(3) Programing media interface considerations The final motion picture presentation, when submitted, includes copies of the instructor guide An instructor guide is developed in accordance with 5 8 with the following conditions included

(a) The motion picture presentation must be referenced on the topic page under trainee preparation if the film is to be used prior to presenting the topic to the trainee If the Film is to be used during the topic, reference it under instructor preparation
(b) The use of the motion picture presentation must be described on the D-D-A of the instructor guide
(c) The motion picture presentation must be listed under the "Films" heading of the MML

(4) Learning objective numbers identifying the space where the number(s) of the objective(s) are located is supported by the scenes
(5) Scene

(c) Script The following information must be included on the script pages

(1) Script identification
(2) Scene number
(3) Scene description
(4) Camera directions
(5) Audio requirements

(d) Data sheet A data sheet aids the instructor by providing a brief synopsis of the film and the learning objectives the film was developed to satisfy (see figure 5-15-6) It also provides any unique points to look for and the running time

5 15 3 3 Final motion picture presentations Final motion picture presentations consist of one reproducible copy of the instructor guide and one motion picture copy, unless the master is requested by the contracting activity

(a) Submittal for record and duplication Submission for record and duplication is made when requested by the contracting activity
(b) Master motion picture production The following additional recommendations are furnished to assist in the development of high quality materials

(1) Narration Only qualified narrators should be used for the

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final product The narrator's voice should be suitable to the material being recorded

(2) Restriction of music and sound effects Music and sound effects should be limited to that necessary to the presentation

(3) Documented releases All motion picture presentations must be legally and properly prepared Written permission with release from liability must be obtained prior to filming any person, written material, facility, equipment, or any other object scene or material except those developed by the material preparing activity for the motion picture being produced This applies to contractor and military personnel as well as from professional actors Music and sound effects also require licensing from the agency holding the original materials except for materials originated by the material preparing activity

(c) Security requirements Each element of the motion picture presentation bears the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510, and the applicable contracting activity instructions

(d) Quality Assurance The quality of motion picture presentations is ensured by appropriate reviews conducted during development Draft materials are evaluated to ensure that they meet the TMO requirements, the requirements of this chapter, and all contracting activity provisions

(e) Motion picture identification number The programed motion picture presentation identification number is provided by the contracting activity

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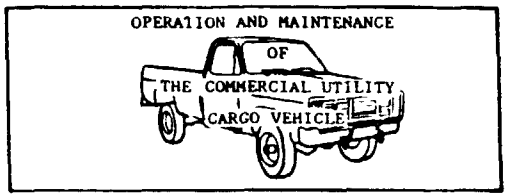
STORYBOARD

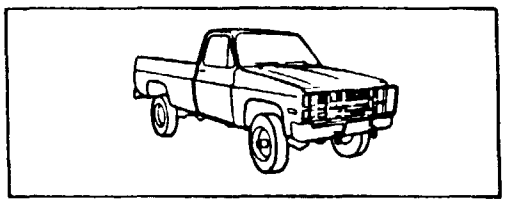
Motion Picture Title Commercial Utility Cargo Vehicle (TYPE A), Utility Operation and Maintenance

Part No - Topic No D542-2-3 Learning Objective No 1-7

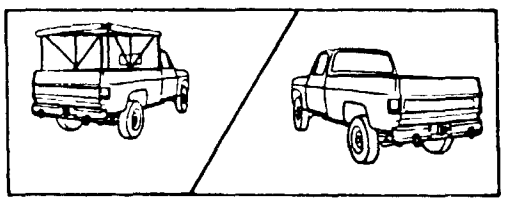
Scene No 1



Scene No 2



Scene No 3



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SCRIPT

Scene Number 1		
GRAPHIC - Title superimposed over	FADE INTO	Music UP - Fade under
LIVE - CUCV (TYPE A) approaching motor pool (other vehicles in background)	TITLE	NARRATOR This short presentation will introduce you to the Navy s new and durable one and one-quarter ton cargo vehicle known as the Commercial Utility Cargo Vehicle TYPE A)
	DISSOLVE TO	
Scene Number 2		
GRAPHIC Photograph of CUCV (TYPE A) (without cargo kit)	GRAPHIC	NARRATOR The light but powerful new truck is equipped with a 6 2 liter diesel engine and a three speed automatic transmission
	CUT TO	
Scene Number 3		
SPLIT SCREEN Action scene of two trucks upper left-hand truck without cargo carrier kit lower right-truck with cargo kit up and operational	SPLIT SCREEN SPECIAL EFFECT	NARRATOR As you can see it is available th an optional covered cargo kit, which installs in just a few minutes
	CUT TO	

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FIGURE 5-15-1. Example storyboard and script page arrangement.

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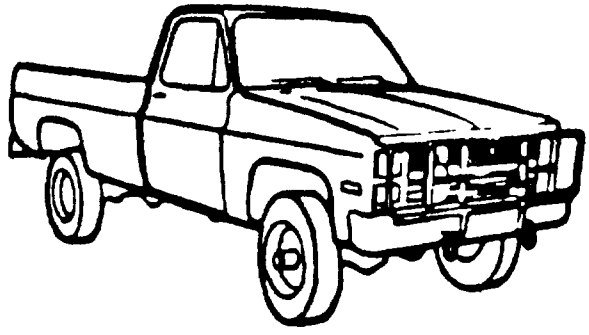
SCENE/FRAME NO 2



SCENE/FRAME SYNOPSIS ACTION Truck approaching motor pool - front angle shot with other vehicles in background.

ART DIRECTION N/A

NARRATION/SCRIPT This light but durable new truck comes equipped with a powerful 6.2 liter diesel engine and a three speed automatic transmission

CAMERA DIRECTION Shoot with 3/4 front shot - with driver plainly visible.

AUDIO NOTES None required Dub narration later

PREPARED BY R L Baker

DATE 6/29/85

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FIGURE 5-15-2 Example storyboard illustration card for proposed motion picture presentation

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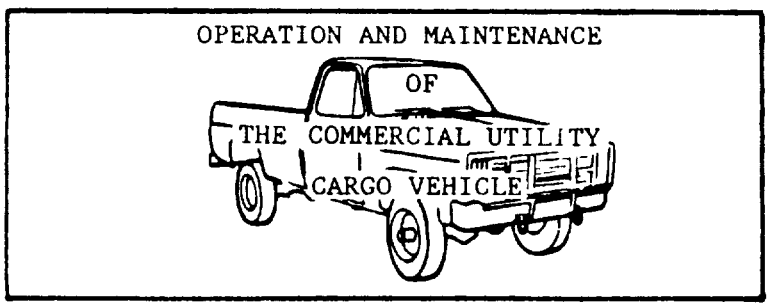
STORYBOARD

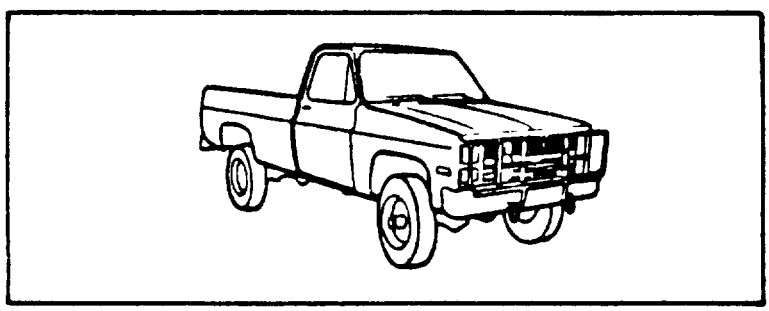
Motion Picture Title Commercial Utility Cargo Vehicle (TYPE A), Utility Operation and Maintenance

Part No - Topic No D542-2-3 Learning Objective No 1-7

Scene No 1



Scene No 2



Scene No 3

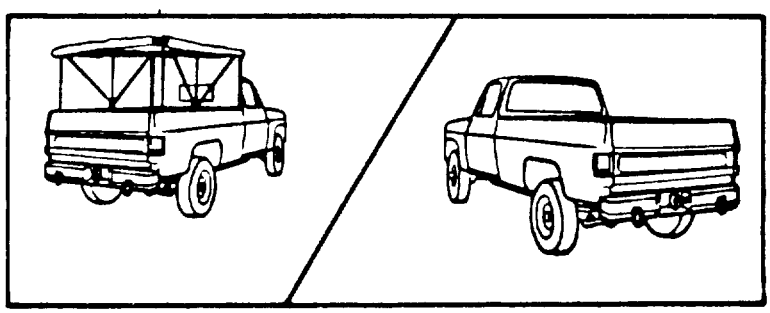


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FIGURE 5-15-3 Example storyboard page (Sheet 1 of 2)

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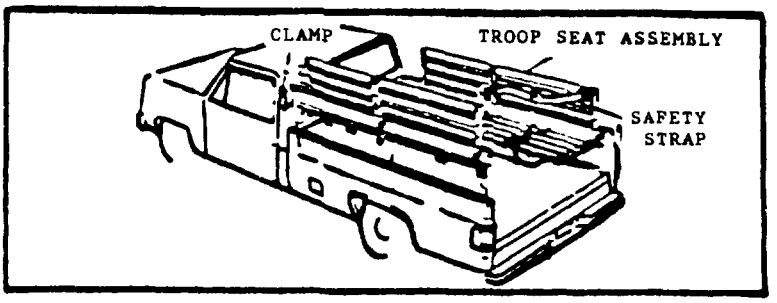
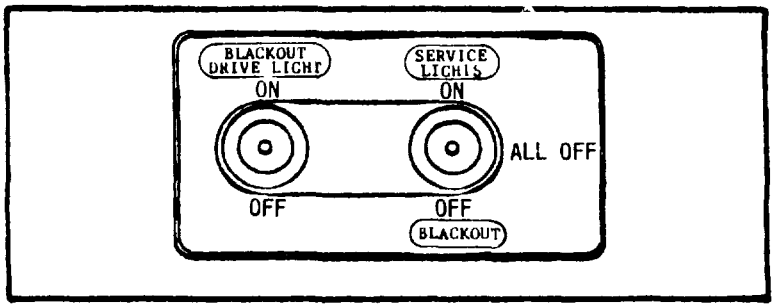
STORYBOARD

Motion Picture Title. Commercial Utility Cargo Vehicle (TYPE A), Utility Operation and Maintenance

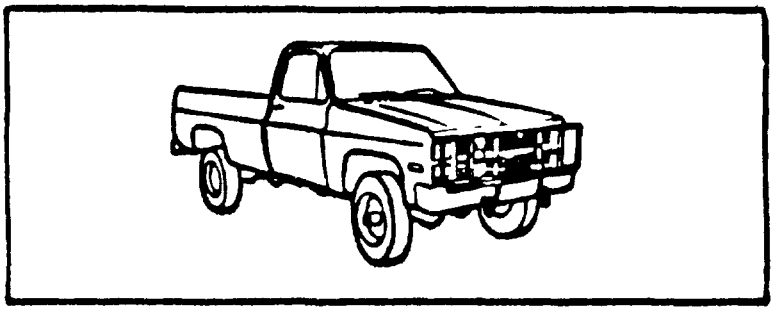
Part No - Topic No D542-2-3 Learning Objective No 1-7



Scene No 25



Scene No 26



Scene No 27

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FIGURE 5-15-3 Example storyboard page (Sheet 2 of 2)

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SCRIPT

Scene Number 1		
GRAPHIC - Title superimposed over	FADE INTO	Music UP - Fade under
LIVE - CUCV (TYPE A) approaching motor pool (other vehicles in background)	TITLE	NARRATOR This short presentation will introduce you to the Navy's new and durable one and one-quarter ton cargo vehicle, known as the Commercial Utility Cargo Vehicle (TYPE A)
	DISOLVE TO	
Scene Number 2		
GRAPHIC Photograph of CUCV (TYPE A) (without cargo kit)	GRAPHIC	NARRATOR The light but powerful new truck is equipped with a 6 2 liter diesel engine and a three speed automatic transmission
	CUT TO	
Scene Number 3		
SPLIT SCREEN Action scene of two trucks - upper left-hand truck without cargo carrier kit, lower right-truck with cargo kit up and operational	SPLIT SCREEN SPECIAL EFFECT	NARRATOR As you can see, it is available with an optional covered cargo kit, which installs in just a few minutes
	CUT TO	

SH132031618

FIGURE 5-15-4 Example script page (Sheet 1 of 2)

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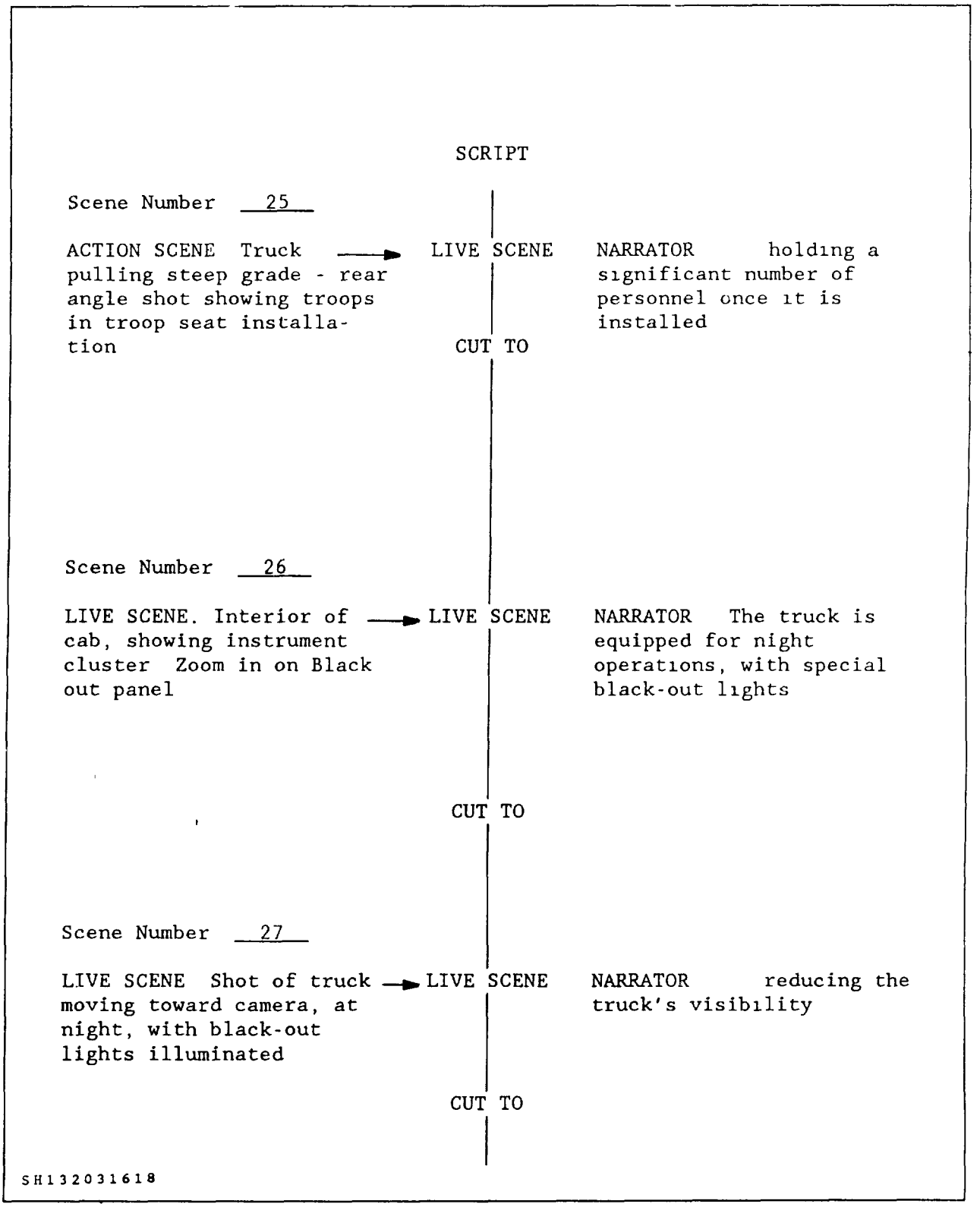

FIGURE 5-15-4 Example script page (Sheet 2 of 2)

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(CLASSIFICATION)

A-234-5678

STORYBOARD-SCRIPT

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY OPERATION AND MAINTENANCE

OPTIONAL →

Prepared for

Chief of Naval Technical Training
Naval Air Station Memphis
Millington, Tennessee 38054

July 1985

SH132031619

(CLASSIFICATION)

FIGURE 5-15-5 Example storyboard-script cover page

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FILM DATA SHEET

FILM TITLE — Commercial Utility Cargo Vehicle (Type A), Utility Operation and Maintenance, DN00000 (TBA)

RUNNING TIME — 27 minutes

SYNOPSIS — This film depicts the operating characteristics of the CUCV (TYPE A), Utility from both an operational and maintenance standpoint Particular emphasis is placed on the operator actions peculiar to the diesel engine, the variable option transfer gear cases, and the four wheel drive Detailed demonstrations of operator-related preventive and corrective maintenance are provided

LEARNING OBJECTIVES — Upon completion of this motion picture presentation, you will be able to

1 Describe operational tasks for CUCV (TYPE A)
   a Pre-operational procedures
   b Operational procedures
   c Post-operational procedures

2 Define the maintenance policy for the CUCV (TYPE A) in support of a tire change

3 Describe the special tools or equipment required to perform post-repair tire change in support of the CUCV (TYPE A) basic corrective maintenance

4 Describe the post-repair procedure tire change in support of the CUCV (TYPE A) basic corrective maintenance

POINTS TO LOOK FOR

OPERATION
1 Diesel engine starting procedures
2 Transfer gear case operation
3 Four wheel drive operation

MAINTENANCE
1 Pre-operation checks
2 Tire changes
3 Special tools and equipment

FIGURE 5-15-6 Example data sheet

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5 16 VIDEOTAPE PRESENTATION

5 16 Videotape presentation This section describes the use, elements, and development guidelines of videotape presentation as specified in the military standard and in DI-ILSS-80090

5.16 1 Use Videotape (VT) presentations provide a means of conveying information by use of still or moving pictures, and sound This media must only be developed after other less expensive forms have been determined inadequate or less effective VT presentations may be stand-alone, programed, or specialized presentations They may be programed, where applicable, from a self-study workbook or an instructor guide The programing media are discussed in 5 17 and 5 8, respectively

5 16 2 Elements The elements of a VT presentation are the storyboard-script and videotape.

5 16 3 Development The approved TMO serves as the basis to develop the VT presentation Guidelines for developing and submitting the TMO are described in Section 5 10 The following paragraphs provide suggestions and examples for developing and assembling the storyboards and script that make up the preliminary plan for a VT presentation

(a) Determine subject presentation strategy The subject should be presented in accordance with the following guidelines

(1) Stand-alone VTs should begin with a statement of the training objectives and end with a restatement of the objectives and a summary of the major points of instruction Stand-alone VT presentations do not require statements of objectives since the Stand-alone VT is only part of a lesson for which the objectives have already been stated.

(2) For both stand-alone and programed VTs, the subject matter should be presented in units which are easily understood For example, when a procedure is being demonstrated, group the steps into clearly recognizable parts of an entire process When information is being conveyed, group the details into major points which can be readily summarized.

(3) Specialized VTs (or specialized VT segments) should be as concise as possible Their only objective is to help the instructor explain a concept or illustrate complex motion which cannot clearly be visualized from an overhead transparency or other conventional media materials Plan specialized VTs so that they do not exceed five minutes in length, usually 1 or 2 minutes are sufficient

(b) Determine development strategy Devise a strategy that considers scheduling logistics, hardware and personnel availability for live

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slots, and production constraints For example, many technical training VTs are made on location in the school for which the presentation is being developed Schedule all live filming sequences around the training, if possible, on a not-to-interfere basis Consider using animation or mock-ups to depict basic concepts or dynamic motion that cannot be readily seen by the trainees

5 16 3 1 Initial storyboard-script development A storyboard-script provides a book-like representation of the audio and visual information that will be presented by the VT

(a) Storyboard pages The storyboard pages must provide the visual representations of the material which will be presented by the VT Prepare storyboard pages so that when viewed in the storyboard-script, they face the corresponding script pages (see figure 5-16-1) The same general storyboard development scheme should be followed as that described for initial design of instructional media materials, with one major exception In this case, capitalize on the VT advantage of motion The single frame storyboard card (see figure 5 16-2) is a useful development tool, although the final storyboard-script will be more comprehensive If the original development was done on single frame storyboards, transfer the information to the storyboard pages in the storyboard-script (see figure 5-16-3) Each card must be representative of a scene vice a single slide frame Convey the theme of the scene to the video director by the rough visual and the included directions Identify the type of visual desired (graphic, 16mm or VT file footage, special effect video, animation, live scenes etc) so the video director can work to the developer's visual objectives The artwork does not have to be professional quality Use stick figures, paste-ups, rough sketches, or any other convenient means of expressing thoughts that the video director can understand Number each storyboard card in the sequence it is to appear in the VT, so that the information may readily be transferred later to the storyboard-script

(b) Script pages The script pages must provide a verbal description of the scene, camera directions, and audio requirements The script is the blueprint for the production of the VT The script must contain, as well as adequately and intelligently impart, all information needed by those who must use the script for preproduction functions such as location requirements, stage directions, stage properties, artwork, stock footage, special effects, etc Prepare script pages so that, when viewed in the storyboard-script, they face the corresponding storyboard pages (see figure 5-16-1) If the original development was done on single frame storyboard cards, transfer the information to the Script pages in the storyboard-script

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The audio portion of a VT presentation may be composed of narration, music, and sound effects For specialized VTs used with instructor guides, little or no audio is required since the instructor is expected to incorporate the specialized VT as a visual aid in his presentation A Stand Alone VT, conversely, is very dependent on audio to convey the intended message The script provides more than narration information Figure 5-16-4 shows a script page Note that the page includes space for scene, camera, and audio information During initial development, it may be more convenient to use the single scene storyboard card to keep the script and visual information together It may be easily transferred to the storyboard-script at a later time Script development considerations include

(1) Write the narration for delivery in a clear, precise, and conversational manner suitable for the intended audience
(2) Use music, if desired, at the beginning and end of stand-alone VTs to signal start and stop points Include music and sound effects throughout the tape if they are required to enhance the visualization and narration Remember, however, to record and mix them at a level that must not be distracting or detract from the narration
(3) Keep ambient sounds at a minimum unless they are an integral part of the subject matter A VT of a jet aircraft landing without the sound of jet engines would not be very believable

(c) Storyboard-script assembly The storyboard and script pages must be assembled so that, when viewed in the completed storyboard-script, they face one another (see figure 5-16-1) This allows the reader to track the entire presentation, scene by scene

(d) Final storyboard-script edit Once the storyboard-script has been assembled, the materials should be edited for adequate sequencing, narration updates, and insertion of appropriate visual or aural cues Include visual/aural cues in the storyboard-script where necessary to enhance the presentation Plan the use of cues carefully to avoid overloading any portion of the presentation VTs consisting of two or more segments require cues to indicate start/stop pause points to correlate the VT presentation with associated discussion points It must contain sufficient detail so that the approach may be reviewed before production, allowing the storyboard-script to function as a viable final production plan Steps and special considerations required along the way to completion of the overall project include

5 16 3 2 Final storyboard-script development The final storyboard-script consists of a cover page, storyboard pages and script pages The following paragraphs and examples are provided to assist in the process

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a Cover page The following information must be included on the cover page (see figure 5-16-5)

(1) The course identification number identifies the activity responsible for the course and its assigned number It will be furnished by the contracting activity
(2) The volume number must identify the number of the volume only if there is more than one Multiple volumes must be used when the content exceeds the capacity of a single binder
(3) The printed words "Storyboard-Script", identify the document
(4) The VT title must identify the complete title of the subject matter
(5) The authority notice identifies the activity that authorized the publication of the VT

(b) Storyboard The following information must be included on the storyboard pages

(1) Storyboard identification
(2) VT title
(3) Programing media interface considerations The final VT presentation, when submitted, includes copies of the programing media The following guidance should be considered

(a) Self-study workbook The self-study workbook is developed in accordance with guidelines contained in 5 17 Statements covering the following areas must appear in the "How to Use the Self-Study Workbook" paragraph in the Introduction

1 The relationship of the self-study workbook to the VT presentation
2 The relationship of the individual self-study workbook lessons to the VT
3 Other data appropriate for an understanding of the VT presentations

(b) An instructor guide is developed in accordance with 5 8 with the following conditions included

1 The VT presentation should be referenced on the topic page under trainee preparation if the tape is to be used prior to presenting the topic to the trainee If the tape is to be used during the topic, reference it under instructor preparation
2 The use of the VT presentation must be described on the D-D-A page of the instructor guide

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3 The VT presentation must be listed under the "Films" heading of the MML

(4) Learning objective number identifying the space where the number(s) of the objective(s), which is supported by the scenes
(5) Scene

c Script The following information must be included on the script pages

(1) Script identification
(2) Scene number
(3) Scene description
(4) Camera directions
(5) Audio requirements

5 16 3 3 Videotape development VTs must provide an effective media for the presentation of subject matter to be learned by the trainee VTs can be used as a supplement to support a given topic or used as a stand-alone element The following additional recommendations are furnished to assist in the development of high quality materials

(a) Narration Only qualified narrators should be used for the final product The narrator's voice should be suitable to the material being recorded Narration is a voice on the sound track apparently coming from somewhere off screen
(b) Master copies One inch type C tape
(c) Production copies 3/4 inch tape
(d) Audio Premixed and synchronized using broadcast quality VT production standards
(e) Leader Information (color alignment, audio adjustment, security classification, title, contract number, contracting activity, producer, and completion date)
(f) VT stock Blank stock specifications
(g) VT labeling Information (title, contract number, length, VT quality, tape speed, and production stage)
(h) Music and sound effects Music and sound effects should be limited to that necessary to the presentation
(i) Documented releases All VT presentations must be legally and properly prepared Written permission or release from liability must be obtained prior to filming any person, written material, facility, equipment, or any other object, scene, or material except those developed by the preparing activity for the VT being produced This applies to contractor and military personnel as well as from professional actors Music and sound effects also require licensing from the agency holding the original materials except for materials originated by the preparing activity
(j) Indexing Identification of key points within the program

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5 16 3 4 Final videotape presentations Final VT presentations consist of one reproducible copy of the programing medium (self-study workbook or instructor guide) and one VT copy, unless the master is requested by the contracting activity

(a) Submittal for record and duplication The submission for record and duplication is made upon completion of the contract or when requested by the contracting activity The submittal for duplication is made to the contracting activity, as provided in the contract, or upon request

(b) Security requirements Each element of the programed VT presentation bears the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and the applicable contracting activity instructions

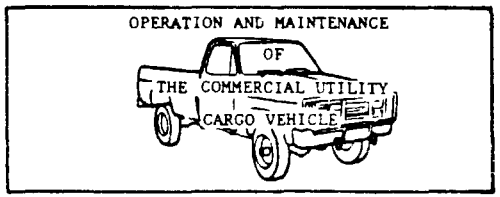
(c) Quality Assurance The quality of programed VT presentations is ensured by reviews conducted after each stage of development Draft materials are evaluated to ensure that they meet the TMO requirements, the requirements of this chapter and all contracting activity provisions

STORYBOARD

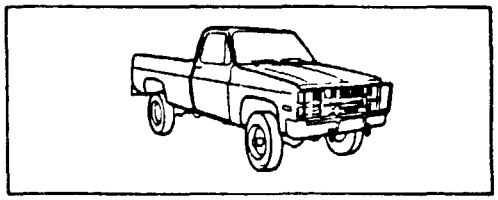
Videotape Title Commercial Utility Cargo Vehicle (TYPE A)
Utility Operation and Maintenance

Part No - Topic No 127 3 Learning Objective No 1 7

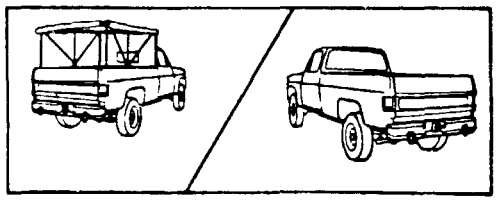
Scene No 1



Scene No 2



Scene No 3



SH132031622

SCRIPT

Scene Number 1

GRAPHIC - Title super imposed o er

LIVE CUCV (TYPE A) approaching motor pool (other vehicles in background

FADE INTO

TITLE

DISOLVE TO

Music UP - Fade under

NARRATOR This short presentation will introduce you to the Navy's new and durable one and one-quarter ton cargo vehicle known as the Commercial Utility Cargo Vehicle (TYPE A)

Scene Number 2

GRAPHIC Photograph of CUCV (TYPE A) (without cargo kit)

GRAPHIC

CUT TO

NARRATOR The light but powerful new truck is equipped with a 6 2 liter diesel engine and a three speed automatic transmission

Scene Number 3

SPLIT SCREEN Action scene of two trucks - upper left-hand truck without cargo carrier kit lower right truck with cargo kit up and operational

SPLIT SCREEN SPECIAL EFFECT

CUT TO

NARRATOR As you can see it is available with an optional covered cargo kit which installs in just a few minutes

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SH132031620

FIGURE 5-16-1. Example storyboard and script page arrangement.

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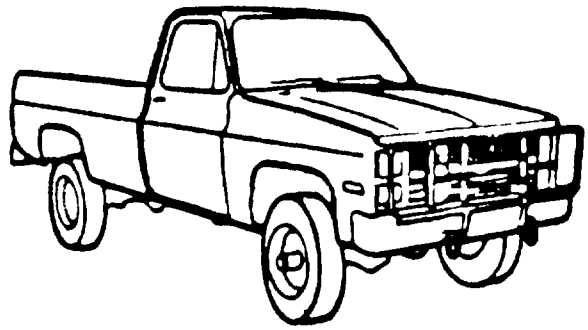
SCENE/FRAME NO 2



SCENE/FRAME SYNOPSIS ACTION Truck approaching motor pool - front angle shot with other vehicles in background

ART DIRECTION N/A

NARRATION/SCRIPT This light but durable new truck comes equipped with a powerful 6 2 liter diesel engine and a three speed automatic transmission

CAMERA DIRECTION Shoot with 3/4 front shot - with driver plainly visible

AUDIO NOTES None required Dub narration later

PREPARED BY R L Baker

DATE 6/29/85

SH13203162

FIGURE 5-16-2 Example storyboard illustration card for proposed videotape presentation

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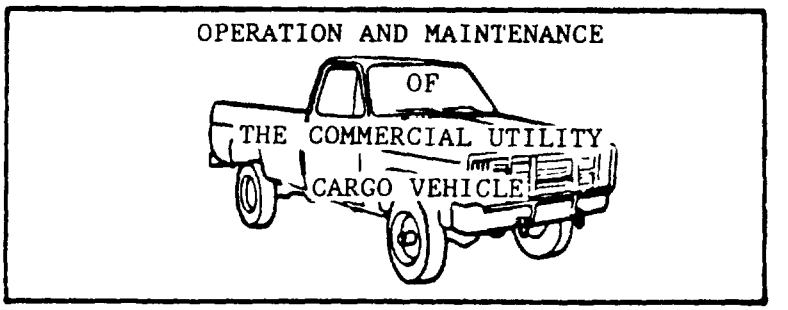
STORYBOARD

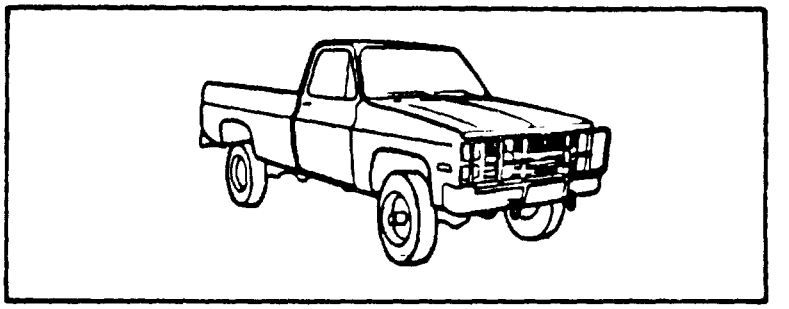
Videotape Title Commercial Utility Cargo Vehicle (TYPE A), Utility Operation and Maintenance

Part No - Topic No 127-3 Learning Objective No 1-7

Scene No 1



Scene No 2



Scene No 3

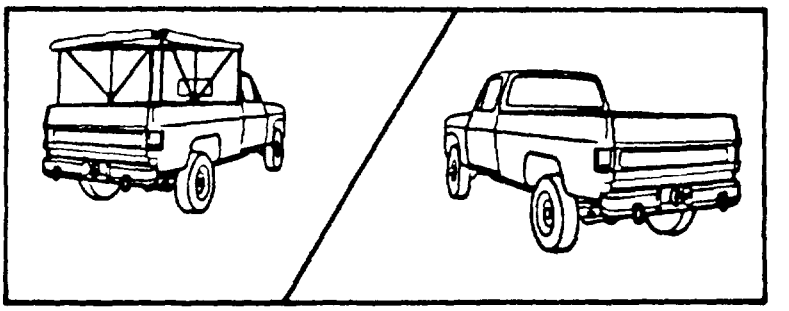


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FIGURE 5-16-3 Example storyboard page (Sheet 1 of 2)

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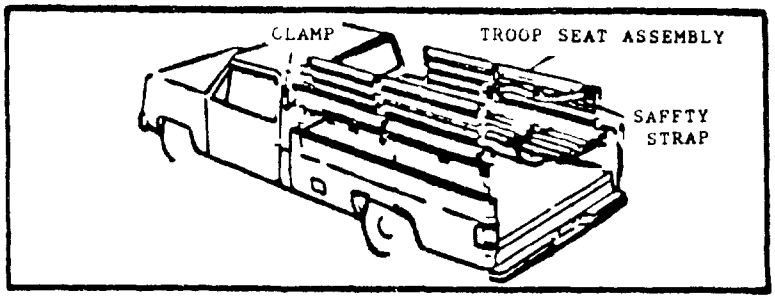
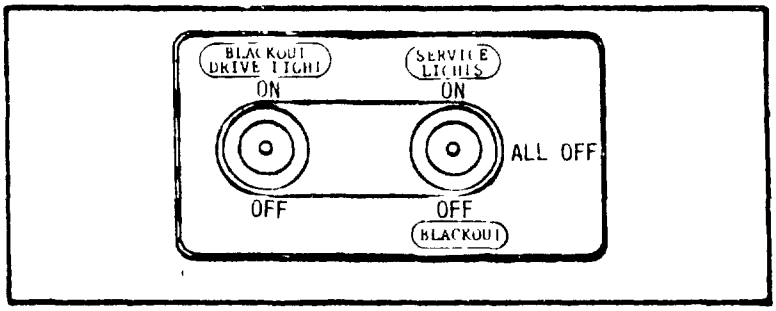
STORYBOARD

Videotape Title Commercial Utility Cargo Vehicle (TYPE A), Utility Operation and Maintenance

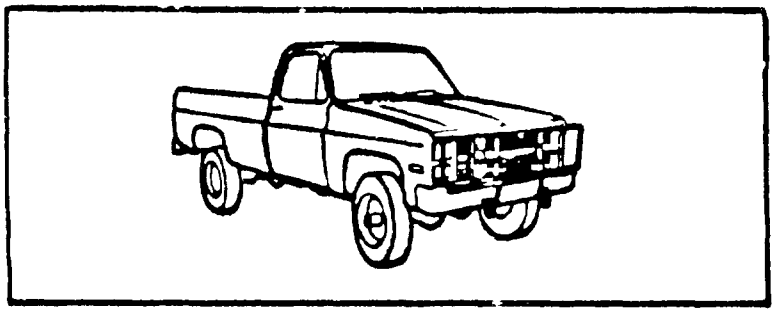
Part No - Topic No 127-3 Learning Objective No 1-7



Scene No 25



Scene No 26



Scene No 27

SH132031622

FIGURE 5-16-3 Example storyboard page (Sheet 2 of 2)

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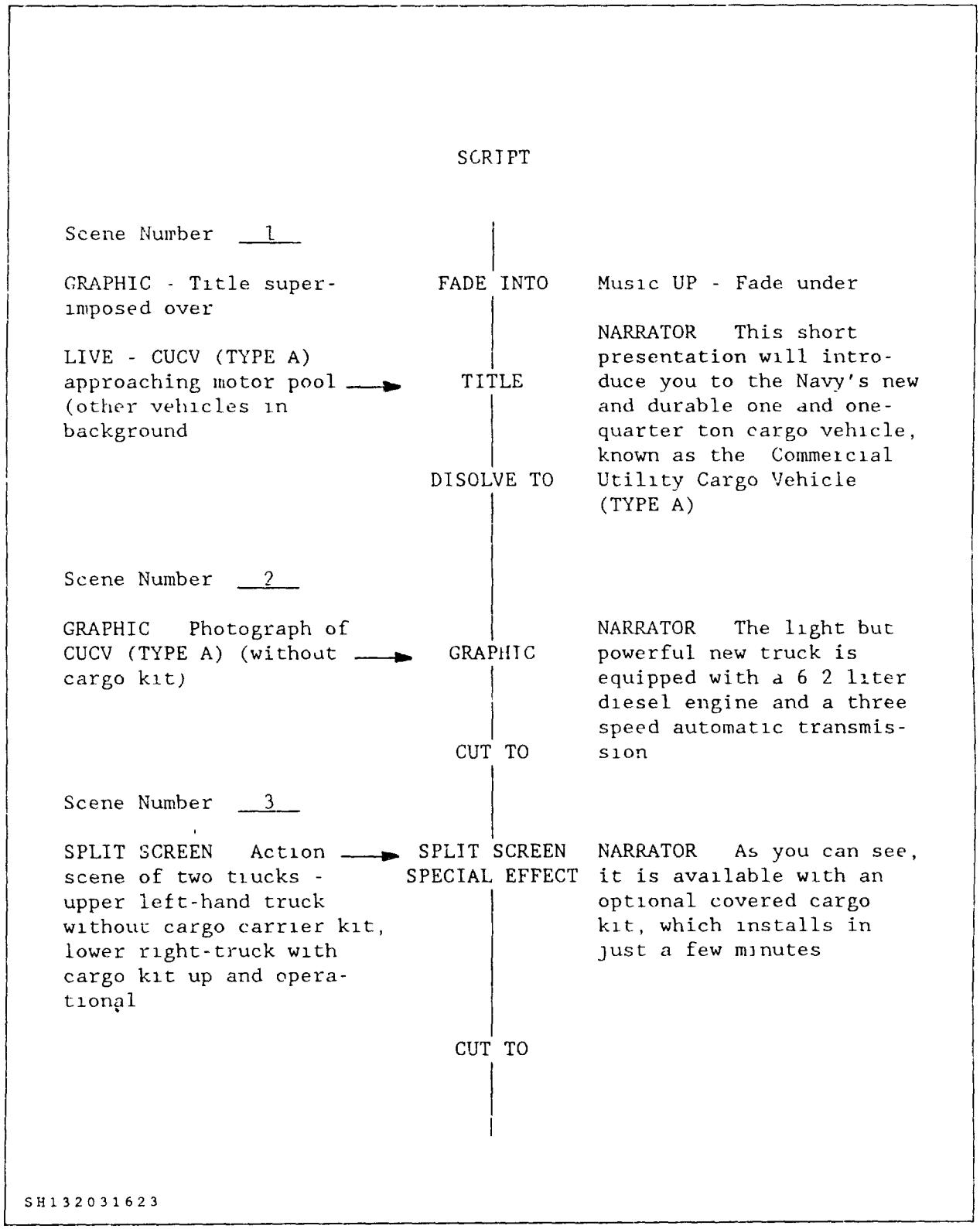

FIGURE 5-16-4 Example script page (Sheet 1 of 2)

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SCRIPT

Scene Number 25		
ACTION SCENE Truck pulling steep grade - rear angle shot showing troops in troop seat installation	LIVE SCENE	NARRATOR holding a significant number of personnel once it is installed
	CUT TO	
Scene Number 26		
LIVE SCENE Interior of cab, showing instrument cluster Zoom in on Black out panel	LIVE SCENE	NARRATOR The truck is equipped for night operations, with special black-out lights
	CUT TO	
Scene Number 27		
LIVE SCENE Shot of truck moving toward camera, at night, with black-out lights illuminated	LIVE SCENE	NARRATOR reducing the truck's visibility
	CUT TO	

SH132031623

FIGURE 5-16-4 Example script page (Sheet 2 of 2)

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A-234-5678

STORYBOARD-SCRIPT

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
OPERATION AND MAINTENANCE

OPTIONAL →

Prepared for

Chief of Naval Technical Training
Naval Air Station Memphis
Millington, Tennessee 38054

July 1985

SH132031624

FIGURE 5-16-5 Example storyboard-script cover page

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5 17 SELF-STUDY WORKBOOK

5 17 Self-study workbook The self-study workbook (SSWB) guides the trainee through a controlled path of study and skill tasks, as required, with a minimum amount of supervision An administrator guide provides direction to successfully complete the SSWB This section describes the format, content, and development guidelines for the SSWB as specified in the military standard and in DI-ILSS-80086

5 17 1 Use The SSWB is used as an extension of formal training within a designated training path system The SSWB is generally created for a specific category of personnel It may be used in either the formal or informal training environment While the SSWB may be a stand-alone training package, it is common to develop it around actual equipment, technical publications, and other forms of instructional media materials For example, a trainee may be directed by a work sheet to perform specific preventive maintenance procedures on a piece of equipment, under close supervision In another instance, a trainee might be directed to view a videotape of slide presentation used in conjunction with the SSWB in order to gain required information The SSWB is a structured form of self-paced training The pace and depth of study is flexible, being controlled by the particular needs of the trainee A SSWB administrator guide provides direction and outlines the rules and responsibilities of the person responsible for supervising the trainee in the performance of the SSWB requirements

5 17 2 Elements The elements of the SSWB are the workbook and the administrator guide

(a) SSWB

(1) Front matter This section provides information pertaining to identification, contents, and usage The front matter contains the following in the order listed

(a) Cover
(b) Reverse side of cover page
(c) Contents
(d) Introduction

(2) SSWB lessons This section contains a series of lessons addressing knowledge and applicable skill requirements The content shall be as follows

(a) SSWB lesson pretest
(b) SSWB assignment sheet
(c) SSWB information sheet
(d) SSWB problem sheet
(e) SSWB work sheet

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(f) End-of-lesson test

b Administration guide

(1) Front matter This section provides information pertaining to identification, contents, and usage The front matter contains the following in the order listed

