PERSONNEL PERFORMANCE PROFILE BASED CURRICULUM DEVELOPMENT MANUAL VOLUME I DEVELOPER'S GUIDE

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NAVEDTRA 131B
PERSONNEL PERFORMANCE PROFILE (PPP)
BASED CURRICULUM DEVELOPMENT MANUAL

DEVELOPER'S GUIDE

RECORD OF CHANGES

Number and Description of Change	Entered by	Date

FOREWORD

NAVEDTRA SERIES MANUALS

- NAVEDTRA 130 Task Based Curriculum Development Manual
- NAVEDTRA 131 Personnel Performance Profile Based Curriculum Development Manual
- NAVEDTRA 134 Navy Instructor Manual
- NAVEDTRA 135 Navy School Management Manual

NAVEDTRA 130 (series) manuals provides fundamental guidance, within Naval Education and Training Command (NETC) domain, for the development of curricula, the delivery of instruction, and the management and evaluation of training programs.

These manuals do not supersede the directive policy established by in these subject areas. Rather, they supplement the NETC instructions in two important ways. First, they reflect the philosophical principles underlying NETC policy for curriculum, instruction, and evaluation; second, they provide procedures for carrying out that policy.

NAVEDTRA 130 (series) interrelationships: Each of the NAVEDTRA 130 series manuals are designed as a stand alone document to serve a specific user group such as curriculum developers, instructors, training managers, or evaluators of training. These manuals are, however, interrelated and appropriately cross-referenced to one another.

SCOPE

NAVEDTRA 131B: Personnel Performance Profile Based Curriculum (PPP) Development Manual provides guidance for developing curricula to teach operation and maintenance of hardware and/or performance of tasks or functions (hardware is any system/ subsystem/equipment). The processes and illustrations found in NAVEDTRA 131B reflect the experience of Subject Matter Experts (SMEs), curriculum developers, and decision makers who approve Navy training material developed by Navy curriculum developers and civilian contractors. NAVEDTRA 131B describes and illustrates all facets of planning, analysis, design, and development of curricula. NAVEDTRA 131B provides step-by-step guidance to curriculum developers for developing job-efficient and effective training material.

Volume I - Developer's Guide: Contains procedural guidelines for the development of training programs. It is designed for use by the individual actually revising or developing training materials. Waivers or deviations from any of these procedural guidelines must be requested in writing and approved by the Curriculum Control Authority (CCA) for the individual course.

Volume II - Sample Products: Provides samples of each of the management and curriculum documents in a format that is consistent with the format conventions discussed in Volume I.

Volume III - Manager's Guide: Designed for the individual charged with the management of a course revision or development. It describes approval points, approval authorities, and responsibilities. The volume addresses the manager's responsibilities in each of the stages of PPP based curriculum development. Waivers or deviations from any of these procedural guidelines must be requested in writing and approved by the CCA.

RELATIONSHIP TO DOD STANDARDS/SPECIFICATIONS AND AUTHORING INSTRUCTIONAL MATERIALS (AIM): Chapter titles in this manual were derived from various DoD Standards and Specifications documents, which this manual supports. The name assigned to individual documents developed in accordance with this manual must correspond with the document name used herein. Exceptions to this rule shall not be granted. AIM is a computer based training materials authoring tool developed by the Navy. Training materials developed using AIM may be different in appearance than examples shown in this manual. However, all training materials developed using AIM are compatible with the concepts of this manual. Any instance exists where the information in this volume is in conflict or is not supported by the constraints of the AIM software, the information in this volume takes precedence and must still be supported.

CONTRACTUAL USE OF MANUAL: NAVEDTRA 131B sample documents may also be used as an exhibit in a contract as service-specific guidance for use by civilian contractors developing Navy training material.

NAME SUBSTITUTIONS ALLOWED: The CCA may allow the following name substitutions:

NAVEDTRA 130 (series) NAME	OPTIONAL NAME
Lesson Plan (LP)	Instructor Guide (IG)
Written Test	Knowledge Test

NAVEDTRA 130 (series) NAME	OPTIONAL NAME
Resource Requirements List (RRL)	Master Materials List/ Equipment Requirements List
Trainee	Student
Learning Site (LS)	Training Facility/Activity

IN PROCESS REVIEWS (IPR): Whether developed in-house or by a contractor, IPR will normally be conducted as follows to review the products. ("Bullets" indicate IPR points, followed by the products to be reviewed):

STAGE ONE:

- PPP Table Listing
- Draft new and/or modified PPP Tables
- Preliminary Training Path Systems (TPS)

STAGE TWO:

- Preliminary Training Course Control Document (TCCD)

STAGE THREE:

- Cross sections of LP, Training Guide (TG)/Instruction Sheets, Instructional Media Material (IMM) (Requirement for cross section and contents to be determined by CCA)
- Draft LP, TG/Instruction Sheets, IMM Roughs, Testing Plan, Tests

STAGE FOUR:

- Conduct Pilot Course
- Pilot Course Monitoring Report
- Red-lined Curriculum

STAGE FIVE: Finalized TCCD, Curriculum, and Letter of Promulgation. How to use NAVEDTRA 131B, Volumes I, II, and III: NAVEDTRA 131B provides guidance and illustrations for use in the

planning, analysis, design, development, implementation, and evaluation of curricula. This manual has been designed so you may read the entire chapter or go to any subject area and perform the required task.

   HOW TO USE NAVEDTRA 131 (SERIES): NAVEDTRA 131 (series) provides guidance and illustrations for use in the planning, analysis, design, development, implementation, and evaluation of curricula. This manual has been designed so you may read the entire chapter or go to any subject area and perform the required task.

   VOLUME I: Contains the step-by-step guidance for developing effective training materials. All chapters in Volume I were written so you can follow along with the corresponding figures, diagrams, Curriculum Development Aids, or examples presented in Volume II. It is important to open Volume II when referenced and study the appropriate illustrations.

   VOLUME II: Contains examples of all the curriculum materials that make up a Course of Instruction developed under the PPP/TPS method. When you have located the sample document in Volume II that corresponds to the chapter you have selected in Volume I, keep the sample at hand as you read Volume I. For example, if you are developing a TPS, turn to the TPS section of the sample course in Volume II.

   VOLUME III: Contains management information important to planning, analysis, design, development, implementation, and evaluation of curricula. The chapters in Volume III establish the requirements for the submission and review of the various products developed during the curriculum development process.

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INTRODUCTION

CHAPTER 1

TRAINING MATERIALS DEVELOPMENT

INTRODUCTION

The core procedures for developing training materials following the Personnel Performance Profile (PPP) Based Curriculum Development method consists of five interrelated Stages. The five stages are preceded by planning, and followed by training materials evaluation, surveillance and modification. A curriculum development project is a complex undertaking bringing together a wide range of human and material resources for the goal of creating quality training.

PLANNING identifies resources requirement and the sequence of events in the development process.

STAGE ONE consists of determining job tasks, supporting skills and knowledge, and level of performance.

STAGE TWO determines the skills and knowledge which must be taught and produces the course learning objectives and an instructional sequence.

STAGE THREE produces the instructional materials for the instructor and the trainee.

STAGE FOUR begins when the Curriculum Control Authority (CCA) has approved a course for pilot and ends with submittal of the Pilot Course Monitoring Report.

STAGE FIVE begins after incorporation of the results of the pilot course ("red-line") into smooth curriculum and management materials, and ends with the CCA's Letter of Promulgation that approves the material for use in support of Navy training.

EVALUATION is the surveillance, evaluation, change, and revision of the training materials based on assessment of the training materials and the performance of the graduates in the fleet.

NAVEDTRA 131B: PPP Based Curriculum Development is designed to guide Navy activity personnel (curriculum developers) in the development of accurate and effective training materials. This manual:

- Specifies the tasks necessary to develop and support training materials.
- Establishes the sequence of task performance.
- Assigns task performance responsibilities.

NOTE

Since the initial writing of this guidance naval training has evolved to include a variety of different training solutions that were not available in the past such as Computer Based Training (CBT), Blended Training, and the Integrated Learning Environment (ILE) just to name a few. Although this volume focuses on PPP Based Curriculum Development the foundational principles explained in this volume such as the development of test items, piloting process, and planning and development of a Training Project Plan (TPP) can and should be utilized with the evolution of new training solutions.

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PLANNING - CCA/Functional Commander/NETC/OPNAV (=)
    ■  TPP

STAGE ONE (*)
    ■  PPP Table List
    ■  New and Modified PPP Tables
    ■  Training Path System (TPS)

STAGE TWO - CCA
    ■  Preliminary Training Course Control Document (TCCD)

STAGE THREE
    ■  Instructional Materials Cross Section (if required)
    ■  Lesson Plan (LP)
    ■  Trainee Guide (TG)
    ■  Tests
    ■  Other Support Materials

STAGE FOUR - CCA
    ■  Course Pilot
    ■  Pilot Course Monitoring Report

STAGE FIVE
    ■  Final Curriculum
    ■  Final TCCD (*)
    ■  Letter of Promulgation

EVALUATION
    ■  Internal              [= Approval Authority]
    ■  External              [* Approval Authority]
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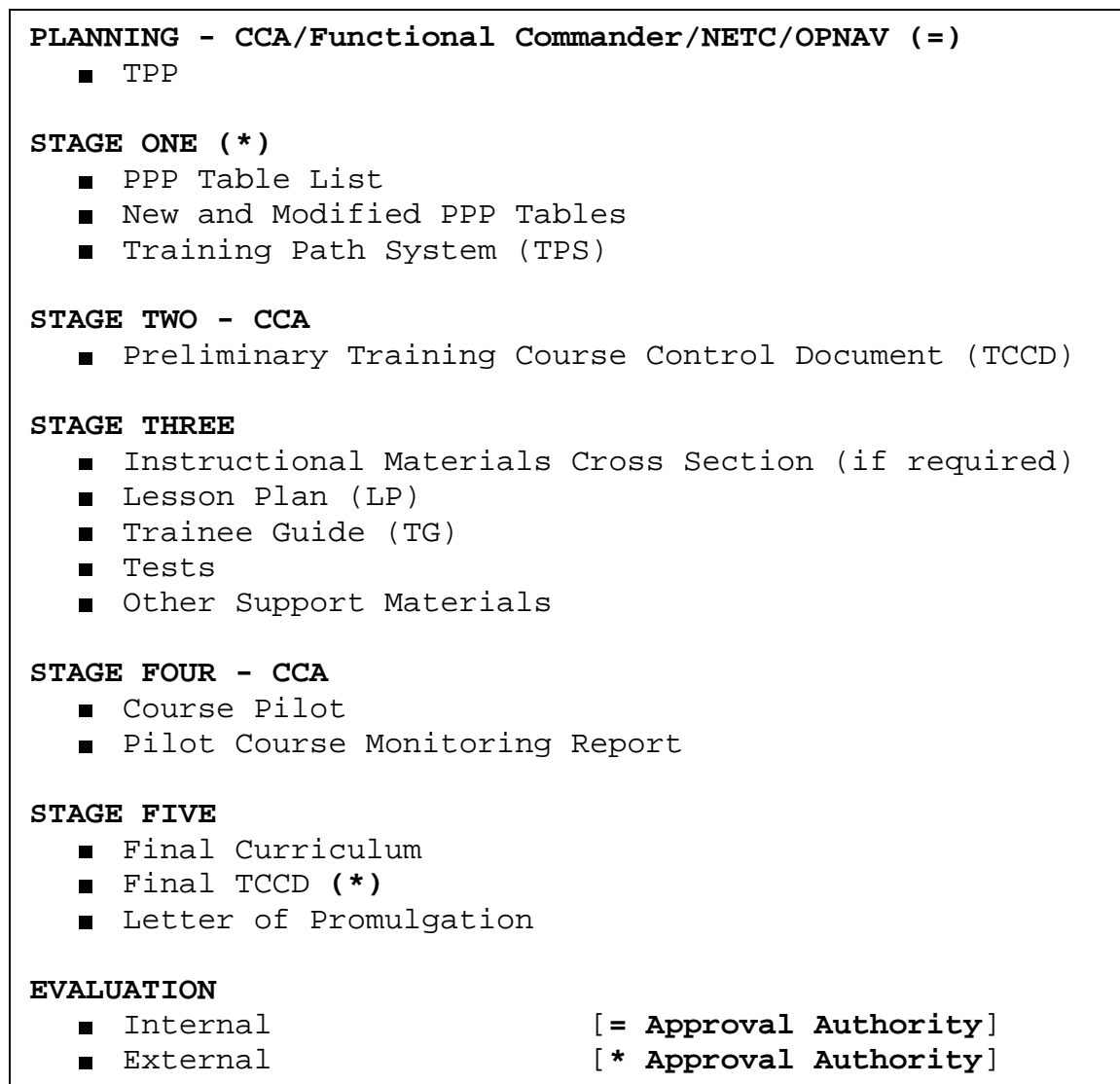
FIGURE 1-1: CURRICULUM DEVELOPMENT PROCESS

SECTION 1 - TRAINING MATERIALS

Training materials include management materials, curriculum materials, and support materials. These training materials are developed following the guidelines of this manual.

NOTE

Recognizing the complexity of training materials development and the external factors which influence curriculum development projects, this manual is to be used as a guideline, not as a prescriptive document. Waiver of any document or procedure is at the discretion of the CCA. The CCA may also require additional documents or reviews.

Authoring Instructional Materials (AIM): AIM is a computer based training (CBT) materials authoring tool developed by the Navy. Training materials developed using AIM may be different in appearance than examples shown in this manual. However, all training materials developed using AIM are compatible with the concepts of this manual and are deemed to be correctly formatted. NETC Learning Centers (LCs), or as designated, shall use the appropriate AIM application for the Plan, Analyze, and Design Phases of curriculum development. The develop phase may also be used if applicable and achievable. AIM I is for PPP Based Development and AIM II is for Task Based development that is discussed in detail in NAVEDTRA 130 (series).

1.1. Management Materials. Management materials define training requirements and provide an overall plan for the accomplishment of these requirements. The chapters of this manual provide detailed content requirements and format conventions for the development of management materials. Management materials for training materials development include:

- TPP discussed in Chapter 2
- PPP Tables discussed in Chapter 3
- TPS discussed in Chapter 4
- TCCD discussed in Chapter 5
- Testing Plan discussed in Chapter 8 and NAVEDTRA 135 (series)
- Pilot Course Monitoring Report discussed in Chapter 10
- Audit Trail Documentation discussed in NAVEDTRA 135 (series)

1.2. Curriculum Materials. Curriculum materials include all materials required for the presentation of information and the development of skills in formal school training. Chapters in this manual contain detailed content requirements, format conventions, and development guidelines for curriculum materials. Under this definition, curriculum materials include:

- LP discussed in Chapter 6
- TG discussed in Chapter 7
- Test Package discussed in Chapter 8 and NAVEDTRA 135 (series)
- Other Materials helpful in the preparation and presentation of Lesson Topics (LT) (e.g. Exercise Controller Guide)

1.3. Support Materials. Support materials are instructional materials and other devices used in support of formal instruction, informal instruction, or for independent study. Chapter 9 of this manual provides more detail on Visual Information (VI) and Instructional Media Materials (IMM). The following are the most common support materials:

- VI includes:

  - Wall Charts (WC)
  - Films
  - Digital and Video Tapes
  - Transparencies
  - Graphic Media Presentations (PowerPoint, etc.)

- IMM includes:

  - On-the-Job Training (OJT) Handbook

- Textbooks include:

  - Technical Manuals to include Interactive Electronic Technical Manuals (IETM)
  - Training Devices (TD)
  - Other materials helpful in the preparation and presentation of LTs, such as a Fault Insertion Guide, or Instructor Utilization Handbook

SECTION 2 - TRAINING MATERIALS SUPPORT

All training materials are maintained current and accurate by surveillance and change efforts.

2.1. Surveillance. Constant surveillance is required to detect changes in documentation, equipment, or procedures that impact training materials. Procedures for identifying training material deficiencies, recommending changes, and coordinating recommended changes are given in Volume III. Some triggers that may direct a surveillance action be taken are:

- Updated Occupational Standards (OCCSTD)
- Job Duty Task Analysis (JDTA)
- Rating Mergers/Consolidations
- Rating Disestablishments
- Requirements Sponsor Changes
- Naval Training System Plan Revisions (NTSP)
- Change to existing operating procedure or policy
- Change in Technical Directives
- Change in Navy Mission Essential Task Lists (NMETLS)

2.2. Training Materials Modifications. There are four categories of training materials modifications: Interim Change, Change, Technical Change, and Revision. Definition for each category is found in NAVEDTRA 135(series), Chapter 4, Section 1.3. Procedures for incorporating training materials modifications are described in the sections for those materials in Volume III, Chapter 9, of this manual.

SECTION 3 - PROGRAM PARTICIPANTS

The following participants have vital roles in the development and support of training materials. Specific command assignments are addressed in Volume III, Chapter 1, of this manual.

3.1. Training Agency (TA). TA is an office, bureau, command, or headquarters exercising command of and providing support to some major increment of the Department of the Navy's formal training effort. Commander, Naval Education and Training Command (NETC) is a Training Agency (TA).

3.2. Training Support Agency (TSA). TSAs are offices, commands, or headquarters responsible for providing material and other forms of support to the TA. The TSA is normally a Systems

Command (SYSCOM) (e.g., Naval Sea Systems Command) responsible
for providing training support to the TA for a piece of
equipment, a system, or a subsystem.

3.3. LCs/Functional Commander (FC). NETC has designated LCs
and/or FCs to plan, manage, and budget for training courses
across broad functional areas.

3.4. Curriculum Control Authority (CCA). The CCA controls the
course content and instructional methods by acting as approval
authority for the curriculum. The CCA is also responsible for
maintaining the curriculum through new development or revision
of training materials. For courses conducted at schools under
other FCs, the CCA will advise the other FC of curriculum
development/revision efforts which result in additional resource
requirements, new course lengths, and/or course convening
schedule requirements. Volume I of NAVEDTRA 10500, Catalog of
Navy Training Courses (CANTRAC) in the Corporate enterprise
Training Activity Resource System (CeTARS) identifies the CCA
for existing courses. NETC LC Commanding Officers (COs) are
designated as the CCA. Additionally, Type Commanders (TYCOMs),
Joint Weapons Training Command, and Operational Units which
develop, deliver, and maintain training can also be designated
as the CCA. The original intended functional control
identification of the Course Identification Number's (CIN's)
single letter for the most part may not always be the case due
to changes in the Navy Training organization by the Revolution
in Training (RIT) and/or LC stand-up, merge, and
disestablishments. NAVEDTRA 135 (series), Chapter 1, delineates
the CCA duties and responsibilities that NETC retained and are
further amplified in NETCNOTE 1500 of 4 January 2010 concerning
CCA duties retained by NETC.

3.5. Course Curriculum Model Manager (CCMM). A CCMM is
assigned by the CCA with the responsibility for conducting and
maintaining a specific course. The CCMM initiates curriculum
development and training materials modification, conducts
curriculum reviews and analysis of feedback, maintains course
audit trail documentation, and develops and approves changes.
The CCMM normally functions as the developer for Navy in-house-
developed courses. However, the CCA can also designate
personnel, other than the assigned CCMM as required, to perform
these functions. CCMM functions as the developer and first line
of approval authority for in-house and contract developed
curriculum.

3.6. Learning Site (LS): Is a Navy command, which has a primary mission of conducting or supporting training usually at school or institution where courses are offered. The LS has responsibility for maintaining selected audit trail documents, annually reviewing training materials in the form of a Formal Course Review (FCR), making recommendations to the CCMM for changes/revisions, and maintaining training equipment and facilities.

SECTION 4 - APPLICABLE DOCUMENTS

The documents listed in Sections 5 and 6 are the primary resources to be used by activity developers in the design and development of training materials. Use of documents and manuals in effect on the date stated in the project plan is assumed. Later issues of these specifications, standards, documents, and publications, or new specifications, standards, documents, and publications, may be used subject to joint agreement of the CCA and activity curriculum developers.

SECTION 5 - STANDARDS, GENERAL

In June 1994 the Secretary of Defense (SECDEF) directed that "Performance specifications shall be used when purchasing new systems, major modifications, upgrades to current systems, and non-developmental and commercial items for programs in any acquisition category (in lieu of Military Specifications and Standards)."

NOTE

SECDEF Memo, Specifications and standards - A New Way of Doing Business, of 29 June 1994. Consequently, references to Military Standards (MIL-STDS) have been deleted.

5.1. Department of Defense:

- DoDDIR 5000.01 Military Handbook (MIL - HDBK) 502

SECTION 6 - PUBLICATIONS

6.1. Secretary of the Navy:

- SECNAVINST 5870.4 (series), Copyright
- SECNAVINST 5510.30 (series), Department of the Navy Personnel Security Program Instruction

6.2. Chief of Naval Operations:

- OPNAVINST 1500.27 (series), Inter-service Training
- OPNAVINST 1500.47 (series), Navy Training Quota Management
- OPNAVINST 1500.74 (series), Utilization of Enlisted Occupational Standards for Training and Career Development
- OPNAVINST 1500.75 (series), Safety Policy and Procedures for Conducting High Risk Training
- OPNAVINST 1500.76 (series), Navy Training System Requirements, Acquisition, and Management
- OPNAVINST 3500.34 (series), Personnel Qualification Standards (PQS) Program
- OPNAVINST 3500.39 (series), Operational Risk Management
- OPNAVINST 5100.19 (series), Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
- OPNAVINST 5100.23 (series), Navy Safety and Occupational Health (SOH) Program Manual
- OPNAVINST 3104.1 (series), Navy Visual Information Program Policy and Responsibilities
- OPNAVINST 5513.1 (series), Department of the Navy Security Classification Guide
- OPNAVINST 1510.10 (series), Corporate enterprise Training Activity Resource System (CeTARS) Catalog of Navy Training Courses and Student Reporting Requirements
- OPNAVINST 11102.2 (series), Training System Installation and Transfer
- NAVPERS 18068 (series), Volume I and Volume II Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards (NEOCS)

6.3. Commander, Naval Education and Training Command:

- NETCINST 5100.1 (series), Safety and Occupational Health, and High-Risk Training Safety Program Manual
- NAVEDTRA 130(series), Task Based Curriculum Development Manual
- NAVEDTRA 131 (series), Personnel Performance Profile Based Curriculum Development Manual
- NAVEDTRA 134 (series), Navy Instructor Manual
- NAVEDTRA 135 (series), Navy School Management Manual
- NAVEDTRA 10052-AJ, Bibliography for Advancement Study
- NAVEDTRA 10500, Catalog of Navy Courses (CANTRAC)
- NAVTRASYSCEN P-530, Naval Training Systems Center Guide
- NETCINST 1500.3 (series), Institutional Accreditation

- NETCINST 1500.4 (series), Inter-service Training Review Organization (ITRO)
- NETCINST 1510.1 (series), Navy Training Management
- NETCINST 3104.1 (series), Naval Education and Training Command (NETC) Visual Information (VI) Program Management
- Training Requirements Data Base Annual Report - Naval Education and Training Program Management Support Activity (NETPDTC)

6.4. OTHER:

- MPT&E CIOSWIT-ILE-STD-1B Navy ILE Presentation Standards
- MPT&E CIOSWIT-ILE-GUID-3B Navy ILE Instructional Content Style guide, Interactive Multimedia Instruction & Instructor Led Training
- DoD MILHDBK 29612.3A DoD HDBK Development of Interactive Multimedia Instruction (IMI) (Part 3 of 5)
- MIL-PRF-29612B Training Data Products
- MIL-HDBK 29612-1A Guidance for Acquisition of Training Data Products and Services (Part 1 of 5)
- MIL-HDBK 29612-2A Instructional Systems Development / Systems Approach to Training and Education (Part 5 of 5)
- MIL-HDBK 29612-4 Glossary for Training (Part 4 of 5)
- MIL-HDBK 29612-5 Advanced Distributed Learning (ADL) Products and Systems (Part 5 of 5)
- NAVSEAINST 4790.8 (series) Ships Maintenance and Material Management (3-M) Manual (Volume 1-3)

SECTION 7 - SECURITY REQUIREMENTS

Classified information will be handled per the Department of the Navy (DON) Information Security Program (SECNAVINST 5510.36 series).

SECTION 8 - SAFETY REQUIREMENTS

Safety, occupational health, and hazard awareness information must be incorporated into the curricula of all appropriate training courses, as prescribed by NETCINST 5100.1 (series) and NAVEDTRA 135 (series).

PLANNING

CHAPTER 2

TRAINING PROJECT PLAN

INTRODUCTION

A curriculum development project is a complex undertaking, bringing together a wide range of human and material resources for the goal of creating quality training. Curriculum development consists of six phases, beginning with the Plan Phase. This phase consists of gathering information and building the plan for training material revision or development. The output product of this phase is a Training Project Plan (TPP). When approved, the TPP is the authorization to undertake a course revision or a new course development project and initiate resource requisitions.

SCOPE

* Describe the factors to be considered when developing a TPP for new course development or course revision
* Provide guidelines for the content and format of the TPP

SECTION 1 - PLANNING FOR COURSE REVISION OR NEW COURSE DEVELOPMENT

Most TPPs for in-house development will be for revisions to existing courses; reflecting the constant introduction of new equipment, processes, and technologies into the Fleet. Although fewer in number, new course development projects respond to new requirements that cannot be met by revising an existing course.

* The Plan Phase is the first of the **six phases** of training materials development process. The output, the TPP, provides the blueprint for revising an existing course or developing a new course.
* A TPP is required to document any of the **seven triggers**. These triggers are:

  * New Training Course
  * Modified Training Course (Revision)
  * Change in Course Instructional Strategy or Delivery Method
  * Change in Course length
  * Training Course deletion
  * Training Course transfer between Course Curriculum Control Authority (CCA)
  * Course Data Processing (CDP) deletion/addition

- Other applications for the TPP are discussed in NETCINST 1510.1 (series), NAVEDTRA 135 (series) Course Revision. Prior to starting the revision to an existing course or development of a new course, a TPP shall be developed and approved in accordance with NETCINST 1510.1 (series).

NOTE

COURSE REVISION: A TPP will be developed and approved per NAVEDTRAs 135, 130, and 131 (series) as well as supplemental guidance as specified in NETCNOTE 1500 of 4 January 2010.

1.1. NEW COURSE DEVELOPMENT. Completing a TPP for new course development requires establishing a Course Identification Number (CIN), CDP, initiating entries for the Catalog of Navy Training Courses (CANTRAC) and Corporate enterprise and Training Activity Resource System (CeTARS), identifying preliminary resource requirements, and possibly planning for facilities requirements. This entails careful research and documentation. See NAVEDTRA 135 (series) for specific guidance on establishing a new course.

1.2. COURSE DEACTIVATION. NETCINST 1510.1 (series), NETCNOTE 1500 of 4 January 2010, and NAVEDTRAs 130, 131, and 135 (series) contain procedures for initiating and documenting the deactivation of an existing course or training program.

SECTION 2 - JUSTIFICATION FOR COURSE REVISION OR DEVELOPMENT

There must be a reason (or reasons) to undertake the development of a new course, the revision of an existing course or the deactivation of a course. The justification may come from:

- Navy Training System Plan (NTSP), OPNAVINST 1500.76 (series)
- Tasking by higher authority (Requirements Sponsor)
- Internal course reviews and local command initiatives
- External course reviews
- Surveillance and external feedback
- Training appraisal
- Updated Occupational Standards
- Enlisted Rating Mergers
- Human Performance Requirement Review (HPRR)

2.1. Training Project Plan (TPP):

- The TPP presents a blueprint for curriculum development which contains course data, justification(s) for the course revision or new course development, or course deactivation, impact statements, milestones, and resource requirements.
- The TPP is generally viewed as a management document. Detailed TPP content descriptions can be found in Volume III, Chapter 2.

NOTE

Each TPP will be as unique as the project it describes. The CCA, working with the Functional Commander (FC) and the TPP developer, shall designate mandatory TPP elements, and possibly call for additional data, which will reinforce the project plan. All data should be researched, referenced, and as accurate as possible. However, the TPP is recognized as a planning document, subject to revision.

2.2. Purpose and Use of a TPP. Describes all training and training support elements required to provide trained personnel to operate and maintain systems or equipment or to perform tasks and functions.

- It provides a Plan of Action and Milestones (POA&M) to achieve a predetermined implementation date.
- It describes all the factors necessary to prepare and conduct a successful training program and attain optimum use of personnel, hardware, and funds.
- It should meet, and not exceed, the training requirement.

2.3. Categories of Resources. Course development, and often course revisions, requires resources to develop or implement the proposed course. Resources fall into four broad categories: (1) facilities; (2) funding; (3) personnel; and (4) equipment. All four categories require long lead-time planning. An approved TPP is the authority to submit requests for resources. Whenever resources are affected (i.e. unfunded requirement), Chief of Naval Operations (CNO) requirement per Memorandum for Distribution 7000 N1 127189 of 15 September 2008 requires a TPP submission to OPNAV (N15) via NETC (N7) for approval and resource allocation. In the case of a course deactivation, the TPP provides justification for the action and a blueprint for reallocation of resources.

2.4. Initiating a TPP. The decision to prepare a TPP can come via the Commanding Officer/Officer-In-Charge (CO/OIC) of a Training Activity or higher authority or the Training Support Activity.

- The CCMM will develop and submit the TPP for a course revision or deactivation.
- The CCA can designate an activity to be the CCMM for a new course and direct them to develop the TPP, or it may be developed by the CCA.

2.5. TPP Outline

- The TPP shall contain all the data and information necessary to identify and justify resources required for the training course under consideration

NOTE

Volume II contains a sample TPP with typical entries. It must be emphasized that the entries selected, and the data presented for your TPP will be determined by the requirements of the project. Volume III, Chapter 2, provides information on completing TPP entries.

- Specific elements of data and information shall include the following items where applicable:

  - Cover Page
  - Table of Contents
  - Justification
  - Impact if the course development, revision, or deactivation is not undertaken
  - Course Data Page
  - Safety Risks and Hazardous Materials exposure
  - Curriculum development method recommended
  - Resource Requirements
  - Milestones

2.6. PLANNING QUICK REFERENCE CHECKLIST

- **PLANNING PRODUCT.** The TPP is a proposal to develop a new course or revise an existing course.
- **TPP CONTENTS.** Use the checklist provided to ensure that your TPP includes applicable elements from those listed.

ELEMENT	CHECK HERE
1. Cover Page	☐
2. Table of Contents	☐
3. Justification	☐
4. Compensation	☐
5. Course Data Page	☐
6. Safety Risks and Hazardous Materials Exposure	☐
7. Curriculum Development Method Recommended	☐
8. Required Resources	☐
9. Milestones	☐

FIGURE 2-1 - TPP CONTENTS CHECK LIST

- **PLANNING REFERENCES**

  - NAVEDTRA 131 (series), Volume I, Chapter 2
  - NAVEDTRA 131 (series), Volume II, Tab A-1
  - NAVEDTRA 131 (series), Volume III, Chapter 2

STAGE ONE

CHAPTER 3

PERSONNEL PERFORMANCE PROFILES

INTRODUCTION

In the previous chapter you were told how to develop a plan to revise an existing course or develop a new one. The output of the chapter was a Training Project Plan (TPP). The TPP is the blueprint for the entire project. When the TPP is approved, you are authorized to begin work on the next step in the project. Prior to a TPP input, a Job Duty Task Analysis (JDTA), a Front End Analysis (FEA), and a Business Case Analysis (BCA) shall be accomplished. In developing a TPP, LCs are directed to complete JDTA, FEA, and BCA prior to the TPP development and reference these documents when reviewing submitted TPP for approval.

Having received approval of your TPP, developing Personnel Performance Profiles (PPPs) will be your first real step in satisfying the training requirements.

The Training Requirement and PPP course development is initiated by a training requirement, as shown below:

- A need to train sailors to operate and/or maintain a specified piece of hardware
- A requirement to train Navy personnel to perform a designated shipboard job other than operation/maintenance of a particular hardware
- All training provided to satisfy this requirement must be accurate and job-related
- Identifying by analysis; all skills and knowledge associated with performance of the requirement
- Compiling these skills and knowledge into a list

NOTE

Skills and knowledge lists go by various names, dependent upon where the list is being described. PPP is the name given this manual's skills and knowledge list.

- Having received approval of your TPP. Developing the PPP(s) will be your first real step toward satisfying the training requirement

SCOPE

To provide information vital to understanding PPPs and to explain terminology which acquires a unique meaning when applied to PPPs.
To explain the systematic process for developing PPP Tables as

presented in Curriculum Developer Aids (CDA) and the PPP Model Statements.

NOTE

The CDAs for PPP Table Development and Model Statements lead you step-by-step through development of a PPP table but does not explain the "how" of the process. The CDAs and Model Statements enable you to develop a PPP table(s) relatively quickly and easily. These CDA's can be found in Volume III, Appendix A.

SECTION 1 - WHAT ARE PPPs?

1.1. PPPs are:

- Lists of required skills and supporting knowledge
- The foundation for ALL curriculum development

NOTE

A PPP is a minimum listing of knowledge and skills required to operate and maintain a system, subsystem, or equipment, or to perform a task or function.

1.2. PPPs are required for developing:

- Training Path System (TPS)
- Course and Topic Learning Objectives (CLOs/TLOs)
- Test Items and Tests
- Lesson Plan (LP) and Trainee Guide (TG)
- Support Materials

1.3. Importance of PPP. The single most important elements of PPP curriculum development are:

- Quality curricula result from quality PPPs
- Poor PPPs lead to a poor curriculum
- Curriculum development requires that all PPPs be developed first because PPP line items are used throughout a curriculum

SECTION 2 - PPP CATEGORIES/TYPES

2.1. **PPP categories are:**

- Hardware System, Subsystem, and Equipment
- Non-Hardware Task/Function and Background

NOTE

Use of these terms will be helpful later on when system/subsystem/equipment PPPs, and task/function and background PPPs, are grouped together and collectively discussed.

2.2. **PPP types are:**

```
┌─────────────┐      ┌─────────────┐
│ System      │      │             │
│ Subsystem   ├──────┤  HARDWARE   │
│ Equipment   │      │             │
└─────────────┘      └─────────────┘

┌─────────────┐      ┌─────────────┐
│ Task/Function│      │             │
│ Background   ├──────┤ NON-HARDWARE │
└─────────────┘      └─────────────┘
```
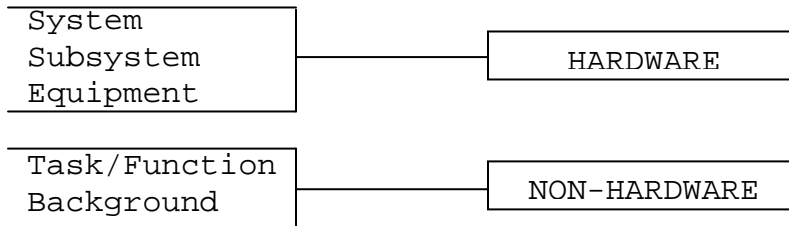
NOTE

Most training programs use a combination of PPPs from the above types during design and development.

2.3. **Volume II, Tab A-2, for PPP Table examples**

- System PPP – F0147
- Subsystem PPP – F0156
- Equipment PPP – F0194/F0202
- Task/Function PPP – B0076
- Background PPP – A0002

2.4. **Hardware PPP types defined**

- SYSTEM – may be:

  - Related subsystems which operate together to meet a strategic or tactical requirement; e.g., Weapons Platform: A Submarine or Surface Ship or Aircraft
  - Related components or equipments established to perform a certain mission or functions; e.g., AN/SQQ-89(V)3 SURFACE ASW COMBAT "SYSTEM"
  - Single or multi-purpose

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NOTE

These PPPs list the knowledge and skills required to operate and maintain a system.

- SUBSYSTEM – can only be:

  - Related equipments which together perform particular functions that contribute to the overall system mission; e.g., X-1B IFF "System" or Ship's Departments: Combat Systems, Operations, Engineering

NOTE

These PPPs list the knowledge and skills required to operate and maintain a subsystem.

- EQUIPMENT – may be either:

A unit of a subsystem for which operation and maintenance can be performed

OR

Any device that supports any system or subsystem; Equipments are made up of various components; e.g., AN/UYQ-21, UYK-44, C-1678/APX IFF CONTROL.

NOTE

These PPPs list the knowledge and skills required to operate and maintain equipment.

2.5. Hardware PPP Table Relationships:

- It is possible that the same hardware may logically be designated as being either:

  - A system
  - A subsystem
  - Or equipment

- What to call this hardware depends upon:

  - Size and complexity
  - Eventual usage and developer's intent

NOTE

Thus, these Hardware types are not necessarily fixed when applied to a specific hardware.

- Hardware PPP types are often directly related to one another:

  - Any equipment can be part of a subsystem; subsystem can be part of a system
  - Two or more related equipments can make up a subsystem, and
  - Two or more related subsystems can comprise a system

2.6. To best determine PPP types/titles, do the following:

- Designate the weapons platform (ship, aircraft, etc.) to be the system
- Designate the weapons platform "department" (weapons, engineering, power plant, airframe, etc.) as the subsystem
- Determine to develop system/subsystem PPPs only if needed
- Recognize that most makers of military hardware call their Whatever hardware a "system," when their system is probably "Equipment" thus, the systems become equipment PPPs
- Write the system PPP title and subsystem PPP titles needed for your training program
- Write-in orders the titles of the equipment, task/function, and background PPP tables that are required

NOTE

This somewhat involved process helps to ensure that only the PPPs that are necessary for the training program are developed.
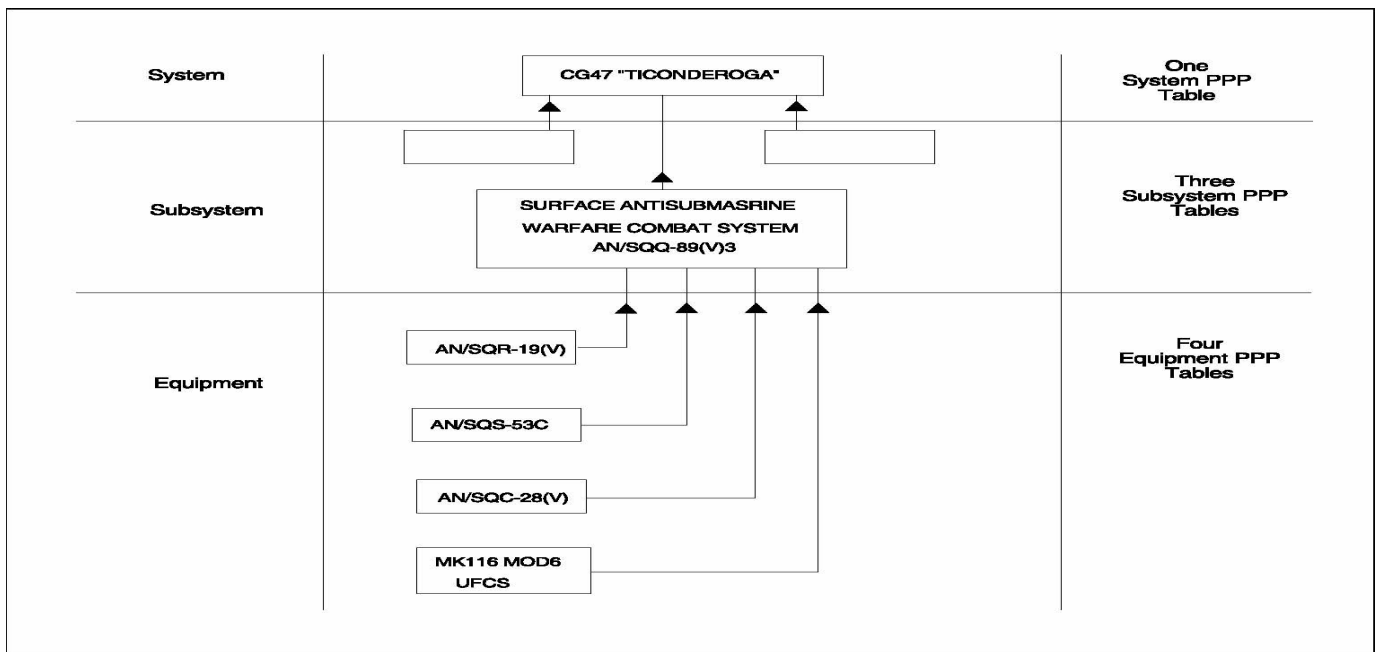
FIGURE 3-1: THE WEAPONS PLATFORM AS THE SYSTEM

FIGURE 3-1 shows the weapons platform—TICONDEROGA—as being the System

- One of this ship's Subsystems is the AN/SQQ-89(V)3 ASW COMBAT "SYSTEM"
- AN/SQQ-89(V)3-related Equipments are the AN/SQR-19(V), AN/SQS-53C, AN/SQC-28(V), and MK 116 MOD 6 UFCS
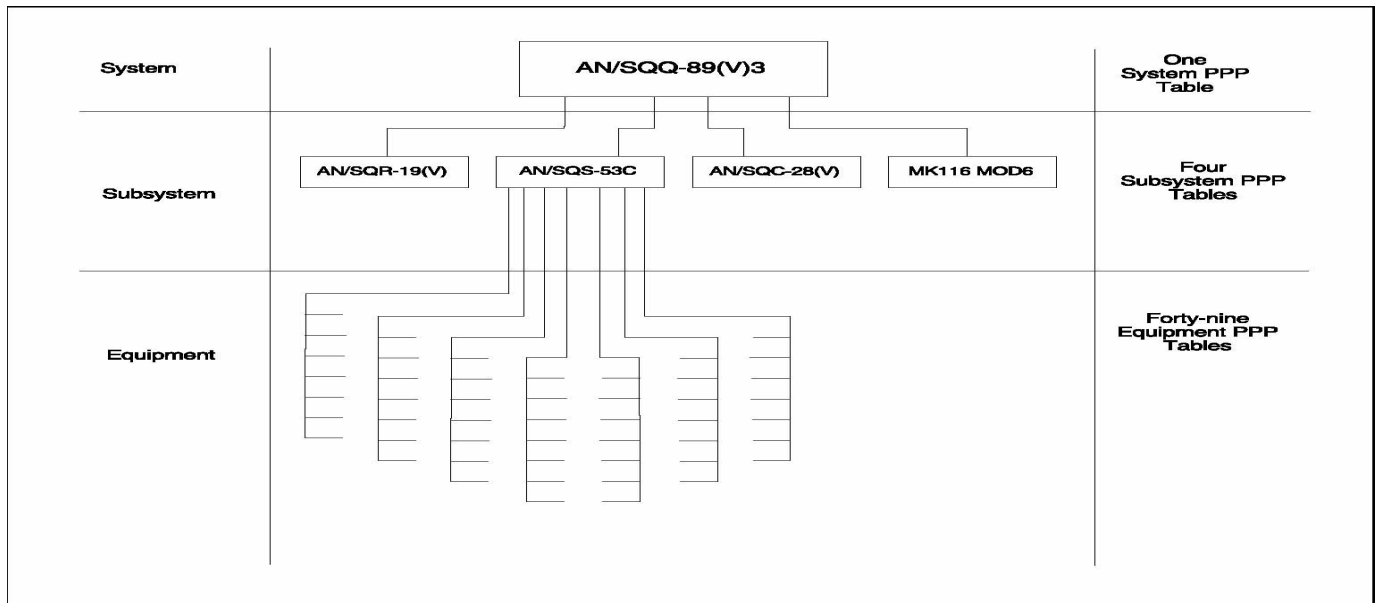
FIGURE 3-2: THE AN/SQQ-89(V)3 AS THE SYSTEM

FIGURE 3-2 shows the AN/SQQ-89(V)3 ASW COMBAT "SYSTEM" as being the System

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- AN/SQQ-89(V)3-related <u>Subsystems</u> are now the AN/SQR-19(V), AN/SQS-53C,AN/SQC-28(V), and MK 116 MOD 6 UFCS
- AN/SQS-53C-related <u>Equipments</u> are the 49 cabinets mentioned above: AN/UYQ-21, UYK-44, XMITTER CONTROL, XMITTER DRIVE CONTROL, etc.

NOTE

Each of these "equipments" is comprised of multiple devices, e.g., the *AN/SQS-53C SONAR* consists of seven Functional Groupings (power distribution, xmitter, display, etc.) and 49 separate cabinets at various locations throughout the *TICONDEROGA*.

2.6.1. Both figures show correct PPP designations:

- Following the Figure 3-2 approach, only four Equipment PPPs are required: AN/SQR-19(V), AN/SQS-53C, AN/SQC-28(V), and MK 116 MOD 6 UFCS

- Following the Figure 3-2 approach, numerous equipment PPPs are required for each Subsystem: The AN/SQS-53C Subsystem alone requires 49 Equipment PPPs—AN/UYQ-21, UYK-44, XMITTER CONTROL, XMITTER DRIVE CONTROL, etc. (one PPP for each of its 49 separate cabinets).

NOTE

Both approaches can produce equally good curricula.

2.7. Generic PPP tables are preferred for use when:

- The specific equipment type that the graduate will operate/maintain is known, but the exact equipment mark/mod is unknown:

  - Generic Hardware PPPs are always Equipment
  - These PPPs are most often used in developing "A" School training

NOTE

Graduate will operate an IBM-compatible microcomputer, **BUT**, the specific make, model or series could be any IBM-compatible microcomputer on the market (IBM, Zenith, Compaq, Zeos, etc).

2.8. Non-Hardware PPPs Defined:

- TASK/FUNCTION – may be defined as: The knowledge and skills required to perform work **NOT** directly related to any specific system, subsystem, or equipment.

NOTE

Task/Function PPPs list the knowledge and skills required to perform a Task or Function.

- BACKGROUND — these PPPs describe:

  - The prerequisite knowledge and skills required for learning operation and maintenance of a System, Subsystem, Equipment, or performance of a Task or Function

NOTE

These PPPs list those things a person must **FIRST** know, and is able to do; **Hence, "PREREQUISITE"** in order to learn to operate and maintain a particular System, Subsystem, or Equipment or to perform a specified Task or Function.

  - A body of knowledge and skills the trainee must possess before entering the classroom/laboratory to begin learning the Hardware or Task/Function skills.