(a) Cover
(b) Contents page
(c) Introduction

(2) Roles and responsibilities This section describes the extent of interaction that the administrator of the SSWB must have with the trainee
(3) Answer sheets Answer Sheets must provide the answers to the questions given during the lesson
(4) Progress checklist This checklist must provide a summary of the same knowledge and skill tasks listed on the SSWB work sheets

5 17 3 Development Development of the SSWB is based on the approved TMO Guidelines for developing and submitting and TMO are described in 5 10 SSWB development differs from the development of other forms of instructional media materials and closely resembles curriculum design All of the thought and planning that goes into creating a major course of instruction also goes into the SSWB As with most individualized instruction, the SSWB is difficult to design in that there is no instructor to step in and answer questions that continually arise in the familiar formal classroom The SSWB designer must anticipate the questions and answer them before they arise Instructions must be perfectly clear, and all required information must be available for the trainee

(a) Security requirements Each element of the SSWB must bear the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M, or OPNAVINST 5510 1, and applicable contracting activity instructions

5 17 3 1 Front matter development The front matter consists of the following (see figure 5-17-1)

a Cover The SSWB cover must be developed to include the following

(1) SSWB identification SSWBs are identified by an alphanumeric designation (see table 5-17-I)
(2) Volume number Identify the number of the volume if more than one volume is produced Multiple volumes may be produced if the material exceeds the contents of a single loose-leaf binder

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(3) Part number The part number identifies the part of a volume only if there is more than one part
(4) Revision data The revision data must identify the latest revision to the SSWB
(5) SSWB title The SSWB title must identify the system/subsystem to which the SSWB is applicable
(6) SSWB subtitle The SSWB subtitle must identify, to a lower level of detail, the system/subsystem to which the SSWB is applicable
(7) Self-study workbook The printed words "Self-Study Workbook" identifies the document

(b) Reverse side of the cover The reverse side of the cover page must contain the guidance statement which provides instructions for reporting problems encountered with the usage of the SSWB (see figure 5-17-2)
(c) Contents page The contents page must list all front matter and text The contents page for the first volume of a multi-volume set must include the contents of all volumes Each subsequent volume must list only the contents of that particular volume (see figure 5-17-3) Number the contents pages consecutively using lower case Roman numerals
(d) Introduction The introduction informs the trainee of the purpose, approximate completion time, SSWB objectives, and recommended prerequisites The introduction must stress safety concerns and provide reminders of the security classification (where applicable) The introduction is comprised of the following requirements

(1) Purpose Develop a statement that will clearly establish why the SSWB is important to the trainee now and after completion (see figure 5-17-4)
(2) Approximate time to complete During the development, this is an estimated time A more realistic time is inserted when the draft SSWB has been reviewed and approved If the estimate is too low, the user may develop an early feeling of frustration, from not being able to "keep up" with the perceived average time for completion If the estimate is too high, a false sense of competence may result in less than adequate concentration
(3) SSWB objectives The objectives must be drawn from the applicable training path system in the same manner as course learning objectives would be drawn for a formal training course
(4) Recommended prerequisites This area is to include necessary prerequisites specified in the training path system for which the SSWB is being created, such as the required rating, formal training courses, Navy Enlisted Classification Codes, etc

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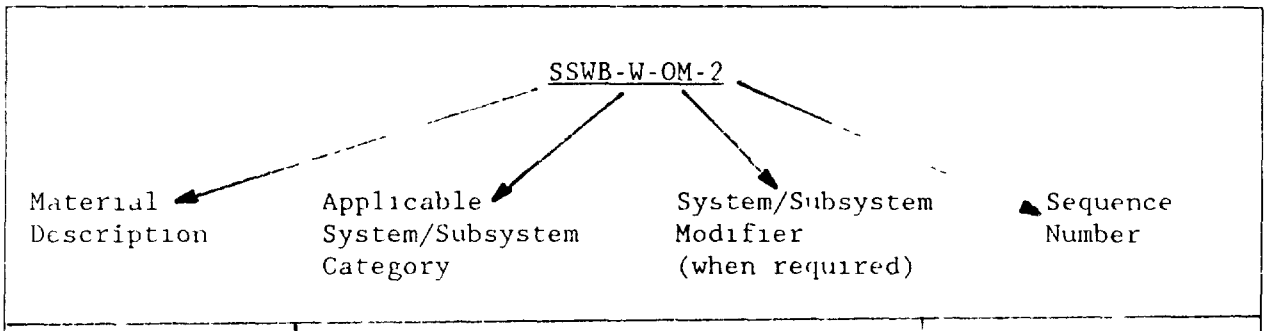
TABLE 5-17-I SSWB identification data



MATERIAL DESCRIPTION	SYSTEM/SUBSYSTEM CATEGORY	SYSTEM/ SUBSYSTEM MODIFIER
SSWB Self-Study Workbook	A - Airframe AF - Automatic Flight Control AL - Air Launch Weapons AR - Armament AU - Automotive C - Communications DS - Data Systems EC - Environmental Control EI - Electrical ES - Escape/Survival EW - Electronic Warfare F - Fire Control ID - Identification IN - Instruments L - Launcher M - Missile and Guidance N - Navigation P - Propulsion PP - Power Plant/Related Systems S - Support Equipment T - Test Equipment W - Weapon System	DM Depot Level Maintenance None SSBN O Officer OP Operator OM Organization Level Maintenance T Intermediate Level Maintenance

NOTE The system/subsystem categories and modifiers shown in the second and third columns are not all inclusive When the table is not sufficient for identification, the Procuring Activity will assign applicable identification data

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(5) Safety The safety paragraph must remind trainees that death, personal injury, and equipment damage can result from carelessness, failure to comply with approved procedures, or violations of WARNINGS, CAUTIONS, and safety regulations Trainees must also be reminded that specific safety precautions are contained in technical documentation and should be obeyed

(6) Security This paragraph identifies the security classification of the SSWB

(7) SSWB elements Each of the elements of the SSWB are fully explained as to their content and use (e g , lesson pretest, assignment sheet, information sheet, problem sheet, work sheet, and end-of-lesson test)

(8) Related materials All necessary equipment, technical documentation and additional instructional media materials required for the trainee to complete the SSWB must be listed

(9) Do not make any marks in this workbook "DO NOT MAKE ANY MARKS IN THIS WORKBOOK" directs the trainee not to mark in the workbook

5 17 3 2 SSWB lessons The lessons provide the sequential guidance for the trainee's progress through the SSWB The normal progression through the SSWB is from pretest to assignment sheet, to end-of-lesson test to work sheet (if task performance is required) to information sheet to end-of-lesson test to completion Since the user essentially works alone, the SSWB must provide complete instructions and information In addition, the sequencing must be absolutely correct The lessons contain the following

(a) SSWB lesson pretest A pretest contains the following (see figure 5-17-5)

(1) Purpose Identifies the purpose of the pretest

(2) Materials Identifies the materials the trainee will require in order to complete the pretest

(3) Instructions Identifies the directions to the trainee for taking the pretest

(4) Pretest Identifies the questions which make up the pretest Lesson pretests consist of a series of questions designed as the first step in working a particular SSWB lesson The purpose of the questions is to identify what the trainee does not know about the subject Therein lies the focus of the SSWB Every effort is made to strengthen weaknesses and provide information where necessary Consider the following when designing the pretest (see figure 5-17-5)

(a) Questions must be limited to multiple-choice or matching Questions development guidelines are discussed in 5 7

(b) Questions must be written to support specific SSWB lesson objectives, with a minimum of one question for each objective

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(c) Lesson pretest evaluation procedures must be provided at the end of each pretest in the SSWB They provide step-by-step instructions to help the trainee develop a personalized study plan for the lesson

(5) Pretest evaluation procedures Identifies the directions to the trainee on where to find the correct answers for the ones missed on the pretest Direction to continue to the next lesson by lesson number is shown

(b) Assignment sheet An assignment sheet contains the following (see figure 5-17-6)

(1) Introduction The introduction states the purpose of the assignment sheet for that particular lesson
(2) Related materials All of the required technical documentation and other materials required to complete that particular assignment sheet must be listed
(3) Study assignments The study assignments contain instructions for the trainee to acquire the information necessary to correctly answer missed pretest items Each pretest item shall have its own study assignment listed

(c) Information sheets Information sheets must be provided in the SSWB only when information pertinent to the subject is not readily available to the trainee, or when the available materials are judged inadequate for the instructional goals of the lesson Information sheets contains the following

(1) Introduction The introduction must state the purpose of the information sheet for that particular lesson (see figure 5-17-7)
(2) Reference The source material used in preparation of the information sheet must be listed
(3) Information Information paragraphs, diagrams, graphs, pictorials, and other common means of providing information are all acceptable when used to enhance the trainee's understanding of the lesson Do not reproduce sections of technical documentation that is readily available to the trainee, especially if that documentation is subject to frequent change or revision

(d) Problem sheet The SSWB problem sheet must consist of practical problems requiring computations, analysis, and decision-making similar to those the trainee may encounter in the trainee's future job assignment Problem sheets must be spaced appropriately so that there is not a long interval between the presentation of information and the Problem Sheet Problem sheets contain the following

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(1) Instructions The instructions provide the directions for trainee completion of the practice items

(2) Problems The problems lists the problems that enable the trainee to practice the full range of skills that are presented in the corresponding information sheets The problems must be keyed to the text, so that if trainees have properly studied the text, they will be able to perform on the practice items

(3) Problem answers The problem answers lists the answers to the problems The answers enable the trainees to receive immediate feedback on problem performance These answers must be concise and complete and shall clearly state the correct response

(e) Work sheets Work sheets may be used as stand-alone lessons or as part of a lesson The work sheets assign knowledge or physical skill tasks Work sheets contain the following (see figure 5-17-8)

(1) Introduction The introduction states the purpose of the work sheet for that particular lesson

(2) Related materials All materials must be listed that are not part of the SSWB but are necessary to complete the work sheet

(3) Equipment List all of the equipment to which the trainee must have access in order to accomplish the tasks specified on the work sheet

(4) Work assignment instructions. Provide directions to determine whether the time, equipment, and supervision are available to accomplish the required tasks If the necessary conditions are met, the trainee must be directed to accomplish the listed tasks, complete the work assignment, and proceed to the next programed element If the task cannot be accomplished at the present time, the trainee is directed to the next programed element and is reminded to return to the work sheet when the time, equipment, and supervision are available If the work sheet is the last element in the SSWB, the trainee is directed to report the completion of the SSWB

(5) Tasks Identify the task to be performed, which may involve use of the relevant system, subsystem, and equipment in conjunction with standard operating and maintenance procedures or may direct the trainee in exercising certain mental skills The tasks must allow the trainee to apply information learned during the lesson Tasks must be clearly related to the lesson and must require the use of appropriate tools and equipment When necessary, space must be given to record results of specific procedural steps such as meter readings, switch conditions, test equipment readouts, etc

f End-of-lesson test End-of-lesson tests must be provided for each knowledge lesson only End-of-lesson tests must contain instructions to direct the trainee through the test and to the next SSWB element upon completion of the test When lesson pretests are used, each lesson

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pretest question must directly correspond to a question in the end-of-lesson test For example, the end-of-lesson test question 2-5a will support the same knowledge objective as question 2-5 on the lesson pretest End-of-lesson test questions must be primarily multiple-choice, however, matching, short-answer completion, or true-false questions may be used if these provide a better measure of comprehension and retention Typically, there will be one test per lesson, however, for particularly long or difficult lessons there may be more End-of-lesson tests contain the following (see figure 5-17-9)

(1) Instructions Provide directions to the trainee for taking the test
(2) End-of-lesson test Identify the questions which make up the end-of lesson test Questions must be clear and concise and must be directly related to the information presented in the lesson

5 17 3 3 SSWB administrator guide The SSWB administrator guide is intended for the person assisting a trainee in the performance of the SSWB requirements The guide provides information on the roles and responsibilities of the administrator The guide also contains the correct answers for the SSWB lesson pretest, problem sheets, and end-of-lesson test Since the SSWB is to be used with a minimum amount of supervision, it does not require the presence of an instructor or object matter expert It is recommended that the administrator have a working knowledge of the system, subsystem, or equipment and safety precautions covered by a particular SSWB

5 17 3 4 Front matter development The front matter pages developed for the SSWB become the basis of the front matter of the administrator guide Refer to 5 17 3 1 for the specific instructions for front matter development except for the following additional requirements and suggestions

(a) Cover The printed words "Self-Study Workbook Administrator Guide", identifies the document
(b) Contents page Contents must identify the composition of the administration of SSWB
(c) Introduction The introduction must inform the SSWB administrator of the purpose, approximate completion time, objectives, and recommended prerequisites of the SSWBs

(1) Purpose Develop a statement that will clearly establish why the SSWB is important to the trainee now and after completion The limitations with respect to formal training and publications are also stated
(2) Approximate time to complete Identify the approximate lesson completion time and total SSWB completion time
(3) SSWB objectives The objectives section identifies what is expected of the trainee for successful completion of the SSWB

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(4) Recommended prerequisites The prerequisites section covers the ratings, previous training, Navy Enlisted Classification Codes, or Navy Officer Billet Classification the trainee should posses prior to starting the SSWB

(5) Safety This paragraph must remind the SSWB administrator that death, personal injury, and equipment damage can result from carelessness, failure to comply with approved procedures or violations of WARNINGS CAUTIONS, and safety regulations

(6) Security This paragraph identifies the security classification of the SSWB

(7) SSWB elements This section provides the same information as in the SSWB with the addition of the progress checklist and answer sheet paragraphs

(8) Related materials This section identifies the materials and technical documentation that the trainee will require to complete the SSWB

5 17 3 5 Roles and responsibilities This section contains the following

(1) Control This paragraph contains the procedures for distributing and accounting for all copies for the SSWB

(2) Process This paragraph identifies the instructions on how the lessons must be conducted Process statements must address topics such as answering trainee questions, monitoring progress, and coping with various problems

(3) Work sheets This paragraph identifies the instructions on the performance of work sheets Work sheet statements must indicate equipment and facilities requirements safety procedures, and any other requirement, scoring, evaluation, and remediation

(4) Tests This paragraph identifies the procedures for administering the tests, scoring, evaluating the tests, remediation and retest procedures

5 17 3 6 Answer sheets Answer sheets provide the answers to questions and must be either a self-grading or non-self-grading type

(a) Self-grading Self-grading answer sheets must immediately notify the trainee whether the answer was correct or incorrect Self-grading answer sheets are normally used when both pretests and end-of-lesson tests are acquired (see figures 5-17-10 and 5-17-11) The contents are as follows

(1) SSWB identification data
(2) Answer sheet lesson number
(3) Trainee identification
(4) Pretest items
(5) End-of-lesson test items

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(b) Non-self-grading Non-self-grading answer sheets must be used when the administrator grades the questions Non-self-grading answer sheets are used with problem sheets, pretests, or end-of-lesson tests The contents of each answer sheet is as follows

(1) SSWB identification data
(2) Answer sheet identification data
(3) Answers

5 17 3 7 Progress checklist This checklist provides a summary of the same knowledge and skill tasks listed in the SSWB worksheets The separate but identical summary is required because the progress checklist may become a part of the trainee's training record Following each lesson title must be listed each discrete knowledge or skill task in the sequence presented in the SSWB lesson The progress checklist identification is identical to the associated SSWB (see figure 5-17-12) The contents are as follows

(a) SSWB identification data
(b) Progress checklist title
(c) Trainee identification
(d) Progress checklist

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(CLASSIFICATION)

SSWB-AU-OP-4
(VOLUME)
(PART)
(REVISION)

COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY
(M1008)

OPERATION AND OPERATOR-RELATED MAINTENANCE

SELF-STUDY WORKBOOK

OPTIONAL →

Prepared for

Chief of Naval Technical Training
Naval Air Station Memphis
Millington, Tennessee 38054

July 1985

SH132031625

(CLASSIFICATION)

FIGURE 5-17-1 Example SSWB cover page

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Comments concerning technical content, accuracy, format, and application are desired and must be addressed to Chief of Naval Technical Training, Naval Air Station, Memphis, Millington, Tennessee 38054

FIGURE 5-17-2 Example reverse side SSWB cover page

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Lesson		Page
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2	Purpose of Controls and Indicators in the CUCV (Type A), Utility	
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FIGURE 5-17-3 Example SSWB contents page

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INTRODUCTION

A Purpose

The primary purpose of this workbook is to provide a self-study program requiring a minimum of supervision This Self-Study Workbook (SSWB) does not replace formal training nor does it supersede any publication, rather it is to supplement your knowledge and skills by guiding you to pertinent information contained in the related material

B Approximate time to complete

Each lesson will take approximately 1/2 hour to 1 1/2 hours to complete The Lesson Pretests and the four full lessons should take no more than 1 day to complete If the Pretest results direct you to complete only a portion of the lessons, then less time will be required to complete the SSWB

C SSWB objectives

The following list of objectives is provided so that you will know what is expected of you for successful completion of this Workbook

Each lesson will begin with the statement of lesson objectives which expand on each of the following SSWB objectives

When you complete this SSWB, you will be able to

1 Recognize and describe the purposes of the controls and indicators used in the performance of normal operational and emergency driving procedures

2 Use the operator's manual to locate information concerning controls, indicators, and procedures for normal operation and emergency driving procedures

3 Describe the personnel and equipment safety precautions to be adhered to during normal operation and emergency driving of the CUCV (Type A), Utility

1

FIGURE 5-17-4 Example SSWB introduction pages (Sheet 1 of 4)

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D Recommended prerequisites

None

E Safety

Injury and death to personnel or damage to equipment can result from carelessness, failure to comply with approved procedures, or violations of WARNINGS, CAUTIONS, and safety regulations Familiarity with and adherence to the applicable safety precautions are mandatory for all personnel, including those involved in normal and emergency vehicle operation Specific safety precautions are contained in the technical manuals and procedures as appropriate The safety requirements of OPNAVINST 5102 1 (series) must also be observed

F Security

This SSWB and its associated videotape are unclassified

G SSWB elements

The complete SSWB consists of this Workbook and its associated Answer Sheet packet Before you begin the lessons, familiarize yourself with the SSWB content and layout This Workbook consists of a series of lessons, which may satisfy knowledge objectives, skill objectives, and in some instances, both knowledge and skill objectives For knowledge lessons, a Lesson Pretest, Assignment Sheet, and End-of-Lesson Test are provided For a lesson containing both knowledge and skill objectives, all elements may appear The Answer Sheet packet contains the Lesson Answer Sheets and a Progress Checklist Each of these elements is described below

1 Lesson Pretest

The Lesson Pretest includes questions covering certain knowledge objectives Depending upon the number of questions you answer correctly, you will be able to skip some, or perhaps all, of the study assignments for that lesson The Lesson Pretest, in other words, is designed to point out those areas in which you need to strengthen your knowledge

FIGURE 5-17-4 Example SSWB introduction pages (Sheet 2 of 4)

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2 Assignment Sheet

The Assignment Sheet lists the lesson objectives, related materials, and lesson study assignments You will be referred to the material to study for each question you missed on the Pretest, and then you will be directed to the End-of-Lesson Test

3 Work Sheet

For skill lesson, a Work Sheet lists physical or mental skill tasks to be completed, and directs you to the next step in your study program

4 Information Sheet

If references are not readily available for study assignments, or are too cumbersome to use, an Information Sheet is supplied

5 End-of-Lesson Test

The End-of-Lesson Test is made up of questions that directly correspond to Lesson Pretest question For the first question you missed on the Pretest, you will complete a study assignment and then answer the corresponding question in the End-of-lesson Test Once you have responded correctly, you will be directed to the study assignment for the next missed question The process continues until you have covered the appropriate material and End-of-Lesson Test question for each incorrect answer on that Lesson Pretest You will then be directed either to the next Lesson Pretest or to a Work Sheet, as applicable

6 Answer sheet

The Answer Sheets are used with both the Lesson Pretests and the End-of-Lesson Tests At the top of each sheet is space for your name, rate, NEC, social security number, date, and the duty station to which you are attached The

FIGURE 5-17-4 Example SSWB introduction pages (Sheet 3 of 4)

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answer portion is designed for responses to multiple-choice, matching, true-false, and completion questions Self-grading Answer Sheets will reveal the correct answer when you make your choice For multiple-choice matching, true-false questions, a "C" appears for a correct answer, and an "N" appeals to an incorrect answer For completion questions, the correct word/words must appear

7 Progress checklist

This Checklist provides you with a concise report of your achievements for skill lessons

II Related materials

1 Answer Sheet packet

2 Ballpoint pen or pencil

3 TM 9-2320-289-10, Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, M1008 (2320-01-123-6827)

4 "CUCV (Type A), Utility Operation and Operator Maintenance" video (number to be assigned)

5 Videotape reproducer and monitor

6 CUCV (Type A), Utility

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FIGURE 5-17-4 Example SSWB introduction pages (Sheet 4 of 4)

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SSWB AU OP 4

PRETEST Lesson #2 Purpose of Controls and Indicators in the CUCV (Type A), Utility

A Purpose

The purpose of this lesson Pretest is to determine your level of knowledge, identify your weak areas, and direct you to specific study assignments, pertaining to the controls and indicators of the CUCV (Type A), Utility

B Materials

1 Lesson #2 Answer Sheet

2 Lesson #2 Pretest Answer Sheet envelope

3 Ballpoint pen or pencil

C Instructions

Make certain you have studied Information Sheet 1I before taking this Pretest

There is no time limit for this Lesson #2 Pretest, however, it is recommended that you complete it all in one sitting At the end of this Pretest, the Pretest evaluation procedure will guide you to the next step in your self-study program

Fill in the information for the examinee box on the Lesson #2 Answer Sheet For each multiple-choice question, select the best alternative, indicate the appropriate selection in the Pretest column of the Lesson #2 Answer Sheet On a self-grading Answer Sheet, a "C" will appear for a correct choice, and an "N" will appear for an incorrect choice Do not mark more than one area per question

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FIGURE 5-17-5 Example SSWB pretest (Sheet 1 of 4)

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PRETEST Lesson #2 - Continued

D Pretest

2-1 There are mirrors to be adjusted by the operator for safe operation

a 1
b 2
c 3
d 4

2-2 The transmission provides ranges of gears and powers axle(s) for normal road driving

a 3, 1
b 3, 2
c 4, 1
d 4, 2

2-3 What is the maximum speed indicated on the speedometer? (mph)

a 55
b 65
c 75
d 85

2-4 How many miles may the CUCV (Type A), Utility be driven if either, or both, "GENERATOR" lights remain on after starting?

a 0
b 5
c 15
d 25

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FIGURE 5-17-5 Example SSWB pretest (Sheet ? of 4)

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PRETEST Lesson #2 - Continued

2-5 What does the "WAIT" light indicate?

a Passenger door is open
b Driver door is open
c Glow plugs are not ready for ignition
d Transfer gear case lever is not engaged

2-6 What does the "DOOR AJAR" light indicate?

a Passenger door is open
b Driver door is open
c Back door (ambulance) is open
d Tailgate is not latched

2-7 What does the "VOLTMETER" indicate?

a The engine is running
b The charging system is operable
c The charging system is operating correctly
d Less than 100 amps is available

2-8 To turn on the blackout drive, what switch must be turned on first?

a Blackout marker
b Dimmer
c Light
d Service light

2-9 Brake inspection and maintenance is required after the "BRAKE SYSTEM" warning indicator comes on

a immediately
b within 5 miles
c within 50 miles
d within 500 miles

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FIGURE 5-17-5 Example SSWB pretest (Sheet 3 of 4)

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PRETEST Lesson #2 - Continued

2-10 The "SERVICE LIGHTS" switch controls all of the following EXCEPT

a brea l lights
b instrument panel lights
c hazard warning lights
d the horn

2-11 How many positions does the transfer case control level have?

a 1
b 2
c 3
d 4

2-12 With the transfer case control lever in the "4L" position, what is the maximum speed of the CUCV (Type A), Utility? (mph)

a 16
b 25
c 35
d 55

2-13 With the transfer case control lever in the "4H" position, what is the maximum speed of the CUCV (Type A), Utility? (mph)

a 16
b 25
c 35
d 55

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FIGURE 5-17-5 Example SSWB pretest (Sheet 4 of 5)

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PRETEST Lesson #2 - Continued

2-14 On the M1008, what should the rear tire pressure be prior to operation? (psi)

a 25
b 35
c 45
d 55

2-15 The CUCV (Type A), Utility engine starting procedures are located in/on the for quick reference

a dashboard
b driver's visor
c driver's door end post
d operator's manual

E Pretest evaluation procedures

1 Open the Lesson #2 Pretest Answer Sheet envelope and remove the Answer Sheet

2 Using the Answer Sheet, locate any incorrect responses in the Pretest column of your Answer Sheet, and circle these question numbers Then proceed to Assignment Sheet 2A, page 20

3 If you did not miss any questions on the Pretest, study Information Sheet 2I, page 22, then proceed to Lesson #3 Pretest, page 26

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FIGURE 5-17-5 Example SSWB pretest (Sheet 5 of 5)

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ASSIGNMENT SHEET 2A Lesson #2 Purpose of Controls and Indicators in the CUCV (Type A), Utility

A Introduction

The purpose of this lesson is to determine your level of knowledge, identify your weak areas, and direct you to specific study assignments, pertaining to the controls and indicators of the CUCV (Type A), Utility

When you complete this lesson, you will be able to

1 Identify controls and indicators used for normal operation and emergency driving procedures

2 Describe operational characteristics and limitations of the CUCV (Type A), Utility to support normal operation and emergency driving procedures

B Related materials

1 Information Sheet 1I

2 TM 9-2320-289-10, Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, M1008 (2320-01-123-6827)

C Study assignments

In the Pretest column of the Lesson #2 Answer Sheet, locate the first circled question and then find the corresponding study assignment listed below After completing the assignment, proceed to the Lesson #2 End-of-Lesson Test, page 23, and read the instructions If you need assistance, check with your supervisor

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FIGURE 5-17-6 Example SSWB assignment sheet (Sheet 1 of 2)

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ASSIGNMENT SHEET 2A - Continued

STUDY ASSIGNMENTS - Lesson #2

Pretest Question Number	
2-1	Study TM 9-2320-289-19, page 1-4, Figure 1-1
2-2	Study TM 9-2320-289-19, page 1-12, Table 1-1
2-3	Study TM 9-2320-289-19, page 2-1, Figure 2-1
2-4	Study TM 9-2320-289-19, page 2-2, paragraph 1
2-5	Study TM 9-2320-289-19, page 2-2, paragraph 7
2-6	Study TM 9-2320-289-19, page 2-2 paragraph 11
2-7	Study TM 9-2320-289-19, page 2-2, paragraph 12
2-8	Study TM 9-2320-289-19, page 2-3, paragraph 18
2-9	Study TM 9-2320-289-19, page 2-3, paragraph 14
2-10	Study TM 9-2320-289-19, page 2-3, paragraph 19
2-11	Study TM 9-2320-289-19, page 2-23, Figure 2-3
2-12	Study TM 9-2320-289-19, page 1-16, paragraph 1a
2-13	Study TM 9-2320-289-19, page 1-16, paragraph 1b
2-14	Study TM 9-2320-289-19, page 1-15, Table 1-1
2-15	Study TM 9-2320-289-19, page 1-11, paragraph 1 8f

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FIGURE 5 17-6 Example SSWB assignment sheet (Sheet 2 of 2)

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INFORMATION SHEET 1I

A Introduction

The purpose of this Information Sheet is to provide you with general and specific information pertaining to the instruments, controls, operating characteristics and equipment peculiar to the CUCV (Type A), Utility

B References

TM 0-2320-289-10, Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, 4x4, M1008 (2320-01-123-6827)

C Information

The CUCV (Type A), Utility is a 1-1/4 Ton, 4x4, cargo truck equipped with a powerful 6 2 liter diesel engine and a three speed automatic transmission, along with a variety of transfer gear combinations It is designed for providing standard tactical mobility required for infrequent off-road operations Because of the various missions to which this truck may be assigned, its operators must be fully versed in operating procedures (normal and emergency), operator-related preventive maintenance, and emergency road repair procedures The following information will be of assistance in completing this Workbook and in later performance of your duties as an operator of the CUCV (Type A), Utility

1 Controls, indicators and gages Read Section 2 of TM 9-2320-289-10, Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, 4x4, M1008 (2320-01-123-6827)

2 Basic equipment furnished/optional

a All models come equipped with pintle hooks at the rear for trailer towing

b A troop seat attachment is available, which furnishes personnel seating for eight

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FIGURE 5-17-7 Example SSWB information sheet (Sheet 1 of 3)

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INFORMATION SHEET 1I - Continued

c There is a 100 amp/12 volt d c power supply available with a communications kit

d Weapons mounts are provided for all models (except the ambulance) For weapons operating instructions, refer to the applicable weapon manual

e Arctic winterization equipment permits operation of the vehicle in extreme cold weather conditions Refer to the winterization equipment manual for operating instructions

3 Operation under unusual conditions

a Cold weather Be very careful when starting the truck in cold weather, especially if it has been shut down for more than a day Lubricants might be congealed and cause damage Tires can be frozen to the ground or frozen in the shape having a flat spot Brake shoes might be frozen to the drums

b Hot weather The main problem when operating in extreme heat is the possible overheating of the engine Be alert for overheating when you are performing the following

(1) Making long, hard pulls in lower gear ranges up steep grades

(2) Driving in slow, heavy traffic

(3) Idling for extended periods of time

(4) Hauling loads close to maximum capacity

(5) Operating over soft terrain

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FIGURE 5-17-7 Example SSWB information sheet (Sheet 2 of 3)

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INFORMATION SHEET 1I - Continued

4 Operations on unusual terrain

a General judgement rules Driving off-road over rough or unusual terrain is basically a matter of exercising good judgement and common sense The following are a few good rules to keep in mind

(1) Keep the engine at moderate speed, no matter what the ground speed may be Use the gear shift lever and the transfer case control lever to vary engine speed within the midrange rpm's

(2) Do not let the wheels start spinning, especially on soft ground

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FIGURE 5-17-7 Example SSWB information sheet (Sheet 3 of 3)

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WORK SHEET 4W Lesson #4 Operator-Related Preventive Maintenance

A Introduction

The purpose of this lesson is to enable you to understand and perform the procedures required to support preventive maintenance

When you complete this lesson, you will be able to perform all of the pre-operational tasks required to support preventive maintenance

B Related materials

1 TM 9-2320-289-10, Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, M1008 (2320-01-123-6827), Table 2-1, Operator Maintenance Tasks

2 TM 9-2320-289-12, Direct Support Maintenance Manual for Truck, Cargo, Tactical, 1-1/4 Ton, M1008

C Equipment

To complete this Work Sheet, you must have access to a CUCV (Type A), Utility and the equipment or materials listed below

1 Gage, tire pressure

2 Clean, dry rag

D Work assignment instructions

The work assignment consists of a number of operator-related pre-operational tasks to be completed Use the Progress Checklist, which is contained in the Answer Sheet packet, to record task completion

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FIGURE 5-17-8 Example SSWB work sheet (Sheet 1 of 4)

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WORK SHEET 4W - Continued

1 If you are unable to accomplish the tasks listed in the Task section below at this time, or in a reasonably short period, keep your Answer Sheets (unless previously directed to turn them in) and Progress Checklist together and complete the tasks when you are able Upon completion of all work assignments on the Progress Checklist for this SSWB, turn in your completed Answer Sheets (if applicable) and Progress Checklist to the SSWB administrator

2 If you have not completed the tasks listed below or any previous work assignments in the SSWB due to unavailability of equipment or supervision, turn in only your Answer Sheets to your LPO or supervisor Retain the Progress Checklist to be completed at a later date when the necessary equipment and supervision are available When the Progress Checklist is completed indicating accomplishment of all work assignments in the SSWB, turn it into the SSWB administrator

E Task

Under proper supervision, perform the inspection and checks in accordance with TM 9-2320-289-10, Operator's Manual for Truck, Cargo, Tactical, 1-1/4 Ton, M1008 (2320-01-123-6827), Table 2-1, for all operator maintenance tasks coded "B"

TABLE 2-1 Operator maintenance tasks

Item No	Item To Be Inspected
	Procedure Check for and have repaired, filled, or adjusted as needed
1	EXTERIOR OF TRUCK
	a Check for obvious damage that would impair vehicle operation

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FIGURE 5-17-8 Example SSWB work sheet (Sheet 2 of 4)

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WORK SHEET 4W - Continued

TABLE 2-1 Operator maintenance tasks - Continued

Item No	Item To Be Inspected
1 (Cont)	b Check tires for cuts, gouges, and cracks Remove all penetrating objects
	c Check conditions of mirrors
	d Check condition of headlights, taillights, turn signals, sidelights, blackout lights, spotlights, and floodlights
	e Check tires for correct air pressure using tire inflation gage Adjust as necessary (58 psi front, 80 psi rear)
	f Check tire tread depth When the tread wear indicators appear in 2 or more adjacent groves at three spots around the tire, the tire should be replaced
2	UNDERCARRIAGE
	a Look under vehicle for evidence of fluid leakage (oil, fuel, coolant, brake, power steering, and transfer fluid)
3	ENGINE COMPARTMENT
	a Check the oil dipstick (located on the driver's side of the engine) for proper level Oil level should be between "ADD" and "FULL" lines on the dipstick If oil is below the "ADD" line, refer to TM 9-2320-289-12

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FIGURE 5-17-8 Example SSWB work sheet (Sheet 3 of 4)

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SSWB-AU-OP 4

WORK SHEET 4W - Continued

TABLE 2-1 Operator maintenance tasks - Continued

Item No	Item To Be Inspected
3 (Cont)	CAUTION Overheating, caused by lack of coolant in the recovery bottle, will cause engine damage b Check the coolant level in the see-through coolant recovery bottle The coolant should be at the "COLD LEVEL" mark If the coolant level is below the "COLD LEVEL" mark, refer to TM 9-2320-289-12 c Visually inspect power steering hoses for leakage d Visually inspect radiator hoses for leakage
4	TRUCK CAB a Check seat belts for security condition, and completeness b Check fire extinguisher condition and stowage Ensure lock wire and seal are intact

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FIGURE 5-17-8 Example SSWB work sheet (Sheet 4 of 4)

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SSWB-AU-OP 4

END OF-LESSON TEST Lesson #2 Purpose of Controls and Indicators in the CUCV (Type A), Utility

A Instructions

At this point you should have completed the assignment for the first circled question in the Pretest column of your Answer Sheet Now locate the corresponding End-of-Lesson Test question (for example, question 2-1a on the End-of-Lesson Test will correspond to question 2-1 on the Pretest) These End-of-lesson questions are answered in the same manner as for the Pretest

Locate and complete the study assignment for the next circled question on the Pretest, and repeat the above procedure There is no time limit for this End-of-Lesson Test, however, it is recommended that you answer each question as soon as possible after you have completed the study assignment for that question If you answer the End-of-Lesson Test question incorrectly, reread the reference material You need only answer the questions that correspond to the missed questions from the Pretest

After completing this Lesson #2 End-of-lesson Test, study Information Sheet 21, page 21, then proceed to Lesson #3 Pretest, page 26

B End-of-lesson test

2-1a How many mirrors have to be adjusted by the operator for safe operation?

a 1
b 2
c 3
d 4

2-2a The transmission provides ranges of gears and powers axle(s) for normal road driving

a 3, 1
b 1, 2
c 4, 1
d 4, 2

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FIGURE 5-17-9 Example SSWB end-of-lesson test (Sheet 1 of 3)

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SSWB-AU-OP 4

END-OF-LESSON TEST Lesson #2 - Continued

2-3a The maximum speed indicated on the speedometer is 100 mph (T/F)

2-4a If either, or both "GENERATOR" lights remain on after starting, the vehicle may be driven for 25 miles (T/F)

2-5a The purpose of the "WAIT" light is to indicate that all passengers are not loaded or all safety belts are not fastened (T/F)

2-6a What does the "DOOR AJAR" light indicate?

a Passenger door is open
b Driver door is open
c Back door (ambulance) is open
d Tailgate is not latched

2-7a What does the "VOLTMETER" indicate?

a The engine is running
b The charging system is operable
c The charging system is operating correctly
d Less than 100 amps is available

2-8a The "LIGHT SWITCH" turns on the service lights, blackout markers, and blackout drive simultaneously (T/F)

2-9a Brake inspection and maintenance is required within two miles after the "BRAKE SYSTEM" warning indicator comes on (T/F)

2-10a The "SERVICE LIGHTS" switch controls all of the following EXCEPT

a brakelights
b instrument panel lights
c hazard warning lights
d the horn

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FIGURE 5-17 9 Example SSWB end-of-lesson test (Sheet 2 of 3)

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SSWB-AU-OP 4

END-OF-LESSON TEST Lesson #2 - Continued

2-11a How many positions does the transfer case control lever have?

a 1
b 2
c 3
d 4

2-12a With the transfer case control lever in the "4L" position, what is the maximum speed of the CUCV (Type A), Utility? (mph)

a 16
b 25
c 35
d 55

2-13a With the transfer case control lever in the "4H" position, what is the maximum speed of the CUCV (Type A), Utility? (mph)

a 16
b 25
c 35
d 55

2-14a Rear tire pressure on the M1008 should be 35 psi prior to operation (T/F)

2-15a The CUCV (Type A), Utility engine starting procedures are located in/on the for quick reference

a dashboard
b driver's visor
c driver's door end post
d operator's manual

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FIGURE 5-17-9 Example SSWB end-of-lesson test (Sheet 3 of 3)

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SSWB-AU-OP-4 ANSWER SHEET LESSON 2

Name _____ Rate _____ NEC _____
SSN _____ Date _____
Duty Station _____

PRETEST

(MARK ONLY ONE PER ITEM)

	a	b	c	d
2-1	☐	☐	☐	☐
2-2	☐	☐	☐	☐
2-3	☐	☐	☐	☐
2-4	☐	☐	☐	☐
2-5	☐	☐	☐	☐
2-6	☐	☐	☐	☐
2-7	☐	☐	☐	☐
2-8	☐	☐	☐	☐
2-9	☐	☐	☐	☐
2-10	☐	☐	☐	☐
2-11	☐	☐	☐	☐
2-12	☐	☐	☐	☐
2-13	☐	☐	☐	☐
2-14	☐	☐	☐	☐
2-15	☐	☐	☐	☐

END OF LESSON TEST

	T a	F b	c	d
2-1a	☐	☐	☐	☐
2-2a	☐	☐	☐	☐
2-3a	☐	☐		
2-4a	☐	☐		
2-5a	☐	☐		
2-6a	☐	☐	☐	☐
2-7a	☐	☐	☐	☐
2-8a	☐	☐		
2-9a	☐	☐		
2-10a	☐	☐	☐	☐
2-11a	☐	☐	☐	☐
2-12a	☐	☐	☐	☐
2-13a	☐	☐	☐	☐
2-14a	☐	☐		
2-15a	☐	☐	☐	☐

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FIGURE 5-17-10 Example SSWB unused answer sheet

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SSWB-AU-OP-4 ANSWER SHEET LESSON 2

Name _____ Rate _____ NEC _____
SSN _____ Date _____
Duty Station _____

PRETEST

(MARK ONLY ONE PER ITEM)

	a	b	c	d
2-1	N	N	N	C
2-2	N	N	C	N
2-3	N	N	N	C
2-4	C	N	N	N
2-5	N	N	C	N
2-6	N	N	C	N
2-7	N	N	C	N
2-8	N	N	C	N
2-9	C	N	N	N
2-10	N	C	N	N
2-11	N	N	N	C
2-12	N	C	N	N
2-13	N	N	N	C
2-14	N	N	N	C
2-15	N	C	N	N

END OF LESSON TEST

	T a	F b	c	d
2-1a	N	N	N	C
2-2a	N	N	C	N
2-3a	N	C		
2-4a	N	C		
2-5a	N	C		
2-6a	N	N	C	N
2-7a	N	N	C	N
2-8a	N	C		
2-9a	N	C		
2-10a	N	C	N	N
2-11a	N	N	N	C
2-12a	N	C	N	N
2-13a	N	N	N	C
2-14a	N	C		
2-15a	N	C	N	N

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FIGURE 5-17-11 Example SSWB answer sheet with all choices revealed

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SSWB-AU-OP-4

PROGRESS CHECKLIST FOR SELF-STUDY WORKBOOK

CUCV (TYPE A), UTILITY OPERATION AND OPERATOR MAINTENANCE

Name _____ Rate/NEC _____

SSN _____ Date _____ Duty Station _____

This Checklist is designed to provide the trainee with a concise report of progress and achievement through the Workbook When completed, this Checklist may become a permanent part of the individual's training record to show satisfactory completion of the subject material

Work Assignment	Date of Satisfactory Completion	Supervisors's Initials	Supervisor's Comments
Lesson 3 Normal operational and emergency driving procedures 1 Tasks Physically located the following controls, gages, and indicators a "WAIT" light			
b Blackout light			
c Service lights			
d Transfer case gear lever			
e Oil pressure light			
f Generator light			

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FIGURE 5-17-12 Example SSWB progress checklist (Sheet 1 of 4)

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SSWB-AU-OP-4

PROGRESS CHECKLIST FOR SELF-STUDY WORKBOOK - Continued

Work Assignment	Date of Satisfactory Completion	Supervisors's Initials	Supervisor's Comments
Lesson 3 (Cont) g Voltmeter			
h Coolant low light			
i Coolant temperature light			
Lesson 4 Operator-Related Preventive and Corrective Maintenance 1 Tasks Physically Inspected the following items EXTERIOR a Obvious damage that would impair vehicle operation			
b Tires for cuts, gouges and cracks Remove all penetrating objects			
c Mirrors			

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FIGURE 5-17-12 Example SSWB progress checklist (Sheet 2 of 4)

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SSWB-AU-OP-4

PROGRESS CHECKLIST FOR SELF-STUDY WORKBOOK - Continued

Work Assignment	Date of Satisfactory Completion	Supervisors's Initials	Supervisor's Comments
Lesson 4 (Cont)			
d Headlights, tail-lights, turn signals, sidelights, blackout lights, spotlights, and floodlights			
e Tires for correct air pressure using tire inflation gage Adjust as necessary (58 psi front, 80 psi rear)			
f Tire tread depth			
UNDERCARRIAGE			
a Evidence of fluid leakage (oil, fuel, brake fluid, coolant, power steering, fluid and transfer fluid)			
ENGINE COMPARTMENT			
a Oil dipstick for proper level			
b Coolant level in the see through cool-ant recovery bottle			

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FIGURE 5-17-12 Example SSWB progress checklist (Sheet 3 of 4)