NOTE

These PPPs are often organized around subject matter areas, such as the following:

Mathematics - Basic Electricity - Basic Electronics

2.9. Non-Hardware PPP Discussion—Task/Function:

- A Task/Function is not unique to the operation and maintenance of any one particular system, subsystem, or equipment
- To perform a given Task/Function, e.g., instructing, requires many different skills and knowledge; all leading to a single application
- A Task/Function usually has one of the following endings – ING, ION, MENT:

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- Cooking (NOT Cooker)
- Navigation (NOT Navigator)
- Training Management (NOT Training Manager)

NOTE

A TASK/FUNCTION PPP WILL ALWAYS DESCRIBE

A **Job** - Cook (Mess Management Specialist)

or

A **Billet** - Navy Instructor

or

A **Function** - Trainee Counseling

or

A **Task** - Conduct a counseling session

or

A **Non-word** - almost always expresses a Job and never an adjective, i.e., ing, ending

- See Figure 3-3 for an illustration

TASK/FUNCTION

Instruction
Lesson Topic Development
Trainee Evaluation
Trainee Counseling
Instructor Evaluation

Computerized Support for Training
Curriculum Maintenance
Trainee Remediation
Academic Review Board
Administrative Duties
Security and Safety

Application:
Navy Instructor
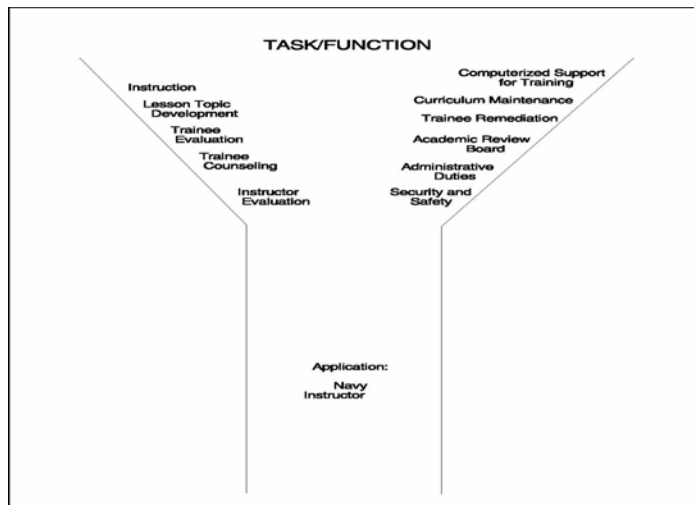
Figure 3-3: SKILLS AND KNOWLEDGE REQUIRED FOR THE TASK/FUNCTION "NAVY INSTRUCTOR"

2.10. Non-Hardware PPP Discussion—Background (BG):

- BG skills and knowledge describe prerequisite requirements
- BG skills and knowledge apply to all, many, or at least more than one, Hardware or Non-Hardware, PPP line items
- BG skills and knowledge are not directly related to any one particular Hardware or Non-Hardware PPP
- Any category of BG skills and knowledge, e.g., mathematics, covers a relatively narrow field of subject matter; but, such BG skills and knowledge, i.e., mathematics, have an almost unlimited range of application and usefulness, as illustrated by Figure 3-4

Background
Skills

Boolean
Algebra

Geometry

Trigonometry

Calculus

Algebra

Arithmetic

APPLICATION

Engineering

Business

Education

Clerical Services

Computer Services

Computer Science
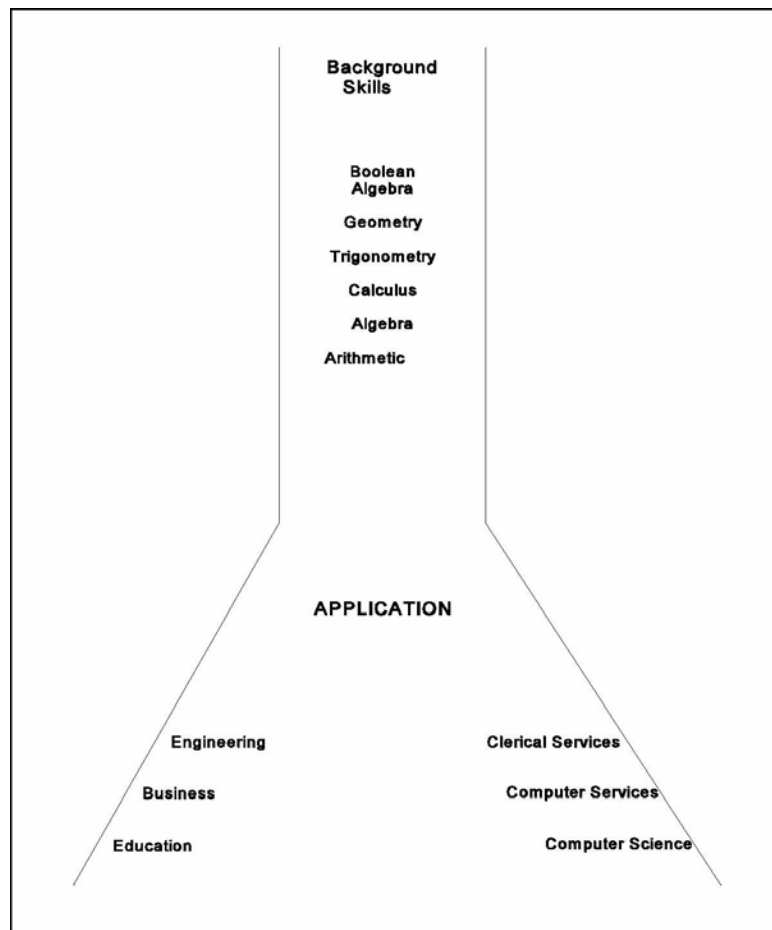
FIGURE 3-4: HOW BACKGROUND SKILLS APPLY TO A VARIETY OF APPLICATIONS

2.11. PPP CHECKPOINT

- You should now know enough about PPPs that you are able to determine the types of PPPs required for your training program and their exact Hardware and/or Non-Hardware titles
- Check your PPP titles against those listed in the *TRAINING REQUIREMENTS DATA BASE ANNUAL REPORT* and associated *QUARTERLY UPDATES*. Obtain copies of those existing PPPs required for your training program

2.11.1. Existing PPPs cannot be duplicated.

- Volume III, Chapter 3, of this manual discusses the report and management of PPPs
- PPPs are developed only if there are no existing tables
- Having determined the types of PPPs required for your training program, compile a PPP Table listing which you will submit to higher authority Curriculum Control Authority (CCA) for review and approval.

SECTION 3 - PPP DEVELOPMENT

3.1. RULES FOR WRITING PPPs

- PPPs are developed from a comprehensive task analysis. A PPP is a minimum listing of required skill and supporting knowledge
- PPPs are written in generally specific terms
- PPPs do not repeat what is in the technical documentation
- Sometimes PPPs must be a comprehensive task listing
- A PPP is not personnel-specific
- A PPP is not course-specific
- Skill PPP items are always identified first
- Each skill has its directly supporting knowledge
- Skills will also have indirectly supporting knowledge
- Skill and knowledge behaviors are job-specific
- All available resources are used in developing PPPs
- Correct order of PPP development:

  - Equipment
  - Subsystem
  - System
  - Task/Function
  - Background

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NOTE

Your PPPs will be accurate and complete if you follow the
rules listed above. Each rule is individually discussed in
the pages that follow.

3.2. PPPs are developed from a comprehensive task analysis

- Use all available resources to gather task analysis data
- This task analysis may be:

  - LSAR (Logistics Support Analysis Record)
  - NOTAP (Navy Occupational Task Analysis Program, i.e.,
    its Occupational Standards and Survey Task Analysis
    documents)
  - OTHER (Job Task Analysis/Technical Manuals/Other
    Reference Sources, etc.)

- The above are all comprehensive task analysis-based
  documents, from which required information can be
  extracted and used to develop a PPP Table
- Task analysis may be done by using Model Statements and
  Curriculum Developer Aids (CDA) for PPP table development

  - The Model Statements consist of fill-in-the blank
    skill and knowledge statements
  - The CDA works in conjunction with the Model Statements
    and leads you through the task analysis process by
    helping you select the correct Model Statements. The
    CDA is used for your hardware PPP tables only
  - Use of the CDA (Hardware PPPs only) and model
    statements ensures your PPP Table will be developed
    following ALL the important rules that are discussed
    in this chapter

NOTE

A technically correct, comprehensive PPP is best developed
by using these Model Statements/CDAs and the appropriate
task analysis-based documentation.

3.3. PPPs are minimum lists of skills and supporting knowledge

- A minimum of statements (and space) are required to
  describe a maximum amount of information

- A PPP reduces, or minimizes, a long list of duties/tasks contained in a comprehensive task analysis to a workable number of several, or more, all-inclusive statements; i.e., *A minimum requirements list* is prepared

3.4. PPP statements are generally specific

- The statement "perform preventive maintenance (PM) on the"

  - In-Service Training "general" because it encompasses ALL PM tasks
  - In-Service Training "specific" when the exact Hardware name is written in
  - In-Service Training also "specific" because task elements are usually listed

- PPP tables are constructed using general terms to support specific skills

3.5. Technical documentation is not repeated in PPPs. All operation and maintenance tasks are listed and discussed in the hardware's technical manual(s), then these same tasks are not restated in the PPP. Anyone needing this information should go ALWAYS to the technical documentation.

3.6. PPPs must be comprehensive task lists when the technical manual(s) for the hardware is either non-existent, or inadequate. This is because the PPP is now the only source of this information.

NOTE

The PPP developer is responsible for getting this information into the hands of those writing/maintaining the technical documentation.

3.7. PPPs are written like this because:

- They can remain static, even though the Hardware changes
- It will ensure that the PPP will be an easy-to-work-with document, and one which is of manageable size
- The figure on the next page illustrates all of the concepts we have discussed thus far
- Comprehensive task analysis — minimum requirements list — generally specific — technical documentation not repeated

- This figure also shows how a PPP statement can be derived from a comprehensive task analysis
- The following examples and figure 3-5 will be used to explain the rules for writing quality PPPs. See the following page for this explanation

PERSONNEL PERFORMANCE PROFILES
STAGE ONE

COMPREHENSIVE TASK ANALYSIS
(From *Chilton's Truck and Van Repair Manual*)

A. Maintain the CUCV (Type A) Utility (24/36,000 mile intervals) — DUTY

A1. Replace wiper blades
A2. Change fuel filter
A3. Replace spark plug wires
A4. Adjust/replace spark plugs
A5. Change oil
A6. Change oil filter
A7. Check brake fluid level
A8. Change coolant
A9. Replace/adjust belts
— TASKS

The results of a comprehensive Task Analysis

PPP TABLE

General (Encompasses ALL preventive maintenance)

Specific to a particular equipment

2. SKILL   2-2. Perform preventive maintenance on the CUCV (Type A) Utility (DUTY)

Does not repeat technical documentation that can be found in *Chilton's Manual*

a.   24,000 mile intervals
b.   36,000 mile intervals
— TASKS

Minimize List

FIGURE 3-5:   PERSONNEL PERFORMANCE PROFILES

- A PPP is a minimum requirements listing: By the process of minimizing, the nine tasks and one duty identified by comprehensive task analysis have been reduced to one PPP line item and two PPP sub-items

- PPPs are written in generally specific terms:

  - The 2-2 PPP line item is specific because writing in the hardware name, CUCV (Type A) Utility, at the end of the PPP statement means that it applies solely to the CUCV (Type A) Utility
  - This 2-2 PPP line item is also general in nature because it can encompass all preventive maintenance tasks performed at 24/36,000 miles, even if the list expands or contracts

- PPPs do not repeat what is in the technical documentation: Chilton's has a comprehensive list of 24/36,000-mile preventive maintenance tasks for the CUCV (Type A) Utility—so there is no need to repeat this list in the PPP Table.

- Sometimes PPPs must be a comprehensive task listing:

  - Suppose there were no Chilton's, and no comprehensive list of 24/36,000-mile preventive maintenance tasks — the PPP Table becomes the only source of this information and, consequently, must be a comprehensive task listing.

NOTE

Each PPP skill statement selected for training is later subjected to a comprehensive task analysis. Also, each is expanded into a list of tasks that must be performed in the workplace. These tasks form the basis of course-related Job Sheets, used for learning and practicing skills in the training environment.

  - When the technical documentation is updated, the PPP may be rewritten as minimum requirements listing, as this information is now available where required.

- To protect integrity of already-developed courses:

  - PPPs are modified only per procedures contained in Volume III.
  - The PPP goes away only when the hardware goes away.

3.8. PPPs are not course/personnel-specific:

- Only one PPP is allowed per each hardware, task/function, or background subject area.
- A given PPP serves as the foundation for all training on the subject hardware, task/function or background subject area.
- PPPs are not developed in such a way that they serve only one course.

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NOTE

As with all rules, occasions sometimes arise which justify violating the rule. A course specific PPP may be warranted. Two activities may each need their own PPP for the same device.

3.8.1. PPP Usability. The PPP must be usable for training everyone from military recruit to commanding officer. The most serious and frequent error occurs because the developer has a specific course in mind for example:

- The developer thinks only of those skills and knowledge required for their course. In making these mistakes the developer:

  - Shortens the list of PPP line items
  - Narrows the scope of the PPP

- This reduces its usability so that it applies only to a single course or skill category

3.9. Skills are always determined first:

- Knowledge is always determined last:

  - After ALL skills have been identified

- ALL knowledge must support a skill(s):

  - Either "directly" or "indirectly"

- Nice-to-know information is not allowed

NOTE

By determining skills first and knowledge last, you ensure that training emphasizes performance of Operating/maintaining hardware and Performing a task or function. Your focus as a developer must always be PERFORMANCE of the skills.

3.10. Skills require directly supporting knowledge:

1-5. Operational description (KNOWLEDGE)

DIRECTLY SUPPORTS

2-1. Operation (SKILL)

1-6. Maintenance description (KNOWLEDGE)

      DIRECTLY SUPPORTS

2-2. Maintenance (SKILL)

- Every skill PPP statement must have a related knowledge PPP statement(s). Note in the following example item 1-5-2 directly supports skill line item 2-1-1 and knowledge line item 1-6-2 directly supports line item 2-2-1.

EXAMPLE

```
2.  EQUIPMENT SKILLS

2-1.  OPERATION

2-1-1.  Perform tasks for operation of the _____ including:

        a.  Preoperational procedures

        b.  Operational procedures

        c.  Post-operational procedures

2-2-1.  Use special tools and test equipment required for maintenance
of the _____ as prescribed in applicable documentation.

1.  EQUIPMENT KNOWLEDGE (THAT DIRECTLY SUPPORTS THE SKILLS)

1-5.  OPERATIONAL DESCRIPTION

1-5-2.  Describe tasks to perform operation on the _____:

        a.  Preoperational procedures

        b.  Operational procedures

        c.  Post-operational procedures

1-6-2.  Describe the use of special tools and test equipment required
for maintenance of the _____ as prescribed in applicable
```

3.11. Indirectly supporting knowledge is needed also:

- This is knowledge that may not be traced back to a specific skill PPP line item
- This knowledge is required for skill understanding—but it is not required for skill performance
- This knowledge allows one to better understand HOW the hardware is operated   and maintained

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- Even though this knowledge does not contain actual operation and maintenance procedures
- It is possible, therefore, to learn to operate and maintain the hardware, even though one has not acquired the body of indirectly supporting knowledge

EXAMPLE

```
1.   KNOWLEDGE (THAT INDIRECTLY SUPPORTS)

     General Description of _____
     Physical Description of _____
     Functional Description of _____
     Interface Description of _____
     Documentation Description _____

2.   SKILL (HARDWARE USE)

     Operation
     Maintenance
```

3.12. Job-specific behaviors are used to develop PPP line items:

- Choose a word that exactly describes the skill: Operate — Maintain — Troubleshoot — Repair — Analyze

- Choose a word which describes precisely how the knowledge will be used on the job: Explain — State — Describe — Locate — Define

SECTION 4 - DEVELOP YOUR HARDWARE PPPs

4.1. Some things are common to all hardware PPPs:

- "1" is associated with Knowledge
- "2" is associated with Skills
- Hardware PPPs have three categories of skill:

  - "2-1" OPERATION
  - "2-2" MAINTENANCE
  - "2-3" ASSEMBLY (On board only - seldom seen in a PPP)

- Hardware PPPs have seven categories of knowledge:

  - General Description

- Physical Description
- Functional Description
- Interface Description
- Operational Description
- Maintenance Description
- Documentation Description

NOTE

See *Volume III Appendix D* for a description of the contents of each of the seven knowledge categories.

- Technical manuals are often organized this same way.

NOTE

The above sequence is also the best for teaching Hardware-related information because the trainee progresses:

Simple – complex
General – specific
Easy-to-do - more-difficult-to-do

However, 1-7 is usually taught very early in the course, even though listed last.

- Hardware PPP Line items are sequential, as shown in the example below. Note that three (3) sub-item levels are allowed, where 1-6-1 is the first level: a. [1st level] - (1) [2nd level] - (a) [3rd level]

ITEM NO.	KNOWLEDGE/SKILLS
1-6	1. Maintenance Description

1-6-1	2. Define the Maintenance policy for _____ <- PPP Line Item
	
	        a. Preventive Maintenance <- - - - - Sublevel 1
	
	            (1) Servicing <- - - - - - - - - -Sublevel 2
	
	            (2) Operational Check
	
	            (a) Pre-maintenance Procedure <- - Sublevel 3
	
	            (b) Performance Checks

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- Volume III Appendix D contains the following helps for developing Hardware PPPs:

  - Hardware PPP Model Statements designed so that fill-in-the blanks produce completed PPP line items.
  - Hardware PPP CDAs (Curriculum Developer Aids) help you to select the applicable Model statements used to complete your PPP table.
  - PPP Table Checklists help to analyze the Hardware so that you can determine content of the PPP (if used, these are not submitted for review).

SECTION 5 - DEVELOP YOUR TASK/FUNCTION PPPs

5.1. Some things are common to all Task/Function PPPs:

- "1" is associated with Knowledge
- "1-X" indicates a major subject area supporting a "2-X" Duty
- "1-X-X" indicates a knowledge supporting a major subject area

Item No.	Knowledge/Skills
1-1	Basic Driving <- - - - - - - - -- - - - - Subject
1-1-1	Describe the Rules of the Road <- - - - - -PPP Line Item
	a. Traffic signs and signals < - - -Sublevel 1
	(1) Shape <- - - - - - - - - - -Sublevel 2
	(a) Octagon <- - - - - - - Sublevel 3

- "2" is associated with Skills
- "2-X" indicates a Duty
- "2-X-X" indicates a Task supporting the Duty: i.e., The PPP Line item

Item No.	Knowledge/Skills
2-1	Perform Basic Driving Duty
2-1-1	Observe Rules of the Road PPP line item
	a. Observe traffic signals and signs Sublevel 1
	(1) Perform action required by Sublevel 2 traffic signs
	(a) Stop upon recognition Sublevel 3 of octagon shape

- Each Duty or Task (or group thereof) must have directly supporting knowledge:

  - Duties must be traceable to their directly supporting knowledge by their numbers.
  - It is desirable for tasks to be traceable to their directly supporting knowledge; however, this is not a requirement.

- Indirectly supporting knowledge is used as needed
- Numbers/letters are used with the two-digit numbers:

  - To indicate sequence of PPP line items
  - To list sub-items of a line item

- Three sub item levels are allowed

NOTE

Task/Function PPPs are developed using standard task analysis procedures, which are not discussed in the manual. The Navy's reference document for Task Analysis information is NAVEDTRA 130B: *Task Based Curriculum Development Manual*.

- It may not be necessary for you to go to the 3rd (or even 2nd) level of sub-items shown in the example on previous page. The only requirement is that:

  - Skills must be identified by the number "2"
  - Knowledge must be identified by the number "1"

SECTION 6 - DEVELOP YOUR BACKGROUND PPPs

6.1. Some things are common to all Background PPPs:

- "1" is associated with Knowledge
- "1-X" indicates a Major Subject Area supporting a "2-X" Area or Duty
- "1-X-X" indicates Knowledge supporting a Major Subject Area

Item No.	Knowledge/Skills
1	Knowledge <- - - - - - - - - - - - - - - Category
1-1	Explain how greases are classified <- - -PPP Line Item
	a. Composition <- - - - - - - - - - Sublevel 1
	(1) Silicone grease <- - - - - Sublevel 2
	(2) Viscosity <- - - - - - - - Sublevel 3

- "2" is associated with Skills
- "2-X" indicates a Major Subject Area or Duty
- "2-X-X" indicates a major Component Subject Area or Task

Item No.	Knowledge/Skills
1	Skill <- - - - - - - - - - - - - - - - - Category
1-1	Select the grease required for Vehicle Application < - - - - - - - - - - - - -PPP Line Item
	a. Bearings <- - - - - - - - - - - - -Sublevel 1
	(1) Roller <- - - - - - - - - - - -Sublevel 2
	(a) Catcher <- - - - - - - -Sublevel 3

- Each Major Subject Area/Component or Duty/Task (or group thereof) requires directly supporting knowledge:

  - Duties/Areas should be traceable to their directly supporting knowledge by their numbers.
  - It is desirable for tasks/components to be traceable; however this is not a requirement.

- Indirectly supporting knowledge is used as needed
- Numbers/letters are used with two-digit numbers:

  - To indicate sequence of PPP line items
  - To list sub-items of a line item

- Three sub-item levels are allowed

6.1.1. Background PPPs are often developed using standard task analysis procedures, which are not discussed in this manual. The Navy's reference document for Task Analysis information is NAVEDTRA 130B: Task Based Curriculum Development Manual.

- One approach to creating a Background PPP table is to begin by organizing your Background PPP table according to duties (skills) or major subject areas (knowledge)
- Another method of organizing your Background PPP table may work equally well for you the only requirement is that:

  - Skills must begin with the number "2"
  - Knowledge must begin with the number "1"

6.2. Task/Functions – Background PPP Special Considerations:

- Write each PPP line item so that it remains a logical expression when any one of the skill descriptors is added to the line item, as shown below:

1-1-1. Describe the function and location of the normal and a auxiliary indications on the Ships Control Panel (SCP)....

1-1-4. State the purpose of the SCP switches, knobs, and valves to include....

1-2-3. Describe the following effects, conditions, and limitations that pertain to the rudder during surface and submerged operation....

2-1-1. Demonstrate proper use of normal and auxiliary indications on the SCP to include the following....

2-1-2. Respond to the failure of normal and/or auxiliary indications to include....

2-2-3. Operate the rudder for course keeping in surfaced and submerged operation under the following effects....

6.3. There are several ways of developing PPPs:

- You can "be creative" – using only the sample PPPs in Volume II for guidance
- Or, you can use the PPP Model Statements

6.4. Another equally viable approach begins by organizing your Background PPP table according to duties (skills) or major subject areas (knowledge) - see the Task/Function PPP table example:

- You may use the PPP CDA appropriate to your Hardware PPP type(s)
- Or, you can use a combination of the above

6.5. Recommended Approaches. If you're inexperienced or uncertain, to develop any Hardware PPP:

- Refer to the sample PPP for your PPP type found in Volume II, Tab A-2
- Use the "Hardware PPP CDAs," and the "Hardware PPP Model Statements"

NOTE

The CDA in conjunction with the Model Statements will lead you step-by-step through the process of identifying all knowledge and skill items required to complete your PPP table.

- Then use the appropriate PPP Table Checklist to ensure the content of your PPP is complete
- To develop any Task/Function PPP:

  - Refer to the sample Task/Function PPP in Volume II, Tab A-2
  - Use the "Task/Function Model Statements and PPP Checklist" to ensure content of your PPP is complete

- To develop any Background PPP:

  - Refer to the sample Background PPP found in Volume II, Tab A-2
  - Use the Background PPP Model Statements and appropriate PPP Table Checklist

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- If you're experienced and/or confident, to develop any Hardware PPP: Use the "Hardware PPP Model Statements" and appropriate "PPP Table Checklist".

NOTE

While the Model Statements can be used alone, using the Checklist also will assure you of the accuracy of your PPP.

- To develop any Task/Function PPP: Use the "Task/Function PPP Model Statements," or "be creative," whichever is easiest for you.

- To develop any Background PPP: Use the "Background PPP Model Statements," or "be creative," whichever is easiest for you.

SECTION 7 - WHAT IS NEXT?

7.1. You will develop the *Training Path System* (TPS):

- You will determine whether to train someone to:

    - PERFORM Hardware or Non-Hardware skills
    - DIRECT those who are the performers
    - COORDINATE the overall actions of those who direct or perform

- You will determine if the trainee:

    - Will operate and/or maintain hardware, or,
    - Perform a Task/Function, and for both,
    - The ability level, which must be attained

- You will determine, first, the skills and knowledge the trainees will acquire by choosing specific line items from the PPPs. Then you will join these PPP line items with the designated ability level(s), thus specifying the precise skills and knowledge to be acquired.

- You will determine a training pipeline of courses, and

    - Where your course(s) fits in this pipeline
    - Where your course(s) will be taught

- You will begin Job Sheet development:

  - This process begins as soon as the TPS is done
  - This is done to make sure that skills drive, or force, content of the curriculum

- You will prepare a PPP Table Listing:

  - This document lists all PPP Tables required for development of your training program.
  - PPP Tables will be listed hierarchically, beginning with that PPP of highest order, (e.g., system is superior to subsystem) followed by titles of corresponding subordinate PPP Tables.
  - Task/Function PPPs will be listed where they best fit in relation to the Hardware PPPs.
  - Functionally related equipment will be grouped to the maximum extent possible.
  - Background PPPs will be listed, alphabetically, last of all.

- PPP Table titles will reflect the exact Hardware/Non-Hardware for which the Table is being provided – MK and MOD numbers will be included, if applicable.

- The suffix "(M)" or "(R)" will be placed following the PPP Table Number of Tables to be revised/modified:

  - Volume III of this Manual discusses revisions and modifications to existing PPP Tables.

STAGE ONE

CHAPTER 4

TRAINING PATH SYSTEM

INTRODUCTION

In the previous chapter, Personnel Performance Profiles (PPPs) were created or selected which identified the skills and knowledge required to operate and maintain a system, subsystem, or equipment, or perform a task/function.

Development of the Training Path System (TPS) completes **Stage One**. Building upon the previously developed PPPs, you will make a series of decisions fundamental to the later development of training materials.

Though the procedures for developing a TPS are presented in a certain sequence, this is not necessarily the sequence in which the elements of the TPS must be developed and, in fact, the various elements can be developed in almost any sequence.

SCOPE

- To help make some very important training decisions, using the basic information contained in PPP Tables.
- Decisions that determine:

  - WHO will be trained
  - WHAT will be trained
  - WHERE will training be provided

- By making these decisions the eventual content of the curriculum or what will actually be taught in the classroom and laboratory is determined
- The TPS bridges the gap between PPPs and the curriculum, and provides the information required to develop; Learning Objectives - Lesson Plan - Trainee Guide - Tests
- Upon finishing with the TPS Chapter, all training requirements for the course will be determined
- This is done by making the required decisions which result in development of required TPS documents

SECTION 1 - THE TPS IN-SERVICE TRAINING

- A management tool which designates the training requirements for Navy personnel involved in a particular training program(s).

- A decision-making process where a series of questions fundamental to curriculum development (see following page) are answered and recorded, thus establishing the training requirements of the curriculum.

SECTION 2 - TPS ELEMENTS (OUTPUTS)

2.1. Training Objective Statements (TOS) describe skills and knowledge to be learned by the individual.

2.2. Training Level Assignments (TLAs) list specific PPP line items to be taught, the training environment where each will be taught, and the level of training to be provided to each PPP line item.

2.3. Table Assignment Matrix (TAM) summarizes the training requirements for PPP Tables listed on the Training Path Chart (TPC) (see below) by showing all TOS associated with each PPP.

2.4. Training Path Chart (TPC) graphically shows a complete training path for a category of people by listing courses in the path, and PPP Tables covered by each

SECTION 3 - TPS CHAPTER'S GOALS

To help you determine ALL training requirements for the course by leading you, step-by-step, through the decision-making process.

3.1. TPS decisions:

- WHO will be trained?
- WHAT will the person be trained to do?

  - Operate something?
  - Maintain something?
  - Operate and maintain something?
  - Perform (or direct, or coordinate) a certain task or function?
  - Acquire some skill(s)/knowledge needed for learning any of the above skills?

- WHAT exact skills will the person learn to perform?
- WHAT knowledge is needed to perform these skills?
- WHERE will the training be provided?
- WHAT other courses come before, or after?

4-3

NOTE

You should now turn to the Sample TPS in Volume II, TAB A-3, and glance over it before reading the TPS discussion. As you read the following pages, you should refer to appropriate sections of the Sample TPS.

SECTION 4 - WHO WILL BE TRAINED?

All Navy personnel fit into one of three groups. Course scope and content are determined by the group from whom the training is intended. In addition, the kind of work that is to be trained determines the personnel group that is selected.

4.1. The three different groups of personnel:

- Those who COORDINATE the work of others, i.e., the Coordinator
- Those who DIRECT the work of others, i.e., the Director
- Those who PERFORM the hands-on work associated with operation and/or maintenance, or doing the task/function, i.e., the Performer

4.2. The following descriptions will help to identify who will be trained, or that group of personnel for which the training is to be designed:

- Coordinator: who has overall authority and responsibility (i.e., CO/XO, the system manager)
- Director: direct supervisor, i.e., department head, division officer, leading petty officer
- Performer: One who does the hands-on work of operating and/or maintaining the system, subsystem, or equipment, or doing the task/function, i.e., technician/operator?

4.3. Choosing the Personnel Group:

- Enlisted personnel may require training to be a Coordinator/Director—such as when a Chief is assigned as the Craft Master of a Tug.
- Officers may require training to be a performer—for-instance; the Radar Intercept Officer performs operational procedures.
- The Prospective Commanding Officer of a ship when being taught the hands-on pilotage skills requires training as a Performer.

4-4

NOTE

Though important, military rank, or whether officer or enlisted DOES NOT determine which personnel group is selected. The personnel group **IS ALWAYS** chosen based on the kind of work to be performed.

SECTION 5 - WHAT WILL THE PERSON BE TRAINED TO DO?

- Deciding what the Sailor will be trained to do and describing what the Sailor will be trained to do is aided by the use of prepared statements such as those shown below.

    - Each skill statement describes a unique form of work

```
Skill statement examples include:

   Coordinate operation and maintenance
   Direct operation, or
   Direct abnormal operations, or
   Direct maintenance, etc.
   Perform normal operations.
   Perform abnormal operations.
   Perform preventive maintenance.
   Perform systematic fault isolation procedures
   Perform undocumented fault isolation procedures
   Perform (Coordinate, Direct) basic skills associated
   with the task/function
   Perform (Coordinate, Direct) advanced skills
   associated with the task/function
```

5.1. These statements are called TOS. Use canned, or prepared, TOS statements to simplify wording and shorten developmental time.

5.2. TOS are organized into Task Sets*:*

- Task Sets are:

    - Coordinate TASK Set
    - Direct TASK Set
    - Perform TASK Set

- Coordinate TASK Set begins on page 4-16
- Direct TASK Set begins on page 4-19

4-5

- Perform TASK Set begins on page 4-23

    - You may then use each TOS as is, add to it, or amend it, to better describe your training program-expanded, amendable TOS are in the Volume III, Appendix E.
    - Amending the TOS usually involves writing into each TOS selected the name(s) and nomenclature of the hardware, or non-hardware, being trained, deleting unnecessary phrases from the TOS, and adding explanatory phrases as needed.
    - Amending the TOS transforms them from generalized statements about skills and knowledge to be trained to specialized statements about the planned-for training.

5.3. To describe a training program:

- Select the desired TASK Set
- Next, select the required skill TOS
- Then, select the supporting knowledge TOS

EXAMPLE

HOW TO DESCRIBE A COURSE IN A FEW WORDS

- Select the desired TASK Set: For instance, by specifying "Perform TASK Set" you are saying that your course will train personnel to *be performers*, i.e., *perform* certain skills (vice Direct or Coordinate skill performance).

- Next, select the desired Skill TOS from this TASK Set: If you choose: "Perform preventive maintenance/Perform systematic fault isolation procedures" you are saying your course will train sailors to perform preventive/basic corrective maintenance.

- Then, select the supporting Knowledge TOS: You must select "Training provides the knowledge to perform preventive maintenance and basic corrective maintenance".

- Finally, combine this information with a PPP Table Title: Such as, *COMMERCIAL UTILITY CARGO VEHICLE (TYPE A), UTILITY*—you have now stated your plans to develop a course to teach preventive and basic corrective maintenance of this one vehicle.

5.4. **TOS CODE identifies each individual TOS** and each TOS has its own unique TOS Code:

- This TOS CODE is a letter/number identifier placed just to the left of each TOS
- TOS Codes provide a shorthand method of referring to a particular TOS
- TOS Codes are used to relate selected PPP line items to designated training objective statements using a TLA form, exemplified in Volume II Sample Products
- The letter TOS Codes for skill are:

  - TO/(S)—Skill (Background)
  - TO/(J)—Skill (Task/Function)
  - O—Operation
  - P—Preventive Maintenance
  - C—Corrective Maintenance
  - M—Maintenance

- The letter TOS Codes for knowledge are:

  - F—Familiarization
  - T—Theory

- The number TOS Codes for skill and knowledge are: 0/ — 1 — 2 — 3 — 4

5.5. **Using TOS Codes** define training requirements:

- Recall that PPP line items are written very broadly
- Adding a TOS Code to a PPP Line Item turns a broadly written statement into one that is more specific

```
┌─────────────────────────────────────────────────────────┐
│             EFFECT OF THE TOS CODE ON THE PPP            │
│                                                           │
│  Using the following PPP Line Item as an example:        │
│  "Perform operation of the CUCV."                        │
│                                                           │
│  This statement can be interpreted several ways — What   │
│  operational tasks are to be performed:  All tasks?      │
│  Some tasks? Normal tasks?  Abnormal tasks?              │
│                                                           │
│  Combine this PPP Line Item with a TOS code:  "Perform   │
│  operation of the CUCV," plus the TOS Code 01.           │
│                                                           │
│  Now, the PPP Line item, plus the 01 TOS code,          │
│  specifies normal operation tasks when teaching this     │
│  PPP Line item.                                          │
│                                                           │
│  But, combine this same PPP Line Item with a second TOS  │
│  CODE: "Perform operation of the CUCV" plus TOS codes    │
│  01 and 02.                                              │
│                                                           │
│  Now, the PPP Line Item, plus the 01 and 02 TOS CODES,  │
│  specifies normal and casualty operation tasks when      │
│  teaching this PPP Line Item.                            │
└─────────────────────────────────────────────────────────┘
```

5.6. Thoughts about using TASK Sets/TOS:

- TOS must be read as TASK Sets: You must always know
  which TASK Set(s) you are currently working with—
  individual TOS get their meaning from their related TASK
  Set.

- Each Skill TOS describes a distinct operation or
  maintenance skill — normal — abnormal — preventive —
  corrective: And each Skill has a related Knowledge TOS.

- TOS Code numbers do not show sequence or priority— you
  are not required to teach a "1" TOS before teaching a "2"
  TOS, or a "2" TOS before teaching a "3" TOS; however,
  this last situation is highly unlikely:

  - A person can learn casualty operations and not know
    normal operations.
  - He does not have to know preventive maintenance to
    perform corrective maintenance.
  - Priority and sequence are determined by the nature of
    the hardware and the skills.

- TOS Code numbers do not indicate degree of difficulty or complexity in learning and performing the skill: A higher number does not always mean the skill will be harder to learn and perform—a "1" TOS may be more difficult than a "2" or "3" TOS.

- *With/Without Supervision* is intentionally loosely defined:

  - It includes all the various methods to ensure proper performance of assigned tasks
  - All people are under supervision in the sense that each is always accountable for his actions

> Advanced Analysis is the process of using mental evaluation or processes to determine steps that must be performed to obtain a known or desired condition. Undocumented procedures and complex documented procedures require advanced analysis.

- Some courses may require using two, or even three, TASK Sets: The Senior Enlisted Academy course is one example and it utilizes TOS from all three TASK Sets.

> Familiarization has unique purposes:
>
>   - It is teaching trainees the use of the documentation associated with the hardware or task/function.
>   - It is also selected when the intent is to teach trainees to perform "general watchstanding" duties which require no knowledge of how the hardware is operated or maintained

5.7. Select TASK Set/TOS:

- You now know all you need to know to decide which TASK Set, and TOS, to use for your course.
- After selecting the appropriate TASK Set/TOS: You must write the course name at the end of, or into, each Terminal Objective (TO).

5.8. Amending/Revising TOS: Remember, you may add to or modify any TOS, thus describing more clearly the training program that

you intend to develop. By doing this, another developer has a better understanding of what you intended to include in the course.

5.9   USING EXPANDED TOS:

- For each TOS contained in this volume there is a corresponding, Expanded TOS contained in the Volume III, Appendix E:

  - Using the Expanded TOS, the developer can describe in great detail the planned-for training.
  - Expanded TOS are best used to ensure that required subject matter and design considerations are incorporated into the curriculum materials, i.e., Lesson Plan (LP), Trainee Guide (TG) and Instructional Media Materials (IMM).

5.10   TO/TOS Category—IMPORTANT INFORMATION ABOUT THEIR USE:

- The TO/TOS category is used as a means of categorizing the Background and Task/Function TOS into a distinct and easily referenced unit. "TO" is primarily used when conducting formal instruction on the Training Path System (TPS) for curriculum developers.
- TO **SHALL NOT** appear on any of the products of curriculum development, i.e., Training Level Assignment (TLA) charts, Profile Item-to-Objective Assignment Chart (OAC), part page, section page, and so forth.

SECTION 6 - COORDINATE TASK SET T0/B/G (BACKGROUND) AND T/F (TASK/FUNCTION)

6.1.   SKILL/KNOWLEDGE TOS:

- **TO/TOS Category includes**: The background skill and knowledge which is prerequisite to the understanding of the operation and maintenance of the system, subsystem or equipment **AND** the task/function skill and knowledge which is not unique to the operation or maintenance of a particular system/subsystem/equipment:

- **S – B/G Skill:** Completion of training provides the PREREQUISITE (Background), PHYSICAL or MENTAL Skills necessary to support follow-on training in COORDINATING the operation or maintenance of a system/subsystem/or equipment, or further background training.
- **B1 – B/G Knowledge:** Completion of training provides the level of knowledge necessary to recognize or recall ideas, phenomena, symbology, and terminology which are PREREQUISITE to comprehension of a task or function.
- **B2 – B/G Comprehension:** Completion of training provides the comprehension of principles, rules and concepts necessary to solve given problems and situations and performance.
- **J – T/F SKILL:** Completion of training provides the PHYSICAL AND/OR MENTAL skills required coordinating the job or task/function.
- **Q – T/F KNOWLEDGE:** Completion of training provides the knowledge required to *COORDINATE* the job or task/function.

6.2. E/SS/S FAMILIARIZATION TOS:

- **F1 – Knowledge:** Completion of training provides FAMILIARITY with the:

  - Purpose, operational concepts, location, capabilities, and limitations of a system/subsystem/equipment
  - Organization, content, and use of the technical documentation provided for use with the system/subsystem/equipment

6.3. E/SS/S OPERATION/MAINTENANCE SKILL TOS:

- **O1 – Skill:** Completion of training provides the ability to coordinate operation and maintenance

6.4. E/SS/S OPERATION/MAINTENANCE KNOWLEDGE TOS:

- **T1 – Knowledge:** Completion of training provides the knowledge to coordinate operation and maintenance: Organization, content, and use of the technical documentation provided for use with the system/subsystem/equipment.

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Training Objective Statement Matrix
Coordinate Task Set
(CO/XO)

Knowledge				Skill		
Prerequisite	T0			S		Background Skill
B1	B2	Q		J		Task/Function Skill
				B1-Background Knowledge		
				B2-Background Comprehension		
				Q-Task/Function Knowledge		
Familiarity	F1					
Normal Operation	T1			O1		Normal Operation
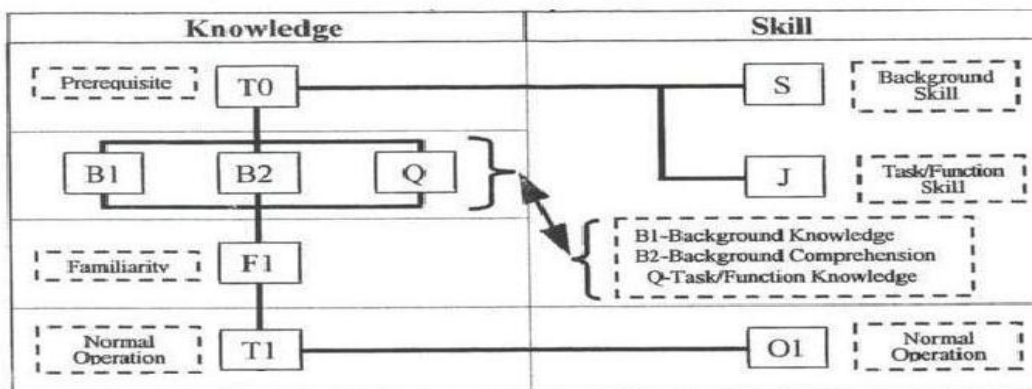
Table 1. Hierarchy – PPP Table Structure

Category	Operation (2-1)		Maintenance (2-2)		Skill
TOS	O1, O2		P1, C1, C2, C3, M1		
Category	Operation Description (1-5)		Maintenance Description (1-6)		Knowledge Direct Skill Support
TOS	T1, T2		T2, T3		
Category	Physical Description (1-2)	Functional Description (1-3)	Interface Description (1-4)		Knowledge Indirect Skill Support
TOS	T1, T2, T3	T1, T2, T3	T1, T2, T3		
Category	General (1-1)		Documentation (1-7)		Knowledge Indirect Skill Support
TOS	F1, T1, T2, T3		F1, T1		
	Task/Function or Background				PPP Tables
TOS	TO ≽ B1, B2, Q , J, S				

FIGURE 4-1: RELATIONSHIP BETWEEN KNOWLEDGE AND SKILL TOS LEVEL

SECTION 7 - DIRECT TASK SET TO/B/G (BACKGROUND) AND T/F (TASK/FUNCTION)

7.1. SKILL/KNOWLEDGE TOS: TO Includes: The background skill and knowledge which is prerequisite to the understanding of the operation and maintenance of the system, subsystem or equipment **AND** The task/function skill and knowledge *which is not unique* to the operation or maintenance of a particular system/subsystem/equipment:

- **S – B/G Skill:** Completion of training provides the PREREQUISITE (Background), PHYSICAL or MENTAL Skills

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necessary to support follow-on training in DIRECTING the operation or maintenance of a system/subsystem/equipment, or further background training.

- **B1 – B/G Knowledge:** Completion of training provides the level of knowledge necessary to recognize or recall ideas, phenomena, symbology, and terminology which are PREREQUISITE to comprehension of a task or function.
- **B2 – B/G Comprehension:** Completion of training provides the comprehension of principles, rules and concepts necessary to solve given problems and situations and performance.
- **J – T/F SKILL:** Completion of training provides the PHYSICAL AND/OR MENTAL Skills required DIRECTING the job or task/function.
- **Q – T/F KNOWLEDGE:** Completion of training provides the knowledge required to DIRECT the job or task/function.

7.2. E/SS/S FAMILIARIZATION TOS:

- **F1 – Knowledge:** Completion of training provides FAMILIARITY with the:

  - Purpose, operational concepts, location, capabilities, and limitations of a system/subsystem/equipment
  - Organization, content, and use of the technical documentation provided for use with the system/subsystem/equipment

7.3. E/SS/S OPERATION/MAINTENANCE SKILL TOS:

- **O1 – Skill:** Completion of training provides the ability to direct normal operations
- **O2 – Skill:** Completion of training provides the ability to direct:

  - Normal operations requiring advanced analysis (defined on 4-14)
  - Abnormal operations (defined as casualty/degraded/not full mission capable)

- **M1 – Skill:** Completion of training provides the ability to direct maintenance

7.4. E/SS/S OPERATION/MAINTENANCE KNOWLEDGE TOS:

- **T1 – Knowledge:** Completion of training provides the knowledge to direct normal operations: Organization, content, and use of the technical documentation provided for use with the system/subsystem/equipment.

- **T2 – Knowledge:** Completion of training provides the knowledge to direct:

  - Normal operations requiring advanced analysis (defined on 4-14)
  - Abnormal operations (defined as casualty/degraded/not full mission capable)
  - Maintenance

SECTION 8 - PERFORM TASK SET TO/BACKGROUND (B/G) AND TASK/FUNCTION (T/F)

8.1. SKILL/KNOWLEDGE TOS:

- **TO/ – Includes:** The background skill and knowledge which is prerequisite to the understanding of the operation and maintenance of the system, subsystem or equipment **AND** The task/function skill and knowledge which is not unique to the operation or maintenance of a particular system/subsystem/equipment:

  - **S – B/G Skill**: Completion of training provides the PREREQUISITE (Background), PHYSICAL or MENTAL Skills necessary to support follow-on training in PERFORMING the operation or maintenance of a system/subsystem/equipment, or further background training.
  - **B1 – B/G Knowledge**: Completion of training provides the level of knowledge necessary to recognize or recall ideas, phenomena, symbology, and terminology which are PREREQUISITE to comprehension of a task or function.
  - **B2 – B/G Comprehension**: Completion of training provides the comprehension of principles, rules and concepts necessary to solve given problems and situations and performance.
  - **J – T/F SKILL**: Completion of training provides the PHYSICAL AND/OR MENTAL Skills required to PERFORM the job or task/function.

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- **Q – T/F KNOWLEDGE**: Completion of training provides the knowledge required to PERFORM the job or task/function.

8.2. E/SS/S FAMILIARIZATION TOS:

- **F1 – Knowledge:** Completion of training provides FAMILIARITY with the:

  - Purpose, operational concepts, location, capabilities and limitations of a system/subsystem/equipment.
  - Organization, content, and use of the technical documentation provided for use with the system/subsystem/equipment.

8.3. E/SS/S OPERATION/MAINTENANCE SKILL TOS:

- **O1 – Skill:** Completion of training provides the skill to perform normal operations.
- **O2 – Skill:** Completion of training provides the skill to perform:

  - Normal operations requiring advanced analysis (defined on 4-14)
  - Abnormal operations (defined as casualty/degraded/not full mission capable)

- **P1 – Skill:** Completion of training provides the skill to perform preventive maintenance.

8.4. E/SS/S OPERATION/MAINTENANCE SKILL TOS:

- **C1 – Skill:** Completion of training provides the skill to perform to the authorized maintenance level, systematic fault isolation procedures.
- **C2 – Skill:** Completion of training provides the skill to perform to the authorized maintenance level:

  - Systematic fault isolation procedures that require advanced analysis.
  - Authorized techniques to isolate faults that cannot be isolated using procedures contained in prescribed documentation.

- **C3 – Skill:** Completion of training provides the skill and knowledge to perform, without supervision:

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- Diagnosis of equipment malfunctions, fault isolation, and all repairs.
- This level of skill cannot be trained in the formal school setting. This skill is acquired only through on-the-job experience, and reflects a continuous learning process that is supported by the skills and knowledge taught in the formal school environment.
- The Training Level Assignment Applicability Indicator "1" will always be used to show this skill is acquired via "operational experience," i.e., shipboard performance.

8.5. E/SS/S OPERATION/MAINTENANCE KNOWLEDGE TOS:

- **T1 – Knowledge:** Completion of training provides the knowledge to perform normal operations: Organization, content, and use of the technical documentation provided for use with the system/subsystem/equipment

- **T2 – Knowledge**: Completion of training provides the knowledge to perform:

  - Normal operations requiring advanced analysis (defined on 4-14)
  - Abnormal operations (defined as casualty/degraded/not full mission capable)
  - Preventive maintenance
  - Basic corrective maintenance

- **T3 – Knowledge:** Completion of training provides the knowledge to perform advanced corrective maintenance

SECTION 9 - WHAT EXACT SKILLS WILL BE TRAINED?

> See Volume II, TAB A-3, TRAINING LEVEL ASSIGNMENT (TLA), as you read the following discussion.

9.1. These skills are taken from the PPP Table(s): First, select a PPP Table for the course, next, select PPP line items from this Table, then, write their numbers on a TLA Form, last, make entries in the correct TOS code column(s).

9.2. To develop the list of skills to be trained:

- Obtain all PPP Tables for your course: PPP Tables are used in this order—Equipment ~ Subsystem ~ System ~ Task/Function ~ Background.
- Select a PPP Table and obtain or prepare a blank TLA Form.
- Write in at the top of the form:

  - The titles of the TPS and PPP Table
  - TPS alpha-numeric identifier may be a Course Identification Number (CIN) or Navy Enlisted Code (NEC) identifier

> TLAs are usually course specific; however, TLAs may also show training for an entire NEC or pipeline—hence the reason for the Training Locator Indicator Codes.

9.3. Develop the list of skills to be trained:

- "2-1. Operation" skills are done first
- "2-2. Maintenance" skills are done last
- Under the "Item" column of the TLA:

  - Write the number of each PPP line item that must be trained in the course.
  - List the letter/number code of EACH PPP sub-item that you want trained.
  - A missing letter/number code indicates the PPP line item, or sub-item(s) will not be trained.

- Indicate TOS applicable to each PPP line item/sub-item:

  - Write in the Training Level Assignment Applicability Indicators—refer to page 4-25 of this chapter for these.
  - Do this using the appropriate TOS Column(s) — you must use those TOS Codes which correspond with the TOS you selected for your course in an earlier step.
  - Each PPP line item/sub-item must have a Training Locator Indicator Code written beside it.

- If two or more TOS apply to a PPP Line Item/Sub-item:

  - An entry will be made in each applicable TOS column using the appropriate Training Level Assignment Applicability Indicators.

SECTION 10 - WHAT KNOWLEDGE WILL BE TRAINED?

10.1. Develop the list of knowledge to be trained:

- This is done exactly as you did in determining the skills
  to be trained in the course, except:

  - Note that several categories of knowledge are required
    to adequately perform the skills.
  - There is, of course, that knowledge which describes
    HOW to perform the skill—this is "directly supporting"
    knowledge.
  - Other knowledge describes purpose, equipment
    interface, general, physical and functional
    description, etc., associated with performing the
    skill—this is "indirectly supporting" knowledge.

    > To refresh your memory as to the terms
    > "Directly Supporting/Indirectly
    > Supporting" refers to the PPP Chapter.

  - You must be sure to select those PPP line items, which
    describe ALL the different knowledge that is necessary
    too adequately and safely perform the skills you have
    decided to train.

- First select all directly supporting knowledge PPP line
  items: "1-5. Operational Description" and "1-6.
  Maintenance Description"
- Next, select the "Indirectly Supporting" knowledge PPP
  line items, beginning with "1-1. General" and ending
  with "1-7. Documentation Description":

  - In most cases you will select all indirectly
    supporting knowledge PPP line items—the exception
    being when a PPP knowledge line item does not apply.

  - For instance, some hardware is totally stand-alone and
    has no "interface" with any other hardware—thus,
    interface description would not be taught in the
    course.