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SSWB-AU-OP-4

PROGRESS CHECKLIST FOR SELF-STUDY WORKBOOK - Continued

Work Assignment	Date of Satisfactory Completion	Supervisors's Initials	Supervisor's Comments
lesson 4 (Cont) c Power steering hoses for leakage			
d Radiator hoses for leakage			
TRUCK CAB a Seat belts for security, condition and completeness			
b Fire extinguisher condition and stow-age Ensure lock wire and seal are intact			

Additional Comments or Notes _____

_____

_____

_____

_____

_____

Supervisor _____ Division Officer _____
(Signature) (Signature)

_____ _____
(Print or Type) (Print or Type)

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FIGURE 5-17-12 Example SSWB progress checklist (Sheet 4 of 4)

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5 18 ON-THE-JOB TRAINING HANDBOOK

5 18 On-the-job training handbook The On-the-Job Training (OJT) handbook defines the specific steps, measures, procedures, and actions to be taken to allow a newly assigned person to become a fully qualified and highly proficient operator and maintenance technician This section describes the format, content, and development guidelines for the OJT Handbook as specified in the military standard and in DI-H-7077

5 18 1 Use The OJT handbook guides the trainee through tasks or duties that are normally performed during the daily operation and maintenance of a system, subsystem, or equipment OJT is instruction that is provided to supplement or reinforce formal training The OJT handbook may be used to fulfill special training needs and to implement onboard practice of tasks that cannot be performed within the formal school environment By using the OJT handbook the trainee may learn at his own pace while on board or between formal school assignments

5 18 2 Elements The OJT handbook consists of two separate volumes, the instructor volume and the student volume

(a) Instructor volume This volume provides the person responsible for administering OJT with the OJT program guidelines, outline of the tasks, reading assignments, completion exercises, work sheets, exam answers, and any other information he will need to guide the trainee's learning

(b) Student volume This volume directs the trainee to the appropriate sections of approved operation and maintenance manuals or other documentation to satisfactorily perform the assigned tasks In the event that the technical documentation is inadequate, it provides the trainee with the step-by-step procedures required to perform the assigned task It also provides the trainee with the OJT handbook user instructions and work sheets which define the task, objectives, reading assignments, references, schematic drawings, lists of tools and test equipment, complete operation and maintenance procedures, problem sheets, and a comprehensive examination

5 18 3 Development of the instructor volume The instructor volume of the OJT Handbook consists of front matter and work sheets The work sheets are divided into four sections (1) operation, (2) computers and peripheral maintenance, (3) system, subsystem, or equipment maintenance, and (4) student test and evaluation The instructor volume must bear the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5520 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

5 18 3 1 Front matter development The front matter defines the content and

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usage of the document Each element of the front matter will be developed in the order listed

(a) Cover The cover must provide information relevant to the identification of the instructor volume (see figure 5-18-1)

(b) Table of contents The table of contents lists the front matter and work sheets contained in the instructor volume and the page on which each is located Front matter pages are numbered using Roman numerals Work sheets are numbered consecutively using Arabic numbers

(c) Guidelines and instructions for conducting the OJT program utilizing the OJT handbook This section provides detailed information on how to conduct OJT using the OJT handbook Included is information on the composition, function, and use of the OJT handbook, as well as the general procedures for evaluating trainee performance and conducting demonstrations and laboratory sessions (see figure 5-18-2)

(d) Outline of all tasks or duties to be performed This section identifies each task or duty for which a work sheet is included It must address all tasks and duties that are normally performed during the operation or maintenance of the system, subsystem, equipment, task or function (see figure 5-18-3)

(e) Instructions relating to the assignment of tasks to the trainee This section explains how tasks are to be assigned to the trainee It addresses questions such as which tasks may be worked on in teams, which are optional, and which tasks or duties must be performed by all trainees to ensure proficiency (see figure 5-18-4)

(f) Reference material This section lists each technical manual, publication, directive, and any other reference documentation needed to perform the tasks and duties assigned by the OJT handbook The references include both military and commercial documents, general as well as specific and technical references Supporting reference information must provide sufficient detail so that they may be ordered by the training facilities, if necessary (see figure 5-18-5)

(g) System and schematic diagrams This section lists all system and schematic diagrams used when performing tasks and duties assigned by the OJT handbook Each schematic and diagram is to be identified by source (i e , publication name), section, and figure or drawing number (see figure 5-18-6)

(h) Simplified training diagrams developed This section lists all simplified training diagrams and charts developed especially for use with the OJT handbook (e g , simplified troubleshooting charts, signal flow diagrams, and block diagrams) (see figure 5-18-7)

5 18 3 2 Work sheet development The work sheets provide the trainee with a guided procedure for learning about and performing a task A work sheet is developed for each task that is performed during the operation and maintenance of the system, subsystem, or equipment It provides detailed information on

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how to perform the task and references to the procedures in the appropriate technical manual If the technical documentation is inadequate, the specific operation and maintenance procedures are provided by the work sheet The curriculum developer must provide sufficient instructions to the person who will oversee the OJT so that he will know how to structure the training, decide on what tasks to include, structure the task performance to optimize learning, develop the performance procedures, etc The four sections of the work sheets are described as follows

(a) Operation This section must contain all tasks or duties which relate to operation of the system, subsystem, or equipment or any auxiliary equipment

(b) Computer and peripheral maintenance This section must contain all tasks or duties which relate to maintenance of the computer, its peripheral equipment, any interface equipment between the computer and its peripheral equipment, or between the computer and any nonperipheral components of the system, subsystem, or equipment

(c) System, subsystem, or equipment maintenance This section must contain all tasks or duties which relate to maintenance of any system, subsystem, or equipment not covered under operation or computer and peripheral maintenance

(d) Student test and evaluation This section must contain a complete set of tests for trainee OJT evaluation with a listing of all acceptable answers These tests must consist of written exams for evaluation of the trainee's mastery of study tasks and performance exams for evaluation of the trainee's mastery of practical application or other performance assignments

5 18 3 3 General and specific guidelines for work sheet development The work sheets must contain the following

(a) General guidelines The following paragraphs provide amplifying guidance on which tasks are to be included and on how to present them in the OJT handbook

(1) Included are the tasks or duties that are performed during the daily operation and maintenance of system, subsystem, or equipment Any task performed routinely may be included Overhauling the engine on the Commercial Utility Cargo Vehicle (type A), utility is not performed daily, however, in a facility where there are many vehicles that are driven frequently, engine overhaul is a common task and should be included in the OJT handbook The question to ask in deciding whether or not to include a task is, "What is the maintenance concept for the system, subsystem, or equipment?" If the OJT handbook is being developed for an equipment for which there is no depot level maintenance, it would be inappropriate to include any depot task

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in the OJT handbook Likewise, it would be incorrect to exclude routine tasks simply because they are not performed daily

(2) Provide complete procedures for accomplishing a given task, but do not duplicate materials or information from the official system, subsystem, or equipment manuals In clarification, the purpose of the OJT handbook is to provide operation and maintenance tasks to train persons so that they become fully qualified and highly proficient at operating and maintaining the system, subsystem, or equipment It must provide the trainee with practice performing tasks using the technical documents that the trainee will have at his job assignment The directions provided in the work sheet must refer the trainee to the appropriate technical documentation by name, volume number, section, and paragraph to perform specific operation or maintenance steps Specific operation or maintenance procedures/steps are provided in the work sheet only when the technical documentation is inadequate for training

(3) Include all tasks or duties, within the maintenance concept, that are performed on the system, subsystem, or equipment At times, curriculum developers have the desire to limit the number of tasks because an operation or maintenance course is restricted in length/time The tasks to be covered in the OJT handbook are not a function of the length of a training program The purpose for procuring the OJT handbook is to provide life cycle support for system, subsystem, or equipment so that persons may be trained whether or not a formal operation or maintenance course is conducted

(4) There are many similarities between the work sheets developed for an OJT handbook and the instruction sheets developed for the trainee guide To assist in the development of work sheets, refer to 5 9

(b) Specific guidelines The following paragraphs describe each portion of the work sheet (see figure 5-18-8)

(1) Definition of the task This portion describes the specific task to be performed and identifies how the task relates to the overall maintenance program for the system, subsystem, or equipment For example, if the task to be learned was, "Remove and Replace the Pitman Arm on the Commercial Utility Cargo Vehicle (type A)," the definition task might state something like, "This work sheet will help you become proficient at removing and replacing the Pitman Arm on the steering and linkage system of the Commercial Utility Cargo Vehicle (type A)"

(2) Objectives to be accomplished by performing the task This portion identifies the specific learning objectives that are satisfied by the successful performance/completion of the task The learning objectives are listed here exactly as they are

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listed in the TLO To assist in the development of learning objectives, refer to 5 6

(3) Reading assignment This portion identifies all required reading which is located in official technical documentation that the trainee must read to successfully complete the task Documents are to be identified by the complete name, publication number, and volume number, if applicable Assignments are to be identified by chapter, section, paragraph, and page

(4) Supplemental reading materials This portion identifies all required reading that is not located in official technical documentation (e g , information sheets, diagram sheets), and other information the instructor might provide as handouts Note, "supplemental" does not mean optional These assignments are required reading

(5) Other references This portion identifies references which aid the trainee in the completion of the task assignment but are not mandatory readings

(6) System and schematic diagrams This portion identifies all system and schematic diagrams that the trainee must study to successfully complete the task The list must include the diagram name and source (e g , "Diagram Sheet XX XXX, Navy Training Program, OD 54410, Volume 2, paragraph 4-5 10 ")

(7) Simplified system equipment handbook diagrams relative to task completion This portion lists all simplified system and schematic diagrams which the trainee must study to successfully perform the task The list must include the diagram name and its source (e g , "Diagram Sheet XX XXX, Student OJT Handbook, Chapter 4, pages 4 through 6", or "Diagram Sheet XX XXX, Handout ")

(8) Simplified training diagrams This portion lists all simplified training diagrams which the trainee must study to successfully perform the task This list must not include diagrams that are part of the system, subsystem, or equipment maintenance documentation Examples of such simplified training diagrams include signal flow diagrams and block diagrams

(9) Required tools and test equipment This portion lists tools and test equipment that the trainee will need to perform the task

(10) Safety precautions This portion list the safety precautions which the trainee must observe These precautions must be specific to the performance of the task and not general safety precautions These precautions must pertain to personnel or equipment safety They may pertain to the misleading conclusions which can be derived through improper analysis of observed indications and data

(11) Procedures for accomplishing the task This section consists of either general or discrete step-by-step procedures for performing operation, maintenance, troubleshooting, or repair

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A major consideration for developing the procedures, where appropriate, is "Activities" This step directs the trainee to record a meter reading, oscilloscope waveform, or prepare a brief statement indicating a pertinent condition of the equipment The information recorded must provide a means of evaluating the trainee's efforts or provide the trainee with information that will require analysis upon completion of the work sheet The trainee will not be required to enter data which is not pertinent to the task being performed If the job is one that requires trainee analysis of gathered data, the performance step should include questions requiring short sentences or short phrases indicating the trainee's ability to provide the proper analysis

A second major consideration is "Categories " The mechanics of developing the performance steps depend on the effectiveness of the instructions listed in the technical documentation Depending on the contents of the documentation, performance steps will fall into one of three general categories that will determine development procedures as follows

In each of the following job steps, provide sufficient space under each step that requires the trainee to record information

Category 1 If the technical manual instructions are complete and accurate

(a) Refer the trainee to appropriate paragraphs in the technical manual
(b) List the performance steps in numerical order Each performance step listed on the work sheet will require completion of one or more instructions in the technical manual
(c) Group technical manual instructions to permit recording useful data or checking of progress by the instructor
(d) Include as a performance step the return of equipment to its original condition
(e) As appropriate, direct analysis of recorded data with a question or series of questions after each performance step

Category 2 If technical manual instructions are incomplete or erroneous

(a) Refer the trainee to the appropriate paragraphs in the technical manual
(b) Where an instruction in the technical manual is in error, develop a performance step that provides the correct procedures and supersedes the technical manual instruction

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(c) When instructions necessary to training are lacking or inadequate, develop the correct procedures for the task as separate performance steps in the appropriate sequence

(d) Where additional procedures are required to supplement technical manual instruction, provide the necessary performance steps

(e) If some technical manual instructions are not in the proper sequence, design the performance steps that provide directions for selecting the instructions from the manual in the appropriate sequence

Category 3 If performance steps are for troubleshooting practice, they should include as a minimum the following steps, as applicable

(a) Record the trouble symptoms that are apparent from the front panel

(b) Identify the unit (drawer, assembly, or other) in which the malfunction occurs

(c) Identify the part that caused the malfunction and describe the failure (open, shorted, leaky, etc)

(12) Self-tests Self-test questions, included as applicable following each performance step, are developed to exercise the decision making requirements that a trainee may face at his work site These questions constitute an open-book test, with the trainee permitted to use the technical manuals and other training program materials in seeking answers Test question development guidelines are discussed in 5 7 In general, when developing self-test questions, the following principles should be considered

(a) Questions must be easily understood, grammatically correct, and easily graded by the instructor

(b) Content must always be technically correct and have direct application to the device or equipment

(c) Questions that permit answers from pure memory or from training program material must be avoided in favor of questions requiring analysis and thought similar to that required in the actual job situation

(d) As far as possible, each question must measure how well the trainee can apply the knowledge gained and how well he can use the information provided in the technical manual and in other training program material

(13) Miscellaneous requirements Each work sheet must include the maximum allowable time for satisfactory completion of the task, a space where the instructor can record the actual amount of time it took the trainee to perform the task, and a space for

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the instructor's initials at each point where his review is required and at the end of the work sheet

(14) Aids to the instructor for preparation of the lessons This section provides information which will assist the instructor in preparing and administering the lessons These instructions may include such information as whether faults are to be inserted into a system, subsystem, or equipment before the trainee comes in contact with the system, subsystem or equipment It also provides references which the instructor might use to prepare for the lesson and tips on how to set-up the lesson

(15) Fault insertion and safety precautions to be observed This section identifies the fault, with its parameters, that will be inserted into a system, subsystem, or equipment and the personnel and equipment safety precautions to be observed For example, if the task were to troubleshoot the Commercial Utility Cargo Vehicle (type A) and the problem was to perform a front-end alignment, the instructor would need to be provided with the "misalignment" parameters which must be inserted It is important to provide the parameters so that when the trainee performs operational tests, which in this case might be to drive the vehicle or performs other aspects of a task, the parameters inserted do not damage the vehicle or result in a condition which would endanger the trainee Likewise, it is important to provide the safety precautions to be observed so that the instructor knows the conditions which might occur during operation or maintenance that could result in equipment damage or injury to a trainee

(16) Instructor inserted malfunction This section identifies each fault the instructor may insert into the system, subsystem, or equipment without damaging it For each fault, the symptoms it will produce are listed If the task were to troubleshoot the Commercial Utility Cargo Vehicle (type A), the symptoms and operating conditions might be as follows

INSTRUCTOR INSERTED MALFUNCTION		SYMPTOM	
1	Insert faulty fuel pump	1	Engine turns over but does not start
		2	During operation, the engine stops running
		3	During operation, the engine runs rough and surges

(17) Performance testing and evaluation This section provides detailed instructions on how the instructor will determine that

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the trainee has successfully completed the task The information must include the performance standards and criteria for an objective assessment of acceptable performance For the example used previously on troubleshooting the Commercial Utility Cargo Vehicle (type A), a performance standard may be, "To successfully complete this Work Sheet, the trainee must align the wheels to + or - 2 degrees camber and + or - 2 degrees toe-in The task must be performed within 60 minutes "

In cases where the process used to perform the task as well as the product itself is important, a checklist which the instructor will use to monitor trainee performance is included The checklist must include the minimum steps which must be performed, some criteria for acceptance, and if appropriate, the sequence of the performance steps

(18) Written tests Complete tests for use in evaluating the trainee's mastery of the subject. Includes written and performance tests to be used to evaluate trainee proficiency

(19) Acceptable answers or actions for satisfactory completion of the evaluation For written tests, this section provides the answer key If several answers are acceptable, all answers are provided For performance tests, this section describes acceptable task actions This information could have been fully addressed in 5 18 3.3 b 17

(20) Completed trainee worksheet During personalization, a copy of each trainee work sheet can be completed and included in the instructor volume It must be annotated with the correct answers In the event that more than one response is acceptable as being correct, all acceptable answers are to be listed

5 18 3 4 Development of the student volume The student volume of the OJT handbook consists of front matter and work sheets The work sheets are divided into three sections Operation, Computers and Peripheral Maintenance, and System, Subsystem, or Equipment Maintenance The student volume must bear the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

5 18 3 5 Front matter development The front matter defines the content and usage of the document Each element of the front matter will be developed in the order listed

(a) Cover The cover must provide information relevant to the identification of the student volume

(b) Table of contents The table of contents lists the front matter and work sheets contained in the student volume and the page on which each is located Front matter pages are numbered using Roman

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numerals Work sheets are numbered consecutively using Arabic numbers

(c) Guideline and instructions for utilization of the OJT handbook This section provides detailed information to the trainee on how the OJT handbook is to be used Included is information on the composition, function, and use of the OJT handbook, direction as to whether or not the trainee can write in his OJT handbook, and how to handle and safeguard the OJT handbook if the information is classified It describes how the trainee is to be evaluated, any general personnel and equipment safety precautions which shall be observed, and any other information which the trainee needs to successfully use the OJT handbook

(d) Outline of all tasks or duties to be performed This section identifies each task or duty for which a work sheet is included The OJT handbook must address all tasks and duties that are normally performed during the operation or maintenance of the system, subsystem, equipment, task or function

(e) Reference material This section lists each technical manual, publication, directive, and any other reference documentation needed to perform the tasks and duties assigned by the OJT handbook The references include both military and commercial documents, general as well as specific and technical references Reference must provide sufficient detail so that they may be ordered by the training facilities, if necessary

(f) System and schematic diagrams This section lists all system and schematic diagrams used when performing tasks and duties assigned by the OJT handbook Each schematic/diagram is to be identified by source (i e , publication name), section, and figure or drawing

(g) Simplified training diagrams developed This section lists all simplified training diagrams and charts developed especially for use with the OJT handbook (e g , simplified troubleshooting charts, signal flow diagrams, and block diagrams)

5 18 3 6 Work sheet development The work sheets developed for the instructor volume are the basis of the work sheet portion of the student volume As a result, the bulk of the work has been completed, i e , the decisions on what tasks to include, how to structure the task performance to optimize learning, development of the performance procedures, etc The three sections of the trainee work sheets are described as follows

(a) Operation This section must contain all tasks or duties which relate to operation of the system, subsystem, or equipment or any auxiliary equipment

(b) Computer and peripheral maintenance This section must contain all tasks or duties which relate to maintenance of the computer, its peripheral equipment, any interface equipment between the computer and its peripheral equipment, or between the computer and any nonperipheral components of the system, subsystem, or equipment

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(c) System, subsystem, or equipment maintenance This section must contain all tasks or duties which relate to maintenance of any system, subsystem, or equipment not covered under operation or computer and peripheral maintenance

5 18 3 7 General and specific guidelines for work sheet development The work sheets must contain the following

(a) General guidelines A work sheet must be provided for each task and must be developed following the same general guidelines as described in 5 18 3 3 a(1) through (4)

(b) Specific guidelines. A work sheet must be provided for each task and shall contain the same information as described in 5 18 3 3 b (1) through (13)

5 18 3 8 Performance test and evaluation A comprehensive examination, designed to enable the trainee to demonstrate his mastery at skills and knowledge necessary for successful accomplishment of the assigned task, must follow each work sheet

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(CLASSIFICATION)

(CHANGE)
A-234-5678 (VOLUME)
(REVISION)

COMMERCIAL UTILITY VEHICLE (TYPE A), UTILITY
OPERATION AND MAINTENANCE

ON-THE-JOB TRAINING HANDBOOK
INSTRUCTOR VOLUME

AUGUST 1986

Published by Direction of the
Chief of Naval Technical Training

(CLASSIFICATION)

FIGURE 5-18-1 Example instructor volume OJT handbook cover

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OJT HANDBOOK A-234-5678

GUIDELINES AND INSTRUCTIONS FOR CONDUCTING THE
OJT PROGRAM UTILIZING THE OJT HANDBOOK

INTRODUCTION

As instructor of the commercial Utility Cargo Vehicle (TYPE A), Utility operations and maintenance training course, you will be using the On-The-Job Training (OJT) Handbook, in conjunction with CUCV (TYPE A) technical documentation, to train Government designated personnel to operate, maintain, troubleshoot, and repair the CUCV (TYPE A)

By using the series of instructions, reading assignments, review questions, and hands-on exercises provided by the OJT handbook, you can easily guide the student through essential CUCV (TYPE A) technical documentation and through tasks normally performed during daily CUCV (TYPE A) equipment operation and maintenance requirements

OJT HANDBOOK STRUCTURE

The OJT Handbook consists of two separate volumes, the Instructor Volume and the Student Volume The content of the Instructor Volume and the Student Volume are closely coordinated to ensure that the same or similar information is sequenced in the same order in both documents

INSTRUCTOR VOLUME

The Instructor Volume is organized into four main sections as identified in the Table of Contents The first and last sections are designed specifically to assist you in conducting the CUCV (TYPE A) training using the OJT Handbook as the primary teaching tool

Section I, which you are reading now, provides background data and training guidelines It is recommended that you prepare yourself for

1-1

FIGURE 5-18-2 Example of guidelines and instructions for conducting the the OJT program utilizing the OJT handbook (Sheet 1 of 3)

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conducting the course by reading Section I thoroughly in the order it is presented Section I includes the following

1 Explanation of OJT objectives

2 Task outline

3 Recommendations for conducting the course using the OJT Handbook

4 Student evaluation procedures

5 List of required references

6 List of supplemental references

7 List of CUCV (TYPE A) system and schematic diagrams

8 List of simplified training diagrams

9 List of all OJT objectives

Sections II and III are specific to CUCV (TYPE A) operation and * maintenance and are instructional in nature Each of these sections * is arranged into a succession of Work Sheets which define the specific tasks to the accomplished, and describe the means for accomplishing them

Section IV contains a comprehensive test used for student evaluation along with all acceptable answers for each question

STUDENT GUIDE

The overall organization of the Student's Volume is the same as that of the Instructor Volume, except that Section I addresses the needs of the student rather than the needs of the instructor and there is

FIGURE 5-18-2 Example of guidelines and instructions for conducting the the OJT program utilizing the OJT handbook (Sheet 2 of 3)

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OJT HANDBOOK A-234-5678

no final section covering student evaluation Section I of the Student Volume provides the student with OJT background data and guidelines for using the OJT Handbook to complete the OJT program successfully, including the following

1 Explanation of objectives

2 Task outline

3 Work Sheet assignment and review

4 Evaluation

1-3

FIGURE 5-18-2 Example of guidelines and instructions for conducting the the OJT program utilizing the OJT handbook (Sheet 3 of 3)

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OUTLINE OF ALL TASKS OR DUTIES TO BE PERFORMED

TASK NO	TASK TOPIC
1	Perform Planned Maintenance System (PMS) tasks
2	Conduct pre-operational tests and inspections
3	Perform post-operational procedures
4	Troubleshoot the CUCV (TYPE A) to the faulty component
5	Troubleshoot the engine
6	Troubleshoot the transmission
7	Troubleshoot the electrical system
8	Troubleshoot the steering and handling system
9	Perform wheel alignment of the CUCV (TYPE A)
10	Remove and replace brakes
11	Remove and replace tie rod ends
12	Remove and replace the Pitman Arm
13	Lubricate the front suspension
14	Turn drums and rotors

1-4

FIGURE 5-18-3 Example of outline of all tasks or duties to be performed

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OJT HANDBOOK A-234-5678

INSTRUCTIONS RELATING TO THE ASSIGNMENT OF TASKS TO THE TRAINEE

The OJT Handbook is designed so that each new unit of instruction builds on the last The sequence listed in the Table of Contents is the preferred order of instruction, and it is recommended that you take the student through the sections in this order

It is also important for the student to complete all Work Sheets within each section in the correct order and to the desired level of competence The basic Work Sheet assignment and review procedure is as follows

1 ASSIGN THE APPROPRIATE WORK SHEET

Review the Work Sheet task, objectives, assignments, and relevant safety precautions with the student

2 CHECK THE STUDENT'S ANSWERS

After the student has completed the reading assignment and progress review questions, discuss incorrect answers and answer any questions the student may have

If the student has satisfactorily completed the progress review questions, place your initials in the space provided on the Work Sheet and assign the student the appropriate practical assignment(s), if any

3 ASSIGN THE APPROPRIATE ASSIGNMENT

You or your designated assistant shall be present to observe as the student performs the practical assignment(s) You may find it helpful to take notes for the latter reference You will want to note items such as procedural steps missed, safety precautions overlooked, specific ways the student can improve future performance, specific ways the student performed well, and any other items of concern to you

1-5

FIGURE 5-18-4 Example of instructions relating to the assignment of tasks to the student (Sheet 1 of 2)

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OJT HANDBOOK A-234-5678

4 EVALUATE THE PRACTICAL ASSIGNMENT(S)

After the student has completed the practical assignment(s), review the student's performance to date If you are satisfied that the student has correctly performed the practical assignment(s), place your initials in the space provided and permit the student to proceed to the next Work Sheet Take time to commend the student for a particularly good task performance If you are not satisfied, draw on the notes you have taken to provide the student with specific, constructive suggestions Don't forget to listen to the student's assessment of the problem

5 ASSIGN THE NEXT WORK SHEET

As before, review the Work Sheet task, objectives, assignments, and relevant safety precautions Follow the Work Sheet assignment and review steps until all Work Sheets have been completed and all objectives have been met satisfactorily

1-6

FIGURE 5-18-4 Example of instructions relating to the assignment of tasks to the student (Sheet 2 of 2)

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OJT HANDBOOK A-234-5678

REFERENCE MATERIAL

	NUMBER	TITLE
1	TM 09-2320-289-10	Operational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009
2	TM 09-2320-289-20	Organizational Maintenance Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009
3	TM 09-2320-289-30	Direct Support Maintenance Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009
4	None	Chilton's Truck and Van Repair Manual, Chilton Book Company, 1984

1-7

FIGURE 5-18-5 Example reference material

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CHANGE 1
OJT HANDBOOK A-234-5678

SYSTEM AND SCHEMATIC DIAGRAMS

	TITLE	SOURCE
1	Electrical Diagram	TM 09-2320-289-20, Organizational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009, Section 5-3
2	Air Conditioning System, Block Diagram	TM 09-2320-289-20, Organizational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009, Section 5-6, Figure 5-6-3
3	Diesel Electrical Systems Diagnosis	TM 09-2320-289-20, Organizational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009, Section 5-7, Figure 5-7-1
4	Second Type Diesel Glow Plug Electrical Control Diagram	TM 09-2320-289-20, Organizational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009, Section 5-7, Figure 5-7-4
5	Pump Fuel Circuit	TM 09-2320-289-20, Organizational Manual for Truck, Utility, Tactical, 3/4 Ton, 4 X 4, M1009, Section 5-8, Figure 5-8-3

1-8

FIGURE 5-18-6 Example of system and schematic diagram

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OJT HANDBOOK A-234-5678

SIMPLIFIED TRAINING DIAGRAMS DEVELOPED

	TITLE	LOCATION
1	Front Axle Shaft and Retainer	OJT Handbook, Section 3 8, Figure 3-8-1
2	Turn Signal Indicator Switch, Exploded View	OJT Handbook, Section 3 10, Figure 3-10-1
3	Throttle Linkage	OJT Handbook, Section 3 11, Figure 3-11-1

1-9

FIGURE 5-18-7 Example simplified training diagrams developed

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OJT HANDBOOK — CHANGE 1
A-234-5678
Sheet 1 of 7

WORK SHEET D542-4-1, CH 1

FAULT ISOLATION PROCEDURES FOR THE
COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY

1 Definition of the task This Work Sheet will help you become proficient at troubleshooting the CUCV (TYPE A) to the faulty component

2 Objectives to be accomplished by performing the task

Describe authorized methods to isolate faults which cannot be located using procedures contained in the prescribed documentation to support undocumented corrective maintenance requiring advanced analysis for the CUCV (TYPE A)

Perform fault isolation procedures in accordance with documented corrective maintenance procedures requiring advanced analysis for the CUCV (TYPE A) *

3 Reading assignment

1 Chilton, Chilton's Truck and Van Repair Manual Read Chapter 1

4 Supplemental reading materials None

5 Other references None

6 System and schematic diagrams

1 "Overdrive Circuit Diagram without Relay", Chilton, Chapter 1, pages 1 through 18

7 Simplified system equipment handbook diagrams relative to task completion

1 Diagram Sheet D542-4-1, "Wiring Connections for Coil with Negative Grounded System "

3-1

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 1 of 7)

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OJT HANDBOOK A-234-5678
WORK SHEET D542-4-1, CH 1 Sheet 2 of 7

8 Simplified training diagrams None

9 Required tools and tools and test equipment

a Test Equipment

(1) STE/ICE Vehicle Test Meter

b Tools

(1) Basic handtools

(2) Special tool set, Organizational Maintenance

10 Safety precautions

1 When troubleshooting the engine, the CUCV (TYPE A) can be started in any gear when the safety switch is bypassed Be sure the transmission is in neutral or park and the parking brake is applied

11 Procedure for accomplishing the task

1 A recent operator of the CUCV (TYPE A) reports that the engine overheats when the vehicle has been driven for more than thirty (30) minutes

a What are the possible causes for engines overheating?

_____

_____

_____

b What inspections would you make before starting the CUCV (TYPE A)?

_____

_____

_____

3-2

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 2 of 7)

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CHANGE 1
OJT HANDBOOK A-234-5678
WORK SHEET D542-4-1, CH 1 Sheet 3 of 7

c Conduct the inspections of the CUCV (TYPE A) that you identified in step 1 b and record the results

_____

_____

INSTRUCTOR CHECK _____
SAT

2 Based on the information provided by your instructor, perform all pre-start operational checks and inspections

a In what major component does the fault probably exist? *

_____

b What pre-start operational checks and inspections will you perform?

_____

_____

c Perform the pre-start operational checks and inspections Record the results below

_____

_____

d What operational checks and inspections will you make with the engine running to determine why the engine is over heating?

_____

INSTRUCTOR CHECK_____
SAT

3-3

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 3 of 7)

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OJT HANDBOOK A-234-5678
WORK SHEET D542-4-1 CH 1 Sheet 4 of 7

3 Start the CUCV (TYPE A) and perform operational checks and inspections

a What safety precautions must you observe before starting the vehicle?

_____

_____

_____

b Record the results of the inspections you made with the engine running

_____

_____

_____

4 Isolate the fault

a What is the probable fault?

_____

_____

_____

INSTRUCTOR CHECK_____
SAT

5 Stop the CUCV (TYPE A) Return the vehicle to normal

COMPLETION DATE_____
INSTRUCTOR'S INITIALS_____

3-4

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 4 of 7)

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OJT HANDBOOK A-234-5678
WORK SHEET D542-4-1, CH 1 Sheet 5 of 7

12 Aids to the instructor for preparation of the lesson

1 This Work Sheet may be used for all troubleshooting problems You should insert the prescribed faults into the equipment prior to the student's entry into the laboratory The student may then use this Work Sheet for guidance during task performance

2 If the students work in teams, ensure that they rotate performance of various elements of the tasks, i e , one student performs pre-operational checks and inspections, the other performs the operational checks On the next task, the students reverse roles

3 The faults listed in paragraph 13 must be used for all students

13 Fault insertion and safety precautions to be observed

1 Faulty distributor cap, Fault D542-1

No special safety precautions

2 Faulty throttle cable, Fault D542-2

Gas pedal may stick in the open position Ensure the student knows that if this happens, he must turn off the engine Ensure student does not operate vehicle when troubleshooting

3 Faulty fuel filter, Fault D542-3

Avoid fuel leaks

4 Faulty thermostat, Fault D542-7

Do not allow the engine to run in an overheated condition for an extended period

Do not remove radiator cap

3-5

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 5 of 7)

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OJT HANDBOOK A-234-5678
WORK SHEET D542-4-1, CH 1 Sheet 6 of 7

5 Faulty master cylinder, Fault D542-12

Brakes will be non-existent or poor Ensure student does not operate vehicle when troubleshooting

6 Faulty power steering pump, Fault D532-14

Avoid fluid contact with body

14 Instructor inserted malfunctions

	MALFUNCTION		SYMPTOMS
1	Faulty distributor cap	1	Engine turns over but does not start
		2	Engine idles rough
		3	Engine runs intermittently smooth then rough
2	Faulty throttle cable	1	Engine idles faster or slower than normal
		2	When operator depresses throttle nothing happens
		3	Gas pedal (throttle) sticks open
3	Faulty fuel filter	1	Engine does not start
		2	Engine runs rough or intermittently
4	Faulty thermostat	1	Engine overheats
		2	Engine does not heat up
5	Faulty master cylinder	1	No brakes
		2	Not enough brakes
6	Faulty power steering pump	1	Steers hard
		2	Noisy steering

3-6

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 6 of 7)

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CHANGE 1

OJT HANDBOOK A-234-5678

WORK SHEET D542-4-1, CH 1 Sheet 7 of 7

15 Performance testing and evaluation

To successfully complete this Work Sheet, the student must troubleshoot the vehicle and identify the faulty component Given three problems, the student will correctly identify the faulty component in at least two problems The student will complete each problem in no more than sixty (60) minutes *

16 Written tests There are no written tests for this Work Sheet

17 Acceptable answers or actions for satisfactory completion of the evaluation

1 Given three problems, the student shall correctly identify the faulty component in at least two of the problems

2 No critical safety violations may occur during performance of any step

3 Each problem must be completed within sixty (60) minutes *

3-7

FIGURE 5-18-8 Example of instructor volume work sheet (Sheet 7 of 7)

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5 19 EXERCISE CONTROLLER GUIDE

5 19 Exercise controller guide The exercise controller guide (ECG) provides a set of exercises for use in either the formal or informal training environment The exercises consist of operational scenarios and selected training procedures designed to accomplish specific, predetermined training objectives This section describes the format, content, and development guidelines for ECGs prepared to support training as specified in the military standard and in DI-ILSS-80087

5 19 1 Use The individual tasked with the administration of the exercises in the ECG is the exercise controller The exercise controller may use the ECG administering laboratory exercises as part of a formal curriculum, as a guide for use with operational trainers, or for demonstration purposes In the informal training environment the ECG may be used as a stand-alone document for conducting independent training The ECG provides definition of training objectives, and direction for equipment operation, safety, and selection and use of the exercises ECG exercises may be used as follows

(a) Training Satisfies specific operational and laboratory training requirements at both the individual and team levels
(b) Diagnosis Assesses trainee/team proficiency, throughout the entire spectrum of operational or laboratory tasks and accomplishes the desired training
(c) Evaluation Assesses trainee/team proficiency, operational readiness, or both

5 19 2 Elements The ECG consists of the following elements and placed in the guide in the order each is listed here

(a) Front matter Front matter provides information relevant to the identification of the ECG, contents, and changes to the document and hazard warnings of the equipment
(b) Introductory material The introductory material includes an overview of the specific equipment and associated training materials
(c) Exercise selection index The exercise selection index provides a tabular listing of significant considerations associated with specific exercises and provides a means of exercise selection for any given training situation
(d) Exercises The exercise is the basic unit of the ECG and is developed to be used in one or more of the following relationships

    (1) Controller only (used for demonstration)
    (2) Controller - Trainee/team (used by a controller to conduct either individual or team training and assessment)
    (3) Controller - Trainee or trainee only (written so as to allow either independent use by a trainee or use by a controller for diagnostic or evaluation purposes)

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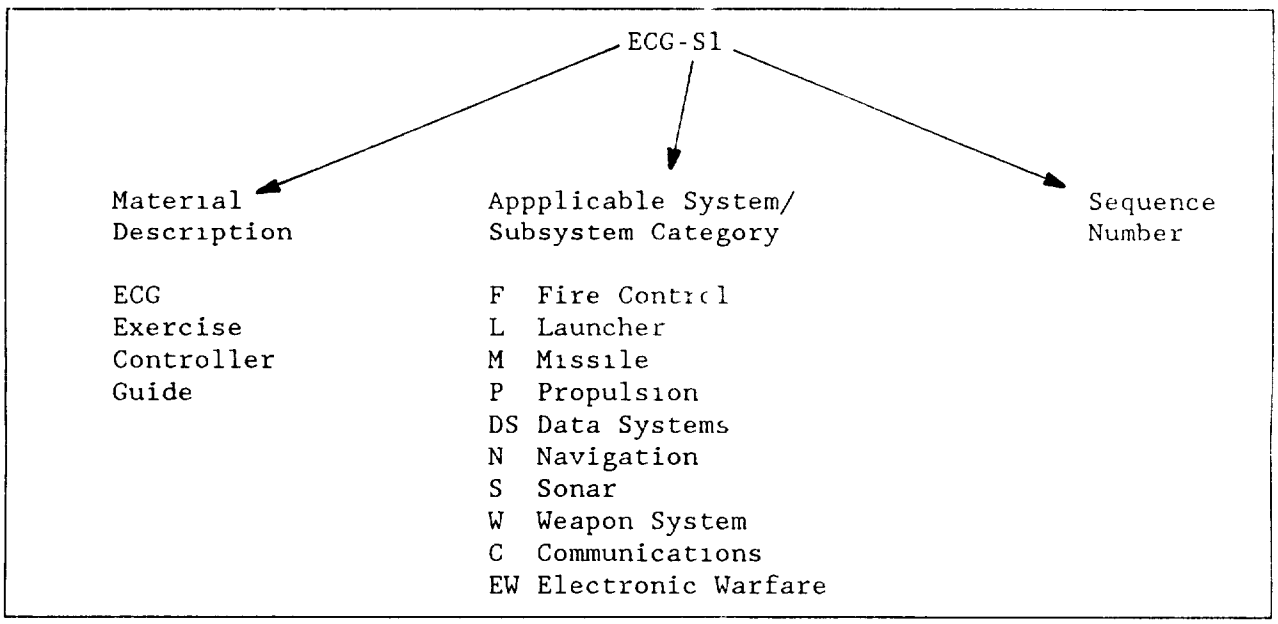
(e) Reference material The Reference Material provides the exercise controller with information relative to the conduct of the FCG

5 19 3 Development Development of the ECG is based on the approved TMO, which is discussed in Section 5 10

(a) Security requirements Each ECG bears the highest security classification demanded by its contents Classification is in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

5 19 3 1 Front matter development ECGs are identified by an alphanumeric designation, as shown in table 5-19-I The letters describe the type of instructional media material and the applicable system or subsystem The Arabic number which follows the letters is a sequence number to aid in instructional media material identification

TABLE 5-19-I ECG identification data



Reference the following figures for examples of the indicated front matter

(a) Cover (see figure 5-19-1)
(b) List of effective pages (see figure 5-19-2)
(c) Letter of promulgation (see figure 5-19-3)
(d) Change record (see figure 5-19-4)

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(e) Hazard awareness notice (see figure 5-19-5)
(f) Table of contents (see figure 5-19-6)

5 19 3 2 Introduction development No specific development guideline is possible due to the wide variety of exercises which may be developed The introductory material section of the ECG appears only in the first volume of an ECG (see figure 5-19-7) In most cases the introduction material will consist of the following

(a) The introduction paragraph includes an overview of the specific training equipment and associated training material to be used with the subject ECG This paragraph also includes a general description of the composition, function, use of the ECG, and directions for the maintenance of the ECG Specific operating controls, theory of operation and maintenance, and repair data contained in the technical manuals developed for the training equipment are not discussed in this paragraph
(b) The exercise selection paragraph presents the procedures for selecting exercises contained in the ECG A detailed discussion describes exercise selection both by diagnostic evaluation and by use of the exercise selection index This paragraph also includes a discussion of the indexing criteria used in the exercise selection index
(c) The instructional and diagnostic methods paragraph discusses the exercise controller's role in maximizing the effectiveness of training and any special considerations and constraints which may influence training effectiveness Discussion is also provided on the utilization of diagnostic exercises in establishing a realistic training baseline
(d) The locally prepared exercises section provides directions for the development of new exercises, if such development is not prohibited by higher authority Detailed information is provided in this section on the use of the blank exercise sheets contained in the ECG
(e) The exercise safety instruction paragraph delineates all precautionary measures which must be observed in the use of the equipment and ECG as related to safety and tactical security

5 19 3 3 Exercise objectives development guidelines Exercise objectives are included on the applicable title sheets The objectives are derived through the use of PPP and the TPS and are constructed as a prerequisite to any further step in the ECG development process If the ECG is non-PPP/TPS based, the exercise objectives are derived from the TAS The exercise objectives are constructed to reflect the training level required for the exercise The objectives should be positive statements of behavior, limiting conditions, and standards of performance which are to be achieved by the trainee The following applicable elements of PPPs, TPS, and some important factors are used in the development of exercise objectives

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(a) Elements

(1) PPPs
(2) Training path chart

(a) PPP table index
(b) Table assignment chart (TAC) (which includes the PPP table index)

(3) TOS
(4) TLA

(b) Important considerations

(1) Trainee background

(a) Previous training
(b) Experience
(c) Naval enlisted classification (NEC)
(d) Naval officer billet classification (NOBC)

(2) Tactical system/subsystem/equipment capabilities
(3) Training equipment capabilities and constraints
(4) Operating guidelines and current tactical doctrine
(5) Training requirements

5 19 3 4 Development of the exercise objectives Exercise objectives are developed as described in the following paragraphs

(a) Refer to the appropriate TPS documentation and select the TPC for the subject NEC(s) or NOBC
(b) Refer to the TAC or the data provided by the contracting activity and determine the PPP and the TOS applicable to the ECG Refer to the PPP table index and determine the titles of the applicable PPP tables
(c) Use the appropriately coded TLAs for the PPP determined in 5 19 3 4 (b) and determine the applicable PPP items and subitems In those cases where a TLA has not been constructed, the contracting activity will provide guidance on the selection of both the applicable PPP item to be selected and the applicable TOS to be applied
(d) Use the TOS from the applicable task set group, the titles of the applicable PPP, the stems of applicable PPP items and subitems, and those factors described in 5 19 3 3 (b) to prepare the exercise objectives
(e) Using all information pertinent to the unique requirements of the ECG being developed, consolidate the exercise objectives just developed, into sets of objectives which logically establish the objectives for a single exercise

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5 19 3 5 Development of exercises Prior to actual development of the exercises, there are some prerequisite exercise criteria which must be established These criteria are based on the established exercise objectives, the factors listed in paragraph 5 19 3 3 (b), and any other pertinent data

(a) Prerequisite exercise criteria The following are exercise criteria which should be established prior to beginning development of exercise events and activities

(1) Exercises are developed to train, diagnose, or evaluate the trainee/team Exercises may utilize any or all of these features

(2) Exercises are developed for use by the controller only (used for demonstration), the controller and trainee/team (used by a controller to conduct either individual or team training and assessment), the controller and trainee or trainee only (written to allow either independent use by a trainee or use by a controller for diagnostic or evaluation purposes), or trainee only (used for individual, independent training) Additional personnel required to accomplish the exercise should also be identified

(3) The exercise scenario is based on consideration of the exercise objectives, the desired exercise difficulty, and the factors listed in 5 19 3 3 b It is a synopsis of conditions under which the exercise is to be performed, including the tactical situation, environmental considerations, or equipment condition (e g , sea state 5, multiple faults inserted, condition I, etc)

(4) Identify the system/subsystem configuration listing the major status, line up, or mode of operation (e g , passive broadband search and detection, navigate, standby, etc)

(5) The training approach is a statement which correlates the exercise objectives and the exercise controller's actions The following is an example of training approach

APPROACH

Provide the operators with sufficient time to detect, track, and evaluate each contact maneuver If a maneuver is not detected, freeze the exercise Emphasize the specific indicators available to each operator to detect such maneuvers If difficulty in detecting and tracking through the maneuver is observed, verify that each operator has considered all factors in recognizing the appropriate contact cues

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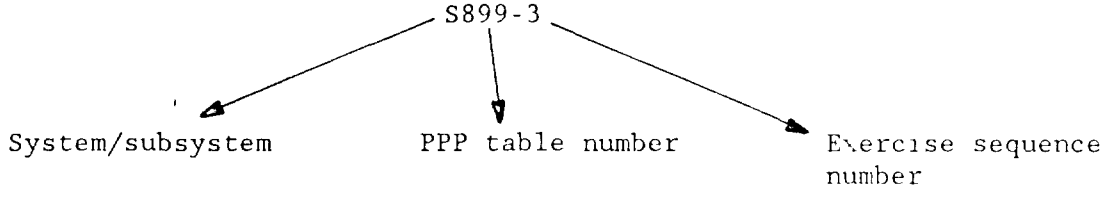
(6) In the case of diagnostic or performance evaluation exercises, the criteria for accomplishing the desired diagnosis and performance evaluation must be determined prior to exercise development This will facilitate the incorporation of diagnostic and performance evaluation into exercise events and activities

5 19 3 6 Exercise selection index All information required to complete an exercise selection index is contained in the exercise title sheets, event-activities sheets, and exercise data sheets The exercise selection index (see figure 5-19-8) consists of

(a) Exercise number
(b) Exercise objectives
(c) Exercise scenario
(d) System/subsystem configuration
(e) Exercise length
(f) Training level
(g) Difficulty index
(h) Additional criteria

5 19 3 7 Exercise title sheet development The exercise title sheet (see figure 5-19-9) includes the elements described below

(a) The exercise number is made up of system/subsystem category designation, the applicable PPP table number, and an assigned sequence number The following is an example of an exercise number



(b) An exercise title which is descriptive of the exercise objective
(c) The exercise objectives The development of these objectives was described in 5 19 3 4
(d) The exercise length as approximated during exercise development Final exercise length is determined and assigned during the validation process
(e) The training level TOS code indicates the highest level of training accomplished within the exercise This level will become evident following the completion of the actions described in 5 19 3 4 c during the development of the exercise objectives
(f) The difficulty index indicates the degree of difficulty relative to the appropriate TOS for each exercise The degree of difficulty is

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used in addition to the TOS because exercises at one level may require varying degrees of proficiency for satisfactory completion The degree of difficulty relative to the assigned TOS is indicated as basic, intermediate, or advanced. The final assignment of the difficulty index will be made during the validation phase

(g) Support requirements necessary for performance of the exercise include required equipments and tools, special manning requirements, references, etc These are determined by an analysis of the exercise objectives to be supported

(h) The training approach provides the exercise controller with general instructions and guidelines for conducting the exercise The approach is determined by analyzing the exercise objectives, taking into account the capabilities and constraints in the training environment in which the ECG is to be used

(i) Specific instructions not elsewhere provided must be placed here (e g , safety or security instructions)

5 19 3 8 Exercise data sheet development The exercise data sheet is required only for exercises developed for use in simulated or actual on board training which is performed entirely, or in part, on a tactical system/subsystem It provides pertinent exercise data relevant to the safety and security of the ship, aircraft, etc Specific guidelines for development are impossible due to the wide variety of possible exercises (see figure 5-19-10)

5 19 3 9 Event-activities sheet development Specific development steps for an event-activities sheet are not possible because of the wide variety of events that may be addressed by an ECG All information pertinent to proper conduct of the exercise is listed chronologically on the event-activities sheet in columnar format The following general guidelines are provided (see figure 5-19-11)

(a) Placed in the "Time" column are all the activity times in an exercise divided into three areas "PRE-COMEX" is the time before any exercise begins The time during which the exercise is actually performed is identified with time T+ for the start of the exercise (an event labeled "COMEX", and times of T+10 to T+20) "FINEX" indicates the time period after the exercise is completed The times of major events must be based on an analysis of the exercise objectives, the exercise difficulty index, appropriate technical documentation and authoritative guidelines, and operational policies

(b) Placed in the "Event" column is a statement of the event that is to occur at the specified time These event statements should be simple, straightforward, and descriptive

(c) The "Controller Activity" column is where the actions to be performed by the exercise controller for an event at a specified time are detailed These instructions must be complete and specific Pertinent safety and security precautions must be included Controller activities include equipment set up and operation and any methods of

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interface with the trainee Information which is to be provided to, or withheld from, the trainee must be stated specifically (e g , do not reveal any target data) Reference may be made to data contained in the exercise data sheet (e g , read the tactical considerations from the exercise data sheet to the trainees)

(d) In the "Operator Activity" column the actions the trainee must perform are detailed These behaviors must be observable and specific They must include both physical actions and required reports When an ECG is being used for team training, care must be taken to always adequately identify the specific member of the team, when applicable, who should be performing the action (e g , the nozzleman operates the fire nozzle to apply a solid stream of water)

5 19 3 10 Reference material development Reference material includes the MML, the OAC, and blank exercise sheet forms The reference material consists of the following

(a) The MML provides the exercise controller with a complete listing of all texts, references, equipment, and other materials required to support the ECG (see figure 5-19-12)

(b) The OAC provides the exercise controller with a cross reference between the PPP items or training task numbers (TAS) and the corresponding exercise objectives (see figure 5-19-13)

(1) Table This column lists the applicable PPP table numbers If the ECG is non-PPP/TPS based, the training task numbers (TAS) must be listed

(2) Item This column lists the applicable PPP line items in sequential order from the PPP table identified in the "Table" column If the ECG is non-PPP/TPS based, the training task numbers (TAS) must be listed

(c) Where applicable, one blank form of each appropriate exercise sheet may be included in the ECG immediately following the OAC The blank sheets must be used as reproduction masters for locally prepared exercises (see figure 5-19-14)

5 19 3 11 ECG assembly The ECG is prepared in accordance with the requirements set forth in the following paragraphs

(a) Page numbering Front matter pages are numbered consecutively with lower-case Roman numerals The cover page and letter of promulgation are not numbered, although they are counted as pages i and iii of the front matter Pages in the introductory material and exercise selection index portions of the guide are numbered consecutively in Arabic numerals Each exercise sheet is numbered consecutively in Arabic numerals in the designated block in the upper right-hand

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corner The title sheet is sheet 1, the exercise data sheet (where required) is sheet 2, and the initial event-activities sheet is sheet 3 (sheet 2 when no exercise data sheet is required) Reference material pages are numbered with consecutive Arabic numerals in parenthesis

(b) Organization by volume The introductory material, exercise selection index, and exercises always start on a lower page When the content of an ECG exceeds the capacity of a single binder (approximately 200 sheets), additional binders may be used Binders are identified by volume number, in Arabic numerals, with the first binder identified as volume 1, and successive binders as volume 2, 3, etc The cover of each volume is the same, except for the volume identification Each page of the ECG, except the letter of promulgation, contains a running head rule at the top

(c) Blank pages Blank pages in the ECG have the words "This Page Intentionally Left Blank" centered on the blank page

(d) Tab dividers Tab dividers are used to identify the following sections of the ECG

(1) Introductory material
(2) Exercise selection index
(3) Exercises from different PPP tables (identified by PPP table number)
(4) Reference material

The section title or PPP table number appears on both sides of the tab divider, the remainder of the tab divider is blank

(CLASSIFICATION) ECG-S1 (VOLUME 1)

SUBMARINE OCEAN ACOUSTIC TRAINING

EXERCISE CONTROLLER GUIDE

(CLASSIFICATION)

PUBLISHED BY DIRECTION OF COMMANDER SUBMARINE FORCE, U.S. ATLANTIC FLEET

FIGURE 5-19-1. Example ECG cover.

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LIST OF EFFECTIVE PAGES

Page No.	Change in Effect	Page No.	Change in Effect	Page No	Change in Effect	Page No.	Change in Effect
Cover	Original	S832-2-1 thru S832-2-8	Original				
ii	Original						
Letter of Promulgation	Original	S832-3-1 thru S832-3-8	Original				
iv thru vii	Original						
1 thru 12	Original	S838-1-1 thru S838-1-6	Original				
S820-1-1 thru S8201-7	Original	S820-1-1 thru S840-1-4	Original				
S820-2-1 thru S820-2-5	Original	S840-2-1 thru S840-2-10	Original				
S820-3-1 thru S820-3-7	Original	(1) thru (5)	Original				
S832-1-1 thru S832-1-6	Original						

SH132031629

FIGURE 5-19-2. Example ECG list of effective pages.

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DEPARTMENT OF THE NAVY
CHIEF OF NAVAL TECHNICAL TRAINING
NAVAL AIR STATION MEMPHIS (75)
MILLINGTON, TENNESSEE 38054

1 January 1986

EXERCISE CONTROLLER GUIDE

SUBMARINE OCEAN ACOUSTIC TRAINING

ECG-S1

This Exercise Controller Guide is the approved instructional material, effective upon receipt, for the planning and conduct of Sonar Operational Training Exercises at Team Trainers and aboard SSBN submarines

Corrections and recommended changes to this guide are invited and should be submitted by Trouble and Failure Report, SSP Form 3100 1A, in accordance with SSPINST 1300 1

Responsibilities, requirements, and procedures for maintaining this Exercise Controller Guide current and accurate are contained in the Military Standard and Associated Data Item Description

E. Evans

ERMON "BUDDY" EVANS
By direction

FIGURE 5-19-3 Example ECG letter of promulgation

EXERCISE CONTROLLER GUIDE

ECG-S1

CHANGE RECORD

Number and Description of Change	Entered by	Date

iv

SH132031630

FIGURE 5-19-4. Example ECG change record.

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HAZARD AWARENESS NOTICE

All personnel involved in operation or maintenance of electronic equipment must be thoroughly familiar with the electronic equipment safety precautions contained in Electronic Installation and Maintenance Book 096-LP-000-0100, section 3, and NSTM, Electronics, chapter 400, S9086-ND-STM-000/ch. 400, section 2. In addition, attention is directed to the Accident Prevention Manual, OPNAVINST 5101.2 series.

This equipment employs voltages which are dangerous and may be fatal if contacted by operating or maintenance personnel. Extreme caution must be exercised when working with this equipment. Hazard awareness dictates that this equipment must always be viewed as an integral part of a system and not as a component While every practical precaution has been incorporated into this equipment, it is not possible or practical to try to list every condition or hazard that you may encounter.

Don't service or adjust alone. Under no circumstances will a person operate or maintain equipment without the immediate presence or assistance of another person capable of rendering aid Unless under direct supervision of a qualified person, no person shall operate or maintain equipment for which he is not qualified.

Don't tamper with interlocks. Reliance on interlock circuits to remove power from the equipment is never to be assumed. Until operation of the interlock is verified, equipment is assumed to be in the hazardous mode of operation. Under no circumstances will any access gate, door, or interlock switch be removed, bypassed or modified in any way by other than authorized maintenance personnel and then only after observing proper tag-out procedures.

Report all hazards. If at any time you detect a hazard, it is your responsibility to report the hazard to ensure that it is corrected. If at any time you detect a "new" or "suspected new" hazard, particularly due to equipment installation, modification, or repair, it is your responsibility to report it through your chain-of-command to ensure that a SAFETYGRAM is submitted to the Naval Safety Center, Norfolk, Va, in accordance with OPNAVINST 5102.1 series. This will ensure that this hazard will be investigated, publicized, or corrected, as required. Additionally, SSPINST 3100.1 series requires SWS personnel to submit special check TFRs when a potential or actual unsafe condition is noticed that could cause injury to personnel or damage to equipment. When a problem/failure occurs involving the safety of personnel or equipment and it cannot be immediately resolved by command/technical assistance on-site, the TFR data shall be transmitted to SSPO and others by Naval Message

FIGURE 5-19-5. Example ECG hazard awareness notice.

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FIGURE 5-19-6. Example ECG table of contents. (Sheet 1 of 2)

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Blank ECG Exercise Forms

FIGURE 5-19-6. Example ECG table of contents. (Sheet 2 of 2)

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INTRODUCTION - Continued.

2. Exercise selection.

2-1. Background. This section presents a procedure for selection of training exercises contained in this volume. Two selection procedures are available diagnostic assessment and use of the Exercise Selection Index. Diagnostic Assessment is used to objectively determine watchstander proficiency and to assign training exercises based on identified watchstander training needs. The Exercise Selection Index provides a matrix of significant sonar training considerations within specific exercises. The index provides the shipboard training supervisor with a method for independent exercise selection for any given training session.

2-2. Discussion. The details regarding the specific procedures for exercise selection are as follows:

2-2.1. Exercise selection by diagnostic evaluation. The diagnostic assessment procedures are structured to determine sonar watchstander training needs. They are used to specify the series of training exercises which address the watchstander's training requirements at three levels. These levels are defined as Basic, Intermediate, and Advanced and are also utilized in the Exercise Selection Index. The diagnostic procedure determines a specific level for each individual sonar watchstander while the exercise index utilizes levels as a general indication of complexity. Based on the results of diagnostic assessment, the watchstander will be directed to specific training exercises within Category IIIa· for example, to improve proficiency in the areas of search/detection, classification, tracking/evaluation, and communication/coordination.

The diagnostic assessment exercises are structured as follows

a. An actual on-line problem is presented which involves the use and application of pertinent publications to select sonar equipment lineups from sonar performance/range prediction criteria. Evaluation of the answers to the actual on line problem will determine which exercises are most valuable to the sonar watchstander. Advanced and intermediate level watchstanders proceed to exercises with real on line problems compatible with their ability. The basic level watchstander is directed to review current doctrine and publications addressing actual problems, before attempting another problem.

b. Sonar equipment lineup and search procedures are used to determine watchstander training needs in the areas of functional equipment lineup and implementation of an associated sonar search plan. The various exercises selected can range from Category II for the towed array through the advanced detection exercise in Category IIIA.

FIGURE 5-19-7. Example introductory material. (Sheet 1 of 6)

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INTRODUCTION - Continued.

c. Sonar detection events will determine watchstander training needs in target detection procedures. The evaluation criteria associated with target detection will delineate specifically where training emphasis is needed.

d. The various aspects of target classification and analysis are evaluated. The evaluation criteria are specific to key desired behavioral responses. As in previous diagnostic functions the advanced level watchstander is directed to a more advanced exercise in the next serial sonar task, (i.e., tracking/evaluation for this situation) while the basic and intermediate watchstanders are assigned exercises to improve proficiency in classification.

e. Target tracking/evaluation is the final aspect of the diagnostic assessment exercise. This aspect of the exercise provides an opportunity for watchstanders to demonstrate proficiency in target tracking/evaluation If the watchstander proves proficient in tracking/evaluation, and all previous areas, training is recommended at the team level in Category IIIB.

f. In summary, the diagnostic assessment exercise evaluates watchstander training needs in the sonar tasks, establishes a baseline to implement a training program, and specifies training exercises tailored to individual watchstander proficiency levels and training requirements.

2-2.2 Exercise selection by index. Exercise selection utilizing the index is an alternate method of selecting one or more exercises for a training session This method is useful when needed training emphasis is known. With the various indexing criteria presented, specific training requirements can be readily addressed. The specific indexing criteria follow with a brief explanation of each indexing criterion:

a. The Exercise Objective specifies the detailed purpose of the particular exercise and may complement the ship's operational requirements, spelling out needed operator's proficiency in a particular situation.

b. The Exercise Scenario column provides a synopsis of conditions under which the exercise is to be performed, including the tactical situation or environmental considerations.

c. The System/Subsystem Configuration column specifies the equipment lineup, readiness condition, or mode of operation required to conduct the exercise.

d. Exercise Length is a consideration used to aid in identifying when the best time to use the exercise will exist with minimum effect on own ship evolutions.

FIGURE 5-19-7. Example introductory material. (Sheet 2 of 6)

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INTRODUCTION - Continued.

e. The Training Level (TOS) column specifies the TOS for each exercise.

f. The Difficulty Index indicates the degree of exercise difficulty relative to the appropriate TOS. It is helpful in selecting exercises appropriate to the proficiency of the operators.

4. Locally prepared exercises.

4-1. Background. This section presents procedures for local development of training exercises. This volume provides a cross section of training exercises relay for immediate use within the shipboard Training Plan. Optimal use of the training system may result in the need for additional materials beyond the limited number of training exercises provided. A portion of this need can be resolved through local training exercise development. This will accomplish two functions· tailor exercises to specific training requirements, and increase the initial exercise library.

4-2. Discussion Locally prepared exercises should make significant contributions to the effectiveness of sonar training and extend the versatility of the training system. To realize these goals, exercise development involves considerably more than just selection of a target and setup geometry derived from a rough track chart. Exercises must be carefully developed by using an organized approach based on a structure to achieve training. The exercises presented involve extensive development and background efforts For shipboard exercise development, the basic considerations are explained to aid in the meaningful development

The component parts within any exercise are

a. Exercise Objectives

b. Setup Requirements

c. Exercise Scenario and Tactical Background

d. Exercise Events

An overall consideration which determines how these components are used within an exercise, and where training should be emphasized, is the training approach. This relationship between the training approach and the component parts of an exercise will be defined in the paragraph following For uniformity, it is highly recommended that the format of exercises in this ECC be used for locally prepared exercises.

4-3. Shipboard exercise development Local exercise development provides another dimension to the training

FIGURE 5-19-7. Example introductory material. (Sheet 3 of 6)

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INTRODUCTION - Continued.

resulting in additional exercises within the library, specifically structured to address the training requirements. The procedure for developing exercises is the same as was used in the developing exercises contained in this ECG These exercises will be provided to the ECG promulgating authority for review and approval once the ship is satisfied the exercise is proper and correct

4-3.1. Discussion. The following guidelines for specific exercise development explain the training approach concept and its role in developing the components within the exercise. A comprehensive discussion of the training approach concept is contained in the Instructional and Diagnostic Methods portion of this Introduction. For each exercise a training approach must be defined which tells the controller exactly how he will administer the exercise. The exercise objective must be determined coincident with the selection of a training approach. The exercise objective defines the subject as well as the object of the training. This involves relating the training need to a specific task such as search /detection, classification, or a specific ship evolution such as Battle Stations Torpedo. Exactly what training is to be accomplished must be defined. It is not advisable to include other training aspects within the same exercise, but to concentrate the objective to the need.

4-3.1.1. Exercise setup. Once the training approach and the exercise objective have been defined, the actual exercise setup must be developed. This includes such considerations as:

a. Exercise length - Expected time to accomplish the objective.

b Target type - Three general considerations should be followed:

1. The target must complement the training objective.

2. A particular target type may be selected as part of the objective.

3. The target exists in the current library.

c. Exercise Geometry - Must incorporate considerations a. and b , ensuring that such items as target course and speed are consistent with the exercise length, the target type, and the exercise objective. The overall exercise track chart should be developed in advance and verified using a maneuvering board, plotting on DRT paper, or the FCS Position Keeper.

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FIGURE 5-19-7. Example introductory material. (Sheet 4 of 6)

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- INTRODUCTION - Continued

4-3.1.2. Exercise Scenario The tactical situation and environment provides the setting in which the training will occur, and must complement the exercise objective. In establishing the exercise environment, it must be kept in mind how the actual external environment (SVP, sea state, weather) is expected to affect the training, and what limits should be established for this.

Exercise Scenario should include:

a Assumed Op Area or location

b. Assumed ship operation or evolution

c. Work tasks for sonar operators

d. Information for operators, such as intelligence data and/or statement of objective.

4-3.1.3 Exercise events. The exercise events are the logical step-by-step method by which the exercise presents the training problem to the operators. They include:

a. Pre-Comex events which are normally used for briefing the operators on the assumed tactical situation versus the training problem, setting up equipment and trainer inputs, and performing items such as FOM calculation and range prediction.

b. Comex is the point in the exercise at which the trainer hardware function is started and target injection occurs.

c. Training Events are the principal events required to accomplish the intended training The specific number of events is based on the requirements of the training objectives

d. Finex is when the trainer is secured, and no further target injection occurs.

e. Review occurs upon completion of the training session. The specifics of this review are a function of the Training Approach for that particular exercise. Generally, the controller may review what training was considered important, how it was or was not achieved, and the approach to correct less-than-effective areas of operation. A question-and-answer period may also occur at this time

4-4. Additional exercise development approaches There are several additional approaches which may be taken to expand the usefulness of training exercises, which include alternative to complete shipboard exercise preparation. These alternatives can provide additional effective training, and include

FIGURE 5-19-7. Example introductory material. (Sheet 5 of 6)

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INTRODUCTION - Continued.

a. Expanding objectives of existing exercises, such as continuation of an exercise with the running of Battle Stations Torpedo evolution following the last planned event in the original timing of the exercise.

b. Modifying the scenario of an exercise to accomplish the intended objective in a different tactical setting.

c. Substitution of target types which provide additional search/detection and classification problems.

d. Revising existing exercise geometry, such as changing initial target range, relative bearings, angles-on-the-bow, speed, and/or depth. This may include any combination of the above parameters.

e. Any modification to an approved exercise which yields an essentially new or different exercise shall be provided to the promulgating authority for review approval, and inclusion in the exercise library.

FIGURE 5-19-7. Example introductory material. (Sheet 6 of 6)

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EXERCISE SELECTION INDEX

Exercise Number	Exercise Objective	Exercise Scenario	Sys/Subsystem Configuration	Exer. Length (Min.)	Trng. Level (TOS)	Diff. Index
S820-3	Provide training in manual and ATF passive broadband tracking on a sonar contact with a changing signal level.	Few contacts, optimum conditions.	PBB Search and Detection	45	02	Intermediate
S832-1	Provide training in PNB search and detection under normal conditions.	Few contacts, optimum conditions.	PNB Search and Detection	45	02	Intermediate
S833-2	Provide training in target classification through PNB analysis.	Optimum conditions.	Target Classification	60	02	Intermediate
S832-3	Provide training in PNB search and detection while tracking multiple contacts and own ship is maneuvering.	Multiple contacts, own ship evasion maneuvering.	PNB Search and Detection	40	02	Advanced
S838-1	Provide training in PBB search and detection with multiple equipment casualties.	Battle stations torpedo, sea state 5, multiple casualties	PBB Search and Detection	75	02	Advanced

FIGURE 5-19-8. Example exercise selection index.

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EXERCISE CONTROLLER GUIDE

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EXERCISE TITLE SHEET

EXERCISE NO	TITLE: PASSIVE BROADBAND TRACKINC USING THE CYLINDRICAL ARRAY	Sheet 1 of 7
S820-3		

OBJECTIVE.

To provide training in manual and ATF passive broadband tracking on a sonar contact with a changing signal level

1. Track a target manually using equipment controls and indicators properly.
2. Track a target in ATF using equipment controls and indicators properly
3. Detect a target course by observing all visual and aural cues.

Exercise Length (Min)	Training Level (TOS)	Difficulty Index
45	02	Intermediate

REQUIREMENTS:

1. Equipment
   a. AN/BQR-21
   b AN/BQR-T4

APPROACH

Provide the operators with sufficient time to detect, track, and evaluate each contact maneuver. If a maneuver is not detected, freeze the exercise Emphasize the specific indicators available to each operator to detect such maneuvers. If difficulty in detecting and tracking through the maneuver is observed, verify each operator has considered all factors in recognizing the appropriate contact cues.

SPECIAL INSTRUCTIONS:

The AN/BQR-15 and AN/BQR-7 operators will not participate in this training exercise. These equipments will remain dedicated to the tactical search requirement

FIGURE 5-19-9. Example exercise title sheet (informal training). (Sheet 1 of 2)

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EXERCISE CONTROLLER GUIDE

ECG-S1

EXERCISE TITLE SHEET

EXERCISE NO. S820-3	TITLE: PASSIVE BROADBAND TRACKING USING THE CYLINDRICAL ARRAY	Sheet 1 of 7
OBJECTIVE: Refer to A-130-0184, section 4, topic 1		Exercise Length (Min) 45
		Training Level (TOS) 02
		Difficulty Index Intermediate

REQUIREMENTS:	APPROACH:
1. Equipment a. AN/BQR-21 b. AN/BQR-T4	Provide the operators with sufficient time to detect, track, and evaluate each contact maneuver If a maneuver is not detected, freeze the exercise Emphasize the specific indicators available to each operator to detect such maneuvers If difficulty in detecting and tracking through the maneuver is observed, verify each operator has considered all factors in recognizing the appropriate contact cues
	SPECIAL INSTRUCTIONS: The AN/BQR-15 and AN/BQR-7 operators are not required

FIGURE 5-19-9. Example exercise title sheet (formal training). (Sheet 2 of 2)

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EXERCISE DATA SHEET

EXERCISE NO S820-3 TITLE PASSIVE BROADBAND TRACKING USING THE CYLINDRICAL ARRAY Sheet 2 of 7

TARGET TYPE Large Merchant Ship

INITIAL BEARING 020° R INITIAL RANGE 16 KYD

INITIAL COURSE 160° T INITIAL SPEED 12 KNOTS

INITIAL DEPTH Ø FT EXERCISE TIME 45 MIN

MANEUVERS T-15, contact changes course right to 315° T, T-30, contact slows to 8 knots

OBJECTIVE

To provide training in manual and ATF passive broadband tracking on a sonar contact with a changing signal level

CONSTRAINTS

For Own ship as follows

1 Steady course and speed - 4 knots or less

2 Minimum shipping traffic

3 Below periscope depth

4 OPAREA - no constraints

TRACK CHART
RANGE SCALE 2 KYDS/DIV

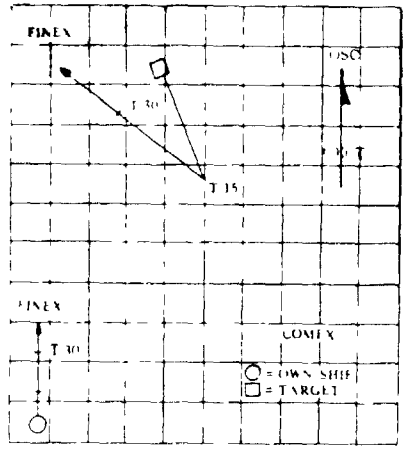

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FIGURE 5-19-10. Example exercise data sheet.

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EVENT-ACTIVITIES SHEET

EXERCISE NO. S820-3	TITLE: PASSIVE BROADBAND TRACKING USING THE CYLINDRICAL ARRAY	Sheet 3 of 7

Time	Event	Controller Activity	Operator Activity
PRE-COMEX	1. AN/BQR-T4 Setup	1. Set up the AN/BQR-T4 as follows: a. If this is a continuation of Exercise S820-2, no additional setup of the AN/BQR-T4 is required. Brief sonar operators per EVENT NO. 2 and continue with this exercise per EVENT NO. 5. b. If this is a stand-alone exercise, set up the AN/BQR-T4 as follows: (1) POWER ON (2) MODE SELECT OPERATE (3) TARGET TYPE MERSHIP (4) TARGET INITIAL RNG 16 KYD (5) TARGET DEPTH 0 FT (6) TARGET INITIAL BRG 020°R (7) TARGET COURSE 160°T (8) TARGET SPEED 12 KTS (9) TRAINING SONAR (1) BQR-21 SELECTED (2) BQR-15 NOT SELECTED (3) BQR-7 NOT SELECTED (10) EXERCISE CONTROL - depress ENTER INITIAL DATA (11) Verify EXERCISE STATUS displays are correct. c. Notify the OOD of estimated time of COMEX and deliver the Exercise Data Sheet.	1. Operators continue with previous watch routine

FIGURE 5-19-11. Example event-activities sheet. (Sheet 1 of 4)

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EVENT-ACTIVITIES SHEET

EXERCISE NO. S820-3	TITLE: PASSIVE BROADBAND TRACKING USING THE CYLINDRICAL ARRAY	Sheet 4 of 7

Time	Event	Controller Activity	Operator Activity
PRE-COMEX	2. Scenario Tactical	2. Brief the operators that a large merchant ship has been reported in our operating area. From previous experience, vessels of this type can be expected to transit through our immediate vicinity. It is believed that avoiding action is not necessary providing this contact continues enroute. This contact is to be tracked using PBB signals from the cylindrical array. The supervisor will give each sonar operator an opportunity to track and evaluate the contact.	2. Operators continue with previous watch routine.
PRE-COMEX	3. Sonar Equipment Setup	3. Direct and monitor the operators in setting up the specified hull array sonar equipment for detection, tracking, and evaluation of merchant ship contacts. a. BQR-21 will initially be used as the tracking sonar. DIMUS displays and trackers will be used to maintain tactical search The analog tracker will be used to track and evaluate the exercise contact	3. The operators and supervisor should begin the equipment lineup as follows: a BQR-21 Analog tracker in MBT, DIMUS displays set for search, DIMUS trackers unassigned. The analog tracker will be employed in a progressive search per NWP 76. Operator monitors headset and all displays and indicators.

FIGURE 5-19-11. Example event-activities sheet. (Sheet 2 of 4)

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EVENT-ACTIVITIES SHEET

EXERCISE NO. S820-3	TITLE: PASSIVE BROADBAND TRACKING USING THE CYLINDRICAL ARRAY	Sheet 5 of 7

Time	Event	Controller Activity	Operator Activity
T+0	4. COMEX	4. Start the exercise as follows: a. EXERCISE CONTROL - RUN/HALT TO RUN	4 COMEX
T+1 to T+15	5. Target Tracking and Evaluation	5. Monitor the operators during exercise ensuring they recognize the indications of target maneuvers in both course and speed. The contact has a turn count of 144 rpm, based on a TPK of 12 turns per knot, at 12 knots. If necessary, freeze the exercise to reemphasize specifics in detecting the target's maneuver. a. BQR-21 - PBB tracking and detection of target maneuvers. Each operator should be given an opportunity to track and evaluate the target.	5. Both operators detect and recognize the merchant ship contact. Each operator reports the detection and contact evaluation as merchant vessel with bearing, bearing drift, and initial turn count to the supervisor. Each operator will track the target as follows: a Shift sonar tracking to ATF as soon as signal is adequate. If not in ATF, BUZZ bearings. Make use of all controls, indicators, and aural/visual cues to maintain a smooth track.
T+15	6. Target Course Change	6. Insert new Target Course as follows:	6. Operators recognize course maneuver and report that contact appears to have changed course to the right. Their evaluation is based on recognition and understanding of the following contact cues

FIGURE 5-19-11. Example event-activities sheet. (Sheet 3 of 4)

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EVENT-ACTIVITIES SHEET

EXERCISE NO. S820-3	TITLE: PASSIVE BROADBAND TRACKING USING THE CYLINDRICAL ARRAY		Sheet 6 of 7
Time	Event	Controller Activity	Operator Activity
		a. TARGET COURSE - 315°T b. EXERCISE CONTROL - UPDATE DATA, depress Target is steady on new course by about time T+20. Observe operators during contact maneuver. Provide them information regarding parameters which indicate the maneuver. Do not allow the total maneuver to proceed unnoticed. Timely feedback in this situation is important in developing the technique of PBB target tracking (NOTE: This should also be done during contact speed change.)	a. Change in signal level. b. Aural change of contact aspect heard in headset. c. Change in rpm. d. Change in character of propeller sounds but rpm remaining the same.
T+30	7. Target Speed Change	7. Target slows, insert speed change as follows: a. TARGET SPEED - 8 KNOTS b. EXERCISE CONTROL - UPDATE DATA, depress	7. Operators recognize speed change and report contact appears to have slowed down and new turn count is 96 rpm. Their evaluation is based on the following contact cues. a. Change in character of propeller sounds with decrease in rpm. b. Change in signal level and bearing rate.

FIGURE 5-19-11. Example event-activities sheet. (Sheet 4 of 4)

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MASTER MATERIALS LIST

Course: Submarine Ocean Acoustic Training

Class Size: As per the Formal Schools Catalog

A. TEXTS

Doc. No.	Description	Per Tr.	Per Cont.	Per Cl.
ECG-S1	Submarine Ocean Acoustic Training Exercise Controller Guide. Prepared by Commander Submarine Force, U.S. Atlantic Fleet.		1	

B. REFERENCES

Doc. No.	Description	Per Tr.	Per Cont.	Per Cl.
NWP 76	Submarine Sonar Employment Manual		1	

C. EQUIPMENT

Description	Per Cl.
AN/BQR-21	1
AN/BQR-24	1

D. OTHER

Description	Per Tr.	Per Cont.	Per Cl.
None			

(1)

FIGURE 5-19-12. Example master material list.

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PROFILE ITEM-TO-EXERCISE OBJECTIVE ASSIGNMENT CHART

Table	Item/ Subitem	Trng Level/ TOS	ECG Vol	Exercise No	Exer Obj
820	2-1-1a	01		S820-3	1
	2-1-1a	02			1, 2
	2-1-1b	01			1
	2-1-1b	02			2, 3
	2-1-1c	01			2
	2-1-1c	02			2, 3
	2-1-1d	01			2
	2-1-1d	02			2, 3
	2-1-1e	02			3
	2-1-1f	02			3
	2-1-1g	01			3
	2-1-1g	02			3
	2-1-2	01			3
	2-1-2	02			3
832	2-1-1a	01		S832-1	1
	2-1-1a	01			1
	2-1-1a	02			1, 2
	2-1-1b	01			1
832	2-1-1b	02			2, 3
	2-1-1c	01			2, 3
	2-1-1c	02			2, 3
	2-1-1d	02			3
	2-1-1e	02			3
	2-1-2a	01			3
	2-1-2a	02			3, 4
	2-1-2b	02			3, 4
	2-1-2c	02			3, 4
	2-1-3a	02			3, 4
	2-1-3b	02			3, 4
	2-1-3c	01			3, 4
	2-1-3c	02			4, 5
	2-1-3d	01			2
	2-1-3d	02			2, 3
	2-1-3e	02			4, 5
	2-1-3f	02			4, 5

(3)

FIGURE 5-19-13. Example profile item-to-exercise objective assignment chart.

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EXERCISE CONTROLLER GUIDE			ECG- VOLUME
EVENT-ACTIVITIES SHEET			
EXERCISE NO.	TITLE:		Sheet of
Time	Event	Controller Activity	Operator Activity

FIGURE 5-19-14. Example exercise sheet (blank).

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5 20 INSTRUCTOR UTILIZATION HANDBOOK FOR SIMULATION EQUIPMENT

5 20 Instructor utilization handbook for simulation equipment The instructor utilization handbook (IUH) for simulation equipment provides instruction to operate simulation equipment so it may be used as a training aid in the presentation of a specific course This section describes the format, content, and development guidelines for IUHs as specified in the military standard and in DI-H-7076

5 20 1 Use The IUH for simulation equipment is designed for instructors and training officers to aid them in the use of specific simulation equipment in a designated course of instruction

5 20 2 Elements The elements of the IUH for simulation equipment are as follows

(a) Front Matter
(b) Section I, Introduction
(c) Section II, General Description of the [Simulation Equipment]
(d) Section III, [Simulation Equipment] Operating Procedures
(e) Section IV, Exercise Objectives
(f) Section V, Training Outline
(g) Section VI, Training Exercises
(h) Section VII, Formulation of New Training Exercises
(i) Section VIII, Reference and Text Materials
(j) Appendix A. Supplementary Information

5 20 3 Development process The development process of the IUH for simulation equipment can best be explained first by providing an overview of the work-flow process used in developing the IUH, and second, by presenting a detailed description of how to develop each section of the IUH including examples

5 20 3 1 Overview of work-flow process Listed below is the suggested sequence of events for developing an IUH

(a) Establish contact with the subject-matter experts for the subject simulator (i e , design engineers, training analysts, or other technicians), and discuss the development effort with them They may have material that could be used in the IUH or as reference material for its development
(b) Obtain and review any engineering reports, design/equipment specifications, and analysis reports that pertain to the simulation equipment for which the IUH is being developed Verify that the information obtained from these documents is current and not subject to change Gather the necessary data and reference material listed below (no particular order)

    (1) Design specifications for the simulation equipment

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(2) Copy of the contract
(3) Appropriate data item description
(4) Appropriate military standard
(5) Appropriate military specification(s)
(6) Simulation equipment drawings and schematics
(7) Logistic support analysis data
(8) Technical documents

(c) Using the appropriate data item description, military standard, and military specifications develop a draft outline to establish format and major topics Provide the subject matter experts with a copy for their technical content review/approval

(d) After approval of the IUH outlines, acquire some hands-on time with the actual equipment and learn its operation The primary objective of the hands-on time is to become familiar with the various components and to see how they function, and to learn the steps involved in the operation of the equipment

(e) Using the appropriate data, reference material, and knowledge gained from 5 20 3 1 (a) through (d), develop section II, General Description of the (Simulation Equipment) The actual name of the simulation equipment will be used vice Simulation Equipment As a precaution, consult the design engineers to ensure that no changes have been made or are pending

(f) Start development of sections IV through VII (Exercise Objectives, Training Outline, Training Exercises, and Formulation of New Training Exercises) To accomplish this, information from a job task analysis is required For the more complex systems, a job task analysis will normally be completed prior to or sometimes concurrently with developing the IUH If a formal job task analysis does not exist or is not planned, an informal job task analysis must be conducted to determine the required tasks and skills information required to develop sections IV through VII of the IUH

(g) Develop section III, (Simulation Equipment) Operating Procedures using the information and references acquired in 5 20 3 1 (f) The actual name of the simulation equipment will be used vice simulation equipment However, an important source of information for this section is actual hands-on experience In situations where actual performance of various tasks is not practical, information will have to be collected from analysis data available in the design specifications, task and skill analysis reports, or other logistic support analysis information sheets

(h) After completing sections III through VII, list the reference required to produce those sections Consider the references that will be used to develop the remaining sections (front matter, section I, introduction, and appendix A, supplementary information)

(i) Develop appendix A, supplementary information, based on the information collected in 5 20 3 1 (a) through (h)

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(j) Perform a technical edit of the draft IUH
(k) Conduct a "user test" by having the trainees read the IUH and perform the tasks on the simulator The trainees used in the "user test" must be selected to reflect the true target audience for which the IUH is intended
(l) Acquire the art work for the IUH This art work includes drawings, schematics, graphs, fold-outs, and charts Any special art work that will require a great amount of time to develop must be started at the earliest opportunity It is possible that while reviewing other documents associated with the simulator and while simultaneously completing 5 20 3 1 (a) through (h), there may be some art work material that could be used in the IUH
(m) Assemble the draft IUH and proof read the document It usually takes several readings to adequately reduce the errors Compare the art work with the equipment and the IUH test to ensure compatibility
(n) Before proceeding any further, perform a final technical edit to include the references When the technical edit is completed and the draft IUH is satisfactory, finish the final sections of the IUH (front matter, section I, introduction, and appendix A, supplementary information)
(o) Prior to the final production, perform quality assurance/quality control checks on a word processor (if available) The art work will normally be on separate pages but can be edited at the same time

5 20 3 2 IUH development This section provides directions for developing the IUH The development procedures must be a sequence to parallel an assembled IUH and not necessarily the actual development process (i e , the front matter section is listed in the IUH first and will be described first but probably will be written near the end of the development process) The intent of the examples in this text is to provide guidance in establishing the format for the information required in each section The subject matter in each section is comprised of examples which are not intended to be compatible or related to the subject matter of the examples in other sections

(a) Security requirements Each IUH must bear the highest security classification demanded by its contents Classification must be in accordance with DoD Instruction 5220 22-M or OPNAVINST 5510 1, and applicable to the contracting activity instructions

5 20 3 3 Front matter Provides information relevant to the identification of the IUH contents, changes, and hazard warnings of the equipment

(a) Cover The cover must include the type of publication, title of the publication, (e g , "INSTRUCTOR UTILIZATION HANDBOOK"), volume number, title of the simulation equipment, name of the agency preparing the IUH, contract number, and the publishing authority, (e g , "Published by Direction of Commander, Naval Training Systems Center") Also included on the page is the IUH number (i e , P-1111)

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in the upper right corner and the date of publication in the lower right corner (see figure 5-20-1)

(b) List of effective pages The list of effective pages identifies the change status of all pages in the volume It has basically two columns, which are repeated across the page the first column is labeled, "Page No " and is used to identify the pages of the IUH, the second column is labeled, "Change in Effect" and identifies the status of each page in the volume as official changes are inserted into an IUH The list of effective pages is included for each volume in the set (see figure 5 20 2)

(c) Letter of promulgation The letter of promulgation is normally provided by the contracting activity It is located only in the first volume of a multi-volume IUH (see figure 5-20-3)

(d) Change record The change record provides space for recording information about each official change inserted in the instructor guide The change record identifies the change number, the description, the person who made the change, and the date the change was entered In a multivolume IUH, a change record is included for each volume in the set (see figure 5-20-4)

(e) Hazard awareness notice page This page advises the instructor or training officer of the personnel and equipment safety precautions as well as explaining how to report hazards not included on this page (see figure 5-20-5) It has four parts

(1) Documentation statement The documentation statement identifies documentation such as technical manuals and safety notices Within these technical manuals and safety notices are contained specific safety precautions and preventive measures that apply to a given equipment or procedure

(2) General information statement The general information statement identifies in a broad sense the hazards that exist, whether to persons or to equipment, when working with a given equipment (e.g , "This equipment operates on high voltage which is extremely dangerous and may be fatal ")

(3) Specific precautions statement The specific precautions statement identifies specific measures to take in order to meet the general information statement (e g , "Avoid contact with all red terminal leads These have voltages in excess of 10,000 volts " or "All equipment will be tagged out in accordance with ")

(4) Safety summary The safety summary includes all general precautions that are not related to any specific procedure and therefore do not appear elsewhere in the publication They are usually general in nature and may apply to more than one procedure during operation of the simulation equipment

(5) Hazard report statement This statement identifies procedures

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for reporting hazards not included in the hazard awareness notice

(6) No hazards There are situations where no hazards exist, except perhaps for paper cuts For these, the hazard awareness notice will state· "There are no hazards associated with the course " and will include a hazard reporting statement

(f) Foreword The foreword must contain the purpose and scope of the IUH as well as any other information required by the technical content specification (see figure 5-20-6).