10.2. Do the Non-Hardware PPPs: When all Hardware PPP Tables
have been analyzed it is time to do the Non-Hardware PPP
Table(s):

- Remember, Task/Function PPPs are done first and any Background PPP Tables are done last.
- Just as you did with the Hardware PPPs, list by their 2-X numbers all the skills that must be trained in the course.
- When all skills have been selected, list by their 1-X numbers all knowledge that must be trained in the course, being sure to identify all directly supporting knowledge first.

Placing a Training Level Assignment Applicability Indicator beside each PPP line item selected for training, in the appropriate TOS Column(s):

- Directs where training will be conducted.
- Indicates nature of work to be performed with respect to the PPP line item, i.e., normal ~ abnormal (operations) ~ preventive basic corrective ~ undocumented corrective (maintenance) procedures ~ basic ~ advanced performance of (job/function) skills.
- Determines the skills that the trainee must learn by attending the course.
- Completed/approved TLAs are directive in nature and prescribe the content of the course.

10.3. What Training Level Assignment Applicability Indicators Do: "Xs" may be used instead of Training Level Assignment (TLA) Applicability Indicators:

- You may want to use Xs when the TLA(s) being developed are for an individual course — vice a training pipeline of courses.
- X's may also be used as a placeholder until the correct Training Level Assignment Applicability Indicators are known.

10.4. It is time for an accuracy check:

- The Skill TOS Columns used in each TLA must agree with the Skill TOS you selected earlier.
- TOS Columns for Operation (O1, O2) can only be used with "2-1. Operation" PPP line items.
- Likewise, TLA TOS Columns P1, C1, C2, C3 apply only to the "2-2. Maintenance" PPP line items: Reading all "2-2" line items closely will reveal additional subtleties

which will affect the TLA TOS Column chosen—some describe
preventive maintenance only, others corrective
maintenance only.

- Recall that TOS Column T1 is used only with normal
  operation "1-5" PPP line items; Column T2 can be used
  with abnormal operation "1-5" and all "1-6" PPP line
  items; TOS Column T3 applies only to "1-6" corrective
  maintenance PPP line items.

10.5.   Thoughts about TLA development:

- Always remember to prepare a separate TLA for each PPP
  Table used in the course, or listed on the Training Path
  Chart (TPC), if appropriate.

- As a TLA developer you must be knowledgeable about the
  people and the Hardware (or Non-Hardware) for which the
  TLA is being developed:

  - In order to accurately select PPP line items for
    training you must understand:

    - What do the individuals currently know?
    - What skills will be performed on the job?
    - What training comes afterward?

- A knowledge of how one TOS relates to another is
  essential. Do not specify T2 if teaching O1 only, or T3
  if O2, or P1, or C1, etc., skills are indicated.

10.6. Develop the Table Assignment Matrix (TAM). The TAM is
developed in conjunction with the TLA:

- The TAM lists, sequentially, all PPP Tables taught in the
  course (or NEC) and the TOS applicable to each PPP.

NOTE

TAM readability and comprehension may be enhanced by
listing sequentially all Hardware PPP Table Numbers first,
followed by those for T/F and B/G (Non-Hardware) training.

- TOS are designated by an "X" in the appropriate block.
  Like the TLA, the TAM represents a training requirement
  when filled out

SECTION 11 - WHERE WILL EACH SKILL/KNOWLEDGE BE TRAINED?

11.1. TLA Applicability Indicators Show where training occurs:

- **R -** Replacement Training course
- **A -** Advanced Training course
- **B -** Both Replacement and Advanced Training courses
- **0 -** Training hardware does not exist at the appropriate facility and operational constraints preclude on board training

1. Operational 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 onboard 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.

NOTE

When required, other TLA Applicability Indicators may be devised if none of the above fit the training situation.

SECTION 12 - THE MEANING OF LETTERS AND NUMERALS:

- As discussed in the preceding section, these codes are essential to TLA development: When entered onto a TLA, TLA Applicability Indicators prescribe where each PPP line item will be trained.

- Letters and numbers show who has accepted responsibility for training the PPP Line Item:

- A Letter TLA Applicability Indicator, i.e., R, A, or B, besides the PPP Line Item, indicates the TRACOM will train to that line item(s).
- A Numeral TLA Applicability Indicator, i.e., 0, 1, 2, 3, 4, or 5 shows that an organization other than the TRACOM, probably an operational unit, will train that PPP Line Item.
- Or, that due to operational constraints, i.e., TLA Applicability Indicator 0, the training requirement is not trained.
- The Numeral TLA Applicability Indicator 5 is ambivalent in that the sailor may receive training for the PPP Line Item by either a TRACOM activity or operational unit.

SECTION 13 - WHAT WILL BE TRAINED, AND WHERE?

13.1. Develop TLAs/TAM: You now have all information needed to develop the TLAs for your training program.

- TLA development is one of the most critical aspects of course development—its importance cannot be over emphasized: This is where you first decide what skills and knowledge the graduates of your course will have when they competed the course

- Use the completed TLAs to develop the TAM: When you have completed this phase of development, you will have a set of filled-in TLAs equal to the number of PPPs you have chose/developed to support your course: You will also have one filled-in TAM.

SECTION 14 - WHAT COURSES COME BEFORE OR AFTER?

14.1. Most courses are part of a "Training Path":

- There are basic, prerequisite courses that must be taken before enrolling in the present course:

  - Many courses provide the person with the technical knowledge and skills necessary to prepare for their first shipboard duty.
  - Other courses provide advanced, follow-on training once the present course has been completed.
  - Still other courses provide shipboard training.

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- A training path may be very brief consisting of only a few courses.
- A training path may be a lengthy one comprising all courses a person may take during a Naval career while in a particular rating.

14.2. What is a TPC?

NOTE

See Volume II, TAB A-3, Training Path Chart (TPC), as you read the following discussion.

- The TPC is used to show the training path:

  - By looking at the TPC you can readily see where your course fits in relation to all other courses in the pipeline.
  - The TPC also shows the courses according to whether they provide basic, entry level training, advanced training, etc.

14.3. The following definitions apply to developing TPCs:

- Background Training: "Prerequisite" training that provides basic technical knowledge and skills required to prepare for further specialized training, or a first assignment.
- Replacement Training:

  - Prepares new personnel for their first assignment
  - Formal school training to provide people with the minimum required operational and maintenance qualifications on assigned equipment, subsystems, and the system

- Conversion Training - Training given to previously trained and experienced personnel to enable them to operate and maintain a new/modified system/subsystem/equipment. The training will be sufficient to allow the person to assume new duties at a level, which normally involves replacement training.
- Advanced Training - Training, which follows replacement/ conversion training. Advanced training normally completes the TOS coverage of particular Hardware/Non-

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Hardware knowledge and skills requiring advanced analysis
(defined on 4-14) or undocumented fault isolation.
- Onboard Training - Training provided aboard ship, and
  which may include individual operator/maintenance
  technical training, individual watch station
  qualifications, watch team training, and training in
  general military subjects.

14.4. Creating a TPC:

- A TPC results from the combination of:

  - PPP Table Index
  - TAM — discussed previously
  - Table Assignment Chart (TAC) - Optional

NOTE

A TAC, which is a graphical display of all related courses in
a pipeline, including course titles and associated PPP Tables,
is frequently prepared in response to a forthcoming Fleet
examination of the course(s).

- The PPP Table Index lists the titles of the PPPs and
  beside each the PPP Table Number assigned to that PPP
  Table Title: The PPP Table Index is usually placed on a
  separate page, especially when the list is extensive.

SECTION 15 - DOCUMENT SUMMARY

15.1. When all TPS elements have been developed:

- The various documents are assembled in this order:

  - TOSs
  - Training Level Assignment(s)
  - TAM
  - TPC

- The pages numbered sequentially beginning with the first
  TOS page, and the completed TPS is now ready for
  submission.

> See Volume II, TAB A-3, for an example of a completed
> and assembled Training Path System (TPS).

15.2. TPS development for single course(s): For such courses, the following TPS elements are required:

- TOS
- TLAs
- PPP Table Index

SECTION 16 - WHAT IS NEXT?

16.1. Your course will begin to take shape as you decide how best to organize the subject matter and the specific goals you want the trainees to achieve:

- Using everything you have developed so far, you will:

  - Prepare the Course Learning Objectives
  - Devise an outline for the course, and display this as parts, sections, and topics, thus reflecting course structure and sequence
  - Develop the Topic Learning Objectives
  - Prepare a profile item-to-topic objective assignment chart which enables each PPP line item to be tracked throughout the curriculum

16.2. Develop Job Sheets: Even though developing Job Sheets is actually part of TG development, you should begin thinking about their development as soon as possible, after the TOS and TLAs are done:

- Job Sheets are one of the most critical of all the curriculum elements.
- They are based on the critical skills the trainees will be expected to do upon graduation.
- And, thus, determine what the person will be able to do at his follow-on duty station.
- For all of these reasons, you should allow yourself ample time for preparing Job Sheets.

> See Chapter 7, "Trainee Guide," for a complete discussion of Job Sheet development.

STAGE TWO

CHAPTER 5

TRAINING COURSE CONTROL DOCUMENT

INTRODUCTION

Stage One was initiated in the previous chapter with the creation of a Training Path System (TPS) where fundamental training decisions were made, such as "who will be trained," "what will the Sailor be trained to do," "where will the training be provided," etc. With completion of the TPS, you are ready to begin the next part of the Design Process.

The Training Course Control Documents (TCCD) aspect of Stage Two focuses on stating in specific terms what the trainees must know and be able to do, and determining the form and structure of the course. The Curriculum Outline of Instruction (COI) is the document used to accomplish these goals.

Stage Two concludes by compiling documents of the COI with other documents, such as course and trainee data, resources, and course scheduling information, to create the TCCD. The TCCD serves as the primary management document for the training program.

Development of Course Learning Objectives (CLOs) is the first step of Stage two. Building from everything that has been done so far, the broad, job-related skills and knowledge are determined. From there, you will proceed through a series of steps, and related document development, which enable you too more specifically define the organization of the course and its content.

Though most of the documents submitted for review and approval are laid out vertically ("portrait" format), each may be formatted (with Curriculum Control Authority (CCA) approval) so that it can be transposed directly to the Lesson Plan (LP), with no additional work being required on it. In most cases, this means laying out the document horizontally ("landscape" format).

SCOPE

- To lay out content requirements and format conventions of documents comprising the course of instruction (COI)/TCCD

> Within Navy technical training there is a need to apply the rules of common sense when COI/TCCD/LP/Training Guide (TG) documents are formatted.

- Regarding format, to show that COI/TCCD documents may be formatted like one of the samples in Volume II, or like the corresponding document from the LP.
- To describe the elements of the COI/TCCD.
- To explain the step-by-step process for developing elements of the COI/TCCD.
- To discuss the need for arranging and sequencing the COI/TCCD into parts," "sections," and "topics" to best enhance learning: This is an aspect of COI development which should receive maximum attention.

SECTION 1 - TCCD IN-SERVICE TRAINING

- The primary management tool of higher authority to approve course scope and outline, and both overall and specific objectives of the course, including resources and the personnel for which the course is being designed to train.
- Your determination as to how all of the different components that make up the course, the COI, should be organized and sequenced so that learning is most effective and efficient.

1.1. Function of TCCD and COI:

- Preparing the COI is a process that directly affects "teach ability" of the course. Most of this chapter will concentrate on developing the COI.
- Preparing the TCCD is the assembling of documents that have been developed to fulfill the approval requirement and giving them a cover.
- The last several pages of this chapter will discuss completing the final TCCD.

SECTION 2 - COMPOSITION OF THE PRELIMINARY TCCD

2.1. Preliminary TCCD includes these documents:

- Profile Item-to-Topic Objective Assignment Chart (OAC): Reflects the coverage of Personal Performance Profile (PPP) items within a curriculum.
- Required Resource List (RRL): Lists resources needed to conduct the course.
- COI describes the overall course outline and objectives.

SECTION 3 - COI ELEMENTS ARE

- CLOs

  - CLOs describe the overall knowledge and/or skills to be attained upon completion of a course.
  - CLOs have a behavior, a condition and a standard - of which they written or implied.

- TLOs

  - TLOs support the CLOs and describe the topic-specific skills and knowledge to be attained by the trainee during the topic.
  - TLOs consist of a behavior, a condition, and a standard.

- COI

  - COI presents the course plan, or outline, for achieving the CLOs and TLOs by showing the subject matter that is to be taught and the order of subject matter presentation.
  - COI function is to help you prepare a plan for teaching the subject matter of the course that reflects the principles of learning.

3.1. Completed, this plan COI describes:

- The overall skills and knowledge to be acquired by the trainee upon completion of training.
- The specific skills and knowledge to be acquired by the trainee during each topic.
- The organization of the subject matter into specific units of instruction (Parts, Sections, and Topics), and the sequence, or order, in which this subject matter will be taught.
- The developer's intent with respect to the course, and each unit of instruction as to content, sequence, purpose, and desired outcome.

3.2. The goal of this plan must be to prepare the trainees as completely as possible for the job to which they will be assigned.

SECTION 4 - DOCUMENT COMPILATION

- Preparation of COI elements leads to the development of related documents. The COI is completed when you have prepared all COI elements listed.
- When finished with the COI, compile all your documents in the order they are discussed in the following pages.

4.1. Documents developed. These correspond to the COI Elements listed on the previous page.

> Take a few moments now to study the ***Sample*** *COI* in Volume II, TAB A-4.
>
> While reading the following pages, you will want to refer back to the Sample COI.

NOTE

The COI will be assembled later with other documents to form the *Training Course Control Document*. See Chapter 5 of Volume III, and TAB A-4 of Volume II of this Manual.

SECTION 5 - REGARDING FORMAT

- It is not necessary that all Navy curricula look exactly alike, right down to the minutest detail.
- What is required is that a particular document must generally look like others of its type.
- What is not necessary, and in fact is counter-productive, is worrying that every document looks exactly like every other of its type, e.g.:

  - Certain words are always capitalized, underlined, placed in parentheses, are all lowercase or uppercase, or end with the same punctuation.
  - Top/bottom and right/left margins are precisely the same fraction of an inch, repetitious data within the document is always placed identically to the nearest fraction of an inch, font style is always identical, pages mirror other similar pages.

5.1. The rule of common sense must apply. If the document is "instructor friendly" and looks to be the same as others of its type, it should be acceptable.

5.2. CCA will provide guidance. The CCA will determine the
degree of format flexibility allowed.

SECTION 6 - DEVELOP CLOs

CLOs are "developed" by selecting the appropriate, already-
prepared Course Learning Objective Model Statements:

- These "Model Statements" correspond to the Training
  Objective Statement Group, and Training Objective
  Statements (TOS), you chose while developing your TPS.
- Refer to the CLO Model Statements as you read the
  following discussion.

6.1.   Prepare the CLOs for your course:

- Use the TPS documents to determine:

  - Titles of all PPPs taught in the course
  - All TOS CODES which apply to each PPP Table

- Select one of the TLAs used in the course (NOTE—arrange
  TLAs in alphabetical order):

  - First, using the TOS column, note all TOS Codes which
    apply to the PPP
  - Second, note the title of the PPP Table

**MEMORY REFRESHER TOS CODES/NUMERIC
VALUES**

F - (1) – Familiarization
T – (0-4) – Theory

S – (B/G) – Skill (background)
J - (T/F) – Skill (Task/Function)
O – (1-2) – Operation
P – (1-2) – Preventive Maintenance
C - (1-2) – Corrective Maintenance
M - (1) – Maintenance

  - Third this PPP Table title will be worked into the
    CLOs

6.2. Use the CLO Model Statements

- Go to the COURSE LEARNING OBJECTIVE MODEL STATEMENTS
  appropriate for your course:

  ┌──┐
  EXAMPLE:

  A TLA shows use of these TOS codes:

      O1 – O2 – P1 – C1 – C2
      T0 – T1 – T2 – T3 – T4

  CLOs chosen are:

      O1 – O2 – P1 – C1 – C2
  └──┘

  - Choose, as the CLOs for this PPP Table, those CLOs
    which correspond to each TOS code(s) assigned to the
    PPP Table.
  - In the space provided within each CLO, write the title
    of the PPP Table.

- Repeat this process for each TLA/PPP Table.
- If two or more PPP Tables apply to a CLO they may be
  listed subordinate to the CLO statement.

6.3. The sample "Curriculum Outline of Instruction" (Volume II, Tab A-4) shows the format of the CLO page:

- Note that CLOs in the sample are organized in LP format
  and style so as to require no revision when they become
  an integral part of the LP. All COI elements may be
  formatted like this.
- Note use and placement of title and introductory phrase
  on the first and subsequent CLO pages.
- Knowledge CLOs are always on the left — Skill CLOs are
  always placed on the right.
- Arrange CLOs in ascending order (e.g., T1 ~ T2 ~ T3 ~ O1
  ~ O2 ~ P1).

> - When all CLOs are developed and sequenced, major divisions of the course can be identified as to "Parts" ~ "Sections" ~ "Topics."
>
> - Quickly scanning the sequenced CLOs will reveal "natural breaks:"
>   - o The PPP Tables become Parts
>   - o Skill CLOs become Skill Sections
>   - o Knowledge CLOs become Knowledge Sections

6.4.   Thoughts about developing CLOs

- The same CLO Model Statement can apply to more than one PPP Table. When this occurs, additional PPP Tables are listed alphabetically within the CLO or subordinate to it.
- You must use the CLO Model Statements to the maximum extent possible.
- However, the CLOs you "write" must also describe accurately the overall skills and knowledge the trainees will acquire upon course completion:

  - To achieve this goal, CLOs may be modified, or "tailored," as required to fit the course.
  - For example, some words or phrases may not apply to your course—these should be deleted.
  - It may be necessary to add a word(s), or phrase(s), to have CLOs that are an accurate reflection of the course and the job to be performed.

- Course completion implies that the trainee can perform the knowledge and skills specified by the OS and to the degree of expertness required by the TOS.

6.5. Training constraints

```
┌─────────────────────────────────────────────────────┐
│                   CLOs AND THE JOB                    │
│                                                       │
│  CLOs closely resemble, and duplicate where possible, │
│  actual skills and knowledge required for job         │
│  performance.                                         │
│                                                       │
│  This includes:  JOB Behavior - JOB Conditions - JOB  │
│  Standard.                                            │
│                                                       │
│  Therefore, CLOs describe those skills and knowledge  │
│  a graduate must have to perform his job.             │
└─────────────────────────────────────────────────────┘
```

- Schoolhouse constraints, NOT testing constraints, determine how closely job-required skills are able to be duplicated in the schoolhouse:

  - Laboratory configuration and capacity, technical training equipment availability, technical training equipment configuration, previous training received by the trainee, etc.
  - Such factors as these influence the similarity of training-provided skills to job-required skills.
  - The goal of training is the competent performance of job skills – in the work place – to the job standard.

SECTION 7 - COORDINATE CLO MODEL STATEMENTS

7.1. S (BACKGROUND) SKILL CLO: S (B/G) Skill - perform the prerequisite (Background) skills necessary to successfully complete - follow-on training in the COORDINATING the — (operation or maintenance of...([System, Subsystem, and Equipment]); (performance of...[task or function]); (receipt of... [further background training]).

7.2. J (TASK/FUNCTION) SKILL CLO: J (T/F) Skill - Coordinate direction/performance of all—task or function skills.

7.3. OPERATION/MAINTENANCE CLO: O1 Skill - Coordinate all Operational and Maintenance Procedures on the...

7.4. B1/B2 (BACKGROUND) KNOWLEDGE CLO: B1/B2 (B/G) Knowledge - Demonstrate an understanding of the knowledge required to perform the prerequisite (Background) skills necessary to successfully complete follow-on training in *COORDINATING* the (operation or maintenance of... [System, Subsystem, Equipment]); (performance of... [task or function]); (receipt of [further background training]).

7.5. Q TASK/FUNCTION KNOWLEDGE CLO: Q (T/F) Knowledge - Demonstrate an understanding of the knowledge required to COORDINATE direction/performance of all task or function skills.

7.6. FAMILIARIZATION CLO: F1 Knowledge - State the capabilities and limitations of the (Subsystem/Equipment) necessary to understand the related (System/Subsystem) and describe associated documentation.

7.7. OPERATION/MAINTENANCE KNOWLEDGE CLO: T1 Knowledge - Describe the theory and associated documentation necessary to understand all operational tasks and all maintenance procedures, without going into functional circuit details or program flow diagrams.

SECTION 8 - DIRECT CLO MODEL STATEMENTS

8.1. S (BACKGROUND) SKILL CLO: S (B/G) SKILL - Perform the prerequisite (Background) skills necessary to successfully complete follow-on training in *DIRECTING* the (operation or maintenance of... [System, Subsystem, and Equipment]); (performance of... [task or function]); (receipt of...[further background training]).

8.2. J (TASK/FUNCTION) SKILL CLO: J (T/F) SKILL - Direct performance of all task or function skills

8.3. B1/B2 (BACKGROUND) KNOWLEDGE CLO: B1/B2 (B/G) Knowledge – demonstrate an understanding of the knowledge required to perform the prerequisite (Background) skills necessary to successfully complete follow-on training in *DIRECTING* the (operation or maintenance of [System, Subsystem, and Equipment]); (performance of [task or function]); (receipt of [further background training]).

8.4. *Q* (TASK/FUNCTION) KNOWLEDGE CLO: Q (T/F) Knowledge – demonstrate an understanding of the knowledge required to *DIRECT* performance of all task or function skills.

8.5. FAMILIARIZATION CLO: F1 Knowledge - State the purpose, function, and location, and describe the documentation required to understand subsystem capabilities and limitations of the ....

8.6. OPERATION/MAINTENANCE SKILL CLOs:

- **O1 Skill -** Direct normal operational procedures on the
- **O2 Skill -** Direct all operational procedures on the
- **M1 Skill -** Direct all maintenance on the

8.7. OPERATION/MAINTENANCE KNOWLEDGE CLOs

- **T1 Knowledge -** Describe the theory and associated documentation necessary to understand normal operational tasks without going into logic, circuits, program flow diagrams, or mechanical component breakdown of the ....
- **T2 Knowledge -** Describe the theory and associated documentation necessary to understand all operational tasks and all maintenance procedures without going into detailed logic, circuits, individual flow diagrams, or detailed mechanical component breakdown of the ...

SECTION 9 - PERFORM CLO MODEL STATEMENTS

9.1. S (BACKGROUND) SKILL CLOs: S(B/G) Skill - Perform the prerequisite (Background) skills necessary to successfully complete follow-on training in PERFORMING the—(operation or maintenance of System, Subsystem, Equipment); (performance of task or function); (receipt of further background training)

9.2. J (TASK/FUNCTION) SKILL CLO: J(T/F) Skill - Perform all task or function skills

9.3. B1/B2 (BACKGROUND) KNOWLEDGE CLO: B1/B2 (B/G) Knowledge - Demonstrate an understanding of the knowledge required to perform the prerequisite (Background) skills necessary to successfully complete follow-on training in *PERFORMING* the (operation or maintenance of...[System, Subsystem, and Equipment]); (performance of... [task or function]); receipt of... [further background training.])

9.4. Q (TASK/FUNCTION) KNOWLEDGE CLO: Q(T/F) Knowledge - Demonstrate an understanding of the knowledge required to PERFORM all task... or function... skills

9.5. FAMILIARIZATION CLO: F1 Knowledge - State the purpose, function and location, and describe the documentation of the..

9.6. OPERATION/MAINTENANCE SKILL CLOs

- **O1 Skill -** Perform normal operational procedures with supervision on the ....
- **O2 Skill -** Perform all operational procedures with supervision on the ....
- **P1 Skill -** Perform preventive maintenance procedures with supervision on the ....
- **C1 Skill -** Perform documented fault isolation and repair procedures to the authorized maintenance level, with supervision, on the....
- **C2 Skill -** Perform all authorized fault isolation and repair procedures with supervision on the....

9.7. OPERATION/MAINTENANCE KNOWLEDGE CLOs

- **T1 Knowledge -** Describe the theory and associated documentation 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 Knowledge -** Describe the theory and associated documentation necessary to support and understand the performance of casualty/degraded/abnormal operational tasks and operational tasks requiring advanced analysis, all routine 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....
- **T3 Knowledge -** Describe the theory and associated documentation necessary to support all corrective maintenance without going into signal or electron 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....