(g) Definitions When necessary, a list of abbreviations and symbols may be included.

(h) Table of contents. The table of contents is developed from the approved topical outline and lists of the front matter, parts, sections, topics, reference material, and the page in the IUH on which each is located. The table of contents for the first volume of a multivolume set contains a complete listing of the contents of all volumes in the set (see figure 5-20-7). The next volumes contain only the contents of the respective volume.

(i) List of illustrations. Publications containing 10 or more illustrations (including charts and graphs assigned figure numbers) will have a list of illustrations showing the figure number, title, and page number of each illustration The security classification, if any, of illustration titles should also be indicated Each volume in an IUH set will contain a complete list of the illustrations contained in all volumes in an IUH set (see figure 5-20-8).

(j) List of tables The rules for developing the list of tables are basically the same ones that apply for developing the list of illustrations, refer to 5.20 3 3 i (see figure 5-20-9)

5 20 3 4 Section I, introduction. This section provides the user with the purpose of the simulation equipment and the intended use of the IUH It also explains how the IUH will aid the instructor to effectively and efficiently operate and employ the simulation equipment during training exercises and missions The primary sources of information for developing the introduction are the technical documents (i e., trainer engineering reports), Integrated Logistic Support Plan (ILSP), and the original proposal documents The purpose of the simulation equipment and intended use of the IUH is known prior to developing the IUH, but it is recommended that the introduction section be developed towards the latter stages of development when a better understanding of the IUH and simulation equipment is assured (see figure 5-20-10)

5 20 3 5 Section II, general description of the [simulation equipment] Obtain and review the necessary reference documents (see 5 20 3 1 (b)) Of primary importance will be the design specification documents, drawings, and reports and any technical documents that describe the simulation equipment These documents should be reviewed with the design engineers and other subject-matter experts to ensure an adequate understanding of the system and subsystem,

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to include its components, capabilities, limitations, functions, and characteristics prior to beginning development It should also be noted that the lack of technical documentation may necessitate a requirement to generate the needed information through further analysis It is also recommended that prior to beginning development, some time should be spent actually working with the simulation equipment Figure 5-20-11 provides an example of a general description section and its main topics and subtopics The information, materials, and knowledge gained in this step will be used to accomplish the remaining tasks in this section This section contains the following elements

(a) General description of the simulation equipment Obtain or develop a general description of the simulation equipment that includes its major assembly, subcomponents, and modes of operations For each, there should be a brief statement that provides a description/purpose

(b) A list or pictorial depiction of all systems, subsystems, etc , included with the simulation equipment Obtain or develop a list and pictorial depiction of all systems and subsystems included with the simulation equipment This will normally consist of drawings that correspond with the descriptive paragraphs and tables listing all the major assemblies The majority of this material will already be available in the existing design specifications and technical documents Should there be a need to develop any new art work, it should be requested early in the development cycle to ensure that it will be available to meet the ready-for-training date

(c) A list of design capabilities of the simulation equipment Obtain or develop a list of design capabilities of the simulation equipment This information should come from the system design specifications and analysis data Should this information not be available in existing documents, it will probably have to be accomplished using design engineers and other subject-matter experts

(d) A list of specific simulation equipment capabilities Obtain or develop a list of specific simulation equipment capabilities Again, this data will come from the design specification and technical documents or the design engineers themselves The information in this requirement will differ slightly from that in the previous step The capabilities mentioned in the prior step deal with the system as a whole, while the capabilities listed here should be directed at the individual major components of the simulation equipment

(e) A list of limitations of the simulation equipment Obtain or develop a list of limitations of the simulation equipment As in the previous steps, the information needed for this requirement will probably be located in the design specification and technical documents This data should then be verified with the subject-matter experts

(f) A list of malfunctions that can be introduced Obtain or develop a list of malfunctions that can be introduced This information should be found in the equipment design specification documents If this

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data is not available contact the subject-matter experts, such as the design engineers and analysts, to produce these requirements

(g) A description of the operating parameters of the simulated systems, environment, etc Obtain or develop a description of the operating parameters of the simulated system, environment, etc The prime purpose of this requirement is to indicate to what extent the trainer simulates the actual item of equipment. The information presented here should include the environmental conditions in which the simulation equipment is required to operate Such requirements might be electric power (i e , 220V), space needed to operate (i e , 20 x 40 foot classroom, etc), operating climate (i e , humidity, temperature range, etc.). As in the previous requirements, this information should be in the design specification or technical documents pertinent to the simulation equipment

(h) Personnel aspects to be considered for the students being trained by use of the simulation equipment Obtain or develop the personnel aspects to be considered for the students being trained by use of the simulation equipment. The purpose of this information is to establish the pre-training or operation requirements for the students and instructors or other personnel involved with using or training with the simulation equipment It merely describes the typical student and instructor who will be using the IUH and simulation equipment The data used to develop these prerequisite requirements will, again, be the equipment design specification and technical documents As in the previous steps, if the information is not available in these documents, an organized effort will have to be made to generate this data

5 20 3 6 Section III, [simulation equipment] operating procedures The operating procedures section identifies the step-by-step standard procedures for placing the equipment in a power-on condition, checking the equipment to ensure it is operating properly, setting up exercises and operating the equipment during the exercises, and placing the equipment in a power-off condition (see figure 5-20-12).

Obtain and review the necessary documents (see 5.20.3.1 (b)) The primary reference for developing the input to this section should be found in the logistic support analysis report data sheets In cases where such reports are not available, actions should be taken to generate the needed data through an informal task and skill analysis In some situations, an operator's manual may exist and could also be used Other references that will probably be needed are the design specification documents and any training test reports that may be available In addition, it is suggested that prior to or during the writing of this section, some time should be spent operating or observing the operation of the equipment. This will ensure a better understanding of the simulation equipment and its operating procedures.

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This section must be prepared so it can be reproduced in its entirety as operating instructions, separate from other parts of the IUH. As such, it must not make reference to any other section of the IUH Classified materials must be included only if necessary to provide complete operating instructions This section has the following elements

(a) Performance characteristics A summary of the configuration and performance characteristics of the simulation equipment must be presented This must include the performance limits of the system, environmental factors, and targets or other operational equipment being simulated by the simulation equipment

(b) Functional description A description of the simulation equipment instructor controls and displays used for training, and a description of the trainee station(s) and their controls and displays must be provided Each control and display must be keyed to a picture of the actual equipment to provide easy identification of the items A functional description of each control and display must be provided Controls and displays must be covered as related groups or major panels/sections The functional description of each simulation equipment control and display must depict the status or malfunction of a particular system or equipment, and a detailed description provided beside each indicator as to what is being and what is not being depicted, affected, displayed, or is exclusive of other indicators and controls

(c) Operational instructions Complete step-by-step instructions must be listed which provide

(1) Simulation equipment preparation considerations/assumptions
(2) Procedures for placing the simulation equipment in a power-on/turn-on condition.
(3) Procedures for checking the simulation equipment to ensure that it is operating properly
(4) Procedures for "loading" the simulation equipment, if applicable
(5) Procedures for setting up problems and generating training problems in advance of the simulation equipment session
(6) Procedures for operating the simulation equipment during exercises
(7) Procedures for placing the simulation equipment in a power-off condition

d Controls to be used only by experienced maintenance personnel When appropriate, a tabular list of controls which are not to be disturbed by anyone other than experienced maintenance personnel must be provided

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e. Daily readiness tests. List and describe each daily readiness test provided with the capability of the simulation equipment Delineate those tests that the instructor may use and enter to assure the proper functioning of the simulation equipment in its complete operational modes and environment Describe in detail how to set up, run, and diagnose the results and readouts of the daily readiness tests

5 20 3 7 Section IV, exercise objectives The objectives specify the skills and knowledge of a job related to an equipment, subsystem, system, task/function The objectives should be positive statements of a behavior, limiting conditions, and standards of performance which are to be achieved by the trainee The objectives identify under what conditions the behavior or knowledge will be obtained, the behaviors to be performed or knowledge to be attained, and the standard to which the behavior will be accomplished The objectives are derived through the use of (PPP) and the (TPS) or by performing a job task analysis (TAS) and are constructed as a prerequisite to any further step in the IUH development process.

(a) Important considerations

(1) Trainee background

(a) Previous training
(b) Experience
(c) Naval Enlisted Classification (NEC)
(d) Naval Officer Billet Classification (NOBC)

(2) Tactical system/subsystem/equipment capabilities
(3) Training equipment capabilities and constraints
(4) Operating guidelines and current tactical doctrine
(5) Training requirements

(b) Development of PPP/TPS based exercise objectives

(1) Refer to the appropriate TPS documentation and select the TPC for the subject NEC(s) or NOBC
(2) Refer to the table assignment chart for IUHs which support formal curricula or the data provided by the contracting activity and determine the PPP applicability Refer to the PPP table index and TOS applicable to the IUH to determine the titles for the applicable PPP tables
(3) Use the appropriately coded TLA for the PPP determined in 5.20 3 7 (b) (2) and determine the applicable PPP items and subitems In those cases where a TLA has not been constructed, the contracting activity will provide guidance on the selection of both the applicable PPP item to be selected and the applicable TOS to be applied

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(4) Use the TOS from the applicable task set group, the titles of the applicable PPP, the stems of the applicable PPP items and subitems, and those factors described in 5 20 3 7 (a) to prepare the exercise objectives
(5) Using all information pertinent to the unique requirements of the IUH being developed, consolidate the exercise objectives just developed into a course learning objective and into sets of objectives which logically establish the objectives for a single exercise

(c) Development of non-PPP/TPS based exercise objectives

(1) Development of non-PPP/TPS exercise objectives is based on a thorough analysis of all available information as discussed in Section 5 2
(2) Obtain or develop a complete listing of all behaviors (skills/tasks) and knowledge items required by the trainee to understand and utilize the training system/equipment Behaviors may be obtained from a previously performed task and skill analysis or developed by performing a task and skill analysis The behaviors must specify such things as assemble, adjust, repair, perform, etc
(3) Obtain or develop the conditions under which each of the respective skills and knowledge items must be performed Conditions may be obtained from a previously performed task and skill analysis or developed by performing a task and skill analysis The conditions must specify such things as available equipment and its condition, available documentation, environmental setting, etc
(4) Obtain or develop the standards to which each of the respective skills and knowledge items must be performed Standards may be obtained from a previously performed task and skill analysis or developed by performing a task and skill analysis. The standards must specify any measurable element such as time limitations, accuracy of task completion, etc
(5) Combine the assembled behaviors or knowledge items, their respective conditions, and standards into narrative statements The statements must be concise, easy to read, and free from vague or ambiguous terminology.
(6) Arrange the objectives in the manner shown on figure 5-20-13

5 20 3 8 Section V, training outline This section outlines the training exercise to be presented in this IUH It must identify topic titles, subject titles, and the allocation of instructional times (classroom, practical application) The outline is developed in the following manner

(a) Obtain a complete listing of all training exercises

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(b) Arrange the various training exercises into topic presentations The exercises must be arranged so that the topic presentation builds from the simple to the more complex to aid in trainee comprehension

(c) Identify practical application (laboratory) times and the classroom times required to present the topics If not already identified during scenario exercise generation, the times can be established by conducting a "dry-run", "validation", or "piloting" of all practical application presentations.

(d) Organize the various subject areas into related topic areas which can be easily understood and taught by the instructors

(e) Arrange the topics, topic items, classroom times, practical application times, and total times in the manner shown on figure 5-20-14

5 20 3 9 Section VI, training exercises Training exercises are topic presentations presented in the practical laboratory setting They consist of topic discussions which utilize the actual training system/equipment to reinforce the subject under discussion They assist the instructor in the presentation of instruction and afford the trainee hands-on experience using the training system/equipment The training exercises consist of three types pre-training diagnostic exercises, training exercises, and post-training diagnostic exercises (see figure 5-20-15)

(a) Pre-training diagnostic exercise development The pre-training diagnostic exercise is a performance type examination designed to evaluate trainee's knowledge and skills The instructor uses the pre-training diagnostic exercises to evaluate the trainee's level of knowledge or skill prior to beginning training This allows the instructor to place the trainee in the appropriate state of the training program or to provide remediation prior to course convening (see figure 5-20-16) The exercise is performed in the laboratory The exercise is developed in the following manner

(1) Obtain or develop the objectives which the trainee is expected to achieve by the end of the course of instruction The development of objectives is explained in 5 20 3 7 (b) and 5 20 3 7.(c)

(2) Upon approval of the training requirements, evaluate the objectives and determine how the objectives can be taught using the training exercise as the means to accomplish the training

(3) Create a method to evaluate the trainee's knowledge and performance of the behaviors identified by the objectives The method of scoring the trainee's knowledge and performance skills could be a checklist to show that the trainee performed each step of a procedure correctly or that the trainee successfully produced the end result required of a procedure

(4) Create an exercise, using the training system/equipment, which can be used to effectively evaluate the trainee's mastery of the

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objectives The exercise should be based primarily on the performance of some procedure It should also realistically represent those skills and knowledge required by the objectives An alternate pre-training diagnostic exercise should also be created

(5) Develop the title for the exercise

(a) Determine the intent of the exercise
(b) Develop a suitable title which is accurate and brief

(6) Assign a number to the exercise

(7) Develop a statement indicating the purpose of the exercise The statement should be brief and to the point

(a) Determine the intent of the exercise in terms of the expected trainee outcome (paraphrasing of the objectives) and the benefit of the exercise
(b) Write the purpose in the narrative form

(8) Develop a description of the problem The description must be concise and completely explain all the information needed by the trainee

(a) Determine the intent of the exercise
(b) State the problem in a brief narrative paragraph The problem description should explain the set of circumstances which exist in the upcoming scenario and what the student is expected to do in order to resolve the problem Examples of circumstances could be wartime/peacetime situations, geographical locations, environments, and familiarization with the training system/equipment Trainee expectations could paraphrase the objectives and could include such things as perform a reconnaissance mission, destroy enemy locations, perform pre-flight procedures, etc.

(9) Develop a time limit required for the completion of the exercise The time limit must allow for a realistic performance time

(10) Identify how many instructors and trainees are required for the conduct of the exercise Exercises may be designed for one trainee or for a team effort, depending on the course mission

(a) Examine the intent of the exercise
(b) Determine types and quantities of personnel required for the performance of the training exercise
(c) Record the results

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(11) Develop the problem set-up The problem set-up must identify all the training system/equipment conditions (e.g., power on condition, computer initialization, exercise parameters to be entered) which must be performed by the instructor prior to exercise start

(a) Examine the intent of the exercise.
(b) Perform and record all the steps, beginning to end, required of the instructor in setting up the conditions of the training system Examples of problem set-up are power condition, initialization of the training system/equipment, and the inputting of the various parameters required for the problem Problem set-up instructions may be determined as a result of the development of the exercise scenario

(12) Develop a briefing outline The briefing must identify that information which the instructor has to tell the trainee concerning the conduct of the exercise

(a) Determine the intent of the exercise scenario.
(b) Identify those items which are required by the trainee for the performance of the exercise The briefing should discuss such things as exercise constraints or limitations, time limitations, what has to be performed, the environment to be encountered, enemy forces and their positions, as well as friendly forces and their positions.

(13) Develop the exercise scenario. The scenario must identify all the sequential steps required of the instructor

(a) Obtain or develop the course objectives
(b) Determine which objectives lend themselves to the development of the exercise scenarios
(c) Analyze those objectives in terms of what information must be presented, what skills must be demonstrated by the instructor, and what the trainee must do in response to instructor prompting
(d) Record, in sequence, the knowledge and skills which must be presented by the instructor
(e) Perform and record all the procedural steps, beginning to end, required of the instructor in the presentation of the subject matter. Each and every step should be performed on the training system/equipment to ensure that the procedure is accurate Some of the procedural steps may qualify as problem set-up steps If this is the case, outline those steps under problem set-up The procedural statements should be made as short as possible and free from vague or ambiguous terminology

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(14) Develop the debriefing outline The debriefing must list the major points of the exercise which the instructor must address (e g , the evaluation of the trainee/team performance, a critique of the trainee/team performance, problem areas observed during the exercise, and praise for good performance)

(a) Determine the important aspects of the exercise scenario Important aspects could be such factors as success or failure of specific procedural steps, alternative ways to handle certain situations, and ways in which to improve their skills
(b) Outline these aspects Indicate that the instructor should ask for any questions concerning the exercise

(15) Arrange the information in the manner shown on figure 5-20-16

(b) Training exercises development The training exercises present various scenarios designed to instruct the trainee in those skills and knowledge items required of the objectives The training exercises are used by the instructor as the means for presenting the subject matter necessary for trainee mastery of the knowledge and skills required by the objectives (see figure 5-20-17) The training exercises are developed in the following manner

(1) Obtain or develop the objectives the trainee is expected to achieve by the end of the course of instruction The development of objectives is explained in 5 20 3 7 (b) and 5 20 3 7 - (c)
(2) Select the objectives which are suitable for use, from the training exercises, as the means of presenting the information
(3) Write the title for the training exercise
(4) Assign a number to the exercise Exercises should be numbered sequentially
(5) Develop the purpose of the training exercise

(a) Determine the intent of the exercise in terms of the expected trainee outcome (paraphrasing of the objectives) and of the benefit of the exercise
(b) Write the purpose in narrative form

(6) Develop the problem description for the training exercise

(a) Determine the intent of the exercise
(b) Write in a brief narrative paragraph what the problem is The problem description should explain the set of circumstances which exist in the upcoming scenario and what the trainee is expected to do in order to resolve the problem

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Examples of circumstances could be wartime/peacetime situations, geographical locations, environments, and familiarization with the training system/equipment Trainee expectations could paraphrase the objectives and could include such things as perform a reconnaissance mission, destroy enemy locations, and perform pre-flight procedures

(7) Assign the amount of time for the exercise The time should be realistic for the performance of the exercise

(8) Develop the personnel requirements of the training exercise The personnel requirements identify, to the instructor, what types of personnel and quantities of personnel are required to perform the exercise.

(a) Examine the intent of the exercise
(b) Determine what types and quantities of personnel required for the performance of the training exercise
(c) Record the results

(9) Develop the problem set-up. The problem set-up identifies to the instructor what the condition of the training system/equipment must be prior to beginning the exercise

(a) Examine the intent of the exercise
(b) Perform and record all the steps, beginning from the very start, required of the instructor in the setting up of the conditions of the training system Examples of problem set-up are power condition, initialization of the training system/equipment, and the inputting of the various parameters required for the problem Problem set-up instructions may be determined as a result of the development of the exercise scenario.

(10) Develop the briefing outline. The briefing is a short outline of any special information or instructions given by the instructor to the trainee.

(a) Determine the intent of the scenario exercise
(b) Identify those items which are required by the trainee for the performance of the exercise The briefing must discuss such things as any exercise constraints or limitations, time limitations, the behavior that has to be performed, the environment to be encountered, and enemy forces and their positions, as well as friendly forces and their positions.

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(11) Develop the exercise scenario The exercise scenario is a step-by-step procedure to be followed by the instructor for the performance of the exercise scenario The procedure informs the instructor of what he must do, how he must do it, when he must do it, and what he must have the trainee do

(a) Obtain or develop the objectives for the course of instruction
(b) Determine which objectives lend themselves to the development of the exercise scenarios
(c) Analyze those objectives in terms of the information that must be presented, the skills that must be demonstrated by the instructor, and the response of the trainee to instructor prompting
(d) Record, in sequence, the knowledge and skills which must be presented by the instructor
(e) Perform and record all the procedural steps, from beginning to end, required of the instructor in the presentation of the subject matter Each and every step should be performed on the training system/equipment to ensure that the procedure is accurate Some of the procedural steps may qualify as problem set-up steps If this is the case, outline those steps under problem set-up The procedure statements should be made as short as possible and free from vague or ambiguous terminology

(12) Develop the debriefing outline The debriefing outline provides the instructor with the short outline of which aspects of the exercise scenario should be discussed The debriefing involves a discussion of the most important aspects of the exercise, a discussion of any problems encountered during the performance of the training exercise as well as praise for the successful completion of the exercise

(a) Determine the important aspects of the exercise scenario Important aspects could be such factors as success or failure of specific procedural steps, alternative ways to handle certain situations, ways in which to improve their skills, etc
(b) Outline these aspects and also indicate that the instructor should ask for any questions concerning the exercise

(13) Arrange the training exercises components in the manner shown on figure 5-20-17

(14) Arrange the training exercises in an order which builds from the simplest level of skill accomplishment to the most complex level of skill accomplishment

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c. Post-training diagnostic exercise development The post-training diagnostic exercise is the means by which the trainee's knowledge and performance of the objectives is accomplished. The post-training exercise should closely approximate the same complexity, length, content, and scoring characteristics as the pre-training diagnostic exercise. The instructor uses the post-training diagnostic exercise to determine whether or not the trainee has mastered the subject matter presented during conduct of the training exercises The results of the post-training diagnostic exercise determine the need for remediation in all or part of the course of instruction The exercise is performed in the laboratory using the training system/equipment (see figure 5-20-18) The post-training diagnostic exercise is developed in the following manner

(1) Obtain or develop the objectives which the trainee is expected to achieve by the end of the course of instruction
(2) Evaluate the objectives and determine which ones can best be taught using the training exercise as the means to accomplish the training
(3) Create a method to evaluate the trainee's knowledge and performance of the behaviors identified by the objectives The scoring of the trainee's knowledge and performance skills should be a checklist showing that the trainee performed each step of a procedure correctly, or that the trainee successfully produced the end result required of a procedure.
(4) Create an exercise, using the training system/equipment, which can be used to effectively evaluate the trainee's mastery of the objectives. An alternate post-training diagnostic exercise should also be created.
(5) Develop the post-training exercise in the same manner as explained in 5 20 3 9 (a) Arrange the post-training exercises components in the manner shown on figure 5-2-18

5.20 3.10 Section VII, formulation of new training exercises The formulation of new training exercises consists of the descriptions and instructions on how to modify existing training exercises or to generate new training exercises The formulation of new training exercises is used by the instructor to develop new training exercises or to modify existing training exercises It also provides the instructor with insight into the generation of realistic exercise (see figure 5-20-19) The formulation of new training exercises is developed in the following manner:

(a) Obtain or develop the procedures required to generate training exercises This step may require assistance from engineers assigned to the training system/equipment or from technical documentation developed in support of the training system/equipment The procedures should outline such things as computer initialization, meth-

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od/sequence of inputting the various data, valid input parameters, how to recover from mistakes in the performance of the procedures, and the effect(s) that the various inputs have on the overall exercise

(b) Verify all the procedures on the actual training system/equipment

(c) Write the procedures in a step-by-step manner, with any information deemed important for explaining an aspect in a procedural step that is peculiar or difficult to understand

(d) Develop narrative paragraphs, informing the instructor of the aspects of the exercise, which are not related to the inputting of information into the computer (e g , tactical considerations, realistic operational conditions, friendly and enemy forces) The instructor should be made aware of the fact that his expertise is a key factor in the development of the exercise. The exercises should represent as realistic a setting as possible It is up to the instructor to generate and replicate that setting

(e) Arrange the information in the manner shown on figure 5-20-19

5 20 3 11 Section VIII, reference and text materials. Reference and text materials is a complete listing of all reference and text documentation containing information essential for an understanding of training system/equipment operation and utilization These materials include maintenance handbooks, texts, manuals, commercial computer documentation, and other documentation, and are used by the instructor and to assist in identifying those documents which will provide sources of data (see figure 5-20-20) The reference and text materials section is developed in the following manner

(a) Collect and review all available handbooks, texts, manuals, etc The collection and review of the documents is made as early in the development of the IUH as possible to aid in the determination of the knowledge and skills required for instructor/student understanding and utilization of the training system/equipment.

(b) Determine which texts have information necessary for the instructor's and trainee's understanding and utilization of the training system/equipment

(c) Record the document title, document number, name of organization who prepared the document, volume, part, and revision number (if any), date of publication and applicable page numbers

(d) Arrange the listing of the texts in the manner shown on figure 5-20-20

5 20 3.12 Appendix A, supplementary information This appendix is a listing of those documents which contain nice-to-know information This information may provide background, amplifying information, or relevant data which may contribute to a better understanding of the training system/equipment, however,

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it is not essential (see 5-20-21) Appendix A supplementary information is developed in the following manner

(a) Review the subject matter content to be presented in the course of instruction
(b) Determine what areas of the subject are candidates for any supporting, amplifying, or supplementary information
(c) Record the document title, document number, name of organization who prepared the document, volume, part, or revision number (if any)
(d) Arrange the documents in the manner shown on figure 5-20-21

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(CLASSIFICATION)

(CHANGE)
NAVTRADEV P-1111 (VOLUME)
(REVISION)

INSTRUCTOR UTILIZATION HANDBOOK

AN/CDE-22(V) UNDERWATER SENSOR SYSTEM OPERATOR

BASIC SONAR OPERATOR/BASIC DIAGNOSTIC (BSOT/BD) TRAINER

DEVICE 2B222

PART NO 33C444444-5555

Smith Aircraft
D9876-66-E6789

Published by Direction of Commander, Naval Training Systems Center

1 JULY 1985

(CLASSIFICATION)

FIGURE 5-20-1. Example IUH cover

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LIST OF EFFECTIVE PAGES

Page No	Change in Effect	Page No	Change in Effect	Page No	Change in Effect
Cover, ii	Original				
Letter of Promulgation	Original				
iv thru xii	Original				
1-1, 1-2	Original				
2-1 thru 2-13	Original				
3-1 thru 3-10	Original				
4-1, 4-2	Original				
5-1, 5-2	Original				
6-1 thru 6-23	Original				
7-1, 7-2	Original				
8-1	Original				
A1	Original				

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FIGURE 5-20-2 Example IUH list of effective pages

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DEPARTMENT OF THE NAVY

CHIEF OF NAVAL TECHNICAL TRAINING

NAVAL TRAINING SYSTEMS CENTER

ORLANDO, FLORIDA 32813

1 January 1986

AN/CDE-22(V) UNDERWATER SENSOR SYSTEM OPERATOR

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This Instructor Utilization Handbook is the approved instructional material effective upon receipt, for the planning and conduct of the Basic Sonar Operation/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222

This Instructor Utilization Handbook provides basic and fundamental information on the BSOT/BD Trainer, Device 2B222 and was developed in accordance with MIL-STD-001379C (Navy) and DI-H-7076

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Commanding Officer, Naval Training Systems Center, ATTN CODE 12345, Orlando, FL 32813, using the appropriate form(s) and procedures provided in the approved references

J E ROPER
Captain, U S Navy
Instructional Standards and
Academic Programs

FIGURE 5-20-3 Example IUH letter of promulgation

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CHANGE RECORD

Number and Description of Change	Entered By	Date

FIGURE 5-20-4 Example IUH change record

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HAZARD AWARENESS NOTICE

All personnel involved in operation or maintenance of electronic equipment must be thoroughly familiar with the electronic equipment safety precautions contained in Electronic Installation and Maintenance Book 0967-LP-000-0100, section 3, and NSTM, Electronics, chapter 400, S9086-ND-STM-000/ch 400, section 2 In addition, attention is directed to the Accident Prevention Manual, OPNAVINST 5101 2 Series

This device employs voltages which are dangerous and may be fatal if contacted by operating personnel Extreme caution must be exercised when operating with this device Hazard awareness dictates that this device must always be viewed as an integral part of a system and not as a component While very practical precaution has been incorporated into this device, it is not possible or practical to try to list every condition or hazard that can be encountered

Don't service or adjust this device alone Under no circumstances will a person operate, maintain, or reach into or enter the device without the presence or assistance of another person capable of giving aid Unless under direct supervision of a qualified person, no person shall operate or maintain device for which he is not qualified

Don't tamper with interlocks Reliance on interlock circuits to remove power from the equipment is never to be assumed Until operation of the interlock is verified, equipment is assumed to be in the hazardous mode of operation Under no circumstances will any access gate, door, or interlock switch be removed, bypassed or modified in any way by other than authorized maintenance personnel and then only after observing proper tag-out procedures

Resuscitation, personnel working with or near high voltages shall be familiar with the latest Cardio Pulmonary Resuscitation (CPR) techniques This type of information is available and shall be obtained through an appropriate qualification program

Report all hazards If at any time you detect a hazard, it is your responsibility to report the hazard to ensure that it is corrected If you detect a "new" or "suspected new" hazard, particularly due to equipment installation, modification, or repair, it is your responsibility to report it through your chain-of-command to ensure that a SAFETYGRAM is submitted to the Naval Safety Center, Norfolk, VA This will ensure that this hazard will be investigated, publicized, or corrected, as required

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FIGURE 5-20-5 Example IUH hazard awareness notice

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FOREWORD

The Instructor Utilization Handbook (IUH) for the AN/CDE-22(V) Underwater Sensor System, Basic Sonar Operation/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222 is designed to aid instructors and operators in the effective use of the BSOT/BD Trainer, Device 2B222 This IUH is bound in two volumes Volume 1 is unclassified, and describes the BSOT/BD Trainer, Device 2B222 hardware, capabilities, limitations, and operating procedures, as well as the training exercise inserted into the BSOT/BD Trainer, Device 2B222 It also presents the method used to develop these training exercises or to update existing ones Volume 2 is a Classified supplement, supporting Volume 1, and includes the exercise objectives, training outline, and introductions to all of the exercises inserted into the BSOT/BD Trainer, Device 2B222, Unit 1

FIGURE 5-20-6 Example IUH foreword

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FIGURE 5-20-9 Example IUH list of tables

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Section I INTRODUCTION

I-1 Purpose The AN/CDE-22(V) Underwater Sensor System, Basic Sonar Operator/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222, is a part-task training device Its purpose is to familiarize the trainee with the physical appearance, location and operation of controls and displays, functional capabilities, and the operation of the AN/CDE-22(V) Underwater Sensor System Using the device during training is intended to develop skills in the performance of operating, diagnostic, and communication procedures that are fundamental to the mission of the AN/CDE-22(V) Underwater Sensor System Device 2B222 supports the AN/CDE-22(V) Underwater Sensor System Operator training course Device 2B222 contains four identical trainee stations, each simulates the physical appearance and operations of AN/CDE-22(V) Underwater Sensor System equipment Trainee operators positioned at these stations, under the supervision of an instructor, receive fully automated, self-paced, and computer-controlled instruction on an individual basis.

I-2 Use of the instructor utilization handbook The Instructor Utilization Handbook (IUH) has been prepared for use by the instructors with Device 2B222, to aid them in the effective utilization of the trainer It provides instructors with all the information necessary to prepare for and conduct training sessions, including the evaluation of trainee performance data in achieving exercise objectives through use of the trainer In addition, this IUH is used as reference material for the AN/CDE-22(V) Underwater Sensor System Operator training course

1-1

FIGURE 5-20-10 Example IUH introduction.

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Section II GENERAL DESCRIPTION OF BSOT/PD TRAINER, DEVICE 2B22

II-1 General description. The BSOT/PD trainer, Device 2B22, consists of three major areas:

a. Four identical trainee stations

b. One instructor station

c. One computer station

The individual unit numbers in Figure 2-1 are explained in Table 2-I. Refer to Figure 2-1 for the trainer equipment arrangement.

TABLE 2-I. BSOT/PD trainer device, 2B22, components

Unit Number	Name/Nomenclature
	Trainee station No. 1
[illegible]A1	Associated Equipment Console
[illegible]	[illegible]/PD Computer Display Console
[illegible]	Instructor [illegible]/PD Display Console
[illegible]	Trainee station No. 2
[illegible]	Trainee station No. 3
[illegible]	Trainee station No. 4
[illegible]	Trainee [illegible]
[illegible]A1	Trainee [illegible]
[illegible]	Trainee [illegible]
[illegible]A1	[illegible] Panel
[illegible]	Instructor Keyboard

FIGURE 2-[illegible]. Trainer [illegible] general description. (Sheet 1 of 10)

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TABLE 2-I BSOT/BD trainer, device 2B222 components - Continued

Unit Number	Name/Nomenclature
6	Double CPU Cabinet
7	Tape Drive and Display Generator
8	Computer Terminal
9	Disc Drive Unit
10	Disc Drive Unit

* Contains the same consoles as Unit 1.

2-2

FIGURE 5-20-11. Example IUH general description (Sheet 2 of 10)

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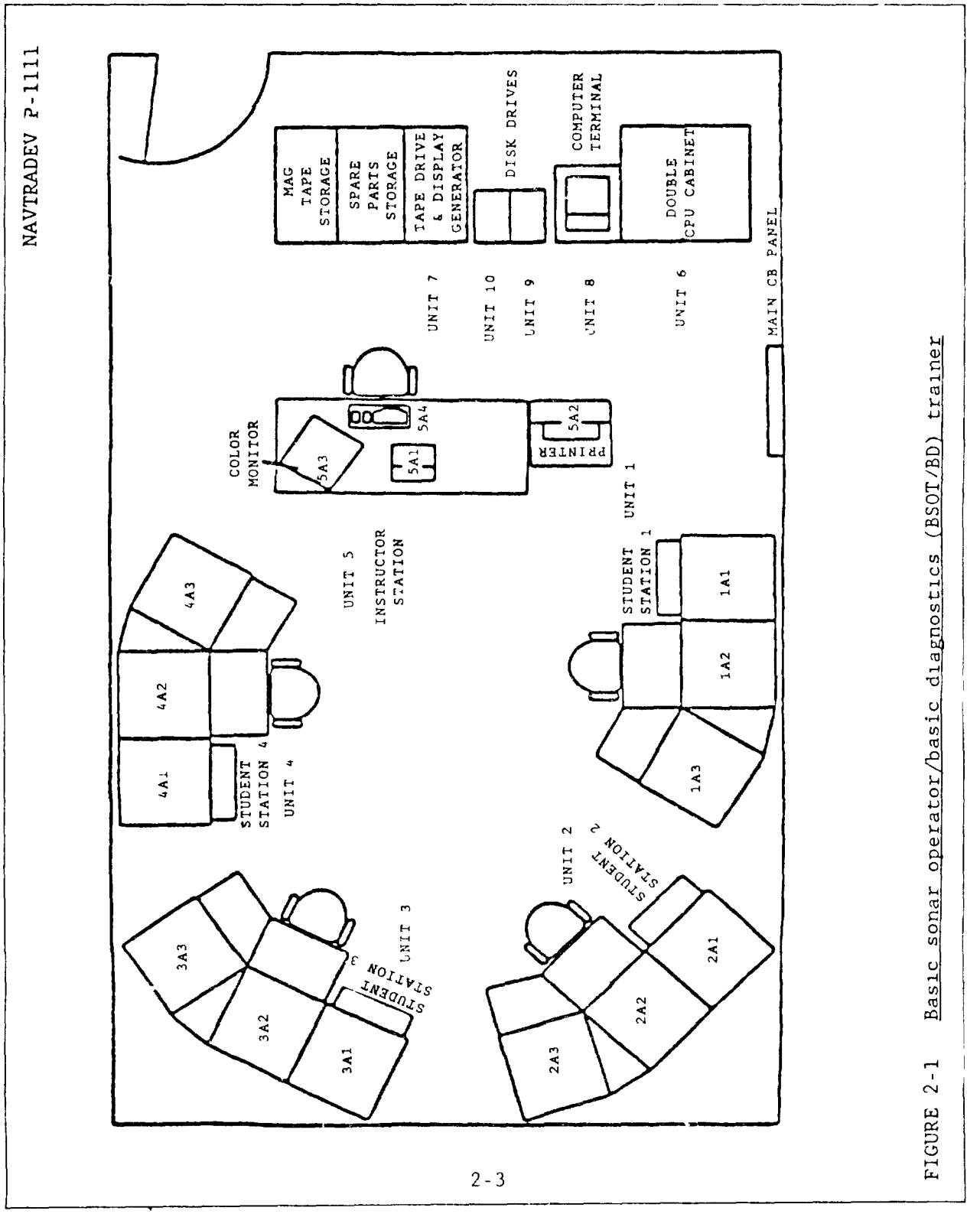

FIGURE 2-1 Basic sonar operator/basic diagnostics (BSOT/BD) trainer

2-3

FIGURE 5-20-11 Example IUH general description (Sheet 3 of 10)

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II-1 1 Training components The training components include recorded instructional narrations and visual presentations of lesson material, practice exercises, and automatically monitored tests with feedback to allow optimal learning in the shortest time There is not "free play" capability provided in the BSOT/BD trainer device. It is designed to provide training to the trainee on specific operating procedures

II-1 2 Modes of operation The BSOT/BD Trainer, Device 2B222, provides three operating modes

a The lesson generation mode allows the instructor to create, assemble, or modify lesson components. This mode is further discussed in Section VII.

b. The diagnostic mode allows for maintenance of the equipment This mode is discussed in the BSOT/BD Trainer, Device 2B222, technical manual

c The training mode provides fully automated, self-paced training for each of the four trainee operators.

II-1.3 Instructional system The BSOT/BD Trainer, Device 2B222, is an instructional system rather than a simulator or stimulator. The overall instructional system design is governed by the concept that at any point in an exercise the exercise conditions are known and the exercise events are sequentially extracted from a data base As the exercise evolves, the state of the system varies predictably as a result of correct trainee responses to the exercise events Incorrect trainee responses result in error messages and remedial instruction.

II-2 BSOT/BD trainer, device 2B222 laboratory The Laboratory, with its trainee stations, instructor station, and computer station, is described in this section in terms of its components.

II-2 1 Trainee stations. Each of the four identical trainee stations consists of three equipment consoles (reference figure 2-2)

a Associated Equipment Console, Unit A1, (sonar equipment)
b AN/WOE-66 Console, Unit A2, (sonar equipment)
c Instructional Display Console, Unit A3, (instructional equipment)

FIGURE 5-20-11 Example IUH general description. (Sheet 4 of 10)

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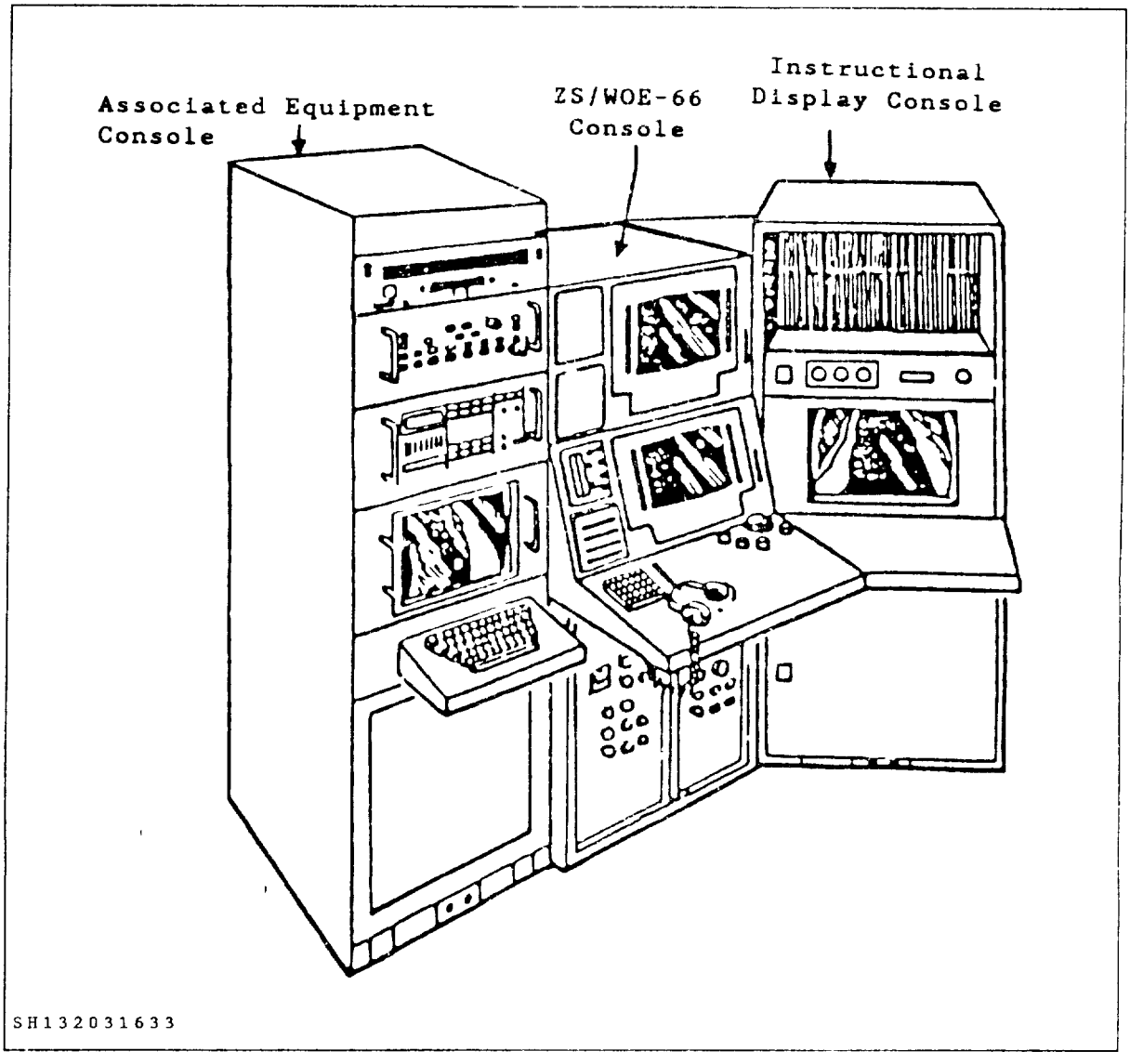

FIGURE 2-2 Trainee station

II-2 2 Instructor station The instructor station provides the controls and displays necessary to control and monitor each of the four trainee stations

FIGURE 5-20-11 Example IUH general description (Sheet 5 of 10)

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The instructor station contains the following equipment located as illustrated in Figure 2-3

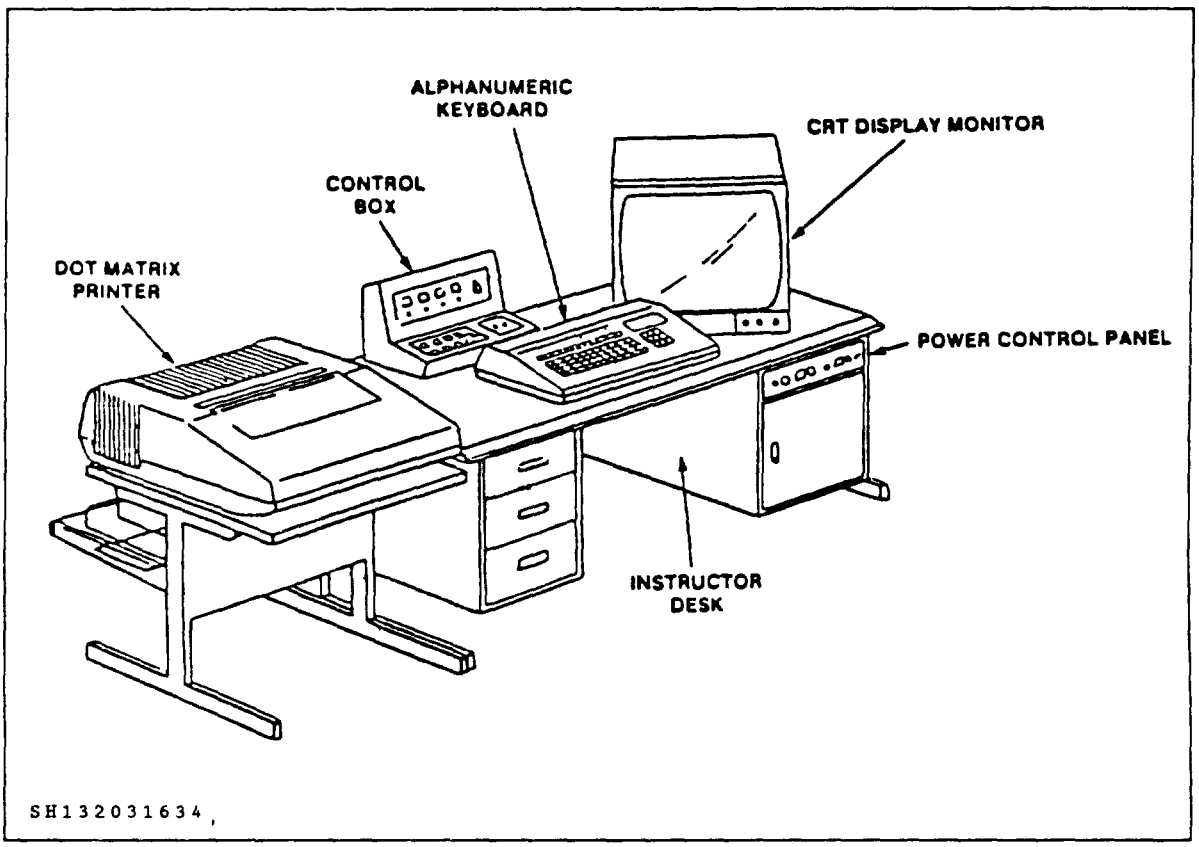

FIGURE 2-3. Instructor station.

II 2 3 Computer station The BSOT/BD Trainer, Device 2B222, is a computer-dependent trainer and is the source of all trainer actions The computer station provides the software programing that executes the system program, which in turn drives the controls, indicators, and displays in the four student stations and the instructor station, it stores the lessons and all performance data, and it executes diagnostic routines. The computer station is located in a separate area away from training (reference figure 2-1) This station consists of the following equipment

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FIGURE 5-20-11 Example IUH general description. (Sheet 6 of 10)

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a Double CPU cabinets

b Disc drive (2) with 6 disc packs

c Magnetic Tape Unit

II-3 BSOT/BD trainer, device 2B222 limitations and capabilities The BSOT/BD Trainer, Device 2B222 provides training for operations of the simulated AN/CDE-22(V) and consists of three separate sensor subsystems that are integrated at the console level The three subsystems are as follows

a AN/MAT-15 Tactical Towed Array Sonar (TACTAS)

b AN/MAB-17 Sonar System

c AN/MAA-10(V) Sonar Signal Processing System

II-3 1 Operational requirements of the simulated AN/CDE-22(V) system The operational requirements of the simulated AN/CDE-22(V) are complex, with a number of functions performed by each sensor subsystem In total, the simulated AN/CDE-22(V) provides for simultaneous operation of the three sensor subsystems in a choice of configurations/functions/modes for each

II-3 2 Required simulated AN/CDE-22(V) operator skills and knowledge Effective operation of the simulated AN/CDE-22(V) requires that the operators be thoroughly familiar with the controls, displays, and functions of the system In particular, the Variable Function Key (VFK) and CCAEP selections, cursor operations, operational procedures, diagnostic procedures, and communication procedures are skills the operators must acquire to operate the simulated AN/CDE-22(V)

II-3 2 1 Use of the BSOT/BD trainer, device 2B222 for operator training Each trainee station simulates the physical appearance and operation of the AN/CDE-22(V) Underwater Sensor System to the extent required for part-task training The trainer is used to teach trainee operators the basic task procedures, such as control functions and diagnostic procedures

II-3 3 BSOT/BD trainer, device 2B222 limitations The BSOT/BD trainer, device 2B222 has limited capabilities when compared to an operational AN/CDE-22(V) In its mission as a part-task trainer, the BSOT/BD Trainer, Device 2B222 has the following limitations

FIGURE 5-20-11 Example IUH general description (Sheet 7 of 10)

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a Background noise visible on the displays is static

b Raw sonar acoustic audio on the operator's headset is not simulated

The design of the BSOT/BD Trainer, Device 2B222 accommodates these limitations without impact on the mission of the trainer. During the performance of the exercise objectives, the trainee will be informed of the limitations through the instructional narration and visuals and he will be shown how the exercise is not affected by the limitation In the case of no free play, the trainer design carefully considers instances where the operator may make several correct choices in any sequence on the tactical system

II-3 4 BSOT/BD trainer, device 2B222 capabilities The BSOT/BD Trainer, Device 2B222, as a part-task trainer, has the following capabilities

a Trainee station capabilities The trainee stations exhibit the following general capabilities·

(1) Simulate the basic operations necessary for the trainee operator to acquire the knowledge of the controls, indicators, and displays of the AN/CDE-22(V) System.

(2) Provide accurate stimuli responses for each task addressed in the exercise being presented

In addition to the general capabilities, the trainee station's communication system provides the trainee with the capability to receive instructional audio in.

(1) Both headset ear pieces

(2) One headset ear piece and "LAMPS" audio in the other ear piece

b Instructor station capabilities The instructor station provides the instructor with the capability to control and monitor each of the four trainee stations The capabilities include selecting and running the exercises, and monitoring trainee performance and communications The functions which can be performed by using the function keys on the instructor station alphanumeric keyboard are·

FIGURE 5-20-11 Example IUH general description. (Sheet 8 of 10)

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(1) Display trainee station summary data

(2) Display trainee station detailed data

(3) Place trainee station on-line

Reference Section III for detailed descriptions or instructor stations functions The instructor station also provides the following communication capabilities·

(1) Selectively monitors the verbal responses of the trainee at each trainee station

(2) Establishes two-way communication with each or all trainee stations and the computer station

c Computer station capabilities The computer station is used to control the computer hardware, monitor both the computer hardware and software, and perform diagnostic and troubleshooting procedures The following major functions are performed by the trainer software·

(1) The lesson generated function provides the means to create, assemble, and modify exercises or lessons

(2) The instructor control function provides the means by which the instructor selects and assigns lessons or exercises to the trainee station and to monitor trainee progress

II-4 Environmental and operational parameters The BSOT/BD Trainer, Device 2B222, has the following requirements

a Environmental Air conditioning to the BSOT/BD Trainer, Device 2B222, is provided by the facility's climate control system It maintains the room temperature at 70 + 5 degrees Fahrenheit and humidity at less than 60% The BSOT/BD Trainer, Device 2B222 heat dissipation, including equipment, instructor/operator personnel, and four trainees is 50,000 BTU/hr No cooling water or special environmental facilities are required by BSOT/BD Trainer, Device 2B222

FIGURE 5-20-11. Example IUH general description (Sheet 9 of 10)

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b Operational BSOT/BD Trainer, Devices 2B222 and 2B666 are the two training devices used in the AN/CDE-22(V) Underwater Sensor System Operator training course The BSOT/BD Trainer, Device 2B222 training exercises are designed to be used with the course topics identified in Section V. The trainer's computer-aided instruction capability is used to supplement and reinforce the classroom training and provides the trainee with the basic knowledge and skills needed for use of the BSOT/BD Trainer, Device 2B666 in the course.

II-5. Personnel requirements. Trainees to be trained on the AN/CDE-22(V) Underwater Sensor System using the BSOT/BD Trainer, Device 2B222, will be Sonar Class "A" school graduates. Some may have at-sea experience on similar sonar systems. Two instructor/operators are required to operate the trainer. One instructor/operator must have graduated from the BSOT/BD Trainer, Device 2B222 Instructor/Operator training course or have been trained and qualified by on-the-job-training by a supervising, qualified instructor The instructor must posses an in-depth knowledge of the functions and operation of all trainer equipment and an understanding of the purpose, capabilities, and procedures for the effective use of the trainer to meet the AN/CDE-22(V) Operator curriculum training objectives

FIGURE 5-20-11 Example IUH general description. (Sheet 10 of 10)

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NAVTRADEV P-1111

Section III BSOT/BD TRAINER, DEVICE 2B222, EQUIPMENT OPERATING PROCEDURES

III-1 Introduction This section provides the trainer instructor/operator with the step-by-step procedures and appropriate information needed to operate the Basic Sonar Operator/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222 The procedures and information are presented in the following sequence

a BSOT/BD Trainer, Device 2B222 performance characteristics

b Functional descriptions of the trainee, instructor and computer station controls and indicators

c Functional descriptions of the system displays

d BSOT/BD Trainer, Device 2B222 equipment preparation considerations and assumptions

e Power-on procedures

f Start-up procedures

g Instructor station operations

h Shutdown procedures

i Maintenance controls operated by experienced personnel only

j Daily Readiness (DRED) Test procedures

III-2 Performance characteristics The BSOT/BD Trainer, Device 2B222 has the following characteristics

a Configuration The trainer consists of four identical trainee stations, an instructor station, and a computer station The trainee stations and instructor station contain hardware that interfaces with the computer station

3-1

FIGURE 5-20-12 Example IUH operating procedures (Sheet 1 of 8)

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(1) Trainee stations Each trainee station contains an Associated Equipment Console, AN/WOE-66 Acoustic Display console, and an Instructional Display Console The Associated Equipment Console and the AN/WOE-66 Console are configured to simulate an AN/CDE-22(V) Sonar System (reference figure 2-2) The Instructional Display console is placed beside them at an angle

(2) Instructor station The instructor station consists of the following components arranged on a desk (reference figure 2-3)

(a) Color CRT Display Monitor

(b) Alphanumeric Keyboard

(c) Control Box

(d) Power Control Panel (in desk)

(e) Dot Matrix Printer

The instructor station is positioned in the training class room so that the instructor can view each trainee station

b Performance The Trainer is an instructional system rather than a simulator or stimulator. The overall system design is dictated by the concept of no "free play," i e , at any point in an exercise, the exercise conditions are known and the exercise events are sequentially extracted from a data base. As the exercise evolves, the state of the system varies predictably as a result of correct trainee responses to exercise events. Incorrect trainee responses result in error messages and remedial instruction

III-2.1 Instructional phases. In the training mode, the BSOT/BD Trainer, Device 2B222, provides the trainee with three phases of training· instruction, practice, and test In the instruction phase, trainees are given verbal and visual instructions that describe, by a step-by-step basis, the operational procedure that is to be performed. In the practice phase, trainees are directed to perform the individual steps in the operational procedure without being told how to accomplish the steps In the test phase, trainees are directed to complete the operational procedures without any computer-aided directions

FIGURE 5-20-12 Example IUH operating procedures (Sheet 2 of 8)

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III-2 2 Trainer response to trainee error The BSOT/BD Trainer, Device 2B222, responds to trainee errors by returning the trainee back to the previously completed phase Two successive errors in performing a test phase step result in the return to the corresponding practice phase step, two successive errors in performing a practice phase step result in the return to the associated instruction phase step, four successive errors in performing an instruction phase step results in a notification to the instructor that the trainee needs help The trainee's errors are displayed on the instructor station CRT monitor The number of trainee errors is also recorded on the trainee's performance data file for future reference

III-2 3 Software performance All BSOT/BD Trainer, Device 2B222, responses are controlled by software The following is a list of the major trainer software functions

a The lesson generated function provides the means to create, assemble, and modify exercises or lessons

b The instructor control function provides the means by which the instructor selects and assigns lessons or exercises to a trainee, monitors trainee progress, and controls every aspect of Daily Readiness Testing (DRED) on-line testing

III-3 Functional description A description of the BSOT/BD Trainer, Device 2B222 controls and indicators used by the instructor and trainee operators and the displays called up on the instructor station CRT and the trainee station IUH are presented in the following sections Tables and illustrations describe the BSOT/BD Trainer, Device 2B222, equipment functions and status The illustrations show the specific locations of the controls and indicators on the operating panels The tables identify the controls and indicators by name and state whether or not each control or indicator is active and describe its function

III-3 1 Trainee station Each trainee station contains two consoles (reference figure 2-2)

a Associated Equipment Console

(1) Unit 30 Fault Indicator Panel

(2) System Control Panel

b AN/WOE-66 Display Console.

FIGURE 5-20-12 Example IUH operating procedures (Sheet 3 of 8)

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III-4 Operational instructions This section covers special BSOT/BD Trainer, Device 2B222 equipment preparation considerations and assumptions and provides complete step-by-step instructions for the following

a. Preparation considerations and assumptions No special equipment considerations are required in preparing the BSOT/BD Trainer, Device 2B222 for use All equipment is verified as being properly maintained and is fully functional by checking the appropriate Log/Log Book

b. Power-on procedure. The procedure for turning on the BSOT/BD Trainer, Device 2B222 is outline in Table 3-I; the outlined steps shall be performed in the order shown. This procedure begins with no power applied to any equipment, when it is completed, all equipment is powered up.

TABLE 3-I. Power-on procedure.

Step	Unit	Procedure
1.	Circuit Breaker Panel Box	1. Close the following circuit breakers a Emergency Trip b Main AC c CPU
2.	GFI Panel Box	2. Close the following circuit breakers· a. Trainee Station #1 b Trainee Station #2
3.	Instructor Station	3 a. At the Power Control Panel, place trainer power Keylock switch to the "ON" position b. Ensure trainer "POWER ON" indicator is lit. c. At the keyboard, set the "POWER" switch to "ON". d. Verify proper operaation

3-4

FIGURE 5-20-12 Example IUH operating procedures (Sheet 4 of 8)

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TABLE 3-I. Power-on procedure - Continued.

Step	Unit	Procedure
4	Trainee Station	4. At the instructional Display Console Power Control Panel a Place the Keylock switch to the "ON" position b Note that the "POWER ON" indicator illuminates c Verify proper operation
5	Computer Station	5 a. At the Computer Program Unit, position the following switches as specified (1) "AC POWER" switch to "ON" (2) Press the "CLR/RST" push button b At Disc Drives #0 and #1, position the Main Circuit Breaker to the "ON" position. c Verify proper operation

c. Initial program load procedure. The procedure for loading BSOT/BD Trainer, Device 2B222 is outlined in Table 3-II, the procedural steps shall be performed in the order shown This procedure allows the instructor to load the Computer Porgram Unit with the system program from the disc and to put the trainer in the training mode

FIGURE 5-20-12. Example IUH operating procedures (Sheet 5 of 8)

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TABLE 3-II Initial program load procedure

Step	Unit	Procedure
1	Disc Drive #10	1. At the Disc Drives: a. Open Disc Drive lid CAUTION Only open Disc Drive lid as often as necessary to mount or dıscount the disc to prevent contaminants form entering the Disc Drive. b. Verify that the desired disc pack ıs mounted in the drive If the desired disc pack is mounted, proceed to step 1.3, if not, perform step 1.c before proceeding to step 1 e If there ıs no disc pack ın the Disc Drive, perform step 1 d before proceeding
2	Maíntenance Console	2. At the Maintenance Console· a Perform the following keystroke sequence (1) [function] [reset] (2) [function] [clear memory] [return] (3) IPL=0800 [return]

FIGURE 5-20-12 Example IUH operating procedures (Sheet 6 of 8)

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d Instructor station operations The instructor station operations are performed by the instructor before the trainer is put under the control of the computer software, during the running of exercises, and at the end of the trainee's training session To perform the instructor station operations, the instructor prepares each trainee station for training As soon as the trainee presses the "EXERCISE CONTROL" switch, the operation of his trainee station is controlled by the computer software From this point on, the instructor monitors the trainee's progress at the instructor station

(1) Preparation for training Following the start-up procedures, the instructor uses the station to prepare the trainer to train trainees at each of the four trainee stations in accordance with the procedures listed in Table 3-III As the first step in trainer preparation, the instructor selects and presses the appropriate function key listed in the trainer preparation procedures

FIGURE 5-20-12 Example IUH operating procedures (Sheet 7 of 8)

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TABLE 3-III Trainer preparation

Procedure Description	Procedure Steps	Notes
1. Call up the "Trainee Station Summary Data Format "	1.a. Press function key "1" 1 b. Observe display change to "Trainee Station Summary Data Format" 1 c Observe prompt message SELECT OPTION P = PRINT DISPLAY X = EXIT	1 If the "Trainee Station Summary Data Format" is already displayed, go to step 2.
2. Place a trainee station on-line.	2 a. Press function key "3" 2.b Observe prompt message ENTER S/S # OR X TO EXIT	
3. Assign a trainee to a trainee station	3.a. Press function key "5" 3.b Observe prompt message ENTER S/S # OR X TO EXIT	

FIGURE 5-20-12 Example IUH operating procedures (Sheet 8 of 8)

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NAVTRADEV P-1111

Section IV EXERCISE OBJECTIVES

IV-1 Introduction The following Course Learning Objective and supporting Topic Learning Objectives are used in formulating the instructor training exercises contained in Section V

IV-2 Course learning objective With NAVTRADEV P-1111 in hand and the BSOT/BD Trainer, Device 2B222 in a power-on operational condition, conduct AV-2B Weapons and Tactics familiarization training under normal and degraded conditions following the procedures as outlined in Section III Maximum time allowed to complete each exercise is one hour All safety precautions will be strictly adhered to without error

a Topic learning objective Given NAVTRADEV P-1111 and Device 2B222 in a power-on ready condition, prepare Device 2B222 for a training exercise by following the procedures outlined in Section III Maximum time to correctly prepare Device 2B222 for each training exercise is five minutes

b Topic learning objective Given NAVTRADEV P-1111 and Device 2B222 in a power-on ready condition, initialize Device 2B222 to a given training exercise by following the procedures outlined in Section III Maximum time to correctly initialize Device 2B222 to a new training exercise is one minute

c Topic learning objective Given NAVTRADEV P-1111 and Device 2B222 in a power-on ready condition, select each operating mode of Device 2B222 following the procedures outlined in Section III Maximum time to correctly accomplish this task is one minute

d Topic learning objective Given NAVTRADEV P-1111 and Device 2B222 in a power-on ready condition, modify the exercise initial conditions following the procedures outline in Section III Maximum time to correctly accomplish this task is two minutes

4-1

FIGURE 5-20-13 Example IUH exercise objectives

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Section V TRAINING OUTLINE

SECTION
VI-1 TRAINING EXERCISES
VI-2 PRE-TRAINING EXERCISE ONE
VI-3 TRAINING EXERCISE ONE
VI-4 POST-TRAINING EXERCISE ONE

EXERCISES
Exercise One AV-2B Weapons and Tactics Operator

	Class Room	Practical Application	Total
a WTT familiarization	0	2	2
1 Trainee station			
2 Instructor station			
3 Computers			
4. Printers			
5. Peripheral equipment			
b Cockpit familiarization	0	2	2
1. Functional/nonfunctional controls and indicators			
2. WTT peculiar controls			
3 WTT/aircraft cockpit configuration differences			
4 Communication network operation			
c IOS operation	0	6	6
1 Function switch keyboard			
2 Touch screen operation			
3 Printer operation			
4 Video tape operation			
5 Visual scene monitoring			
6 Timer/clock operation			
7 Instructor control panel function			

FIGURE 5-20-14. Example IUH training outline (Sheet 1 of 2)

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Exercise One - Continued

	Class Room	Practical Application	Total
d Mission set-up	0	25	.25
1 Training mode selection			
2 Mission selection			
3 Parameter modification in reset			
4 Mission initialization			
5 Plan mode introduction			
e Mission conduct	0	75	.75
1. Use of operate/freeze/reset			
2 Parameter modification (training mode)			
(a) Aircraft position (slew)			
(b) Weather			
(c) Targets			
(d) Tactical situation display			
(e) Threat status			
(f) NY-77 codes			
(g) Visual scene			
3 Instructor interaction			
(a) Activating targets			
(b) LST operation			
(c) Smoke/flare usage			
(d) NY-77 operation			
(e) SAM launching			
(f) AAA firing			
(g) FAC duty performance			
(h) Ordnance reloading			
(i) Parameter record usage			
4 Malfunction introduction			
(a) Malfunction insertion			
(b) Pilot action monitoring			
5 Approaches			
(a) Vectors to an AWLS approach			
(b) TACAN approach			
(c) Weather/visual scene modification			
(d) Parameter recording			
Exercise One Total			2.00

5-2

FIGURE 5-20-14. Example IUH training outline. (Sheet 2 of 2)

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Section VI-1 TRAINING EXERCISES

VI-1 Introduction This section contains three types of exercises (Pre-Training Diagnostic, Training, and Post-Training Diagnostic) for utilization of the Device These exercises support the course objectives stated in Section IV and the outline of the exercises is contained in Section V Both punched cards and a magnetic tape containing these exercises are provided with the Device for instructor utilization A criterion test was developed to assist the instructor in determining the proficiency level of trainees/teams utilizing the Device and is provided in Appendix A A summary of the three exercises is as follows

a Pre-training diagnostic exercises These exercises are designed to provide the instructor with the means of evaluating the proficiency level of trainees/teams entering the training program Through analysis of criterion testing, the instructor may identify the proficiency level of the trainees/teams and prescribe specific detailed training utilizing the training exercises provided

b Training exercises The training exercises provide a means for increasing the proficiency level of trainees/plotting teams using the Device These exercises may be modified by the instructor prior to or during training to achieve the desired proficiency level of training as required by the trainees/teams in the training program Additional exercises may be created by following those procedures outlined in Section VII

c Post-training diagnostic exercise These exercises are designed to provide the instructor with a means of evaluating the trainee/team performance at the completion of the training program Results of these exercises, when compared with the results of the pre-training diagnostic exercises, provide the criterion for the instructor evaluation of trainee/team proficiency improvements, as well as evaluation of the effectiveness of the training course These results may also be used by the instructor to determine what additional, if any, training is required by the trainee(s) or team

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FIGURE 5-20-15 Example IUH training exercises introduction

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Section VI-2 PRE-TRAINING EXERCISE ONE

Exercise title Mission Demonstration Bangor

Mission number 1

Purpose of exercise To provide the instructor with a method of evaluating the proficiency level of the trainee/plotting team entering the training program utilizing criterion testing

Problem description Ownship, positioned in the Hood Canal southwest of Bangor Wharf, will be required to navigate northeast toward the Hood Canal Bridge in accordance with Inland Rules of the Road Ownship will encounter shipping traffic, minimal sea state, and maximum visibility

Exercise time 3 0 hours (1 brief, 1 exercise, 1 critique)

Personnel requirements

1 Instructors 1 to 3

2 Trainees 1 to 20

Problem set-up

1 Device mode Independent

2 Mission command device Card Reader or Mag Tape Unit

3 Place the Device in "RECORD" to enable "REPLAY" for the exercise critique

4 Initialization

a Mission No 1 (PCMSN 1)

b Map No 9 (PC MPN 9)

c Enable Mission Command Device (PC EMC), Card Reader (CR), or Mag Tape (MT)

6-2

FIGURE 5-20-16 Example IUH pre-training diagnostic exercise (Sheet 1 of 5)

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NOTE

Parameters listed in set-up steps 4 d through h are defined on punch cards and/or magnetic tape

d Ownship parameters.

```
TIME 0 0 0   MISSION # 1     MAP # 9    VEHICLE MONITOR
OS SSBN 726  LAT   47 43 36 9N   SPD 5 0   CRS 30 0  DPTH 40   ENG
             LONG 122 45 30 1W   ORD 5 0   ORD 30 0  ORD  40   RDR    0
             X 182732            Y 128815  SOUNDING  260 FT    TRN RT 0 0
```

TGT	TYPE	LAT	LONG	CRS	SPD	DPTH	RANGE	BRG	STATUS
1	CVA	47.46 14 9N	122 43 39 3W	210 0	8 0	0	5900	25	ACT MIS
2	LKA	47 42.55 9N	122 46·06.3W	30 0	0 0	0	1600	206	ACT MIS
3	SSN	47 43 33 9N	122 43:54.1W	318.0	0 0	25	2900	48	ACT MIS
4	MSO	47·47.58 9N	122 43 35.1W	178 0	0 0	0	9200	16	ACT MIS

e Environment parameters·

(1) Wind speed, 0 knots

(2) Wind direction, 0 degrees

(3) Current set, 0 degrees

(4) Current drift, 0 knots

(5) Sea state, 1

(6) Visibility, 20,000 yards

(7) Storm(s), None

f System degrade. Radar S/N 12 db

g Radar parameters Set to system default values Assign radar control as required

h Active NAVAID's Refer to chart 18458, Hood Canal, South Point to Quatsap Point including Dabob Bay, for locations

6-3

FIGURE 5-20-16 Example IUH pre-training diagnostic exercise (Sheet 2 of 5)

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NAV34	FIX E SPN NC BDG	PLL	47 51 33N	122 37 15W
NAV35	SISTERS LT	LPP	47 51 33N	122 38 23W
NAV36	SOUTH PT	PLL	47 49 57N	122 41 13W

5 Trainee Stations Assign as required

a Plotting stations

(1) Piloting officer

(2) Navigation chart plotter

b Radar Operator Stations

(1) PPI operator

(2) Maneuvering board operator

BRIEFING OUTLINE

1 Introduction

a State title and purpose of exercises

b Read problem description

c Assign trainee stations

d Indicate testing method

2 Initial condition data

a Ownship Type SSBN 726, positioned in Hood Canal approximately 2 1/4 miles southwest of Bangor Wharf, heading 030°, speed 5 knots

b Targets Four available

(1) Target 1 - bearing 025°, range 5,900 yards

(2) Target 2 - bearing 206°, range 1,600 yards

FIGURE 5-20-16 Example IUH pre-training diagnostic exercise (Sheet 3 of 5)

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h Active NAVAID's Refer to chart 18441, Admiralty Inlet and Puget Sound to Seattle, for locations

NAV 1	TONGUE PT	PLL	48 10 00N	123 42 12W
NAV 2	RACE ROCKS LT	PLL	48 17 50N	123 31 48W
NAV 3	ALBERT HEAD LT	PLL	48 23 12N	123 28 38W
NAV 4	EDIZ HOOK LT	PLL	48 08 27N	123 24 30W
NAV 5	TRAIL ISLAND LT	PLL	48 23 42N	123 18 14W

5. Trainee Stations· Assign as required

a Plotting Stations

(1) Piloting officer

(2) Navigation chart plotter

(3) DDRT plotter

(4) Navigation fix log keeper

b. Radar Operator Stations

(1) Radar operator

(2) Maneuvering board plotter

Briefing outline·

1. Introduction:

a. State title and purpose of exercises

b. Read problem description

c Assign trainee stations

2. Initial condition data

a Ownship. Type SSBN 726, positioned in the Strait of Juan De Fuca approximately 6,000 yards northwest of Protection Island, heading 030°, speed 0 knots

FIGURE 5-20-17. Example IUH training exercise (Sheet 3 of 6)

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b Targets 8 (6 active, 2 visible on PPI's)

(1) Target 2 - bearing 009°, range 13,700 yards Masked by Target 3, does not show on PPI

(2) Target 3 - bearing 009°, range 13,600 yards

(3) Target 4 - bearing 310°, range 3,600 yards

c Environment (Modify as required)

(1) Wind speed, 0

(2) Sea state, 1

(3) Visibility, 20,000 yards

d NAVAID's Identify those currently within visual range of periscope

(1) NAV 8, New Dungeness LT, bearing 274°, range 11,589 yards

(2) NAV11, PT Partridge, bearing 069°, range 17,240 yards

3 Exercise Brief

a Instructor assumes the role of Helmsman and Bridge Lookout

b Navigate using ownship sensors as required through the Strait of Juan De Fuca, Admiralty Inlet, and Hood Canal to Bangor Wharf

c Follow Inland Rules of the Road

4 Man trainee stations and the instructor station and insure that initial conditions are as indicated

FIGURE 5-20-17 Example IUH training exercise (Sheet 4 of 6)

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Section VI-3 TRAINING EXERCISE ONE

Exercise title: Mission Demonstration Bangor

Mission number: 3

Purpose of exercise To achieve an increased proficiency level for individual trainees and navigation teams by providing at-sea practical training in electronic navigation and restricted waters piloting procedures and techniques

Problem description: Ownship, positioned in the Strait of Juan De Fuca northwest of Protection Island, will be required to navigate through the Strait of Juan De Fuca, Admiralty Inlet, and Hood Canal to Bangor Wharf in accordance with Inland Rules of the Road Ownship will encounter shipping traffic throughout the problem Environmental effects such as wind, water currents, visibility, and rain squalls may be utilized as required to achieve the training goals of individual trainees and teams in the training course

Exercise time 7 to 10 hours (1 brief, 4 to 6 exercises, 2 to 3 critiques)

Personnel requirements

1 Instructors: 1 to 3

2 Trainees 1 to 20

Problem set-up:

1 Device mode Independent

2 Mission command device Card Reader or Mag Tape Unit

3 Place the Device in "RECORD" to enable "REPLAY" for utilization in exercise critique (PC REC)

4 Initialization:

a Mission No 3 (PC MSN 3)

b Map No 9 (PC MPN 9)

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FIGURE 5-20-17. Example IUH training exercises (Sheet 1 of 6)

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c Enable Mission Command (PC EMC), Card Reader (CR), or Mag Tape Unit (MT)

NOTE

Parameters listed in set-up steps 4 d through h are defined on punch cards and/or magnetic tape

d Vehicle parameters

```
TIME 0 0 0   MISSION # 3    MAP # 9   VEHICLE MONITOR

OS SSBN 726  LAT   48 10 29 9N   SPD 10 0  CRS 70 0  DPTH 40   ENG
             LONG 122 58 0 2W    ORD 10 0  ORD 70 0  ORD 40    RDR    0
             X 165387            Y 183264                      TRN RT 0 0

TGT TYPE       LAT          LONG          CRS       SPD  DPTH RANGE BRG STATUS

1   LKA      48 30 00N  122 46 32W    196 0     12 0    0  24688  38 ACT MIS
2   MERCHANT 48 17 10N  122 56 21W    145 0     10 0    0  13676   9 ACT MIS
3   CVA      48 17 08N  122 56 21W    145 0     12 0    0  13609   9 ACT MIS
4   CVS      48 11 40N  123 00 00W    940 0      8 0    0   3608 310 ACT MIS
```

e Environmental parameters

(1) Wind speed, 0 knots

(2) Current direction, 0 degrees

(3) Current set, 0 degrees

(4) Current drift, 0 knots

(5) Sea state, 1

(6) Visibility, 20,000 yards

(7) Rain squalls, None

f System degrade Radar S/N 12 db

g Radar parameters Set to system default values Assign radar control as required

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FIGURE 5-20-17 Example IUH training exercise (Sheet 2 of 6)

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h. Active NAVAID's Refer to chart 18441, Admiralty Inlet and Puget Sound to Seattle, for locations.

NAV 1	TONGUE PT	PLL	48:10 00N	123 42 12W
NAV 2	RACE ROCKS LT	PLL	48 17.50N	123 31 48W
NAV 3	ALBERT HEAD LT	PLL	48 23 12N	123 28 38W
NAV 4	EDIZ HOOK LT	PLL	48 08 27N	123 24 30W
NAV 5	TRAIL ISLAND LT	PLL	48 23 42N	123 18 14W

5. Trainee Stations: Assign as required

a Plotting Stations

(1) Piloting officer

(2) Navigation chart plotter

(3) DDRT plotter

(4) Navigation fix log keeper

b. Radar Operator Stations

(1) Radar operator

(2) Maneuvering board plotter

Briefing outline

1. Introduction:

a. State title and purpose of exercises

b. Read problem description

c Assign trainee stations

2 Initial condition data:

a. Ownship: Type SSBN 726, positioned in the Strait of Juan De Fuca approximately 6,000 yards northwest of Protection Island, heading 030°, speed 0 knots

6-9

FIGURE 5-20-17. Example IUH training exercise (Sheet 3 of 6)

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b Targets 8 (6 active, 2 visible on PPI's)

(1) Target 2 - bearing 009°, range 13,700 yards Masked by Target 3, does not show on PPI

(2) Target 3 - bearing 009°, range 13,600 yards

(3) Target 4 - bearing 310°, range 3,600 yards

c Environment (Modify as required)

(1) Wind speed, 0

(2) Sea state, 1

(3) Visibility, 20,000 yards

d NAVAID's Identify those currently within visual range of periscope

(1) NAV 8, New Dungeness LT, bearing 274°, range 11,589 yards

(2) NAV11, PT Partridge, bearing 069°, range 17,240 yards

3 Exercise Brief

a Instructor assumes the role of Helmsman and Bridge Lookout

b Navigate using ownship sensors as required through the Strait of Juan De Fuca, Admiralty Inlet, and Hood Canal to Bangor Wharf

c Follow Inland Rules of the Road

4. Man trainee stations and the instructor station and insure that initial conditions are as indicated

FIGURE 5-20-17 Example IUH training exercise (Sheet 4 of 6)

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EXERCISE SCENARIO

1 Start the exercise by placing the Device in RUN 1X

2 Execute ownship helm commands as directed by the trainee Piloting Officer

3 Assume duties of Bridge Lookout and report observations as required

4 Observe trainee/team performance throughout the exercise, "FREEZING" the mission and critiquing problem areas as required

5 The following events are based on ownship maintaining an average speed of 10 knots and the required courses to maintain track within designated vessel shipping channels Since the proficiency level of individual trainees and teams in the training course will vary, the average speed, required courses, and time of course changes may be different from those calculated for the ownship The instructor therefore may be required to assume manual control of pre-defined targets to alter ordered speeds and headings in order to achieve desired CPAs and Inland Rules of the Road situations This may also be required to prevent undesirable CPAs and Inland Rules of the Road situations

a Ownship is positioned approximately 6,000 yards northwest of Protection Island, heading 070°, speed 0 knots An initial speed of 10 knots is recommended which would result in ownship intersecting the inbound shipping channel at approximately time 14 00 Ownship will then be required to navigate through Admiralty Inlet and Hood Canal with a final destination of Bangor Wharf Estimated time of arrival, based on an average speed of 10 knots, is 4 00.00

b Target 1 is an LKA and is positioned in one of the inbound shipping channels approximately 5,000 yards east of Smith Island, heading 196°, speed 12 knots. Target 1 pre-defined commands provide course and speed changes to allow it to navigate through Admiralty Inlet and Hood Canal past Bangor Wharf and south to Hazel Point. At time 45 00, it will enter the inbound channel to Admiralty Inlet This will be approximately 12 to 13 minutes after ownship enters Its track from that point will be similar to that of the ownship at approximately time 1.53 00 Then target 1 speed will be reduced to 8 knots at time 2 21.30 and target 1 will be overtaken by ownship at approximately time 2 50 00

6-11

FIGURE 5-20-17 Example IUH training exercise (Sheet 5 of 6)

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c Target 2 is a MERCHANT and is positioned in an inbound channel approximately 9,000 yards southwest of Smith Island, heading 145°, speed 10 knots The pre-defined commands of target 2 provide course changes to allow it to navigate through Admiralty Inlet and Puget Sound toward Seattle It will enter the inbound channel to Admiralty Inlet at time 44 00 This will be approximately 11 to 12 minutes after ownship enters It will navigate a track similar to that of ownship until time 2 09 00 and will then change course for Puget Sound Based on the speeds of ownship and target 2 being equal, target 2 will maintain an approximate range of 4,000 yards astern of ownship

6 Assume manual control of targets as required

7 Modify media parameters or degrade ownship sensors as required to achieve the desired complexity of the exercise

Exercise critique

1 Discuss and review trainees/team performance utilizing Device replay capability

2 Resolve individual trainee and team problem areas

3 Reinforce good performance to motivate trainees

FIGURE 5-20-17 Example IUH training exercise (Sheet 6 of 6)

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VI-4 POST-TRAINING EXERCISE ONE

Exercise title: Mission Demonstration Bangor

Mission number. 5

Purpose of exercise: To provide instructor with a method of evaluating the final proficiency level of trainee/plotting teams completing the training course through criterion testing.

Problem description: Ownship, positioned in Hood Canal northeast of Bangor Wharf, will be required to navigate southwest to Bangor Wharf in accordance with Inland Rules of the Road Ownship will encounter shipping traffic, minimal sea state, and maximum visibility.

Exercise time. 7.0 hours (1 brief, 1 exercise, 1 critique)

Personnel requirements:

1. Instructors: 1 to 3

2. Trainees: 1 to 20

Problem set-up:

1 Device mode. Independent

2 Mission command device: Card Reader or Mag Tape Unit

3 Place the Device in "RECORD" to enable "REPLAY" for utilization in exercise critique.

4 Initialization:

a Mission No. 3 (PC MSN 5)

b Map No. 9 (PC MPN 9)

c Enable Mission Command (PC EMC), Card Reader (CR), or Mag Tape Unit (MT)

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FIGURE 5-20-18. Example IUH post-training exercises. (Sheet 1 of 6)

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NOTE

Parameters listed in set-up steps 4 d through h are defined on punch cards and/or magnetic tape

d Vehicle parameters

```
TIME 0 0 0   MISSION # 6     MAP # 9   VEHICLE MONITOR
OS SSBN 726  LAT   47 43 36 9N   SPD 5 0   CRS  23 5 DPTH 40   ENG
             LONG 122 45 30 1W   ORD 5 0   ORD  30 0 ORD 40   RDR    0
             X 182732            Y 128815  SOUNDIND  260 FT   TRN RT 0 0

TGT TYPE     LAT             LONG        CRS       SPD DPTH RANGE BRG   STATUS

 1 CVA  47 46 14 9N    122 43 39 3W   210 0     8 0    0  5900  25  ACT MIS
 1 LKA  47 42 55 9N    122 46 06 3W    30 0     0 0    0  1600 206  ACT MIS
```

e Environment parameters

(1) Wind speed, 16 knots

(2) Wind direction, 120 degrees

(3) Current set, 2 degrees

(4) Current drift, 210 knots

(5) Sea state, 5

(6) Visibility, Fog 100 yards

(7) Storm #1 - size, 5 nmi^2 positioned 1,000 yards, bearing 180° from ownship on course 120°, speed 5 knots

f System Degrade

(1) SINS LAT 0 5°, 5-minute period

LONG 0 5°, 5-minute period

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FIGURE 5-20-18 Example IUH post-training exercise (Sheet 2 of 6)

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(2) Periscope Bearing· 1 5°, 5-minute period,

range 20 yards, 5-minute period

(3) Sonar Bearing· 1.5°, 5-minute period,

range 75 yards, 5-minute period

g Radar Parameters· Set to system default values Assign radar control as required

h. Active NAVAID's· Refer to chart 18458, Hood Canal, South Point to Quantsap Point including Dabob Bay, for location/identification

NAV34	FIX E SPN NC BDG	PLL	47·51.33N	122.37 15W
NAV35	SISTERS LT	PLL	47:51 33N	122 38 23W
NAV36	SOUTH PT	PLL	47 49 57N	122 41 13W
NAV37	LOFALL	PLL	47.48 54N	122 39 15W

5. Trainee stations: Assign as required

a Plotting stations

(1) Piloting Officer

(2) Navigation Chart Plotter

(3) DDRT Plotter

(4) Navigation Fix Log Keeper

b. Radar operator stations

(1) PPI Operator

(2) Maneuvering Board Operator

c. Navigation operator station (NOS)

d. Periscope operator station (POS)

e. Fathometer station

FIGURE 5-20-18 Example IUH post-training exercise. (Sheet 3 of 6)

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Briefing outline

1 Introduction

a. State title and purpose of exercises

b. Read problem description

c Assign trainee testing method

d Indicate testing method

2 Initial condition data

a Ownship Type SSBN 726, positioned in Hood Canal approximately 2 1/4 miles southwest of Bangor Wharf, heading 030°, speed 5 knots

b Targets Two provided

(1) Target 1 - bearing 025°, range 5,900 yards

(2) Target 2 - bearing 206°, range 1,600 yards

c. Environment

(1) Wind speed, 16

(2) Wind direction, 120°

(3) Current set, 2 knots

(4) Current drift 210°

(5) Sea state, 5

(6) Visibility, 100 yards

(7) Storm # 1 - size, 5 nmi^2, positioned 1,000 yards, bearing 180° from ownship on course 120°, speed 5 knots

d Radar parameters Identify and modify as required

6-16

FIGURE 5-20-18 Example IUH post-training exercises (Sheet 4 of 6)

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e. NAVAID's· Identify available NAVAID's as required

3 Exercise Brief

a Instructor assumes the role of Helmsman and Bridge Lookout

b Navigate using northeast toward Hood Canal Bridge

c Follow Inland Rules of the Road

4 Man trainee stations and instructor station and insure that initial conditions are as indicated.

5. Plot proposed track on chart, marking with significant information (i e., navigational points, turn bearings, courses, navigational hazards, etc).