SECTION 10 - DEVELOP OTHER COI ELEMENTS

- The COI presents the course plan, or outline, for achieving the CLOs and TLOs by showing:

  - The subject matter that is to be taught
  - And the order of subject matter presentation

10.1. To develop the COI you must first determine:

- Part Title(s)
- Section Title(s)
- Topic Title(s)
- TLO(s)

10.2. Next, you must determine:

- Organization and sequence of these several components
- You are looking for that arrangement of Parts - Sections - Topics - TLOs that promotes:

  - The most complete knowledge of the material
  - And learning within the shortest possible time

10.3. Prepare the COI for your course

See Volume II, TAB A-4, for a Sample *Curriculum Outline of Instruction*, in the TCCD as your read the following discussion.

10.4. Prepare the Parts for your course

- The Part is the primary organizational element of the COI/LP and each is divided into one or more Parts:

  - A PPP Table
  - A part of a PPP Table
  - A combination of PPP Tables

- The Part is the largest element of the COI/LP because the PPP is the largest unit of analysis done to identify skills and knowledge to be taught in the training program.

- Title and number of the Part correspond with the related PPP Table title and number: Each Part normally covers all PPP line items from the related PPP which are to be taught.
- Sometimes, "teach ability" may require that one PPP be taught in two or more Parts:

  - As when "familiarization" of the hardware or task/function is taught early in the course
  - And an in-depth coverage of this hardware or task/function is provided later in the course
  - Consideration should be given to using a subsystem PPP table for familiarization and then using the equipment PPP table for the in depth description.

- Several PPPs may also be covered in one Part — such as when the subject of one or more of the PPPs clearly supports the subject of the primary PPP. The purpose of combining PPPs is usually to eliminate the repetition of PPP line items common to a group of PPP Tables

10.5. Determining Part Numbers is derived from the PPP Table Number (for example; PPP Table Number is S0136):

- When the PPP is covered without interruption — S0136
- When coverage of the PPP is divided into two, or more, parts (called "split parts")

  - S0136/1 — 1st usage
  - S0136/2 — 2nd usage
  - When more than one PPP is covered in the part — S0136
  - This part contains information from PPP Tables A0074, B0076, S0136, S0137 and S0138

<div align="center">**NOTE**</div>

Number displayed, e.g., S0136 is that of primary PPP.

- As you will see, parts are comprised of Sections.
- Multiple Parts within a LP are separated from one another by Tab Dividers.
- Part number is placed on the "tab" of the Tab Divider, as follows—"Part S0136".

10.6. Prepare the Sections for your course

- Parts are split into Sections:

  - The Section allows a similar group of skills, for example, "normal operations", "preventive maintenance", and their related knowledge to be taught together
  - The TOS that are assigned to a PPP Table (Part) determine its Section titles.

- The sources of Section titles for Hardware PPPs are the Section Title Model Statements for Hardware PPPs.
- Sections may also be combined in whatever way best fits the training situation and desired outcomes:

  - See following page, for some possible combinations of Hardware PPP Section titles.
  - Combined Sections will reflect by their titles all TOS covered within that section.

- The source of Section titles for Non Hardware PPPs are the proper names of the skill or knowledge areas, etc., covered in that Section, for example: Basic Mathematics – Special Mathematics – Electrical Safety – Direct Current Fundamentals – Oscillators.
- The Section titles for a part are placed on the Tab Divider for that part(see Volume II, Tab A-4). The number before each title shows numerical sequence.

SECTION TITLE MODEL STATEMENTS FOR HARDWARE PPPs

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 _____

COMBINED SECTION TITLE EXAMPLES FOR HARDWARE PPPs

T1/O1 – INTRODUCTION TO AND BASIC OPERATION OF THE _____
T2/O2 – THEORY AND OPERATION OF THE _____
T2/O2/ – THEORY, OPERATION, AND
P1/C1 – PREVENTIVE AND BASIC CORRECTIVE MAINTENANCE OF THE

10.7. Prepare the Topics for your course

- Sections are split into Topics, which are the basic organizational units of instruction:

  - Related TLOs are listed following each Topic title.
  - A statement of rationale (optional) describing intended lesson content and goals may be included if necessary.
  - See Volume II, TAB A-4 for examples.

- Like Sections, Topic titles are also predetermined according to the TOS that are assigned to the Part.
- The sources of Topic titles for Hardware PPPs are the Skill (or Knowledge) Topic Titles for Hardware PPPs.
- The sources of Topic titles for Non-Hardware PPPs are the Skill (or Knowledge) Topic Titles for Non-Hardware PPPs: The Topic, Documentation Description, though listed last (1-7) is usually taught very early in the course. It may stand either by itself, combined with another Topic(s), or placed throughout the course, as necessary.

10.8. Combining Topics

- Topics may also be combined as best fits the training situation and desired outcomes — except that sequence of Topics must not be broken, that is:

  - "General and Functional Description," or "Functional and Operational Description," etc.
  - Are not allowed (unless this particular TLA and/or PPP had no Physical or Interface Description).

- Normally, no more than three Topic titles should be combined — this is to ensure clarity.
- When all Topics for a Section have been identified they are listed on the corresponding Section page to form a "Section table of contents," as per the examples in Volume II, TAB A-4. Note that this table of contents lists the number, title, and starting page number of each Topic in the Section.

SKILL TOPIC TITLES FOR HARDWARE PPPs

O1 – Basic Operation of _____

O2 – Operation of _____

P1 – Preventive Maintenance of _____
C1 – Basic Corrective Maintenance of _____
C2 – Corrective Maintenance of _____

KNOWLEDGE TOPIC TITLES FOR HARDWARE PPPs F1, T1, T2, T3

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 _____
Topic X – Documentation Description of _____

SKILL TOPIC TITLES FOR NON-HARDWARE PPPs

S(B/G) – Prerequisite Performance of _____
J(T/F) – Performance of _____

KNOWLEDGE TOPIC TITLES FOR NON-HARDWARE PPPs

B – Understanding of _____
Q – Application of _____

10.9.   Prepare the TLOs for your course (Volume II, TAB A-4)

- TLOs — reflect the coverage provided in the Topic by using those PPP line items identified by the TLA: Applicable PPP sub-items are either listed under the TLO as they were with the related PPP line item or they may be incorporated in the TLO
- TLOs contain these elements:

  - Behavior
  - Condition
  - Standard (may be implied)

- The behavior consists of:

  - A subject
  - A performance-oriented verb ("action verb")
  - And an object

  > The Behavior identifies what the trainees should be able to do upon completion of the Topic.

- The PPP line item forms the behavior, though the verb may be modified to improve clarity (if done, however, thought should also be given to likewise modifying the PPP's behavior).

10.10. Conditions and Standards

- The condition describes those "aiding" or "limiting" conditions which influence how the behavior is performed:

  - The condition is usually traceable back to the appropriate TOS—these phrases have been "lifted" from the TOS, and incorporation into the TLO as the condition.
  - Conditions other than these TOS - related phrases may be used as necessary, and, conditions may be implied

  > The condition is critical because this phrase tells the instructor to what depth to cover the related discussion point.

- The standard specifies those criteria which the demonstration of performance or knowledge must meet: If implied, the standard is assumed to be "without error" "100 percent accuracy," etc

  > The standard is critical because it is an indicator of how well the Trainee should be able to perform the job.

- Both condition and standard are discussed in greater detail on the following pages

  > Chapter 4 of NAVEDTRA 130B, "Task-Based Curriculum Procedures," provides an in-depth discussion of these TLO elements.

10.11. Aiding and Limiting Conditions

- The TLO condition element describes the circumstances under which the behavior will be performed. Circumstances must be selected that clarify how the behavior will be demonstrated: Most often, the TOS-determined condition will suffice.
- Limiting Conditions. These place limits or restrictions on desired performance (behavior). Examples include:

- Fieldstrip the M16A2 Rifle while blindfolded.
- Classify received signals according to frequency, modulation, and type of function of the emitter.

- Aiding Conditions. These describe the help or assistance permitted or afforded the trainee in performing the desired behavior. Examples are:

  - Trace signal flow through the receiver, using the schematic diagram provided.
  - Align the IF strip of the radio receiver. Use of the technical manual is permitted.
  - Multiply two three-digit numbers, using a calculator.

- TLOs may require multiple limiting or aiding conditions, or a combination of both to obtain the desired behavior.
- Normal classroom conditions, for example, "given paper, pencil, and appropriate instruction," are not written into the TLO because it is assumed these are always provided.

10.12. Quantity or Quality as Standard. The TLO standard element describes the quantity and/or quality of the trainee output:

- Completeness. The precise nature of the output, number of steps, points, pieces, etc., that must be covered or produced.
- Accuracy. How close to correct performance must be. Exact numbers reflecting tolerances, values or dimensions that acceptable answers/performance assumes.
- Time. Exact time to demonstrate the behavior, when time is a critical factor in behavior performance.

10.13. The LO elements combined

- The following examples, and discussion, will show which is the behavior, the condition, and standard.
- In the example below the standard is implied to be "100 percent accuracy," i.e., "without error". See below example:

Example: Describe the physical interface of the AN/XYZ to the detail required to support basic corrective maintenance:

- In the following example, the entire TLO is the behavior. The condition is implied, i.e., "authorized techniques" implies "advanced corrective maintenance." The condition also implies that the description will be "in your own words." The standard is also implied to be "100 percent accuracy" or "without error".

Example: Describe authorized techniques used to isolate faults, which cannot be located using procedures contained in prescribed maintenance documents.

NOTE

Do not imply the condition unless it is possible to infer the level of training required. Perform calibration procedures for preventive maintenance on the ABC meter, using OP YYYY. The meter must be accurate to 1 milli-volt after calibration.

```
TLOs are prefaced by the following introductory
statement:  "Upon successful completion of this
topic, the trainee will be able to:" when shifted
to the LP Topic Pages
```

SECTION 11 - HARDWARE TOS-DETERMINED CONDITION STATEMENTS

11.1. TOS INDICATOR

F1 ...to support general duties for...
                    OR
...general watchstanding duties...

T1 ...to support normal operation of...
T2 ...to support casualty/degraded/abnormal 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
   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...

SECTION 12 - NON-HARDWARE TOS-DETERMINED CONDITION STATEMENTS

- **S(B/G)** in accordance with (prescribed documentation
  for...), (*name of documentation*...), (or other
  appropriate condition or modifier...)
- **J(T/F)** in accordance with (prescribed documentation
  for...), (*name of documentation*...), (or other
  appropriate condition or modifier...)
- **B(B/G)** in accordance with (prescribed documentation
  for...), (*name of documentation*...), (to support the
  PREREQUISITE [Background] Skills of...), (or other
  appropriate condition or modifier...)
- **Q(T/F)** in accordance with (prescribe documentation
  for...), (*name of documentation*...), (to support those
  skills required for the performance of [task or
  function]...), (or other appropriate condition or
  modifier...)

12.1. PPPs may require several TLOs: PPP items may sometimes
require several TLOs to adequately reflect the necessary
training—as illustrated by the following example for the PPP
line item "*Perform preventive maintenance on the CUCV (Type A)*":

- **TLO 1.** Perform preventive maintenance on the CUCV (TYPE
  A) in accordance with preventive maintenance procedures
  in the applicable documentation.
- **TLO 2.** Perform engine tune-up on the CUCV (TYPE A) in
  accordance with preventive maintenance procedures in the
  applicable documentation.
- **TLO 3.** Perform engine oil change on the CUCV (TYPE A) in
  accordance with preventive maintenance procedures in the
  applicable documentation.

- **TLO 4**. Perform chassis lube job on the CUCV (TYPE A) in accordance with preventive maintenance procedures in the applicable documentation.

> Only TLO-1 has a direct relationship with a specific PPP line item. TLOs 2 through 4 do not, but they do amplify TLO 1, and provide guidance that is more definite as to skills the trainees must acquire.

12.2. TLO's consisting of multiple PPPs: Sometimes two to three PPP line items may be combined to construct one TLO as illustrated by the following example for the two PPP line items "Use special tools and test equipment required for maintenance of the CUCV (Type A)" and "Perform preventive maintenance on the CUCV (Type A)" TLO1. 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.

12.3. Finish the sequencing of your course:

- You have developed all CLOs, TLOs, Parts, Sections and Topics for your course. These COI elements must now be arranged into a logical teaching sequence.
- You should sequence in this order (Parts - Sections - Topics - TLOs).

12.4. To sequence you can go by:

- **Job Performance Order** is the order in which the skills of the job are performed. The sequence is the same as the job sequence. For example, a gunner will learn to load, aim, and then fire the weapon.
- **Chronological Order** sequence flows from: Part - Part Section - Section and Topic - Topic according to the order in which the events covered occur in time. For example, recruits may be taught in order: World War I - World War II - Korean War - Viet Nam - Desert Storm.
- **Critical Sequence**: Ordered in terms of their relative importance. For example, a first aid course may address potentially fatal injuries ~ permanently disabling injuries ~ minor injuries.
- **Simple to Complex**: Sequence in terms of increasing difficulty. For example, marine navigation based on buoys and landmarks may be taught before navigation based on the location of stars or the angle of the sun.

- **Comparative Sequence**: Teach what is already familiar
  before teaching the unfamiliar. Sailors should study
  familiar U.S. ships before less familiar foreign ships.
- **Relationship of like COI elements**: Parts: Parts –
  Sections: Sections – Topics: Topics – TLOs: TLOs.
  These relationships may be as follows:

  - **Dependent Relationship**. To master one Part (or
    Section or Topic or TLO), you must first master
    another Part (or Section or Topic or TLO). Those that
    must be mastered first are taught first.
  - **Supportive Relationship**. The learning of one COI
    element transfers over to another COI element and
    makes mastery of the second element easier. Such COI
    elements should be sequenced and taught as close
    together as possible. Schoolhouse situations may also
    cause support relationships. Examples include
    availability of equipment, similar conditions ("at
    night", "on a muddy terrain", "while flying"), safety,
    and/or cost.
  - **Independent Relationship**. The relationship of like
    COI elements is such that sequencing is not a major
    factor in learning. You can sequence and teach these
    as appropriate.

- **Principle of reverse sequencing**. You may want to reverse
  one or more of these sequencing techniques. For example,
  Topics may be arranged in reverse chronological order or
  from least critical to most critical.
- **Combination approach.** Use a mixture of the methods
  described to sequence elements of the COI in a logical
  teaching order. Consider this a tentative sequence for
  the course. The final sequence will be made after the
  pilot (course tryout).

12.5. Prepare the OAC for your course

- The **OAC** (Profile Item-To-Topic Objective Assignment
  Chart) is:

  - An administrative tool designed to reflect the
    coverage of PPP items within a curriculum
  - And is structured to correlate PPP item coverage to
    specific TLOs within a curriculum

- Prepare the OAC in accordance with the guidelines below. An example is shown in Volume II, TAB A-4:

  - TABLE column—identifies each PPP table once per page, followed by "(Cont)" as appropriate. List tables in ascending order.
  - ITEM column—lists PPP items sequentially, starting with the 1-1 series and ending with the 2-2 series for each PPP table listed in the "TABLE" column. Whenever ALL sub-items of a PPP item are not applicable to the same TLOs, the sub-items covered must be listed separately. In some cases, a PPP item or sub-item may be listed more than once due to coverage in different Parts/Sections/Topics and/or coverage at different training levels.
  - TOS column—arranged so the sequence of TOS listing per profile item or sub-item is T0, F1, T1, T2, T3 for knowledge categories, and O1, O2, P1, C1, C2 for skill categories, as appropriate.

12.6. Finish the OAC

- **VOL** column—lists the volume where the TLO is located if the LP is a multivolume set; otherwise, no entry is made. Enter volume number in the "VOL" column at the beginning of the page and when the volume number changes
- **PART** column—lists the part in which the TLO is found if the part number is different than the table number. Otherwise, no entry is made
- **SECT** and **TOPIC** columns—specify the Section and Topic in which the PPP item or sub-item is covered
- **LRNG OBJ** column—specifies the TLO which relates to the PPP item or sub-item.
- **TEST ITEM** column optional, and relates test item number to Topic Learning Objective
- **Resource Requirements List** (includes these elements):

  - Texts. List all text materials (e.g., LP and TG) to be used in the course.
  - References. List in alphanumeric order, all reference documents used in the course
  - Equipment. Includes all equipment, special tools and test equipment, including:

    - Technical training equipment by Mk, Mod, and official name

- Specialized test equipment and instructional tools such as mock-ups and models
- Computer terminals supporting computer-based instruction and Interactive Courseware (ICW)
- Common hand tools and general purpose test equipment. Those given a group listing in technical manual are listed by group name rather than individually
- Pre-faulted modules

- Films. Also includes videotapes and videodiscs.
- Graphics. List transparencies, wall charts, slides, photographs, etc., and Interactive Courseware (ICW).
- Support materials. Not all instruction sheets contained within a Trainee Guide, list instruction sheet number, title, and quantities required per class.
- Other. List as required.

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

See Volume II, TAB A-4, for a Sample Resource Requirements List, in the TCCD as your read the following discussion.

SECTION 13 - PREPARE THE FINAL TCCD

13.1. You will recall that:

- The TCCD is the primary course developmental and management document.
- The approved TCCD serves as authority for further development and provides information needed by the curriculum developers to create the training materials.

13.2. Description and application of the TCCD

- The TCCD is a collection of products, which expresses in summary form, the content, structure, and essential management information for a course.
- Most of the information has already been developed in the form of the COI.

13.3. Final TCCD elements are:

- Front Matter: Includes Cover Page – Letter of Promulgation – Table of Contents – Foreword – Course Data Page –Trainee Data Page – Other, as required

- Curriculum Outline of Instruction: Includes CLOs – Part Title(s) – Section Title(s) – Topic Titles – TLOs

- Annexes: Includes Resource Requirements List – Course Master Schedule – Fault Applicability List – Profile Item-to-Topic Objective Assignment Chart

> A sample TCCD is shown in Volume II TAB A-4.

13.4. Develop Front Matter

- Cover Page: Contains the same information as the Training Project Plan Cover Page

- Letter of Promulgation: Issued after successful course pilot, at the initial CCA review and approval. It consists of a "reserved" page

- Table of Contents: Self explanatory

- Foreword: Not required, but serves as a place to explain to reviewers any unique aspects of the course which may not be apparent from the basic data

- Course Data Page: Data should be identical to that listed on the TPP's Course Data Page

- Trainee Data Page (Includes the following elements):

  - Personnel Physical Requirements. For a rating (YN, RP, AT, etc.) these physical requirements are found in "Manual of Navy Enlisted Manpower and Personnel Classification and Occupational Standards, NAVPERS 18068."

    – Additional physical requirements may be imposed by specialty groups (aircrew, SEALS, diver, etc.) which involve many ratings.

- Specific physical requirements for each specialty group are found in "Manual for the Medical Department, NAVMED P-117."

- Security clearance. This is the security clearance necessary for the course and/or the teaching site.
- Prerequisites. Copy this information from the Course Data Page of the Training Project Plan. An entry of "In accordance with CANTRAC" may also be used.
- Obligated service. Obtain this information from the NAVMILPERSCOM manuals. An entry of "In accordance with the Enlisted Transfer Manual" may also be used.
- NOBC/NEC earned. Copy this information from the same entry on the Course Data Page.

13.5. Incorporate the COI

- The COI is placed exactly as compiled earlier into the TCCD, where indicated by the sample TCCD shown in Volume II.
- Include all new or modified PPP Tables, PPP Table Index listing existing PPPs used, and the TPS, for the course to facilitate review and approval of the TCCD.

  - Lists faults by identification number
  - Lists supporting documentation/directions

SECTION 14 - WHAT IS NEXT?

14.1. Complete the Annexes

- Completing the Annexes involves finishing documents you began developing in earlier stages, beginning with:

  - Resource Requirements List (Final)
  - Profile Item-to-Topic Objective Assignment Chart (Final)
  - Course Master Schedule (CMS):

    - Group Lesson Topics for continuity. For example, start and end laboratory sessions on the same day; attempt to schedule closely related Lesson Topics so that one Topic in the series is not left to the next day or over a weekend.
    - Note differences between curriculum periods; the time required, without any constraints, to teach lesson topic classroom, labs and, course periods —

those periods required to teach lesson topic classroom and labs after factoring in constraints, such as course bottlenecks or additional course sections and Total Course Length, the sum of course hours (including constraints), testing periods and administrative periods, when building the CMS.

- Schedule tests at about 40/-50/ instructional hour intervals throughout the course, where they should naturally occur.

- **Fault Applicability List (FAL):**

  - Lists all planned equipment faults
  - Identifies the equipment/system to be faulted
  - Faults that may apply and that may be used to further student learning, in addition to those required should be listed

- Using all elements of the TCCD you've just finished, especially the COI, you will develop the curriculum to include (LP – TG – IMM's).
- Where the LP is concerned, you will find all the hard work behind you, because the COI is most of the LP: You will also discover that outlining the TLOs for each Topic creates that topic's discussion points.
- The remaining tasks are to list the reference for each DP to guide instructor personalization and determine supporting material for each.
- Contents of the TG are determined by studying the LP contents, technical documentation applicable to the course, and, of course, the Job Sheets, and deciding what amplifying information the trainee needs.
- IMM is best developed by examining the critical skills, or Job Sheets, that must be learned, and the DPs of the LP, and deciding the most appropriate media to illustrate the DP or critical skill.

STAGE THREE

CHAPTER 6

LESSON PLAN

INTRODUCTION

The curriculum provides a plan for learning. The care and energy devoted to training materials development will have a direct bearing upon the ability of the course graduates to perform the job for which they have been trained.

In the preceding chapter, parts, sections, lesson topics, and Learning Objectives were developed and organized into a logical and effective instructional sequence, as summarized in the Training Course Control Document (TCCD). During the continuation of the develop phase, the curriculum is developed to support the objectives.

This chapter will discuss Lesson Plans (LP). The following chapters will discuss the remaining training materials designed to supplement the instructor's presentation or to assist the trainee.

> Development of the LP, Trainee Guide (TG) and tests, to a large extent, occurs simultaneously. That is, as you are creating an LP, TG, or Test you are shifting back and forth to the other two as good ideas come to mind. **Hence, it is important to read all three chapters before attempting to develop either a LP, TG, or tests.**

SCOPE

- Provide the guidelines for LP format
- Provide a step-by-step procedure for developing Lesson Topics/LP
- Instructional methods used most often in the Navy

> **COURSE MODIFICATIONS**
>
> Course revisions and modifications are discussed in volume III, chapter 7.
>
> Identification of LP elements/pages affected by a revision or modification is discussed in this chapter under Training Materials Modifications.