Exercise scenario·

1. Start the exercise by placing the Device in RUN 1X

2 Execute ownship helm commands as directed by the trainee Piloting Officer

3 Assume duties of Bridge Lookout and report observations as required.

4 The following events are based on ownship maintaining an average speed of 5 knots and an ordered course of 030° They are listed in the expected chronological order of occurrence

a Target 1· Type CVA, positioned approximately 1 mile north of Bangor Wharf, heading 210°, speed 8 knots, CPA - time 13 20, bearing 295°, range 500 yards Creates head to head situation, both ships are burden.

b. Target 2· Type LKA, positioned approximately 1,500 yards astern of ownship, heading 030°, speed 0 knots, problem time 5 00, speed 10 knots, CPA - time 19 30, bearing 299°, range 8 yards Creates overtaking situation, target is burden

FIGURE 5-20-18 Example IUH post-training exercise (Sheet 5 of 6)

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5 Maneuver targets in accordance with Inland Rules of the Road, as required to support and monitor trainee progress and evaluate as per criterion test sheet

6. "FREEZE" mission after all CPAs have been completed

Exercise critique

1 Evaluate trainee/team performance per criterion test sheet

2 Discuss and review trainee/team performance using criterion test sheet and Device replay capability

3 Indicate individual trainee and team progress and recommend additional training as required to correct unresolved problem areas

FIGURE 5-20-18 Example IUH post-training exercise (Sheet 6 of 6)

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Section VII FORMULATION OF NEW TRAINING EXERCISES

VII-1 Lesson generation overview It may be necessary to augment the AN/CDE-22(V) training material by creating new exercises or by updating existing training material to reflect equipment changes The lesson generation process is used in both cases The lesson generation process is extremely complex and should be used only by qualified personnel with the background knowledge, familiarity, and access to the required documents

a. Required experience and knowledge

1 Qualified AN/CDE-22(V) tactical equipment operator

2 Thorough understanding of the Exercise Definition language, which is a high-level programing language developed exclusively for coding BSOT/BD Trainer, Device 2B222 lesson components

3 Understanding of exercise structure, library item structure, and the Lesson Generation Function, described in Section VII-3

b. Documents

1 Detecting Range Sonar Set, AN/MAA 19 4242424-001, Operator Manual, SE611-AB-TB-MMO-999/(C) MAA 19 AND SE611-AB-MMO-335/(C) MAA 19, Volumes 1 and 2, prepared by Jones Aircraft Corp for Naval Sea Systems Command.

2 Program Performance Specification for AN/MAA-19 Sonar Controls and Displays Software, PG-21212, prepared by Jones Aircraft Corp , Ground Systems Group, Jackson, California, for Naval Sea Systems Command

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FIGURE 5-20-19. Example IUH formulation of new exercises

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Section VIII REFERENCE AND TEXT MATERIAL

VIII-1 Reference and text material The following is a list of source documentation to assist in the understanding and application of the BSOT/BD Trainer, Device 2B222 equipment.

Number	Title
NAVTRADEV P-111	Basic Sonar Operator/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222, Instructor Utilization Handbook Instructor Guide
NAVTRADEV P-111	Basic Sonar Operator/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222 Instructor Utilization Handbook, Instructor Guide, Classified Supplement
NAVTRADEV P-1111	Basic Sonar Operator/Basic Diagnostic (BSOT/BD) Trainer, Device 2B222, AN/CDE-22(V) Underwater Sensor System Operator Instructor Utilization Handbook
A-678-5000	AN/CDE-22(V) Underwater Sensor System Operation and Maintenance

8-1

FIGURE 5-20-20 Example IUH reference and text material

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APPENDIX A

The following information is supplied as an aid for flight planning and quick reference in finding specific information about navigational landmarks and targets Landmarks are separated into military and civilian categories and are listed alphabetically while targets are listed by target classification

LANDMARKS

Military	Latitude	Longitude	Elevation
ELIZABETH CITY, CGS	N 36 16	W 076 10	33
LANGLEY AFB, RUNWAY 7	N 37 05	W 076 21	53
Civilian			
FAYETTEVILLE MUNICIPAL	N 34 59	W 078 53	150
LUMBERTON	N 34 36	W 079 07	117
ROCKY MOUNT/WILSON	N 35 51	W 077 54	137

TARGETS

AIR

Target Number	Description
1	Fighter
2	Helicopter

SEA

Target Number	Description
3	Patrol Boat
4	Destroyer

A-1

FIGURE 5-20-21 Example IUH supplementary information

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5 21 SIMULATOR SOFTWARE UTILIZATION HANDBOOK

5 21 Simulator software utilization handbook The Simulator Software Utilization Handbook (SSUH) provides complete procedures for system operation, evaluation of system readiness, system testing, use of all utility programs, support software file generation, and system performance characteristics verification This section describes the format, content, and development guidelines specified in the military standard and in DI-ILSS-80092

5 21 1 Use The SSUH is designed to be used by simulation system operators who must test, evaluate, and correct deficiencies in simulator software For the handbook to be effectively used by the system operators, the material or data within the handbook must be easily understood and "user friendly" The handbook provides descriptions and explanations required to understand all of the software construction and usage

5 21 2 Elements. The elements of the SSUH are as follows:

(a) Front Matter
(b) Section I, Operating Procedures
(c) Section II, Readiness and System Testing
(d) Section III, Software Utilities
(e) Section IV, Support Software File Generation
(f) Section V, Performance Characteristics Verification
(g) Appendixes

5.21 3 Development process. The development process of the SSUH can best be explained by first providing an overview of the work-flow process used in developing the SSUH, and by second presenting a detailed description of how to develop each section of the SSUH.

5 21 3.1 Constraints, limitations, and requirements In developing the SSUH, the following specific constraints, limitations, and requirements must be observed and the following information provided.

(a) A topical index to provide several means of entry into the information
(b) Specific cross-referencing
(c) Locations of detailed items shown in relationship to the larger elements
(d) Illustrations to support related written discussions
(e) Minimal references to other documents.
(f) Operational statements presented in the order in which the actions are made or the observations are taken
(g) Indication of how the equipment will respond when mistakes are made by the operator on the equipment
(h) Instructions presented so as to produce actions in the correct and preferred order.

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(i) Portrayal of simultaneous actions by several system elements

5 21 3.2 Overview of work-flow process The process of developing an SSUH will vary depending on the needs of the user, availability of hardware data, or other such events normally beyond the control of the SSUH developer Listed below is a suggested sequence of events for developing an SSUH

(a) The personnel responsible for developing the SSUH must read and ensure they thoroughly understand the contents of the related data-item-descriptions (DID), specifications, statements of work, or other documents prescribed by the contract Based on the information acquired from these documents, develop a synoptic outline of the SSUH This will prevent the omission of any pertinent data

(b) Using the SSUH outline, outline a plan of action and milestones to include review dates, tests, draft due dates, etc. required by the contract documents, personnel staff requirements, responsibilities, and the time required to develop and produce the SSUH

(c) After planning and organizing the development effort, gather the necessary reference data The primary source of information for the SSUH will normally be the performance and design specifications or other documents developed in conjunction with the hardware The following list of documents contain the necessary information for developing the SSUH. The list provides both the current titles of the reference documents and the obsolete tiles, in brackets, which may be more familiar.

(1) Total trainer definition documents Operational Concept Document (OCD) [Trainer Specification Computer Systems Report (CSR)]

(2) Management documents. Software Development Plan (SDP) [Software Configuration Management Plan (SCMP), Software Quality Assurance Plan (SQAP)]

(3) Requirements documents Software Requirements Specification (SRS)

(4) Preliminary design documents Software Top-Level Design Document (STLDD) [Program Performance Specification (PPS)]

(5) Critical design documents Software Detailed Design Document (SDDD) [Program Design Specification (PDS), Computer Program Test Procedures/Report (CPTP/R)]

(6) Test documents Software Test Plan (STP) [Computer Program Test Plan (CPTP)]

(7) Life cycle support documents Software Product Specification (SPS) [Program Description Document (PDD)], Computer Resources Integrated Support Document (CRISD)

(8) Configuration management documents Version Description Document (VDD)

(9) User documents (technical manuals) Computer System Operator's Manual (CSOM) [Operator's Manual (OM)], Software User's Manual

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(SUM), Computer System Diagnostic Manual (CSDM), , Software Programmer's Manual (SPM), Firmware Support Manual (FSM)

(d) Another source of information for the SSUH is provided by the project engineers and program managers involved in the same project or related projects They may have information or material that could be useful in developing the SSUH. Remember, set a cut-off date for the collection of data for the first draft. Without a cut-off date, program delays can be expected. Any data coming in after the cut-off date can be incorporated into the second draft.

(e) Having organized the effort and gathered sufficient data, develop a detailed draft outline using the reference material, DIDs and first draft outline. In addition, consideration should be given to any comments or resolved action items resulting from any training conferences or project-related meetings that may have taken place prior to this time.

(f) Most of the efforts up to this point have been concerned with preparing to develop the SSUH. Actions from this point on will be concentrated on actual development. Before beginning to write, refer to the contract to ensure that the SSUH is developed in compliance with the contract specifications Remember, the handbook must be "user friendly". The order in which the sections are written will vary depending on the available information. The following order is the recommended process·

(1) Operating Procedure - Section I
(2) Readiness and System Testing - Section II
(3) Software Utilities - Section III
(4) Support Software File Generation - Section IV
(5) Performance Characteristics Verification - Section V
(6) Front Matter (Introduction)
(7) Appendixes (References, Abbreviations, Acronyms)

(g) The reference data used to develop the SSUH sections are constantly changing or being updated as the SSUH is being developed, and as such, the information in the sections mentioned will likewise constantly change. It is important to set a cut-off date for incorporating changes into the first draft SSUH to prevent program delays An additional consideration is the need for illustrations and schematics. These usually require longer lead times, especially if they have unique graphic requirements. The final consideration, prior to developing the individual sections, is the amount of typing to be accomplished and the scheduled time available for development of the SSUH Included in the development and production time is the amount of time necessary to assemble, proof, and edit the draft SSUH

(h) After completion of the draft, the next procedure is to validate the material by having in-house individuals who have not been closely affiliated with the development of the SSUH read it and provide an

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objective viewpoint After having the SSUH informally validated, incorporate the necessary changes and submit the preliminary draft.

(i) The preliminary draft is then reviewed by the end-user organization and verified in a training course to determine its effectiveness After receiving and evaluating comments from the end-user, integrate this additional information into the SSUH as appropriate, and produce, promulgate, and distribute the final copy

5 21 3 3 SSUH development This section provides directions for developing the SSUH The development procedures must be sequenced to parallel an assembled SSUH The information necessary for developing the individual sections will usually be the result of gathering reference data as described in paragraph 5 21 3 2(c) If the required reference data is not available, it may become necessary to conduct an analysis to obtain the required information

5 21 3 4 Front matter Provides information relevant to the identification of the SSUH, contents, purpose, use, safety precautions, and security requirements

(a) Cover The cover identifies the document as a SSUH. Content and format is as follows

(1) Volume number Identifies the number of the volume, only if these is more than one volume. The volume number (if required) is placed in the upper portion of the page, flush right

(2) Simulator title Identifies the complete title of the simulator (no abbreviations) and is centered in the upper middle portion of the cover page.

(3) Simulator software utilization handbook Identifies the document as a SSUH It is located two lines below the simulator title and centered on the page

(4) Date Identifies the date of the publication of the SSUH and is placed in the lower middle portion of the page and centered

(b) Introduction The introduction provides information relevant to the purpose and scope of the document Content and format are as follows

(1) Introduction Identifies the introduction page and is centered in the upper middle portion of the page

(2) Purpose Identifies the purpose and intent statements and is placed four lines below introduction, flush left The purpose and intent of the document statements are in narrative form and begin on the same line and to the right of purpose.

(3) Scope Identifies the scope and objectives of the document and is placed two lines below the last line of the purpose paragraph, flush left The scope and objectives statements are in

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narrative form and begin on the same line and to the right of Scope

(c) Hazard awareness notice Provides information relevant to safety precautions for both man and machine and the reporting of such hazards Content and format is as follows

(1) Hazard awareness notice Identifies the page as a hazard awareness notice page and is placed in the upper middle portion of the page and centered
(2) Documentation statement Provides relevant documentation concerning specific safety precautions and preventive measures that are applicable to particular equipment or procedures It is placed four lines below hazard awareness notice, flush left
(3) General information statement Identifies, in general terms, hazards whether to man or machine, which exist for the particular equipment This statement begins two lines below the last line of the documentation statement, flush left
(4) Specific precautions statement Provides specific directions to personnel concerning safety. The statements remind personnel that death, personal injury, and equipment damage can result from carelessness, failure to comply with approved procedures, violations of WARNINGS, CAUTIONS, and safety regulations It is placed two lines below the last line in the general information statement, flush left
(5) Hazard reporting statement Identifies the requirement of personnel to report all hazards and the activity to whom such reports should be sent This statement is placed two lines below the last line in the specific precautions statement, flush left.

(d) Table of contents Lists all contents of the document If more than one volume is used, the first volume contains a complete listing for all volumes Subsequent volumes contain only a listing for the respective volume Content and format are as follows

(1) Table of contents Identifies the page as the table of contents page and is located in the upper middle portion of the page and centered.
(2) Contents Identifies the heading beneath which the contents of the document is shown and is placed four lines below the table of contents flush left
(3) Volume number Identifies the volume number when there is more than one volume and is placed two lines below contents and indented two spaces
(4) Section number and titles Identifies the major sections of the document and is located two lines below the volume number, if applicable, or two lines below contents when there is only one

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volume The section titles are indented two spaces and numbered consecutively, using Arabic numbers

(5) Section contents Identifies section contents by paragraph titles, begins one line below section number and title, and is indented two spaces

(6) Page Identifies the heading beneath which the page number of the content items is shown Page is placed on the same line as contents, flush right The page numbers are placed on the same line as the respective content item

(7) Running dots Shall connect the content items and the page item

(e) How to use the simulator software utilization handbook. Provides a general description of the composition, function, and use of the document as well as statements relevant to security and safety Content and format are as follows

(1) How to use simulator software utilization handbook Identifies the page as the how to use the SSUH page and is centered in the upper middle portion of the page

(2) Composition Identifies the heading beneath which statements concerning the content and structure of the document is shown The composition statements begin four lines below how to use the SSUH, flush left The statements must be in narrative form and must begin on the same line and to the right of composition

(3) Function Provides statements concerning the function, application, and constraints of the document and should be located two lines below the last line of the composition statements, flush left The function statements must be in narrative form and begin on the same line and to the right of function

(4) Use Identifies the heading beneath which statements concerning the use of the handbook are shown and is placed two lines below the last line of the function statements, flush left The statements will be in narrative form and must begin on the same line and to the right of use

(5) Security Identifies the statements concerning the handling and safeguarding of the document and is placed two lines below the last line in the previous statement, flush left The statements, themselves, will be in narrative form and must begin on the same line and to the right of security Each SSUH bears the highest security classification demanded by its contents Classification is in accordance with DoD 5220 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

(6) Safety Identifies the statements pertaining to safety awareness and is placed two lines below the last line of the security statement, flush left The statements are in narrative form and must begin on the same line and to the right of safety

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5 21 3 5 Section I, operating procedures. This section provides the user with complete procedures for operating the simulator, including the computer and the associated peripherals Content and format are as follows.

(a) Section number Identifies the number of the section and is placed in the upper portion of the page, flush left

(b) Operating procedures. Identifies the section as the operating procedures section and is placed on the same line and to the right of the section number

(c) Procedure number and title. Identifies the number and title of the procedure and begins two lines below the section number, flush left The procedure number is a two-part Arabic number consisting of the section number and a sequential procedure number Only those procedures necessary to exercise the various software functions must be identified as follows·

(1) Use of safety equipment and emergency conditions unique to the training equipment.
(2) Procedures for placing the simulation equipment in a power-on/turn-on condition
(3) Procedures for loading the simulation equipment computer programs and files, including the use of all computers and peripherals
(4) Procedures for exercising the simulation equipment's self-test programs/provisions to obtain system go/no go indications
(5) Setting up exercises and operating the simulation equipment during training sessions
(6) Procedures for using computer system vendor or simulation developer performance monitoring and support functions available in the on-line mode.
(7) Procedures for recovering from a power-fail or casualty condition
(8) Procedures for integrating (coupling) the simulation equipment with other simulation equipment, if applicable
(9) Placing the simulation equipment in a power-off/turn-off condition.

(d) Steps Identifies the step-by-step directions required to accomplish the procedures. The steps begin two lines below the procedure number and title and are indented two spaces Arabic numbers are used to number the steps

5 21 3 6 Section II, readiness and system testing This section provides the user with complete procedures for loading, running, and analyzing all readiness and system testing programs Content and format as follows

(a). Section number Identifies the number of the section and is placed in the upper portion of the page, flush left

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(b) Readiness and system testing Identifies the section as the Readiness and system testing section and is placed on the same line and to the right of the section number.

(c) Procedure number and title Identifies the number and title of the procedure and is placed two lines below the section number, flush left The procedure number is a two-part Arabic number consisting of the section number and a sequential procedure number Only those procedures necessary to thoroughly test the software, including the procedures for loading, running, and analyzing the results, must be identified for the following

(1) Simulation equipment systems test program.
(2) Simulation equipment weekly operational readiness test program
(3) All maintenance and diagnostic programs required for commercial vendor computers/equipments, which are part of the simulation computer complex used in support of the simulation equipment
(4) Any other programs, routines, or verification processes used to determine the operation or maintenance status of the simulation equipment, the related parts, and support equipment

(d) Steps Identify the step-by-step directions required to accomplish the procedure They being two lines below the procedure number and title and should be indented two spaces Arabic numbers must be used for numbering the steps

(e) Intersystem/intrasystem data flow. Provides in narrative and tabular form a detailed, logical description of all data units, all messages, and the usage of all control signals for inter/intrasystem data flow This section will provide information similar to the portion of the Interface Design Specification (IDS) which specifies the addressing, controlling, and formatting for data communication in the system This section begins four lines after the readiness and system testing procedures

5 21 3 7 Section III, software utilization This section provides the user with complete procedures for performing all utility programs Content and format are as follows

(a) Section numbers Identify the number of the section and are placed in the upper portion of the page, flush left

(b) Software utilities Identifies the section as the Software Utilities section and is placed on the same line and to the right of the section number

(c) Procedure number and title Identifies the number and title of the procedure and is placed two lines below the section number flush left Two-digit Arabic number consisting of the section number and a sequential procedure number must be used The procedures must be those required for the support and operation of the simulation

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equipment and all utility programs provided with or used during the development and testing of the simulation equipment

(d) Steps Identify the step-by-step directions required to accomplish the procedure They begin two lines below the procedure number and title and must be indented two spaces Arabic numbers must be used for numbering the steps

(e) Explanations and examples. Provide detailed explanations and examples of the use of all functions, commands, options, and format of the computer utility programs and operating system They begin four lines below the software utilities procedures and are in narrative form

5 21 3 8 Section IV, support software file generation. This section provides the user with procedures and information on file generators Emphasis should be placed on including (in the Glossary of Abbreviations, Mnemonics, and Terms) any such abbreviation, mnemonics, or terms that are used in this section which are not of common usage or standard terminology of the system being simulated Content and format are as follows

(a) Section number Identifies the number of the section and is placed in the upper portion of the page, flush left

(b) Support software file generation Identifies the section as the Support Software File Generation section and is placed on the same line and to the right of the section number.

(c) Procedure number and title Identifies the number and title of the procedure It begins two lines below the section number flush left A two-digit Arabic number consisting of the section number and a sequential procedure number is used for numbering the procedures Only those procedures required to load, operate the file generators, and verify the contents of the files produced by each of the file generators required in supporting the simulation equipment must be used

d Steps Identify the step-by-step directions required to accomplish the procedure. They begin two lines below the procedure number and Title and must be indented two spaces Arabic numbers must be used for numbering the steps

e Descriptions and explanations The descriptions and explanations section begins four lines after the support software file generation procedures and provides detailed descriptions and explanations of the software file generation process as follows

(1) Descriptions of all operating modes of each file generator and all available options in the selection of modes and the designation of input/output peripheral equipment for the use of generation of the file

(2) Descriptions and examples of the manipulation and file management of files generated, such as copying from one media to

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another, duplicating a file or file set, renaming a file, and file backup procedure

(3) Descriptions of procedures used when combining files to produce a composite file or creating files that contain files previously created by one or more of the other file generators

(4) Explanation of any input term along with examples for the scaling or normalization of terms or derivation of special variables unique to the simulator manufacturer's design

(5) Examples of all file generator work sheets, specification sheets, or applicable criteria

5 21 3 9 Section V, performance characteristics verification This section provides the user with descriptions of software flow, performance characteristics, and verification processes Contents and format should be as follows

(a) Section number Identifies the number of the section and is located in the upper portion of the page, flush left

(b) Performance characteristics verification Identifies the section as the Performance Characteristics Verification section and is placed on the same line and to the right of the section number

(c) Software description and flow diagram Provides a detailed description and flow diagram of the simulation software flow of both programs data and execution control Functional relationships of the modules, as well as the interfaces among modules should be described It begins two lines below the section number, flush left and the description should be in narrative form

(d) Performance characteristics Provides a description of how specific performance characteristics are affected by variable parameters, both by direct and indirect relationships It is placed four lines below the Software Description and Flow Diagram section and is in narrative or tabular form.

(e) Verification process Provides a step-by-step verification process to be used to support personnel in evaluating files generated by the support software It beings four lines after the Performance Characteristics section and is in narrative form or outlined similar to a procedure Emphasis must be placed on isolation and correction of unexpected results caused by the direct or indirect relationship of input variables or generator parameters

5 21 3 10 Appendix. This section provides the user with the supplementary information essential to the use of the SSUH The appendixes must be as follows

(a) Appendix A - applicable documents Provides a list of all referenced documents to include their title, identification or serial number, exact date of issue, and publisher

(b) Appendix B - abbreviations, mnemonics, and other terms Lists all

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nonstandard abbreviations, mnemonics, and other terms unique to the simulation equipment

5 21 3 11 SSUH assembly The SSUH is prepared in accordance with the requirements set forth in the following paragraphs

(a) Page numbering Front matter pages are numbered consecutively with lower-case Roman numerals The cover page is not numbered, although it is counted as page i of the front matter Each section page is numbered consecutively in Arabic numerals and placed in the lower-middle of each page Appendix pages are initially identified with a capital letter, starting with A and then consecutively with Arabic numerals (e g , A-1, A-2, B-1, B-2)

(b) Separator sheets Separator sheets, or tab dividers, provide the user with quick access to the various sections, when necessary, and shall be used to separate the major sections of the SSUH as follows

(1) Section I, Operating Procedures
(2) Section II, Readiness and System Testing
(3) Section III, Software Utilities
(4) Section IV, Support Software File Generation
(5) Section V, Performance Characteristics Verification
(6) Appendix

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5 22 TECHNICAL HANDS-ON TRAINING SYSTEM PACKETS

5 22 Technical hands-on training system packets The technical hands-on training system is a self-paced form of instruction designed to teach the trainee operation and maintenance skills in lieu of formal stand-up instruction This section describes the format, content, and development guidelines of the technical hands-on training system packets as specified in the military standard and in DI-H-7078

5 22 1 Use The technical hands-on training system packets serve as the principal method of instruction for the trainee receiving training on equipment and to assist the trainee in researching documentation for operation, maintenance, and troubleshooting information In the course, the trainee uses the approved documentation such as operator and maintenance manuals, commercial books, engineering drawings, and schematics Each trainee works independently at essentially his own pace An instructor is present to assist the trainee, as required, and to follow and evaluate the progress of the trainee

5 22 2 Elements The technical hands-on training system is a series of individualized instructional packets. For the purpose of this section, the technical hands-on training system packets must be referred to as "Packet(s) " The packets are as follows

(a) Student training packets Each packet leads the trainee through learning and troubleshooting problems in a "closed-loop" manner from the packet, to the maintenance documentation, to the equipment for practical hands-on application, and then back to the packet for recording the findings

(1) Packet 1 - introduction This packet contains information which must be read by the trainee before the course is started

(2) Packet 2 - individually titled These packets consist of two groups and may be produced in the quantity as required The two groups are as follows

(a) Common core This packet provides background and fundamental information, and lists the prerequisites to be completed sequentially

(b) Specific equipment/subject matter This packet, or blocks of packets, contains information on specific pieces of equipment or subjects They may be completed in order, when required, or at random

(3) Packet 3 - references. This packet contains a list of all information used throughout the technical hands-on training system course and must be positioned as the last packet in the series of packets It must be developed if the complexity of the subject matter requires it

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(b) Instructor guide packet This packet is developed in sufficient depth to be the instructor's primary teaching document in support of the entire course

5 22 3 Development The approved training materials outline serves as the basis to develop the packets Guidelines for developing and submitting the training materials outline are described in 5 10 The following paragraphs provide suggestions and examples for developing and assembling the packets

5 22 3 1 Cover development The first sheet will constitute the cover for each packet and will contain the name reflecting the specific equipment/subject matter Each packet must be sequentially numbered Each packet bears the highest security classification demanded by its contents Classification is in accordance with DOD 5220 22-M or OPNAVINST 5510 1, and applicable contracting activity instructions

5 22 3 2 Student training introduction packet development A cover (see figure 5-22-1) and a table of contents (see figure 5-22-2) must be prepared for this packet All information in the introduction packet must be formatted in the order listed as follows (see figure 5-22-3)

(a) Purpose This section will state the purpose of the technical hands-on training system and the training course and must be stated in positive terms to motivate the trainee to achieve the course objectives It contains an overview of what is to be taught, what the trainee must do during the course, and must address the trainee's need to know the task being taught

(b) Description of training course This section states that the training course consists of individual packets presented in a self-paced format The training packets direct the trainee to perform troubleshooting and maintenance on the device and refers the trainee to the actual technical manuals used to operate and maintain the equipment

(c) Packets and assigned numbers This section provides a list of the packets developed for the technical hands-on training course The list is arranged numerically by assigned packet number with the subject title following A list of the text materials to be issued with the course shall appear as an appendix The statement "FOR TRAINING USE ONLY" shall be printed in the lower middle of each page that provides operation or maintenance instructions

(d) Instructions for use of packets This section provides detailed assistance for the use of the packets The following information and guidance is provided to the trainee

(1) How to complete assignments
(2) How much time is allotted for course completion
(3) What to do in case the course cannot be completed

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(4) Requesting instructor aid
(5) How to use the maintenance documentation
(6) Proceeding to hands-on tasks
(7) Requesting an evaluation
(8) Returning the course materials

e Description and summary of individualized packet sections I, II, and III This section briefly describes and summarizes the three sections into which each instructional packet is divided: section I, instructional information, section II, training assignments, section III, troubleshooting procedures

f. Role of the instructor. This section explains the role of the instructor in the technical hands-on training system course It must emphasize that even though this course is administered through a self-paced, individualized method, an instructor must always be available The instructor is to help in directing the trainee to the correct documentation, answering questions, monitoring hands-on tasks, scheduling equipment time, and evaluating trainee progress

g Maintenance recommendations. This section describes the recommendations for maintaining copies and updating the packets

h Safety procedures and rules This section must emphasize personnel and equipment safety procedures and rules All hazardous or potentially hazardous operational and maintenance tasks must be identified. Safety rules for operating the training equipment must be listed here Basic first aid procedures must be listed to support the event of electrical shock. Safety precautions must be emphasized throughout the entire group of packets

5 22 3 3 Individual titled packets development The title and number of each common core and specific equipment/subject matter packet must be placed on the cover (see figure 5-22-4)

The common core packets must contain packets which must be completed first and in numerical sequence They will provide background, fundamental, prerequisite information, and an overall general framework of knowledge and skills the trainee will need before commencing work on each system, subsystem, or equipment

The specific equipment/subject matter packets must be packets, or blocks of packets, on specific system, subsystem, equipment, or components Following completion of all common core packets, the trainee will complete all packets on specific equipment/subject matter The packets, or blocks of packets, may be completed in any order or at random The trainee may be required to proceed sequentially through a given block of packets, if necessary, for continuity

The packets contain up to three sections and are developed in the following format

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(a) Section I Section I is an introduction to the individualized titled packet (see figure 5-22-5) It must contain the following

(1) Specific behavioral objectives The objectives to be attained during utilization of this packet must be listed first and contain the behavior to be learned, the condition in which it will be performed, and the standard to be applied Objectives must be measurable and be directly applicable to the lesson

(2) Reference materials. All the materials the trainee will need for completion of this particular packet must be listed This includes, but is not limited to maintenance documentation such as operation and maintenance manuals, engineering drawings, and vendor manuals

(3) Prerequisites. All packets that must be completed prior to beginning this packet must be listed It must also include in the list any supplemental instructions that must be accomplished prior to commencement of this packet, such as other maintenance courses. The information provided must be limited to only items that provide skills and knowledge necessary for comprehension and completion of this packet

(4) Overview and summary. This area must inform the trainee of the intent of the packet and how it applies to the overall course objective. Special instructions for the completion of this packet or areas that require special emphasis are to be identified here. These instructions would be unique and not apply to the other packets in the course

(b) Section II The purpose of section II is to provide instructions related to system functions and theory of operation and may contain assignment, information, problem, or diagram type sheets It must include work or training assignments that are to be followed step-by-step with specific instructions, directions, and questions (see figures 5-22-6 and 5-22-7) It is organized by assignments and must include the following:

(1) Instructions. Each assignment must have directions for the trainee to follow and must lead him to reading material The reading material consists of the maintenance documentation and any supplemental information being provided The instructions must lead to the equipment or subsequent exercises to be performed to accomplish the objectives of the assignment Subsequent exercises may consist of problems or questions that the trainee must complete in order to demonstrate his mastery of the assignment

(2) Reference materials All the materials used to develop this packet as well as the materials necessary for the trainee to complete the assignments must be listed Normally this list

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must include the references listed in section I and additional materials used for course development

(3) Reading material Troubleshooting problems for the trainee to analyze must be listed These problems must be theoretical and must be in a work sheet format Provide the trainee ample space to supply answers or information This type of material must be kept to a minimum and will be used to reinforce information learned in the assignment

(4) Information sheets, figures, and diagrams Materials used to supplement reference materials must be included in this area These materials are included only if the information is not found in the references or is divided over several references This information may take the form of simplified explanations, background or clarifying information, or diagrams used to supplement maintenance documentation. Only material that supports the specific behavior objectives must be included and numbered to correspond with the related assignment

(c) Section III Section III is required for all individual titled packets It contains troubleshooting instructions for the instructor-induced problems that are indicative of maintenance tasks These troubleshooting exercises should be representative of the problems that may occur on operational equipment (see figures 5-22-8 and 5-22-9). To assist in the development of work sheets, refer to 5 9 The following must be included in section III

(1) Instructions The instructions must include the objectives of the assignment and the procedures for the trainee to follow to complete the task. These instructions must lead the trainee to a work sheet and allow the trainee to proceed through the assignment in a logical manner

(2) Troubleshooting problems The problems selected for the assignments must be sufficiently varied so that the specific behavior objectives are tested. They must be significant to the maintenance history, or expected maintenance history of the equipment, and must require the trainee to utilize the maintenance documentation for circuit analysis The number of problems must be appropriate to the complexity of the equipment and may advance from simple to difficult This can be in the form of providing organizational level maintenance problems, then progressing to intermediate level maintenance problems if both levels are included in the course objectives

(3) Work Sheets The work sheet requests information from the trainee in a step-by-step fashion that will lead the trainee through the problem in a logical order. Space must be provided to the trainee for recording the information attained while performing the task References that the trainee may use are not listed here The trainee can be required to list the

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references necessary for the problem. Space may be left at the end of each assignment for the instructor's initials acknowledging trainee completion of assignment

(d) Figures Figures that will be used as supplemental information to the maintenance documentation must be placed after section III The figures must be numbered according to the assignment they support and placed in the packet sequentially The figures may be line drawings, photographic, or illustrative, but must be reproduced on the same type paper as the body of the packet (see figure 5-22-10)

5 22.3 4 Reference packet development All reference material used in the development of the packets, such as maintenance documentation, operator manuals, and other supplemental information must be listed in the reference packet The list must be descriptive providing both complete titles and publication numbers as applicable It must also contain a complete glossary of acronyms used in the packets and their definitions. Since the Reference packet is the last packet in a series, the number assigned to it must be the final packet sequence number

5 22 3 5 Instructor guide packet development The title and number of each instructor guide packet must be placed on the cover (see figure 5-22-11) This packet is used to support the other course packets It must be designed so that the instructor does not require any other materials to conduct the course, with the exception of the equipment and reference documentation used by the trainee It must include instructions and guidelines for the implementation of the technical hands-on training system course, set-up procedures for the troubleshooting problems, a list of malfunctions, and the manner in which they are to be inserted into the equipment, answers to work sheet questions found in the individual instructional packets, and a record of trainee progress by objectives

(a) Instruction development. The instructions must explain the different individually titled packets, the overall objectives of each packet, and the purpose of the three sections in the individually titled packets. The methods of implementation are to be detailed including directions for the trainee to follow, and instructions regarding the trainee progress, such as completion matrices to be developed by the instructor The directions for the trainee must include personnel and equipment safety precautions and instructions on when the trainee is to go to the instructor for progress checks These progress checks allow the instructor to schedule the equipment for laboratory times according to the progress of the trainee as well as check for correct completion of the objectives

(b) Answers to questions All questions found in section II of the individually titled packets must be repeated in the instructor guide packet in the same format and numbering system. The answers to the questions must be typed in upper case letters in the space provided

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It is not necessary to repeat the reading material as listed in the individually titled packets in the instructor guide packet (see figure 5-22-12)

(c) Completed job plans The job plans or troubleshooting work sheets found in section III of the individually titled packets must be repeated in the instructor guide packet, but must have the expected results typed in upper case letters in the space provided Figures found in the individually titled packets need not be placed in the instructor packet

(d) Set-up procedures development These procedures must outline the steps to be followed for the fault insertion, troubleshooting, and correction of the instructor-induced problems that are used for completion of section III in the individually titled packets These steps must lead the instructor through the process of inserting the fault, including the method for simulating the fault, emphasizing personnel and equipment safety precautions Steps for the trainee to follow may be included in the set-up procedures as well Once the trainee has completed troubleshooting, the instructions must detail the method for correction of the problem and any tests of the system that may be necessary to ensure the equipment is fully operational after the completion of the laboratory assignment (see figure 5-22-13)

(e) Malfunction chart development The malfunctions to be inserted by the instructor must be designed so the trainee will have to isolate, identify, indicate, and then repair or recommend a procedure for correction of the problem. The quantity of appropriate problems must be from five to ten depending on the complexity of the equipment The malfunctions must be listed on a chart in the order of difficulty, simple to complex, and each assignment in the packets should have an individual chart The chart must include the malfunction, the method for simulating the malfunction, the applicable drawing number if desired, and the expected symptom (see figure 5-22-14).

5 22 3 6 Text materials A complete set of all documentation used with the course must be provided to each trainee. Maintenance documentation includes system, subsystem, or equipment operator and maintenance technical manuals or handbooks, publications, computer documentation if instruction on a computer is included in the course, vendor documentation, maintenance drawings, schematics, and block diagrams A list of the documentation to be issued with the course is appendixed to the "Packets and their Assigned Numbers" in the student training introduction packet

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TECHNICAL HANDS-ON TRAINING SYSTEM

STUDENT TRAINING PACKET NUMBER 1

COMPUTER SYSTEM SEL/77

INTRODUCTION

FIGURE 5-22-1 Example student training introduction packet cover

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PACKET 1

INTRODUCTION

TABLE OF CONTENTS

Paragraph		Page
1-1	Purpose of the technical hands-on training system	1
1-2	Description of the training course	1
1-3	Packets and assigned numbers	2
1-3-1	Packets and assigned numbers appendix	3
1-4	Instructions for using the packets	3
1-5	Description and summary of packet sections I, II, and III	4
1-6	Role of the instructor	4
1-7	Maintenance recommendations	5
1-8	Safety procedures and rules	6

FIGURE 5-22-2 Example introduction packet table of contents

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PACKET 1

INTRODUCTION

1-1 Purpose of the technical hands-on training system A continuing requirement for training newly assigned personnel exists due to the continuous turnover of Naval personnel through attrition and Permanent Change of Station (PCS) Military Orders. The development of training Packets for application on selected equipment is considered the most cost effective means of providing continuous training The purpose of the Packets is to provide the training activity with the capability of transforming newly assigned personnel into competent and efficient operator/maintenance technicians in a relatively short time, thus reducing the adverse impact of losing experienced personnel

The Technical Hands-On Training System Packets will assist the trainee in researching documentation, guide him during the practice of hands-on tasks, and help him to become more self-sufficient, confident, and proficient The hands-on exercises, work assignments, and troubleshooting problems will motivate the trainee to learn, use, and analyze reference documentation for the equipment

1-2 Description of training course The Training Packet concept, by design, only imparts knowledge and skills necessary for trainees to

1

FIGURE 5-22-3 Example introduction packet (Sheet 1 of 6)

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PACKET 1

INTRODUCTION

properly operate and maintain the device The course is further trainee-oriented in that the Training Packet concept permits the course to be self-paced. Evaluation of trainee achievement is accomplished by the criterion referenced performance tests

1-3 Packets and their assigned numbers

Student training packets

PACKET 1	Introduction to the Technical Hands-On Training System
PACKET 2	Introduction to Equipment XXXXX
PACKET 3	Computer and Peripheral Documentation
PACKET 4	Programing Concepts
PACKET 5	Input/Output Concepts
PACKET 6	System Troubleshooting

Instructor guide packets

PACKET 1	Introduction to the Technical Hands-On Training System
PACKET 2	Introduction to Equipment XXXXX
PACKET 3	Computer and Peripheral Documentation
PACKET 4	Programing Concepts

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FIGURE 5-22-3 Example introduction packet (Sheet 2 of 6)

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PACKET 1

INTRODUCTION

PACKET 5 Input/Output Concepts

PACKET 6 System Troubleshooting

1-3-1 Packets and assigned numbers appendix One copy of the following operation and maintenance documentation is to be issued to each trainee

1 Operation and Maintenance Handbook, P-XXXX

2 Maintenance Drawings, P-XXXX-S-1

3 Planned Maintenance System Documentation, P-XXXX

4 Commercial Computer Documentation Set, P-XXXX

1-4 Instructions for use of packets After completing the required reading assignments, answer each question There is no time limit for answering the questions because this course is accomplished as personal/equipment time permits. If you have any questions, ask your instructor for help The instructor will assist you in using the maintenance documentation and will schedule time for you When you are ready to be evaluated, inform your instructor Return all materials to your instructor after all Packets have been completed, or if you are unable to finish the course

3

FIGURE 5-22-3 Example introduction packet (Sheet 3 of 6)

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PACKET 1

INTRODUCTION

1-5 Description and summary of sections I, II, and III Each Packet is divided into three sections. Section I lists the objectives for that Packet so that both you and the instructor will know what can reasonably be expected from you upon completion of the Packet Section II contains assignments and laboratory exercises with no answers filled in The instructor will review your progress in each assignment, checking your answers to verify that you have obtained the correct information from the reference document and that you are proceeding in a timely manner After completion of Section II assignments, you are ready to proceed, where applicable, to Section III These assignments cover troubleshooting and will provide you with the list of tools, materials, and equipment needed General instructions on performing the maintenance and completing the troubleshooting forms will also be provided

1-6 Role of the instructor Though the Technical Hands-On Training System concept does not involve the use of a traditional instructor in a formal classroom environment, some supervision and direction must be provided The Technical Hands-On Training System instructor is important and plays a significant role in the quality of training received from this course The instructor will follow the

FIGURE 5-22-3 Example introduction packet (Sheet 4 of 6)

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PACKET 1

INTRODUCTION

Instructor Guide to check your progress and to identify problem areas The instructor reviews your progress and ensures that you comprehend the subject matter before you proceed to the next assignment The instructor may assign additional assignments if you are having difficulty completing an assignment You shall inform the instructor before beginning any laboratory exercise The instructor must schedule the equipment and ensure that the status of the equipment will support the lab exercise You may notice that you require a considerable amount of individualized attention in the beginning of the course, but as you progress through the course you will become more proficient and the need for guidance will decrease All assignments and laboratory exercises shall always be discussed with the instructor

1-7 Maintenance recommendations A Training Material Support Program has been established for the purpose of improving this material It is your responsibility to become familiar with appropriate elements of this program, and you are to submit suggestions for improvement There will be no changes in this material until authorized by the course supervisor

5

FIGURE 5-22-3 Example introduction packet (Sheet 5 of 6)

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PACKET 1

INTRODUCTION

1-8 Safety procedures and rules The following regulations are mandatory and must be observed at all times These regulations are necessary to personnel and equipment safety Remember, the trainer/equipment must be ready for operation or training the next day or shift

a Obtain the instructor's permission prior to performing any work on the trainer/equipment

b Never operate or perform maintenance on the trainer/equipment without a designated observer or partner/assistant

c Never remove any module, wire, component, etc , or make any change in adjustments without approval form your instructor

d Observe all safety precautions unique to the operation or maintenance of the specific trainer/equipment, computer equipment, or motion base systems

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FIGURE 5-22-3 Example introduction packet (Sheet 6 of 6)

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TECHNICAL HANDS-ON TRAINING SYSTEM

STUDENT TRAINING PACKET NUMBER 4

COMPUTER SYSTEM SEL/77

PROGRAMING CONCEPTS

FIGURE 5-22-4 Example individual packet cover

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PACKET 4

SECTION I

PROGRAMING CONCEPTS

A Objectives Unless otherwise specified, the following objectives will be accomplished in accordance with the conditions and standards as described in Packet 1. Upon completion of this Packet, the trainee will be able to

1 Given the coded instruction, memory location, and original General Purpose Register (GPR) initial data state, determine the GPR contents after instruction execution and verify this data on the Serial Control Panel (SCP) readout

2 Given the name or coding of an instruction, determine the memory locations and registers used during the execution of the instruction.

3. Given a flow chart, generate a machine language program and check its accuracy by running it on the machine

B Reference materials.

1 Technical Manual, XXXXX Series Computer, Publications Number P-XXXXX-X (Book 1).

2 Reference Manual, XXXXX Series Computer, Publications Number P-XXXXX-X (Book 1).

C Prerequisites Completion of Packets 1 through 5 is required prior to starting this Packet

1

FIGURE 5-22-5 Example individual titled packet, section I
(Sheet 1 of 2)

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PACKET 4

SECTION I

PROGRAMING CONCEPTS - Continued

D Overview This Packet is designed to give you a working knowledge of the machine language instructions As you progress through this course, you will find that a working knowledge of the machine language instructions will not only make the material easier to understand, but will simplify many troubleshooting problems you may encounter with this system This will aid you in meeting the overall course objective of learning how to maintain this system For this reason, it is important that you place a greater emphasis on this Packet and strive to obtain the maximum benefit from it

2

FIGURE 5-22-5 Example individual titled packet, section I (Sheet 2 of 2)

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PACKET 4

SECTION II

ASSIGNMENT SHEET 4-II-3

PROGRAMING CONCEPTS

A Objectives

Upon successful completion of this lesson, you will be able to

1 Determine how the logical instructions affect the Condition Code

B Study assignment

1 Read Technical Manual, XXXXX Computer, P-XXXX-X (Book 1), paragraphs 64 through 79 and refer to figure 3

C Study questions

3-1 How do Logical instructions affect the Condition Code?

_____

_____

3-2 Given Contents of GPR5 = 6767222

Memory location 01100 = 81075795

Instruction = 86801101

What will be the contents of GPR5 after instruction execution?

_____

3-3 Given Contents of GPR5 = A5A5A5A5

Contents of GPR7 = 31224244

(Sheet 1 of 2)

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FIGURE 5-22-6 Example individual titled packet, section II, assignment sheet (Sheet 1 of 2)

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PACKET 4

SECTION II

ASSIGNMENT SHEET 4-II-3

PROGRAMING CONCEPTS

Instruction = 06F0

What will be the contents of GPR5 after instruction execution?

3-4 Given Contents of GPR5 = 55AA6622

Memory location 01200 = 07465795

Instruction = 8A881202

What will be the contents of GPR5 after instruction execution?

(Sheet 2 of 2)

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FIGURE 5-22-6 Example individual titled packet, section II, assignment sheet (Sheet 2 of 2)

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PACKET 4

SECTION II

INFORMATION SHEET 4-II-3

SEL MAINTENANCE DOCUMENTATION

A Introduction. This information sheet is designed to provide you with an understanding of the technical documentation for the SEL Computer System

B References Technical Manual, XXXXX Series Computer, P-XXXXX-X (Book 1)

C Standard hardware manuals Standard SEL hardware manuals are supplied for each SEL manufactured model within the system Each hardware manual contains revision instructions and revision history and lists the changes which have been incorporated An example of the drawing level control is provided on the first sheet of a drawing set The level of the drawing set and each individual page along with Engineering Change Orders (ECO) by revision level are shown on this page

The Firmware or PROM Control Listing provides the control point for all PROM's and Firmware Listings associated with that specific product.

In addition to standard hardware manuals, system configuration

(Sheet 1 of 2)

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FIGURE 5-22-7 Example individual titled packet, section II, information sheet (Sheet 1 of 2)

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PACKET 4

SECTION II

INFORMATION SHEET 4-II-3

SEL MAINTENANCE DOCUMENTATION

documents reflecting the unique aspects of the configuration are provided with each system

D Assembly drawing A System Assembly Drawing (103 prefix) depicts, in block diagram format, all elements of the entire system and their interconnections The 103 drawing includes unit and model numbers and a pictorial layout showing unit assemblies in the SEL furnished cabinets

A Unit Assembly Drawing (104 prefix) shows all elements of the unit in either pictorial or block diagram form

(Sheet 2 of 2)

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FIGURE 5-22-7 Example individual titled packet, section II, information sheet (Sheet 2 of 2)

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PACKET 4

SECTION III

TROUBLESHOOTING WORK SHEET 4-III-1

A Objectives

Upon successful completion of this lesson, you will be able to

1 Determine if the reported malfunction actually exists on the equipment

2 Locate and use the correct maintenance documentation

3 Determine the proper test equipment required to trouble-shoot the malfunction

4 Isolate the cause of the malfunction

B Work Assignment

1 Identify and troubleshoot problems inserted by your instructor

C Procedure

1 The referenced reading assignments and prints used within this packet, in addition to the material covered in the preceding packets, must provide sufficient data to enable you to effectively troubleshoot the inserted problems

2 Be sure to complete a general troubleshooting Work Sheet as you progress with troubleshooting the problem

(Sheet 1 of 2)

FOR TRAINING USE ONLY

FIGURE 5-22-8 Example individual titled packet, section III, troubleshooting work sheet (Sheet 1 of 2)

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PACKLT 4

SECTION III

TROUBLESHOOTING WORK SHFET 4-III-1

NOTF Proper analyzation can, at times, determine the cause of a problem without the aid of test equipment

(Sheet ? of ?)

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FIGURE 5-22-8 Example individual titled packet, section III, troubleshooting work sheet (Sheet 2 of 2)

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PACKET 4

SECTION III

TROUBLESHOOTING WORK SHEET 4-III-1

Problem Number_____ Name_____

Date_____

A INTRODUCTION.

At this time the instructor will insert a problem into the system, subsystem, or equipment for you to troubleshoot

B JOB STEPS

Step 1. Observing all personnel, electrical, and equipment safety precautions, perform steps 2 through 15

Step 2. Reported problem._____

_____

Step 3 Observed symptoms _____

_____

Step 4 Circle one:

Actual problem? Yes/No or Cannot determine? Yes/No

Step 5 If , cannot determine explain, citing references _____

_____

_____

Step 6 Result of visual checks _____

_____

(Page 1 of 4)

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FIGURE 5-22-9 Example individual titled packet, section III, troubleshooting work sheet. (Sheet 1 of 3)

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PACKET 4

SECTION III

TROUBLESHOOTING WORK SHEET 4-III-1

Problem number _____

Step 7 List the references you intend to use to troubleshoot the problem _____

_____

Step 8 List the test equipment you intend to use to troubleshoot the problem, stating the reason for selection _____

_____

_____

Step 9 Intended troubleshooting plan _____

_____

_____

Step 10 Stop at this point and have the instructor check your progress

Instructor check_____

SAT

Step 11 Record of actual troubleshooting steps (electrical measurements, deductions, conclusions, discoveries and other comments)

_____

_____

(Page 2 of 4)

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FIGURE 5-22-9 Example individual titled packet, section III, troubleshooting work sheet (Sheet 2 of 3)

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PACKET 4

SECTION III

TROUBLESHOOTING WORK SHEET 4-III-1

Problem Number_____

Step 12. Actual references used _____

_____

_____

Step 13 Actual test equipment used _____

_____

Step 14. Defective card, module, or component._____

_____

_____

Step 15. Intended corrective action _____

_____

_____ _____

Trainee signature Instructor signature

(Page 3 of 4)

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FIGURE 5-22-9 Example individual titled packet, section III, troubleshooting work sheet (Sheet 3 of 3)

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PACKET 4

SECTION III

TROUBLESHOOTING WORK SHEET 4-III-1

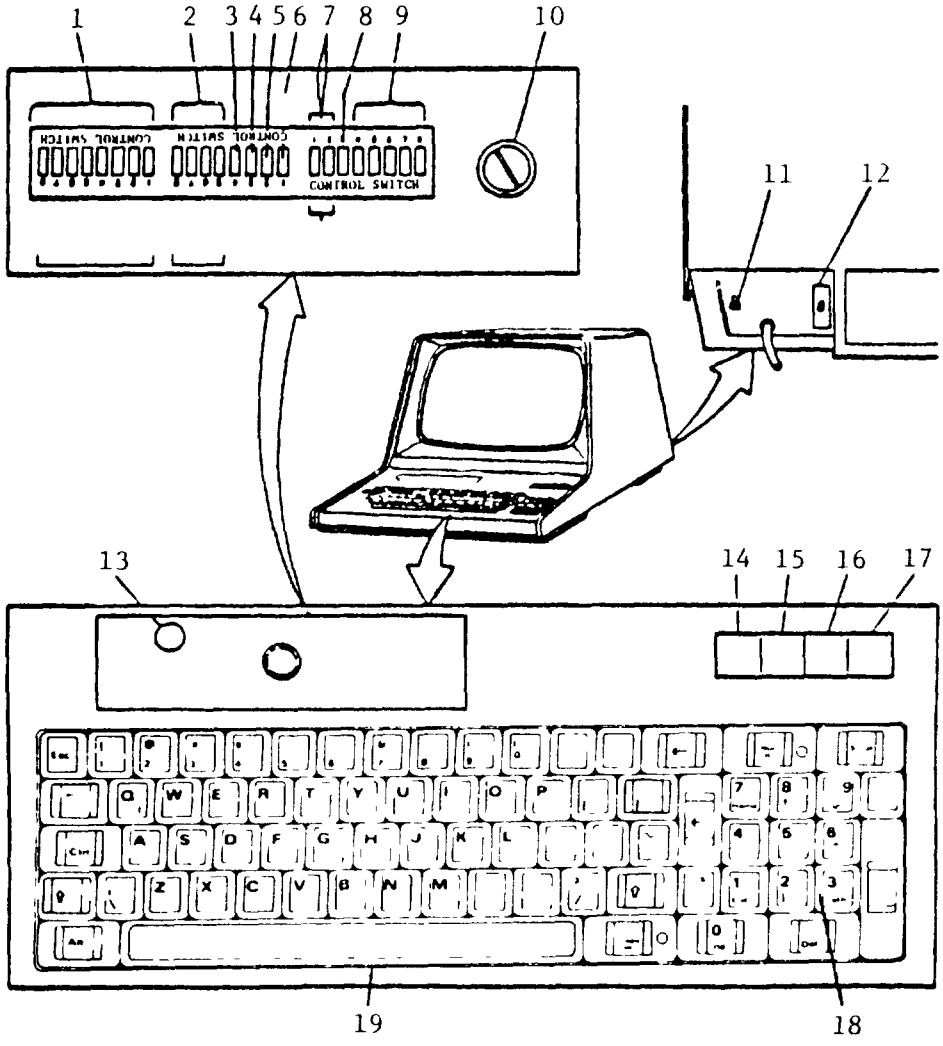

FIGURE 1 Introduction to SEL 32/77 computer system

(Page 4 of 4)

SH1320316 35

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FIGURE 5-22-10 Example individual titled packet, diagram sheet

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TECHNICAL HANDS-ON TRAINING SYSTEM

INSTRUCTOR GUIDE PACKET 4

COMPUTER SYSTEM SEL/77

PROGRAMING CONCEPTS

FIGURE 5-22-11 Example instructor guide packet cover

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NAVTRADEV P-5118

INSTRUCTOR GUIDE

PACKET 4

SECTION II

ASSIGNMENT SHEET 4-II-1

PROGRAMING CONCEPTS

VISUAL VITAL IV MAINTENANCE DOCUMENTATION

E Application

1-3 Utilizing the documentation set supplied to support the maintenance of the Visual Vital IV System answer the following questions

a The Visual Vital IV System, on the trainer, is supported by a flexible disk drive that uses a 5 or 8 inch diskette In what document would the technical information be located NAVTRADEV P-5124

b The name of the V-76 minicomputer diagnostics is 'Maintain III In what vendor documentation would you locate information on how to load and execute the computer diagnostics? 98A 9452 075

c Which manual would you refer to for the Index of Applicable Publications used on the V-76 minicomputer? NAVTRADEV P-5124, Vol. 1, Table 1-3

(Sheet 2 of 4)

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FIGURE 5-22-12 Example instructor guide packet, answers to questions

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NAVTRADEV P-5118

INSTRUCTOR GUIDE

PACKET 6

SECTION III

SET-UP PROCEDURES 6-III-1

TROUBLESHOOTING EXERCISE ON THE 2F132 VISUAL

VITAL IV DEVICE, RASTER BLASTER OCCULTER SHADER (RBOS)

A Title

Control Logic (A10), X-Computer (A9), and Y-Computer (A11) Troubleshooting

B Procedures

1 Ensure the availability of the Visual Vital IV System

2 Ensure all the tools, material, and equipment listed in the guide item "C" are available

3. As you set up this laboratory, note that the troubleshooting chart provides many faults to install They are listed in order of difficulty Therefore, you will have to use discretion based on the trainee's progress The troubleshooting exercises are cumulative

4. Upon completion and correction of each fault, direct the trainee to reboot the system and verify operational status

(Sheet 1 of 4)

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FIGURE 5-22-13 Example instructor guide packet, set-up procedures (Sheet 1 of 4)

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NAVTRADEV P-5118

INSTRUCTOR GUIDE

PACKET 6

SECTION III

SET-UP PROCEDURES 6-III-1

C Fault insertion

Step 1 To install a fault into the RBOS chassis, the following procedure shall be used

a. Observe all personnel and equipment safety precautions

b Place the three (3) circuit breaker switches on the back of the TASC/RBOS chassis to "OFF " It is not necessary to turn off the complete system

CAUTION

The trainee must never remove or replace a circuit board with these switches in the "ON" position To do so may cause catastrophic failure of the complete system

c Remove the cover from the front of the chassis

d Remove the component board to be faulted

e Refer to the troubleshooting chart and select a fault to be installed

(Sheet 2 of 4)

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FIGURE 5-22-13 Example instructor guide packet, set-up procedures (Sheet 2 of 4)

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INSTRUCTOR GUIDE

PACKET 6

SECTION III

SET-UP PROCEDURES 6-III-1

f Obtain a spare Integrated Circuit (IC) of the type you selected from the troubleshooting

(1) If the chart calls for an open circuit, cut the pin

(2) If the chart calls for a grounded pin, use a wire wrap tool and connect a wire from the IC pin to the component board ground, which can be found on sheet two of the appropriate drawing

g. Refer to the troubleshooting chart Notice that the column labeled "Applicable Drawing" is the MDEC drawing # and sheet # of the drawing where the IC can be found Also shown is the component board location of the IC

h. Remove the operating IC and replace it with the faulted IC

i Replace the component board and chassis cover

(Sheet 3 of 4)

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FIGURE 5-22-13. Example instructor guide packet, set-up procedures. (Sheet 3 of 4)

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INSTRUCTOR GUIDE

PACKET 6

SECTION III

SET-UP PROCEDURES 6-III-1

Step 2 When you have completed Step 1, direct the trainee to complete the troubleshooting exercise

Step 3 Each trainee shall troubleshoot at least two of the problems listed on the troubleshooting chart or one from this troubleshooting chart and one from a previous troubleshooting chart

Step 4 After each trainee completes the troubleshooting exercise, direct him to configure the system to its original condition and ensure it is operating properly

Step 5 Direct the trainee to Assignment Sheet 6-II-3

(Sheet 4 of 4)

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FIGURE 5-22-13 Example instructor guide packet, set-up procedures (Sheet 4 of 4)

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INSTRUCTOR GUIDE

PACKET 6

FAULT INSERTION/MALFUNCTION PROBLEMS 1

TROUBLESHOOTING EXERCISE ON THE 2F132

VISUAL VITAL IV DEVICE, RASTER BLASTER

OCCULTER SHADER (RBOS)

RBOS CHASSIS

IC TYPE	APPLICABLE DRAWING	SYMPTOM
1 74LS04 Lift Pin 2, YSELA - This makes output high at at all times	Drawing #H09G2249 Sheet #3 Location U-18	Deltas miscalculated due to selection of low order bits off Also selects 512 raster density when 1024 is desired
2 74LS00 Lift Pin 1, INDLMJ - This makes input high at all times	Drawing #H09G2249 Sheet #3 Location S-27	Major bits for delta left break-points never loaded
3 74LS04 Lift Pin 11, RAYR - will always be high	Drawing #H09G2249 Sheet #4 Location L-27	Shapes right edge not calculated when shape is approached due to wrong address supplied to XR storage RAMS
4 74S85 Tie Pin 6 to Pin 8 A=B always low	Drawing #H09G2249 Sheet #4 Location L-63	No picture A never equals B when calculating variable beam settling time

(Sheet 1 of 2)

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FIGURE 5-22-14 Example instructor guide, malfunction problems (Sheet 1 of 2)

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NAVTRADEV P-5118

INSTRUCTOR GUIDE

PACKET 6

FAULT INSERTION/MALFUNCTION PROBLEMS 1

RBOS CHASSIS

IC TYPE	APPLICABLE DRAWING	SYMPTOM
5 74LS257 Lift Pin 7 Always high	Drawing #H09G2250 Sheet #6 Location L-63	No color orange selected
6 74LS251 Lift Pins 12 and 13 Always high	Drawing #H09G2250 Sheet #4 Location Y-53	Flashing lightpoints in center of screen
7 74LS251 Lift Pin 8 No ground to chip	Drawing #H09G2250 Sheet #9 Location E-9	No problem in normal operation Fails diagnostics

(Sheet 2 of 2)

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FIGURE 5-22-14 Example instructor guide, malfunction problems (Sheet 2 of 2).

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5 23 STUDENT AND TRAINING EVALUATION FORMS

5.23 Student and training evaluation forms. The Student and Training Evaluation Forms provide an instrument for evaluating trainee performance, the course of instruction, and related materials. This section describes the format, content, and development guidelines for the Student Training and Evaluation Forms as specified in the military standard and DI-ILSS-80046.

5 23.1 Use. The student evaluations are primarily for the trainees' parent activities. Course evaluations are for the contracting activity and future training agents

5 23 2 Elements. The elements of the Student and Training Evaluation Forms are the Instructor Evaluation of Student, Student Evaluation of Training, User Activity Technical Manual, Technical Training and Student Status Report, Course Evaluation, and Certificate of Training.

5.23 3 Development. The Student and Training Course Evaluation Forms are developed around the need for feedback on trainee performance as well as on course materials and instruction, so that areas for improvement can be identified and adjustments made prior to administration of the next course.

5 23.3.1 Privacy act statement. An appropriate privacy act statement must be included on each form when personal identification information (i e , name and social security account number) is provided. The privacy act statement must include authority for collecting the information, the principal purpose(s) for which the information is used, other routine uses, whether the disclosure is mandatory or voluntary, the effect on the individual of not providing information, and any form designation and number.

5.23 3.2 Instructor evaluation of student form development. This form must be prepared by the instructor for each trainee attending a training program Trainee progress must be continually evaluated by instructor personnel through classroom participation, practical application exercises, special projects, homework assignments, and by tests. The Instructor Evaluation of Student Form consists of the following and must be entered as follows (see figure 5-23-1)

(a) Course information. This section must contain.

(1) Course title Provide the complete name or title of the course
(2) Course objective Provide the complete objective of the course
(3) System/equipment. Provide the complete official name of the system/equipment
(4) Course hours. Provide the total number of academic course hours including classroom and practical application.

(b). Student information This section must consist of·

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(1) Name. Provide the last name, first name, and middle initial
(2) S.S. Number Provide the trainee's social security number
(3) Parent activity Provide the complete official mailing address of the trainee including activity/agency (e.g , NSA, DCA, DLA)
(4) Rank/grade Provide the military rank or grade or, for federal employees, the General Service (GS) or Wage Grade (WG) rating
(5) Branch of service/agency Provide the branch of service or agency
(6) Personnel specialty Provide the trainee's personnel specialty code

(c) Attendance information This section must consist of

(1) Date reported for course Provide the date the trainee reported for the course
(2) Date completed course Provide date trainee completed course
(3) Hours attended Enter the actual number of hours the trainee was present for training in the classroom and for practical application

(d) Evaluation This section must consist of

(1) Attitude When evaluating attitude, include the trainee's willingness to learn, to participate in class and practical application sessions, and to apply extra effort to the learning situation
(2) Application This consists of a percentage grade to indicate the trainee's application to the new learning situation experiences and previously learned facts, principles, techniques, theories, concepts, and procedures This information could be measured by administering a pretest and comparing the results with post-test grades
(3) Practical Provide a percentage grade indicating the trainee's accomplishment of the tasks or duties performed during the practical portion of the course This grade must be based on the following factors

(a) Proper use of test equipment
(b) Proper use of documentation
(c) Proper application of safety precautions
(d) Amount of guidance or supervision needed
(e) Skill attained

Table 5-23-I may be helpful in converting values for these factors to percentage grades

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TABLE 5-23-I. Percentage grade and qualitative rating

Final average grade	Qualitative rating
91 to 100 percent	Outstanding
81 to 90 percent	Excellent
69 to 80 percent	Satisfactory
0 to 68 percent	Unsatisfactory

(4) Exam grades. The percentage grade assigned to the trainee which indicates the average grade on all progress tests and the post-test administered during the course

(5) Final average grade The percentage grade resulting from an average of application, practical and exam grades

(6) Qualitative rating. Terms "Outstanding", "Excellent", "Satisfactory", or Unsatisfactory" must be assigned by converting the final average grade (see table 5-23-I).

(7) Class standing Provide the trainee's rank order in class based upon his final average grade and the number of trainees in the class.

(e) Instructor comments. Instructor comments must amplify the grades, performance, and attitude of the trainee during the course Consideration should be given to the trainee's completion of homework assignments, and initiative in seeking either extra help or materials to aid in attaining CLOs.

(f) Name of contractor. Provide, as required, the complete name of primary contractor conducting the course

(g) Instructor in charge. Signature of the course instructor.

5.23 3 3 Student evaluation of training form development. Each trainee must be provided with a Student Evaluation of Training Form. This form provides the trainee an opportunity to critique the course material, course presentation, training aids, equipment, publications, and technical manuals The Student Evaluation of Training Form consists of the following and must be entered as follows (see figure 5-23-2)·

(a) Period of training Provide the starting and ending dates of the course

(b). Number and title of course Provide the course number and title

(c) Place where training was taken. Provide the official title of the

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activity or base where the course was conducted

(d) Part I course material This part requires rated opinions on the course material in four categories· on information received in the course, technical level, length of course, and adequacy of material

(e) Part II course presentation This part requires opinions on the adequacy of course presentation and unit presentation, difficulty and consistency of instructor presentation and ratio of amount of theory to amount of practice

(f) Part III value of training aids The part requests opinions on the adequacy of training aid application, and the quantity and quality of the training aids

(g) Part IV tools and equipment This part addresses quantity, modernity and condition of tools and equipment

(h) Part V training facilities and accommodations This part requests ratings for shops and classrooms, accommodations, and transportation

(i) Part VI opinion, remarks and recommendations of overall course This part requests an overall one-word opinion of the course as well as recommendations for improvements and previous experience and assignments, home station, division or branch, job title, name and grade, trainee signature, and the date the form is completed

5 23 3.4 User activity technical manual comment sheet This comment sheet is used for evaluating and recommending changes to technical manuals The top of this sheet must contain the date, publication number, volume number, and title nomenclature The user evaluation section provides a space for a ranking of the manual and a space for supporting comments The bottom third of the sheet provides space for describing a problem, question, suggestion or comment Provide the page, paragraph, line, figure, or table numbers as well as an explanation and reasons of the recommended changes when recommending a change (see figure 5-23-3)

5 23 3 5 Course evaluation report The course evaluation must be typed in contractor format and is prepared by the contractor. It must include all problems encountered during the conduct of the course such as deficient subject coverage, equipment failures and documentation deficiencies This report is also for recommending supplemental training

5 23 3 6 Certificate of training A certificate of training must be completed in duplicate for each trainee who satisfactorily complete the contractor-conducted course The contracting activities must supply their respective approved certificates

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INSTRUCTOR EVALUATION OF STUDENT

COURSE INFORMATION
- a. COURSE TITLE:_____
- b. COURSE OBJECTIVE:_____
- c. SYSTEM/EQUIPMENT:_____
- d. COURSE HOURS:_____

STUDENT INFORMATION
- a. NAME_____ d. RANK/GRADE._____
- b. S.S. NUMBER:_____ e BRANCH OF SERVICE _____
- c. PARENT ACITIVITY_____ f PERSONNEL SPECIALTY _____

ATTENDANCE INFORMATION
- a. DATE REPORTED FOR COURSE_____ c HOURS ATTENDED _____
- b. DATE COMPLETED COURSE_____ PRACTICAL APPLICATION ____
  CLASSROOM·_____

EVALUATION
- a. ATTITUDE:_____ d EXAM GRADES _____
- b. APPLICATION:_____ e. FINAL AVERAGE GRADE _____
- c. PRACTICAL:_____ f QUALITATIVE RATING _____
  g. CLASS STANDING _____

INSTRUCTOR COMMENTS:

_____ _____

Name of Contractor

Instructor in Charge
(Signature)

PRIVACY ACT STATEMENT: Personal information entered on this form is used to evaluate the student. Disclosure of personal information is voluntary

FIGURE 5-23-1 Example instructor evaluation of student form

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STUDENT EVALUATION OF TRAINING

1 PERIOD OF TRAINING

FROM	THRU

1 NUMBER AND TITLE OF COURSE	2 PLACE WHERE TRAINING WAS TAKEN

PART I (CHECK ONE) COURSE MATERIAL

4 INFORMATION RECEIVED IN COURSE IS ☐ A GREAT HELP IN MY JOB ☐ OF SOME HELP IN MY JOB ☐ OF NO USE IN MY JOB	5 TECHNICAL VALUE IS ☐ ABOUT RIGHT ☐ TOO DIFFICULT ☐ TOO ELEMENTARY
6 COURSE IS ☐ TOO LONG ☐ TOO SHORT ☐ LONG ENOUGH	7 COURSE MATERIAL IS CONSIDERED TO BE ☐ OUTSTANDING ☐ ADEQUATE ☐ NEEDS IMPROVEMENT (SEE ITEM 25)

PART II (CHECK ONE) COURSE PRESENTATION

8 MAJORITY OF LESSONS WERE ☐ VERY WELL PRESENTED ☐ ADEQUATELY PRESENTED ☐ POORLY PRESENTED	9 MAJORITY OF TRAINING UNITS WERE ☐ VERY WELL PRESENTED ☐ ADEQUATELY PRESENTED ☐ POORLY PRESENTED	10 INSTRUCTOR PRESENTATIONS WERE ☐ EASY TO FOLLOW ☐ DIFFICULT TO FOLLOW ☐ EASY TO UNDERSTAND ☐ DIFFICULT TO UNDERSTAND
11 THE INSTRUCTOR ☐ FOLLOWED THE SUBJECT ☐ DID NOT FOLLOW THE SUBJECT ☐ GAVE OPPORTUNITY TO ASK QUESTIONS ☐ DID NOT GIVE OPPORTUNITY TO ASK QUESTIONS	12 THEORY ☐ TOO MUCH THEORY ☐ THEORY ABOUT RIGHT ☐ NOT ENOUGH THEORY	13 PRACTICE ☐ TOO MUCH PRACTICE ☐ PRACTICE ABOUT RIGHT ☐ NOT ENOUGH PRACTICE

14 TIME DEVOTED TO EACH SESSION WAS
☐ FULLY AND EFFECTIVELY UTILIZED ☐ NOT FULLY AND EFFECTIVELY UTILIZED IN A FEW INSTANCES ☐ NOT FULLY AND EFFECTIVELY UTILIZED IN A GREAT NUMBER OF INSTANCES

PART III (CHECK ONE) VALUE OF TRAINING AIDS (Wall Charts Slides, Motion Pictures Videotapes etc)

15 USE ☐ EXCELLENT APPLICATION ☐ ADEQUATE APPLICATION ☐ POOR APPLICATION	16 QUANTITY ☐ TOO MANY ☐ ABOUT RIGHT ☐ INSUFFICIENT	17 QUALITY ☐ EXCEPTIONALLY WELL SELECTED ☐ ADEQUATELY SELECTED ☐ COULD BE IMPROVED (SEE ITEM 25)

PART IV (CHECK ONE) TOOLS AND EQUIPMENT

18 QUANTITY ☐ SUFFICIENT ☐ NOT SUFFICIENT	19 MODERNITY ☐ UP TO DATE ☐ OUT OF DATE	20 CONDITION ☐ GOOD CONDITION ☐ POOR CONDITION

PART V (CHECK ONE) TRAINING FACILITIES AND ACCOMMODATIONS

21 SHOPS AND CLASSROOMS ☐ ADEQUATE IN LIGHTING & VENTILATION ☐ INADEQUATE IN _____	22 HOUSING ACCOMMODATIONS ☐ SATISFACTORY ☐ UNSATISFACTORY	23 TRANSPORTATION FACILITIES ☐ GOOD ☐ FAIR ☐ POOR

PART VI OPINION REMARKS AND RECOMMENDATIONS OF OVERALL COURSE

24 OPINION (CHECK ONE) VERY GOOD GOOD FAIR POOR

25 MY REMARKS AND RECOMMENDATIONS FOR IMPROVING THIS TRAINING ARE

26 PREVIOUS EXPERIENCE/ASSIGNMENTS

27 HOME STATION	28 DIVISION OR BRANCH	29 JOB TITLE
30 NAME AND GRADE (TYPE OR PRINT)	31 STUDENT SIGNATURE	32 DATE FORM COMPLETED

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FIGURE 5-23-2 Example student evaluation of training form

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USER ACTIVITY TECHNICAL MANUAL COMMENT SHEET

(Use this comment sheet to provide for corrections and evaluating this publication)

DATE

PUBLICATION NO | *VOLUME NO | *TITLE NOMENCLATURE

USER EVALUATION

MANUAL IS ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ POOR ☐ COMPLETE ☐ INCOMPLETE

RELATED REMARKS

☐ PROBLEM ☐ QUESTION ☐ SUGGESTION ☐ COMMENT (check one)

RECOMMENDED CHANGE TO PUBLICATION

PAGE NO	PARA-GRAPH	LINE NO	FIGURE NO	TABLE NO	RECOMMENDED CHANGES AND REASONS

USE BLANK CONTINUATION SHEET AS REQUIRED

*To be filled in by Contractor before printing

SH132031637

FIGURE 5-23-3 Example user activity technical manual comment sheet

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5 24 TRAINING MATERIAL SUPPORT

5 24 Training material support The central concept behind the support process is the constant improvement of training materials This section describes the format, content, and development guidelines for change or revision of training materials as specified in the military standard

5 24 1 Use The training program(s) must provide effective means of training personnel throughout the life cycle of the training system The training material support process will provide updated training materials through a system that provides a means of keeping training materials current and accurate, that is responsive to changing training requirements and equipment/documentation alterations, and that is open to innovation The training material support process establishes the basis for the military standard requirement that each training program must be designed and developed in order that the program may be utilized by the Government to perform any future training

5 24 2 Elements Training material support consists of three major functions, surveillance, change, and revision

(a) Surveillance. The process involves monitoring hardware and documentation changes for impact on training materials and initiating corrective action, detecting errors or deficiencies in existing training materials and initiating corrective action, reassessing training materials on an on-going basis, and submitting recommendations for their improvement

(b) Change. The change process picks up where surveillance leaves off An interim change involves minor changes to curriculum materials to correct editorial, typographical or technical errors, format for teachability, or to incorporate urgent safety or Type Commander (TYCOM)-promulgated subjects This change will not affect course or topic learning objectives. A change involves more extensive alterations to curriculum materials such as insertion of updated topical information, a shift from one instructional strategy to another, or resequencing of courses in a training program A change will not affect course learning objectives or require additional resources

(c) Revision A revision may be a republication of existing training materials, prepared in lieu of a change whenever the volume of material is so great as to make the insertion of change pages impractical and costly A revision includes any modification to curriculum materials that affects course learning objectives or requires additional resources

5 24 3 Training material support general requirements The support submittal, review, and approval process is implemented by the contracting activity The contracting activity will establish the surveillance functions and define the coordination and interface requirements of each participating organization

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The contracting activity will also initiate a positive planning and control program to ensure efficient review, development, and production of changes and revisions

(a) Surveillance Surveillance will provide training materials feedback to keep training programs current and accurate in an environment of changing hardware, operating techniques, and training requirements The continual monitoring of hardware and documentation changes for impact, alertness for errors or deficiencies, and engaging in an on-going reassessment of training materials to initiate corrective action or submit proposals will achieve this end Surveillance begins as soon as a training material product becomes available and continues until it is removed from inventory

(b) Change Change to training materials (management documentation, curriculum materials, instructional media materials) may be developed after these materials are promulgated for use The change process for most training materials is analogous to the development process A change to any training material is issued to add, amend, correct, substitute, delete, or otherwise modify existing data A change usually affects less than 50 percent of the document being changed, and does not impact on course learning objectives or resources

(c) Revision A revision of training materials may be issued to also add, amend, correct, substitute, delete, or otherwise modify existing data, but which affects course learning objectives, requires additional resources, or the revision is of a magnitude to require a pilot of the material A revision usually affects more than 50 percent of the document being modified

5 24 3 1 Change development A change consists of three parts change pages, change materials, and change notice

(a) Change pages The change pages consist of all pages within the training materials that have been modified, corrected, or amended and those pages added or substituted The change pages are developed in the format of the existing training materials Changes in training materials must be made by reissuing new pages on which the changes are to be shown A note "change (no)" must be placed in the appropriate location on the changed page as required by the DID for each type of training material, and as shown by examples throughout the sections of this handbook Complete two-sided pages (both sides) must be replaced so that the old page can be removed and the new page inserted

During development, it is essential that each change page be checked for impact on other pages among the training materials Examples of change impacts are (1) changing a title on a topic page which requires changes to the appropriate section page, D-D-A page, and table of contents, (2) adding or deleting a reference publication on

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D-D-A pages which requires a change to the appropriate section objective page, topic page, and to the MML, (3) deletion of an instruction sheet contained in a trainee guide which requires removal of the instruction sheet, a change to the trainee guide table of contents, and changes to the appropriate D-D-A page, the appropriate topic page, and the answer Sheet, and (4) the addition of faults to the fault applicability list which requires changes to D-D-A pages, topic pages, and the MML

(b) Change materials The change materials consist of the instructional media materials (slides, transparencies, etc) that have been modified, corrected, or amended, and those that have been added or substituted Changes to some media materials are not possible due to the nature of the material When approved changes are made, the change materials are developed in the format of the existing training materials During development, it is essential that the change materials be checked for impact on the instructor guide and trainee guide, as well as other support materials

Examples of change impacts are (1) a transparency change which requires an update of the MML, changes to the appropriate topic page(s) to reflect the change number, and changes to the D-D-A page(s) where the transparency is discussed, and (2) deletion of an instruction sheet (not contained in a trainee guide) which requires changes to the MML, answer sheet, the appropriate topic page, and D-D-A page(s)

(c) Change notice Change notices are used to transmit changed training materials Change notices are not used to make or transmit complete revisions The change notice is a letter containing three basic section promulgation heading, justification, and directions for inserting the change Refer to figure 5-24-1 for an example change notice supporting training material containing a list of effective pages and figure 5-24-2 for an example change notice supporting training material that does not contain a list of effective pages

(1) The promulgation heading The promulgation heading must contain the name and address of the contracting activity, the audience (all holders of the document), the change number, the document number, the date of the change, the number of pages in the change notice itself, the number of document change pages enclosed, and the signature of approval with the name and title of the signer typed beneath the signature

(2) Justification If the required information is available, this section states that the changed pages incorporate responses to change initiation documents This phrase is followed by a list of the documents providing review and approval for the change process

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(3) Directions for inserting the change This section provides directions for inserting the changed pages For inserting the change package that is supported by a list of effective pages two columns are required (1) remove Page(s) and (2) insert page(s). Inserting a change package that is not supported by a list of effective pages requires the following columns (1) new Page, (2) change status, (3) superseded page, and (4) change status. Following the list are additional paragraphs providing instructions to enter the change into the document as required and to retain the change notice

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DEPARTMENT OF THE NAVY
CHIEF OF NAVAL TECHNICAL TRAINING
NAVAL AIR STATION
MILLINGTON, TENNESSEE 38054

To All Holders of
NAVTECHTRA 656-0179 VOL 1

CHANGE 1
DATE

TITLE Auxiliary Equipment Technician Replacement Training

Approved for
The Chief of Naval Technical Training

1 Page Page 1
(with 22 enclosures)

(NAME)
Commander, U S Navy
Head, Submarine Systems
Training Branch

1 This Change incorporates the responses to the following TMMFs, FMR, TRIDs, and TMAC

NTEC TMMF 830106/FMR 200176
NAVSEA TMMF 840139/TRID 0129
NAVSEA TMMF 840428
NAVSEA TMMF 840533/TMAC 0241
TRITRAFAC TMMF 830389/TRID 0418
TRITRAFAC TMMF 840227

2 The following pages of NAVTECHTRA 656-0179, Vol 1 have been revised They should be removed and the new pages inserted as indicated

Remove Page(s)	Insert Page(s)	Remove Page(s)	Insert Page(s)
Cover	Cover	RM-50	RM-50
ii	ii	Tab and STO-1 thru STO-11	Not applicable
iv and v	iv and v		
1 thru 3	Not applicable	ST-1 thru ST-4	ST-1 thru ST-4
FT-10 and FT-11	FT-10 and FT-11	ST-9	ST-9 and ST-9a
Not applicable	Tab and FT2-1 thru FT 2-25	ST-18	ST-18
		TM-6	TM-6
Tab and RMO-1 thru RMO-26	Not applicable	TM-9	TM-9
		DL-1	D-1

3 Record entry of Change Number on Record of Changes page and file this Change Notice in NAVTECHTRA 656-0179 Vol 1, Change 1 immediately preceding the List of Effective Pages

4 Holders of NAVTECHTRA 656-0179 Vol 1 will verify that page changes and additions indicated above have been entered This notice page will be retained as a check sheet This issuance, together with appended ages, is a separate publication and is to be retained by stocking points until this training material is completely revised or canceled

FIGURE 5-24-1. Example of change notice for material that contains a supporting list of effective pages

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DEPARTMENT OF THE NAVY
CHIEF OF NAVAL TECHNICAL TRAINING
NAVAL AIR STATION
MILLINGTON, TENNESSEE 38054

TECHNICAL HANDS-ON TRAINING SYSTEM

TO ALL HOLDERS OF STUDENT TRAINING PACKET NUMBER 1
COMPUTER SYSTEM SEL/77

CHANGE 1
DATE

1 Page Page 1
(with 5 enclosures)

(NAME)
Commander, U S Navy
Head, Submarine Systems
Training Branch

1 The following pages of Student Training Packet Number 1 have been revised and supersede the pages listed

New Page	Change	Superseded Page	Change
5	Original	5	Reprinted without change
6	Change 1	6	Original
7	Change 1	7	Original
8	Change 1	8	Original
9	Change 1	9	Original
10	Original	10	Reprinted without change
11	Original	11	Reprinted without change
12	Change 1	12	Original
13	Original	13	Reprinted without change
14	Change 1	14	Original

2 Retain this notice and insert before Table of Contents

3 Holders of Student Training Packet Number 1 will verify that page changes and additions indicated above have been entered This notice page will be retained as a check sheet This issuance, together with appended pages, is a separate publication and is to be retained by stocking points until this training material is completely revised or canceled

FIGURE 5-24-2 Example of change notice for material that does not contain a supporting list of effective pages

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d Change identification Changes are issued and identified with the individual volume of training material but change numbers (e g , Change 1, Change 2, etc) are only used once for each training material Changes are numbered consecutively, using Arabic numerals until the training materail is revised The change identification is made as follows

(1) The new cover page is identified with the change number located above the document identification number
(2) The change pages in an instructor guide or trainee guide are identified with the change number in the running head above the document identification
(3) If any page in an instruction sheet changes, all pages of that instruction sheet contain the change number adjacent to the four-element identification number
(4) Instructional media materials and instruction sheets that are changed are identified in the MML and on the Topic page with the change number located after the material identification number
(5) Changes to training materials not bound in a volume (e g , transparencies, job sheets, etc) are included with the Change Notice for the volume containing the materials listing
(6) When any instructional material is deleted by a change, the word "(Deleted)" is inserted near the former location of the deleted material
(7) When instructional media materials are deleted from an instructor guide by a change, the titles in the MML are replaced by "(Deleted) " The next revision issued removes the identification number and all "(Deleted)" entries from the list
(8) Change pages to be inserted into material that is not supported by a list of effective pages must have the change number located above the document identification number A note "supersedes page (no) of change (no)" shall be placed in the lower left-hand corner of each changed page

(e) Change symbols Change symbols are asterisks or vertical lines which direct the user to the changed or added copy of a changed page The change symbol is located in the right hand margin of the page and adjacent to the changed material If more than 50 percent of the body of the page is changed, a change symbol is placed adjacent to the page number Change symbols are not used to identify changes to the list of effective pages, minor non-technical or typographical corrections, page numbers, running heads, deletions, security classification, cover page, or unchanged but relocated data

(f) Numbering of change pages Where possible, the change page carries the same page number as the page replaced When it is necessary to insert data between existing pages, the inserted data is identified by the previous page number followed by a lower case letter (e g , 315-1-2-21 -22 -22a, -22b, -22c, etc) For insert pages between insert pages,

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numbers are added in parentheses as follows 315-1-2-18b, -18e,-18e(1), -18e(2), etc

When one or more pages are deleted the notation "Page --- Deleted", "Pages --- and --- Deleted", or "Pages --- through --- Deleted" is entered on the bottom of the preceding page On the list of effective pages, the deleted pages are indicated by the notation "Deleted"

(g) Numbering of changed instructional media materials Where possible, instructional media materials are assigned the same number as the corresponding media materials being replaced along with the change identification When applicable, new instructional media materials will be assigned the next sequential number following the last materials sequence number assigned for that topic For example, if transparency 315-1-4-16 is the last transparency for topic 4, a new transparency for topic 4 would be numbered 315-1-4-17, CH 1, regardless of its position within the topic presentation sequence

5 24 3 2 Revision development Revision format is in accordance with the requirements described throughout this handbook for training materials Normally a revision will not be prepared solely to update the format A revision is usually required if the nature of the change is such that a pilot or validation of the changed material is required A revision must be prepared when the changes in the training material are of considerable length in relation to the content of the original, or when it is necessary to change the security classification When revisions are made, the entire contents must be analyzed and brought up to date

(a) Revision identification Revisions must be indicated by a capital letter adjacent to the document identifier in accordance with the requirements described throughout this handbook for training materials The revision identification will be included on all training materials containing the training material document number The first revision must be marked with the letter "A", and succeeding revisions must be indicated by other letters in alphabetical sequence, except that the letters "I", "O", "Q", "S", and "Z" must not be used

(b) Revision approval date Each new revision supersedes the preceding issue of the same training material, and a statement to that effect, as well as the approval date must be included in the letter of promulgation

For training materials that do not have a letter of promulgation the latest approval date and supersession identification must appear under the document identifier

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Example

THOTS-ST-1B
1 MAY 1986
SUPERSEDING
THOTS-ST-1A
1 OCTOBER 1978

5 25 Subject term (Keyword) listing

Advanced training
Course evaluation
Curriculum
Follow-on training
Formal training
Instructional Material
Job environment
Job performance
Learning objectives
Management materials
Personnel performance
Replacement Training
Shipboard Training
Training Materials

Custodian
Navy-SH

Preparing activity
Navy-SH
(Project ILSS-N018)

Review activities:
EC,AS

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COMMANDER
NAVAL SEA SYSTEMS COMMAND (SEA 55Z3)
DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1 DOCUMENT NUMBER	2 DOCUMENT TITLE
DOD-HDBK-292-2 (NAVY)	

3a. NAME OF SUBMITTING ORGANIZATION	4 TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
	☐ USER
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ MANUFACTURER
	☐ OTHER *(Specify)* _____

5 PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6 REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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