SECTION 1 - A LESSON PLAN

- Programs the use of all other training materials

- Contains learning objectives that reflect knowledge and/or skills attained upon successful completion of the course
- Provides an outline of instructional materials to be taught in a logical and efficient manner
- Provides specific equipment and instructional media requirements, and guidance for conducting the course

SECTION 2 - ELEMENTS OF THE LESSON PLAN

The LP, depicted in Figure 6-1, consists of the following minimum elements:

- Front Matter
- Lesson Topics
- Resource Requirements List (RRL) (Optional)

It is highly unlikely to have a formal course which consists of only one Lesson Topic. When multiple Lesson Topics are combined and organized, they form a LP. Volume II, Tab A-5, contains a sample of a LP, which meets the minimum requirements of this manual.
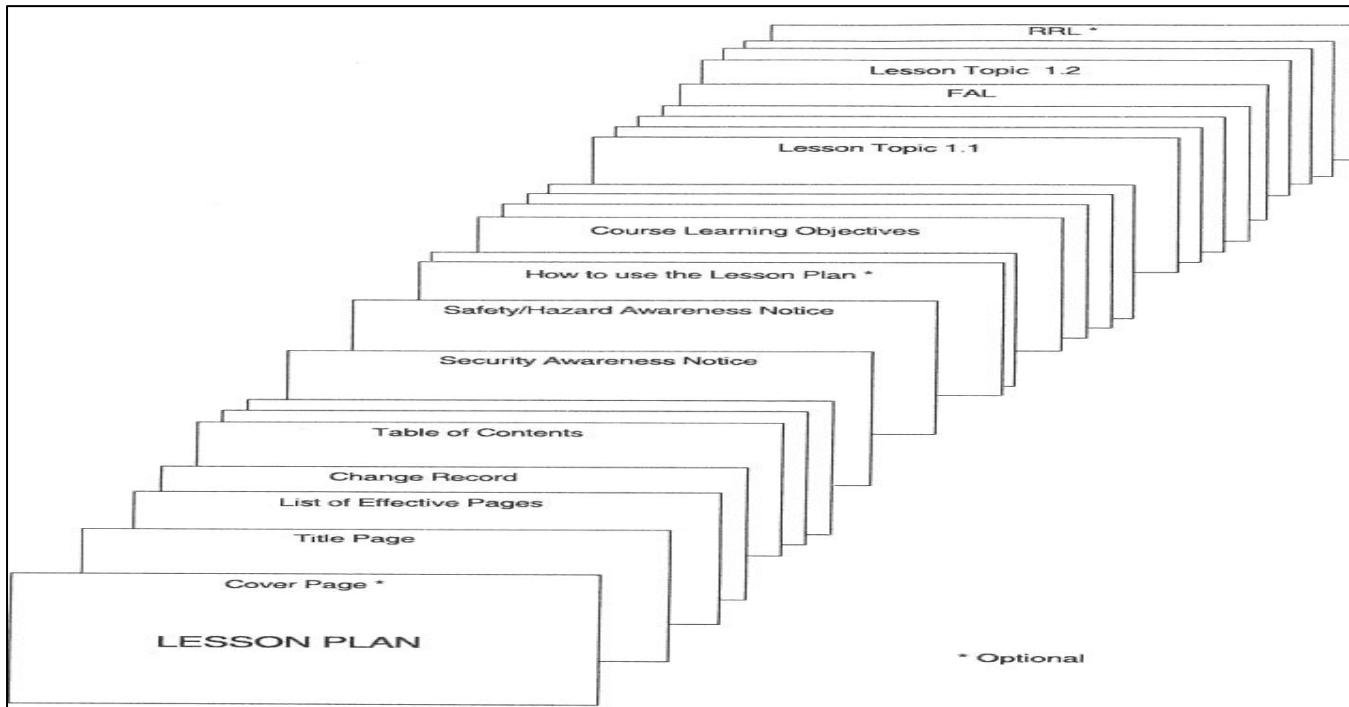
FIGURE 6-1: LESSON PLAN ORGANIZATION

6-3

2.1. Front Matter

* Consists of the following elements in this order:

  * Cover Page (Optional)
  * Title Page
  * Change Record Page
  * Table of Contents Page(s)
  * Security Awareness Notice Page(s)
  * Safety/Hazard Awareness Notice Page(s)
  * How to Use the LP (Optional)
  * Terminal Objectives Page(s)

* Each page except the Cover and Title pages:

  * Has a two-line running header consisting of:

    – The phrase LP
    – The Course Identification Number (CIN)

* See LP in Volume II, Tab A-5, for an example of the layout. If there are multiple volumes, the volume number will follow the CIN

COVER PAGE (Optional)

* Printed on heavy paper stock or equivalent material
* Optional at the Course Curriculum Model Manager's (CCMM) or the Curriculum Control Authority's (CCA) direction
* If required, the Cover will contain:

  * The phrase LP
  * Course title
  * CIN
  * Security classification (if applicable)
  * CCMM's name and address
  * CCA's name and address
  * Date the LP was prepared
  * An identification seal such as the Navy seal, community logo, or similar illustration may also be added

TITLE PAGE

- The Title Page provides for easy identification of the course, including information on the revision and change version of the course

- The Title Page will contain:

  - The phrase LP
  - Course Title
  - CIN
  - Revision number in Alpha characters following the CIN (if required)
  - The word Change with Arabic number following the CIN (if required)
  - Volume number (if a multi-volume LP)
  - Security classification (if applicable)
  - Name and address of CCMM
  - Name of CCA
  - Month and year the LP was prepared. If a revision, the later date is placed in parentheses under the original promulgation date.

CHANGE RECORD PAGE

- The Change Record provides space for recording information related to training materials modifications incorporated into the LP after it is approved for implementation.
- Under the heading Change Record, provide space to record:

  - Number and description of change
  - Name of the person inserting the change
  - Date change entered

TABLE OF CONTENTS PAGE(S)

- Under the heading Table of Contents, for a single volume LP list:

  - Front matter elements, such as Change Record, Security Notice
  - The Table of Contents itself will not be listed
  - All Lesson Topics by unit, number, and complete title in the order in which they appear

- Under the heading Table of Contents, for a multiple volume LP:

  - In the first volume, list the complete contents of all volumes in the LP
  - In subsequent volumes, only the Lesson Topics in that volume will be listed by unit, number, and complete title in the order they appear

SECURITY AWARENESS NOTICE PAGE(S)

Each LP shall bear the highest security classification demanded by its contents.

- Under the heading Security Awareness Notice:

  - State whether classified material is contained in the course or not.
  - Describe procedures for handling and safeguarding classified materials used in the course.

- Refer to the latest OPNAVINST 5510.1 (series) on Security Program Regulations to ensure that all training materials are marked and handled in accordance with the latest policy guidance.

> The Security Awareness Notice should be as individual as the course. This notice does not relieve the developer from the responsibility of incorporating security requirements throughout the course.

SAFETY/HAZARD AWARENESS NOTICE PAGE(S)

- Under the heading Safety/Hazard Awareness Notice:

  - Identify hazards to personnel and equipment.
  - Provide special direction to personnel concerning safety.
  - Provide safety precautions for the protection of personnel and equipment.
  - Provide specific policy on Training Time Out (TTO).
  - Provide for designated Volunteer High Risk Courses specific policy on Drop on Request (DOR).
  - Describe the purpose of the Emergency Action Plan (EAP).

- Provide instructions for the reporting of safety and hazard violations.
- Specify safety and hazards found in the course.
- Identify relevant documentation containing specific precautions and preventive measures.

> Refer to NAVEDTRA 135 (series) and NETCINST 5100.1 (series) on Training Safety to ensure that the latest policy guidance is incorporated in the notice.

TOPIC LEARNING OBJECTIVES PAGE(S)

> The Safety/Hazard Awareness Notice should be as individual as the course. This notice does not relieve the developer from the responsibility of incorporating safety throughout the course.

- Under the heading Topic Learning Objectives (TLO):

  - List the TLOs in numeric sequence
  - After each TLO list the Identification Number of the Course Training Task List (CTTL) item from which it was developed.

> TLOs will be the same as the TCCD COI.

2.2. Lesson Topics

- Lesson Topics are organized into Units and Lesson Topics

  - Units and Lesson Topics are numbered the same as the TCCD COI.
  - Units are listed in the Table of Contents for organization purposes but there are no Unit pages.

- Each Lesson Topic contains two parts:

  - Topic pages
  - Discussion Demonstration Activity (DDA) pages

- Each page of the Lesson Topic:

  - Has a three-line running header

    - First line contains the phrase LP

- Second line contains the unit number, unit title and the CIN
- Third line contains the Lesson Topic number and title

- Has the Lesson Topic number and title centered on the first Topic Page
- Has on all following Topic and DDA pages, the Lesson Topic number and title flush left under the Unit number and title
- Displays all Topic page information in dual columns of approximately the same width. This is commonly called "newspaper" columns because the information continues from the bottom of the left hand column to the top of the right hand column.
- Displays all DDA page information in dual columns

TOPIC PAGES

- The Topic Pages list:

  - Allocation of classroom and laboratory time
  - Topic objectives (appended with their CTTL numbers)
  - Trainee preparation materials
  - Instructor preparation materials
  - Training materials required

- Under the headings Class Periods and Lab Periods, list in periods, not in hours or minutes, the time required for the Lesson Topic.

  - Periods are defined in NAVEDTRA 135 (series).
  - Time usually will not be listed in fractions of a period. If it is necessary, the time should be shown in quarter-period increments (.25, .50, .75).
  - If the Lesson Topic has both classroom and laboratory periods, list both. If not, list only the applicable periods.
  - The time displayed represents the total time necessary to present the Lesson Topic or conduct one laboratory session. For example, a two-period laboratory session which must be conducted in three shifts would be shown as two periods, not six. It does not include testing time associated with the Lesson Topic.
  - Testing periods are shown on the Course Master Schedule.

- Under the heading Topic Title, list the enabling objectives in the order they are taught.

  - Topic Objectives will be the same as the COI.

  > If, during the development of the Lesson Topic, a particular Topic is determined to be incorrectly titled and/or sequenced, make required changes and update the TCCD COI accordingly.

- Under the heading Trainee Preparation Material, list Trainee Support Material and Reference Publications.

  - Under the heading Trainee Support Material, list individually each instruction sheet to be studied/reviewed by the trainees prior to starting the Lesson Topic, such as, Outline Sheet 7-1-1, Information Sheet 7-1-2. These Instruction Sheets were assigned in the previous Lesson Topic. If no support materials are to be reviewed, enter the word "None".
  - Under the heading Reference Publications, list all material to be read by the trainee prior to starting the Lesson Topic, such as technical manuals or instructions.

    - All references will be listed by identification number/publication number, full title, and source (if not obvious from the number/title).
    - Any publication listed here will also be listed as an Instructor Preparation Reference Publication.
    - If no reference publications are required, enter the word "None".

  - Trainee Preparation Materials will usually be listed in the DDA pages as part of the Assignment in the previous Lesson Topic.
  - Trainee Preparation Materials will either be referred to or reviewed with the trainee and therefore will appear in the Related Instructor Activity (RIA) column.

- Under the heading Instructor Preparation:

  - Enter the phrase Review Assigned Trainee Materials

- Under the heading Reference Publications, list all references which are cited as "Refer to" or "Reference" in the RIA column

  - All references will be listed by identification number/publication number, full title, and source (if not obvious from the number/title).
  - No reference will be listed under Reference Publications if it is not cited in the RIA column.

- Under the heading Training Materials Required, list all support materials which are required for the instructor to present/conduct the Lesson Topic, such as publications, wall charts, transparencies, and fault insertion guides.

  - Support materials will be listed by type and identification number.
  - If all Instruction Sheets are bound into a TG, list "TRAINEE GUIDE".
  - If the Instruction Sheets are issued separately, list the individual Instruction Sheet by type and number.
  - "Refer to" publications are those to be used by the trainee during the Lesson Topic and are listed by number and title.

Such common classroom materials as desks, chalk/VAP boards, podium, overhead projector, and screen will NOT be listed under Instructor Preparation.

DISCUSSION-DEMONSTRATION ACTIVITY (DDA) PAGES

- DDA pages consist of two columns labeled:

  - Discussion Point (DP)
  - RIA

- Under the heading, DP lists all points to be covered, in the proper sequence for presentation, including all sub-points necessary to ensure the proper level of coverage for each discussion point

  - The first DP will be numbered 1, and will be under the heading Introduction:

- Review the Lesson Topic Title.
- Provide an overview of the Lesson Topic.
- Provide motivational statements on importance of the subject matter.
- List any safety precautions related to the Lesson Topic.

- For Lesson Topics which include labs involving equipment, the first DP will also include a review of Training Time Out (TTO) procedures.
- For courses, which are, designated Volunteer High Risk Courses, the Introduction DP of each laboratory Lesson Topic will review DOR procedures.

> NAVEDTRA 135 (series) and NETCINST 5100.1 (series) contain the latest policy, requirements, and procedures for training safety and the TTO and DOR programs.

- All DPs that follow:

  - Will be numbered consecutively, starting with "2"
  - Support the Lesson Topic Title
  - Will be presented in objective sequence
  - Cover facts, concepts, principles, and procedures that trainees must know to accomplish the tasks being trained
  - Break down the general concepts into their simplest component parts and segments, which are presented one by one
  - Will be presented in sufficient detail to lead the instructor smoothly and comprehensively through all portions of the presentation
  - May range from minimal to a level of detail where no research of the technical documentation is necessary

> The DPs guide the instructor's presentation so, normally, only key words or phrases are entered.

EXAMPLE:

     3.

         a.

            (1)

              (a)

- DPs will be listed with ample space between DPs for
  the instructor to insert notes and examples as part of
  his personalization of the topic.
- Personalization occurs when the LP has been issued to
  the instructor.

- A DP labeled Summary and Review will:

  - Be a review of the major DPs;
  - Condense and repeat the principal points of the Lesson
    Topic;
  - Condense and repeat the Topic Title; and
  - Check the trainee's comprehension of the Lesson Topic
    by providing review questions/problems

- The final DP for most Lesson Topics will be labeled
  assignments and will:

  - Direct the trainees to Instruction Sheets which will
    assign homework to reinforce the Lesson Topic
    material.
  - Direct the trainees to Instruction Sheets which will
    assign trainee preparation for the next day's Lesson
    Topic(s).
  - Tell trainees when the test on the Lesson Topic will
    occur.

- For Lesson Topics which combine classroom and laboratory
  sessions, in addition to the Summary and Review and, if
  appropriate, the Assignment, there may be an Application.

  - Application directs the trainees to an instruction
    sheet, usually a Job Sheet, which assigns a problem or
    laboratory exercise that allows the trainee to
    practice what has been taught.
  - When safety is part of a DP, it should begin with the
    words Safety Precaution, followed by the specific
    information.

- When there are multiple teaching facilities:

  - Verify that each site has the equipment, etc., before
    including the requirement in the Lesson Topic.
  - Site-unique requirements, which because of resource
    constraints cannot be changed to a standard, require a
    site-specific alternative DP or special instructions
    to the instructor.

- Under the heading Related Instructor Activity, the RIA column gives the instructor specific directions which:

  - Are keyed/numbered to correspond to the DP in the DP column to which they relate

    - There need not be an entry in the RIA column for every entry in the DP column.
    - There must be an entry in the DP column for every item in the RIA column.
    - A DP is not required to contain reference if the DP is not a teaching DP, e.g., review and summary, critique and assignment.
    - An upper-level DP is not required to contain a reference if all the lower-level DPs contain references equals the intent of the upper-level DP.
    - A lower-level DP is not required to contain a reference if the reference for the upper-level DP contains the information needed for the lower-level DP.
    - A DP is not required to contain a reference if it contains an instruction sheet or an exercise sheet, and this sheet contains the appropriate reference.

  - Refer to reference documents that the instructor can use to prepare to teach a DP.
  - Refer to support materials and appropriate demonstrations that are to be used to support DPs.
  - List actions to be performed by the trainees during the presentation of instruction; such as, take notes, refer to.
  - Provide guidance to the instructor on how to present the DP.

    EXAMPLES: "Draw on board," "Demonstrate procedure...," "Reference MILPERSMAN 5030320...." update

  - Use the phrase "Reference..." to direct the instructor where to locate information needed to prepare to teach a discussion point. The first time the reference is listed in the RIA column, list it by complete number and title
  - Use the phrase "Refer to..." to direct the instructor to use in class a particular reference, document, or Instruction Sheet.

- Use the phrase "Display..." to direct the instructor to use a particular Instructional Media Material (IMM) referenced by identification number and title.
- May use phrases such as "Demonstrate...," "Show...," and "Point to..." as appropriate to tell the instructor what actions are required.
- May use the phrase "Review as Required" to indicate points in the Lesson Topic where the amount of discussion depends on the trainees' understanding and must be a judgment call on the part of the instructor.
- Include under the Introduction DP: Directions to the instructor to introduce self if it is the first time the instructor and trainees have met, and any specific relationships or examples that the instructor should cover.
- Label and clearly state problems/exercises at the appropriate point, along with the correct answers.
- Provide answers to questions on assignment sheets, job sheets, and problem sheets at the appropriate point.
- Refer to instruction sheets by type and number, such as, Job Sheet 4-2-4, in the order of their use within the Lesson Topic.

  - The phrase "Question number and answer" indicates the question number shown on the Instruction Sheet and the correct answer.
  - When questions on Instruction Sheets do not have discrete answers, this should be indicated.

- Cite or assign all Instruction Sheets provided in the TG.
- Provide additional information on DPs to be emphasized, such as safety precautions.
- Describe demonstrations to be performed by the instructor.
- Provide guidance for administering trainee practice sessions/labs.
- Provide directions to the instructor for classroom or laboratory environmental requirements such as temperature, lighting, ventilation, and cleanliness.
- Indicate testing points and use of the Administrator's Guide for administering the tests.
- Chapter 8 of this volume will discuss the Administrator's Guide in detail.
- Include a Fault Applicability List (FAL) if the laboratory has pre-faulted modules or fault able modules. The FAL:

- Identifies the equipment/system to be faulted
- Lists faults by identification number
- Lists supporting documentation/directions

SECTION 3 - LESSON PLAN SPECIFICATIONS

The curriculum developer should ensure that the LP
contains all the guidance, directions and information an
instructor will need to present a course. Trainees are
more likely to grasp and retain facts and concepts
presented; with interesting support, materials and which
are arranged in a way that enhances learning.

- LP's will be oriented horizontally, that is, 11" x 8 1/2"
  on standard paper. This is often referred to as
  landscape layout.
- LP's may be organized into one or more volumes.
- Do not repeat all elements of the Front Matter for each
  volume, except where specifically stated.
- A volume will consist of approximately 200 sheets of
  paper.
- LP's may be printed on one side of the page or back to
  back. The phrase "This page intentionally left blank" or
  similar phrase will NOT be required on blank pages unless
  all pages must be accounted for because of the classified
  nature of the Lesson Topic.
- Front Matter pages will be numbered:

  - Consecutively, using Arabic numerals
  - In the lower right-hand corner of the page

    - A page number is not placed on the Cover page.
    - A page number is not placed on the Title page;
      however, it is counted as page 1.

- Lesson Topic pages will be numbered:

  - Consecutively within the Lesson Topic using Arabic
    numerals
  - In the lower right-hand corner of the page. The
    number will consist of the following parts, written in
    this order:

- Part number
- Section Number
- Lesson Topic number
- Sequential number, starting with 1

EXAMPLE: S0136/2-1-2-3-15, represents the 15th page of DP3.

- RRL (Optional)

SECTION 4 - TRAINING MATERIALS MODIFICATIONS

- If components of a LP (i.e., individual lesson topics) are revised as part of a revision, an alpha character starting with "A" for the first revision will follow the CIN on the LP Cover Page and a new publication date will be shown in parentheses under the original publication date. A new Change Record Page will be inserted, as all outstanding Changes will be picked up by a Revision. Revised lesson topics will be printed and replaced as an entirety, with the alpha character appended to the CIN at the top of each lesson topic page.

EXAMPLE: A-433-0023A

- If components of a LP are changed as part of a Change, the term Change, with a number starting with 1 for the first Change, will follow the CIN on every page affected by the Change. All changes are entered on the Change Record page.

EXAMPLE: A-433-0023 **Change 1**

- Interim Changes are entered by the instructor as directed by the CCMM. Instructors can apply pen and ink changes only, cannot delete or modify information. Technical Changes are usually received as a package of replacement pages. The entry is noted on the Change Record page. The CCMM will retain all Interim and Technical Changes for inclusion in later Revisions or Changes as appropriate.

SECTION 5 - LP/LESSON TOPIC DEVELOPMENT

Some developers can use the content and format guidelines presented in the previous sections to develop new and revised LPs or individual Lesson Topics. If a more structured approach

is desired, the following seven-step development plan will aid in development of a LP and Lesson Topics:

- Review the Course Learning Objectives
- Review the technical documentation
- Organize the individual Topic Learning Objectives and Lesson Topics
- Choose or develop Visual Information (VI) aids and IMM
- Prepare initial Lesson Topics/LP
- Conduct Pilot
- Finalize Lesson Topics/LP

STEP 1: REVIEW THE COURSE LEARNING OBJECTIVES

- Review the COI in the TCCD to determine:

  - The course's Topic Learning Objectives and Topic Title
  - The course sequence
  - Any modifications required in the objectives or sequence

- Objectives may be modified because:

  - The cost associated with performance objectives is prohibitive and "paper and pencil" alternatives must be substituted for actual hands-on training.
  - Required equipment or publications are unavailable or not available in the quantity needed.
  - Constraints in training time do not allow enough time for trainees to practice or reach a specific level of proficiency.

- Lesson Topic Titles may be re-sequenced for reasons as:

  - More time is required to practice or prepare for a performance test.
  - A Lesson Topic requires more time to teach than was estimated.
  - A Lesson Topic's content is a prerequisite to another Lesson Topic.

- TCCD modification:

  - Modifications, which do not affect the course length or resources, may be approved by the CCMM.

- Modifications which do affect the course length, or resources require submittal of a TPP per OPNAV Memorandum for Destruction 7000 Ser N1/127189 of 15 September 2008 and NETCNOTE 1500 of 4 January 2010. Information on TPPs may be found in Volume III, Chapter 2 of this manual.
- All modifications in objectives, Lesson Topic title, or sequence must be incorporated in the TCCD Outline of Instruction.

> The final TCCD Outline of Instruction must be the same as the sequence of objectives in the approved course.

STEP 2:   REVIEW THE TECHNICAL DOCUMENTATION

- Review the supporting technical documentation and determine the main points to be included in the Lesson Topic:

  - To be appropriate, information must support the objective(s).
  - To be useful, information must aid both the instructor and the trainee in the learning process.

> The developer should always begin Lesson Topic development with the latest reference material, but the developer's own experiences, and the experience of other subject matter experts, should also be considered.

STEP 3:   ORGANIZE THE INDIVIDUAL LESSON TOPICS

- Organizing the individual Lesson Topic consists of:

  - Developing a content outline
  - Selecting an instructional method

- Develop a content outline to support the objectives:

  - Begin by outlining the objectives. Normally the behavior elements of the objectives are the elements of the outline.
  - Develop subheads from these elements.

- Add additional DPs if more detail is required.

> Different levels of detail may be used within a single course/topic, if appropriate. The final decision as to depth of coverage for each DP shall be at the discretion of the course developer.

- DPs may be added in the order in which events/steps happen or in the order to be followed in carrying them out.

    EXAMPLE: Discuss cleaning, priming, then painting metal surfaces.

- DPs may be added according to some directional strategy — top-to-bottom, bottom-to-top, the center to the outside.

    EXAMPLE: Discuss a control panel on a plane by describing first those instruments in the center most often used, then moving out toward the surrounding instruments which are used least often.

- DPs may be added so that one set of conditions is given as a cause for another set.

    EXAMPLE: Discuss the effect of two dissimilar metals in contact with each other when an electrolyte is introduced causing galvanic corrosion.

- DPs may be added to show that a problem exists and then offering a corrective action that is practical and desirable.

    EXAMPLE: Discuss implementation of a safety program to reduce the number of traffic fatalities during a holiday period.

- DPs may be added which are for or against an item or show advantages - disadvantages of an event providing fairly even attention to both sides

> Before revising an existing Lesson Topic or developing a new one, review existing material and select what is applicable. Look for other courses in the Navy, other military agencies, and other government agencies which teach the same subject or use the same equipment.

    EXAMPLE: Discuss various types of methods.

- DPs may be added to describe categories such as classes and components.

  EXAMPLE: Discuss classes of ships.

- Select the instructional method which suits the object(s).
- The methods used most often in the Navy are:

  - Lesson
  - Demonstration

- A Lesson is a presentation of information, concepts, or principles by a single individual to a group of listeners. It is interactive in nature. It involves VI aids and involves two-way communication.

EXAMPLES: Skill, knowledge, or values orientation
Teaching fundamental facts and terminology

- VI in support of a lesson is used to:

  - Focus trainee interest and attention
  - Show basic structure of a concept
  - Relate general concepts to an observable reality
  - Turn difficult concepts into meaningful pictures
  - Explain relationships

NOTE

Chapter 9 of this volume provides more information on VI.

EXAMPLE: Introducing new equipment using illustrations, a model, or the actual equipment

- Demonstration is the process wherein one person does something in the presence of others to show them how to do it or to illustrate a principle. It covers all the steps students need to learn a skill, in an effective learning sequence.

EXAMPLE: Showing the effects of acid on metals

- The instructor presents a demonstration, then it is followed by some type of repetition, and then the trainee practices what has been demonstrated.
- Repetition is used to reinforce the action being demonstrated. Types of repetition include:

  - Instructor Repetition
  - Trainee Repetition
  - Instructor-Trainee Repetition
  - Group Performance Repetition
  - Coach-and-Pupil Repetition

- Trainees practice under supervision until they have attained the required proficiency and then they will usually be evaluated by a performance test.
- Chapter 8 of this volume provides more guidance on Performance Testing.
- Multiple methods may be used in the same Lesson Topic.

EXAMPLE: Theory and a performance might be incorporated into the same Lesson Topic.

STEP 4: CHOOSE OR DEVELOP VI AIDS AND IMM

- Use VI aids and IMM in a Lesson Topic to provide:

  - Training when equipment, space, or time is lacking
  - Remedial or accelerated instruction
  - Reinforcement
  - Instruction in subjects, which are difficult to present

- Review existing VI aids and IMM for application to Lesson Topic.

  - Consult Defense Imagery at http://www.defenseimagery.mil/index.html for a list of existing VI aids and IMM which might support the Lesson Topic.
  - Review technical documentation for possible illustrations.
  - Review material used in other courses teaching similar subject matter.

- Develop VI aids and IMM complying with guidelines discussed in Chapter 9 of this volume.

- Whatever the instructional media selection, it must support and help achieve the learning objectives.

STEP 5: PREPARE INITIAL LESSON TOPIC/LESSON PLAN

- Prepare a Lesson Topic draft which includes the basic elements of the Topic and DDA pages or Front Matter and Lesson Topics for the LP:

  - Use of computers/word processing equipment in preparing the Lesson Topic/LP is highly encouraged.
  - Review CCA and CCMM requirements for word processing program to be used, font size, and specific formats beyond those established in this manual.
  - Review the printing and publications guidance in NAVEDTRA 135 (series) to ensure compliance.

- Use classified material only when absolutely necessary.
- Review OPNAVINST 5510.1 (series) to ensure compliance with marking and handling requirements for classified material.
- Coordinate quality assurance assistance review with the learning functional area or the Quality Assurance Officer.
- Coordinate review of instructional materials by the CCA, if appropriate.
- Volume III of this manual and NAVEDTRA 135 (series) provide specific guidance on the management of curriculum development.
- Steps 6 and 7 actually occur after all curriculum materials have been developed.

STEP 6: CONDUCT PILOT

Conduct a pilot for an entire course or a major segment of the course, usually at least one unit in length. This process is discussed in Chapter 10 of this Volume and in Volume III, Chapter 7.

- Review material for correctness and completeness.
- The pilot itself will determine if the trainees have learned what the objectives called for.
- A detailed "redline" copy will identify changes which must be incorporated.

STEP 7: FINALIZE LESSON TOPIC/LP

Revise and prepare the final versions of the instructor, trainee, and all support materials, including tests and IMM. Volume III of this manual and NAVEDTRA 135 (series) describe the procedures for implementing the final material.

STAGE THREE

CHAPTER 7

TRAINEE GUIDE

INTRODUCTION

Whatever the subject being taught, the curriculum developer is responsible for assisting the instructor and the trainees in using their time efficiently while developing the skills, knowledge, and attitudes essential to effective performance in the Fleet. The curriculum developers incorporate their skills, knowledge, and understanding of the subject matter into an instructional strategy in order to best present the material effectively and achieve stated objectives. To ensure uniform coverage of the material, the Lesson Plan (LP) is developed to guide and direct the instructor.

Through the use of various aids, the curriculum developer directs the trainees to supplementary material, structures their note taking, replaces abstract ideas with concrete images, and may provide trainees with the opportunity to apply their newly acquired skills and knowledge. Development of Instruction Sheets and the Trainee Guide (TG) are covered in this chapter. A TG leads the trainee through the course just as the Lesson Plan Guides the instructor.

Development of the LP, TG, and Tests, to a large extent, occurs simultaneously. That is, as you are creating an LP, TG, or Test you are shifting back and forth to the other two as good ideas come to mind. Hence, it is important to read all three chapters before attempting to develop either a LP, TG, or Test.

SCOPE

- Describe the content guidelines for a TG.
- Provide a step-by-step procedure for developing Instruction Sheets/TG.

COURSE MODIFICATIONS

Training materials and modifications are discussed in Volume III, Chapter 9.

Identification of TG elements/pages affected by a revision modification are discussed in the chapter under training materials and modification.

SECTION 1 - TRAINEE GUIDE

- Is the primary trainee material
- Contains knowledge and skill objectives the trainee is to attain upon successful completion of the course
- May provide an outline of instruction

This manual establishes the minimum requirements for each of the elements of each Instruction Sheet. It does not specify exact formats, such as, line counts. Samples of Instruction Sheets which meet the minimum content requirements and provide acceptable formats, are provided in Volume II, Tab A-6 of this manual.

SECTION 2 - ELEMENTS OF THE TRAINEE GUIDE

The TG, as shown in Figure 7-1, consists of the following:

- Front Matter
- Instruction Sheets

Occasionally, both individual Instruction Sheets and a TG will be used due to security requirements or changes in equipment or procedures.
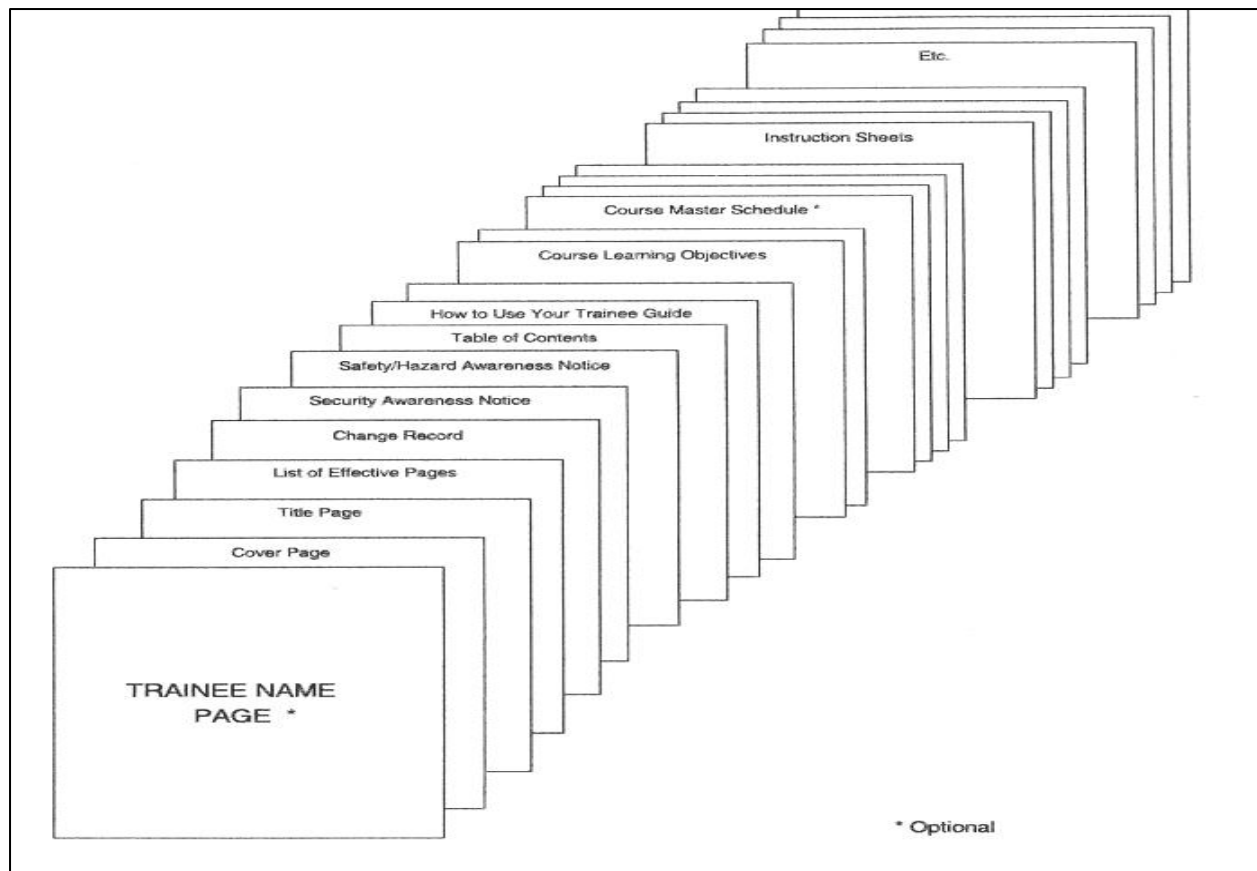
FIGURE 7-1: TRAINEE GUIDE ORGANIZATION

2.1. Front Matter:

- The front matter of the TG consists of the following
  elements:

  - Trainee Name Page (Optional)
  - Cover (Optional)
  - Title Page
  - Change Record
  - Table of Contents Page(s)
  - Security Awareness Notice Page(s)
  - Safety/Hazard Awareness Notice Page(s)
  - How To Use Your TG Page(s)
  - Terminal Objectives Page(s)
  - Course Master Schedule (Optional)

- TRAINEE NAME PAGE:

  - Is optional at the Course Curriculum Model Manager
    (CCMM) or the Curriculum Control Authority (CCA)
    direction

- Is used to track copies or to hold a trainee accountable for the TG
- If required, the Trainee Name Page provides space to record:

    - Between five and ten trainee names
    - Class number

- Each volume of the TG may have a Trainee Name Page or only those volumes which must be controlled.

- **COVER PAGE**

    - It is optional at the CCMM's or the CCA's direction
    - If required, the Cover contains:

        - The phrase TG for
        - Course title
        - Course Identification Number (CIN)
        - Security classification (if applicable)
        - CCMM's name and address
        - CCA's name and address
        - Date the TG was prepared
        - An identification seal such as the Navy seal, community logo, or a similar illustration may also be added.

    - Cover pages are printed on heavy paper stock or equivalent material

- **TITLE PAGE:**

    - Contains the phrase TG for
    - Course title
    - CIN
    - Revision number in alpha characters after the CIN (if required)
    - Change number in Arabic numbers after the CIN (if required)
    - Volume number if a multi-volume TG Security classification (if applicable)
    - Security classification (if applicable)
    - Trainee Name Block (Optional)
    - Name of CCA authorizing publication
    - Name of CCMM

- Month and year the TG was prepared. If a revision, the later date is placed in parentheses under the original promulgation date

- **CHANGE RECORD**

  - Under the heading Change Record, provide space for recording information related to each training material modification incorporated into the TG after it is approved for implementation.
  - The Change Record provides space to record:

    - Number and description of change
    - Person inserting the change
    - Date change entered

- **TABLE OF CONTENTS**

  - Under the heading Table of Contents, for a single volume TG, list:

    - Front Matter elements, such as, Change Record, Security Notice
    - Each Instruction Sheet by Unit and Lesson Topic number and complete Instruction Sheet title in the order they are used

  - Under the heading Table of Contents, for a multiple volume TG, list:

    - In the first volume, a complete listing of the contents of all volumes in the TG
    - The Table of Contents will not be listed as an entry. In subsequent volumes, list only the contents of the respective volume.

  > It is very unusual for the TG to be multiple volumes. If multiple volumes are required, it is usually because one volume is classified.

- **SECURITY AWARENESS NOTICE PAGE(S):**

  - States whether or not classified material is contained in the course.

- Describes procedures for handling and safeguarding classified materials in the course.

> Each TG shall bear the highest security classification demanded by its contents.

- Refer to the latest OPNAVINST 5510.1 (series) on Security Program Regulations to ensure that all training materials are marked and handled in accordance with the latest policy guidance.

> The Security Awareness Notice should be as individual as the course. This Notice does not relieve the developer from the responsibility of incorporating security requirements throughout the course.

- **SAFETY/HAZARD AWARENESS NOTICE PAGE(S):**

  - Under the heading Safety/Hazard Awareness Notice:

    – Identifies hazards to personnel and equipment
    – Identifies special directions to personnel concerning Safety
    – Provides safety precautions for the protection of personnel and equipment
    – Provides instructions for the reporting of workplace safety and hazard violations
    – Provides specific policy on Training Time Out (TTO)
    – Provides for designated High Risk Course policy on Drop on Request (DOR)

  - The developer should refer to NAVEDTRA 135 (series) and the latest NETCINST 5100.1 (series) on training safety to ensure that the latest policy guidance is incorporated in this section.

> The Safety/Hazard Awareness Notice should be as individual as the course. This Notice does not relieve the developer from the responsibility of incorporating safety throughout the course.

- **HOW TO USE YOUR TRAINEE GUIDE PAGE(S):**

  - These pages include a general description of the composition, function, and use of the Instruction Sheets and the TG.
  - Under the heading How To Use Your TG, discuss:

    - The types of Instruction Sheets contained in the TG
    - How to use the Instruction Sheets
    - The types of examinations and quizzes administered in the course
    - The course divisions

- **TOPIC LEARNING OBJECTIVES (TLOs) PAGE(S).** Under the heading, Topic Learning Objectives, list the topic objectives in numeric sequence.

  > TLOs will be consistent with the TCCD Outline of Instruction both in content and sequence.

- **COURSE MASTER SCHEDULE (CMS)**

  - CMS, for courses greater than one day, should be made available to each trainee as a handout, part of the TG, or posted in a conspicuous place.
  - If included in the TG, under the heading CMS:

    - List the Unit and Lesson Topics by number and title in instructional sequence by day and period
    - Indicate when tests will be administered and which Units/Lesson Topics will be covered

  - CMS in the TG usually is identical to the CMS prepared for the TCCD.

2.2. Instruction Sheets

- Instruction Sheets are organized by Units and Lesson Topics:

  - Instruction sheets include Outline, Assignment, Information, Job, Problem and Diagram Sheets.
  - Units and Lesson Topics are numbered according to the TCCD COI.

- Units and Lesson Topics are listed in the Table of Contents in the Front Matter for organizational purposes but there is no Unit or Lesson Topic Pages.
- Instruction Sheets are arranged according to the sequence in which they are used within the Lesson Topic they support.
- All Instruction Sheets are developed to support instructions as presented in the LP. All Instruction Sheets developed will be cited or assigned at some point in the Lesson Topic.

- Each Instruction Sheet has a running header:

  - The first line contains:

    - The phrase TG
    - CIN
    - Revision number in Alpha characters (if appropriate)
    - The phrase Change with number in Arabic numbers (if appropriate)
    - Volume number if a multi-volume TG
    - Security classification (if applicable)

  - The second line indicates, in the right corner, the number of pages composing the Instruction Sheet.

    EXAMPLE: Page 1 of 4

  - The third line is centered and includes the Instruction Sheet type and its number.

    EXAMPLE: Outline Sheet 4-10-6

All Instruction Sheets should be marked "For Training Use Only" at either the top or bottom of the page. This is to preclude the instruction sheets being used in the work environment.

2.3. Outline Sheets:

- Are titled the same as the Lesson Topic in the LP
- Under the heading Introduction, has statements concerning the overall scope and content of the Lesson Topic
- Under the heading Topic Title, lists the topics

- They are identical to those listed on the topic page of the Lesson Topic

- Under the heading Topic Outline, presents an outline of the major points to be covered in the Lesson Topic

  - Only key words or phrases should be entered
  - More subheadings may be included than on the DDA page in the Lesson Topic

2.4. Assignment Sheets:

- Are titled so as to describe the subject matter of the sheet
- Under the heading Introduction, has statements concerning the overall scope and content of the assignment
- Under the heading Topic Titles, lists the topics:

  - They will be identical to those listed in the Lesson Topic in the LP.
  - If both an Outline Sheet and an Assignment Sheet are used to support a Lesson Topic, the Learning Objectives will be listed only on the Outline Sheet.

- Under the heading Study Assignment, list material to be studied by the trainee before the presentation of the next Lesson Topic. This can be given as a homework assignment:

  - Applicable documentation is identified by paragraph, page, figure, or diagram numbers.
  - Specific study instructions, including preferred sequence of study may be included.

- Under the heading Study Questions, lists questions which assess understanding of what was studied or tests ability to apply the information.

2.5. Information Sheets:

- Are titled so as to describe the subject matter of the sheet
- Under the heading Introduction, provides a general explanation of how or why an understanding of the covered material benefits the trainee

- Under the heading References, lists all publications used to develop the information section of the Information sheet: Each reference is listed by number, volume, part, and complete title
- Under the heading Information, provides:

  - Information sheets should not reproduce information contained in texts or references readily available at the level required for instructional purposes
  - Information written clearly and to a level consistent with the understanding of the trainee
  - Reference to technical manuals or other approved publications citing specific paragraphs, figures, tables, etc.
  - Information on new concepts

    EXAMPLE: Special integrated circuit components, unique symbols, terminology

  - Background information

    EXAMPLES: Transistors, magnetic amplifiers

  - Clarifying information

2.6. Problem Sheets:

- Are titled so as to describe the subject matter of the sheet
- Are normally used for paperwork troubleshooting when the equipment is not available
- Under the heading Problems, problems are presented which:

  - Are organized in any reasonable manner that promotes problem-solving abilities
  - Provide a clear statement of the problem(s), the conditions, and parameters affecting the problem(s)

- Under the heading Directions, the directions and procedures for the solution to the problem are provided
- Incorporate drawings/diagrams, if required, as part of the Problem Sheet, not as a Diagram Sheet

2.7. Job Sheets:

- Are titled so as to describe the subject matter of the sheet
- Under the heading Introduction, the purpose of the Job Sheet and trainee benefits are explained.
- Under the heading Equipment, a complete listing of all equipment required for use by the trainee to accomplish the job is provided. Reference to official documentation which lists the equipment may be substituted.
- Under the heading References, all publications required to perform the Job Sheet are listed. Each reference will fully identify the document by number, volume, part, and complete title.
- Under the heading Safety Precautions, state safety precautions that apply to the overall job. For example, in the Volume II Sample TG Job Sheets, Training Time Out procedures are reviewed. If there are no safety precautions related to the overall job, enter "Not Applicable" or "None".
- Under the heading Job Steps, procedures for performing operation, maintenance, troubleshooting, or repair of equipment are listed:

  - Will not duplicate the procedures listed in the reference
  - Will include specific safety precautions in the Job Steps unless they are called out in the supporting technical manuals/references and cited in the step
  - May consist of either general or discrete step-by-step procedures for performing tasks associated with a job
  - Provide sufficient space under each Job Step to record information

- Under the heading Self-Test Questions, or after individual Job Steps, questions are provided which:

  - Are easily understood, grammatically correct, and easily graded by the instructor
  - Are technically correct and have direct application to the task being performed
  - Require analysis and thought similar to that required in the actual job situation

> Administration of a performance test is
> accomplished by using an Administrator's Guide
> and Job Sheets. Chapter 8 will provide
> additional information on the Job Sheet and its
> use in performance tests

2.8. Diagram Sheets:

- Are titled so as to describe the subject matter of the
  sheet
- Under the heading Diagram, provides diagrams, schematics,
  or charts:

  - Organized in any reasonable manner to accomplish the
    Lesson Topic objectives
  - May range from foldout schematics or block diagrams to
    a simplified schematic
  - Should be large enough so the trainee can make
    pertinent notations

SECTION 3 - INSTRUCTION SHEETS NOT IN A TG

3.1. Instruction Sheets distributed separately:

- Will not have Front Matter: Security information or
  safety/hazard awareness information may be provided on an
  Information Sheet.
- Listed under training materials required
- Have the same content and form as those contained in a
  TG, except the following will be omitted from the running
  header:

  - Volume identification
  - The phrase TG

> Instruction Sheets and the TG are important parts of the
> total instructional package. As much thought and
> attention should go into them as into the LP.

SECTION 4 - TG SPECIFICATIONS

4.1. All TGs developed in accordance with this manual:

- Are oriented vertically (8 1/2" x 11") on standard paper.
  This is often referred to as portrait layout.

- Are organized into one or more volumes: Volume number
  will be included in the cover page between the title and
  CIN.

> Repeat all elements of the Front Matter for each volume,
> except for How to Use Your TG, Topic Learning Objectives,
> and Course Master Schedule.

- May be printed on one side of the page or back-to-back:
  The phrase "This page intentionally left blank" or
  similar phrase will not be required on blank pages unless
  all pages must be accounted for because of the classified
  nature of the TG material.
- Generally, a TG will be created when the number of
  Instruction Sheet pages exceeds the number of pages which
  would be required by the Front Matter.

- Number Front Matter pages:

  - Consecutively using Arabic numbers
  - Placing number in the lower right-hand corner of page
  - Do not place a number on the Trainee Name Page or the
    Cover
  - Do not place a number on the Title Page; although, the
    Title Page is counted in the numbering of the Front
    Matter as page 1.

- Each Instruction Sheet:

  - Is titled as to the type of Instruction Sheet
  - Is identified with a three - element number which
    relates the Instruction Sheet to the Unit - Lesson
    Topic in the LP it supports/supplements

    - First element - Unit number
    - Second element - Lesson Topic number
    - Third element - Sequence number within the Lesson
      Topic:

        EXAMPLE: Assignment Sheet 7-3-1

    - In this example, 7 is the Unit number, 3 is the
      Lesson Topic, and 1 is the sequence number

- Is page numbered consecutively within the Instruction Sheet in the format of "Page __ of__" on the second line of the running header?

SECTION 5 - TRAINING MATERIALS MODIFICATIONS

- If components of a TG (i.e., individual instruction sheets) are revised as part of a Revision, an alpha character starting with "A" for the first revision will follow the CIN on the title page and a new publication date will be shown in parentheses under the original publication date. The entire instruction sheet will be printed with the revised CIN. No entry will be made on the Change Record Page:

EXAMPLE: A-433-0023A

- If components of a TG are changed as part of a Change, the term Change, with a number starting with 1 for the first change, will follow the CIN on every page affected by the Change. All changes are entered on the Change Record Page:

EXAMPLE: A-433-0023 Change 1

- Interim and Technical Changes are entered by the instructor. The entry is noted on the Change Record Page. The CCMM will retain all Interim and Technical Changes for inclusion in later Revisions or Changes as appropriate
- Categories of training materials modifications are discussed in NETCINST 1510.1 (series)

SECTION 6 - TG/INSTRUCTION SHEET DEVELOPMENT

Some developers can use the content and format guidelines presented in the previous sections to develop a new or revised TG or individual Instruction Sheets. If a more structured approach is desired, the following five-step development plan will aid in development of a TG or Instruction Sheet.

- The five steps are:

  - Review the Lesson Topic and technical documentation
  - Select appropriate Instruction Sheet
  - Prepare initial Instruction Sheets/TG

- Conduct Pilot
- Finalize Instruction Sheets/TG

STEP 1: REVIEW THE LESSON TOPIC AND TECHNICAL DOCUMENTATION

- Review the Lesson Topic to determine the topic's:

  - Place in the course sequence
  - Course Learning Objectives
  - Instructional method

- Review the Technical Documentation to determine:

  - Information which should be provided to the trainee
  - Which reference material can be used in lieu of reproducing the information in the TG

  STEP 2: SELECT APPROPRIATE INSTRUCTION SHEET

- There are six types of Instruction Sheets:

  - Outline Sheet
  - Assignment Sheet
  - Information Sheet
  - Problem Sheet
  - Job Sheet
  - Diagram Sheet

- Use Instruction Sheets to provide:

  - Supplementary information needed to complete a course successfully
  - Information which is not available in reference publications at the level required for instructional purposes
  - Problems to complete or a series of steps to perform which call upon trainees to apply what they have learned
  - The most appropriate experience for the trainee

- All Instruction Sheets will comply with the requirements of OPNAVINST 5510.1 (series) for the marking and handling of classified material
- Outline Sheets:

- Provide the trainee with an outline of the major teaching points in the Lesson Topic
- Are consistent with the outline of the discussion points contained on the Lesson Topic DDA pages
- Allow the trainee to follow the progress of a Lesson Topic

- Assignment Sheets:

  - Simplify the trainee's search for relevant data
  - Prepare the trainee for future job tasks that require researching and locating data in technical manuals necessary for operational and maintenance purposes
  - Maximize the effectiveness of the trainee's study by providing clear statements of learning objectives and study questions

- 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 documentation
  - Are useful for promoting or aiding the trainee's comprehension of technical manual materials

- Problem Sheets:

  - Present practical problems requiring analysis and decision-making similar to what trainees may encounter in their eventual job assignments
  - Engage the trainee in problem solving, emphasizing the fundamentals of logical thinking, and give practice in the application of knowledge to practical situations
  - Are used when the subject matter of a course requires the ability to solve a problem in a logical manner

  A Problem Sheet is NOT to be used for testing, a substitute for laboratory activity, or as a do it-yourself training method.

- Job Sheets:

  - Direct the trainees in the step-by-step performance of a practical job that may be encountered in their eventual job assignment

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- Provide a means for the trainee to apply knowledge obtained during instruction
- Do not contain any directions to the instructor
- Require the trainees to use the technical documentation in performing their task just as they would in their ultimate assignments

> Specific safety precautions rather than general safety precautions should be incorporated in the Job Sheet.

- Diagram Sheets:

  - Provide the trainee with copies of special course material such as diagrams, schematics, or illustrations
  - May depict a sketch the instructor will also draw on the board, IMM (such as a transparency), or any diagram or schematic the developers may deem important for trainee use

> Diagram Sheets are NOT to be provided where material exists in reference documentation and the use of that documentation will suffice.

STEP 3:   PREPARE INITIAL INSTRUCTION SHEET/TG

- Prepare Instruction Sheet drafts which meet the Instruction Sheet format requirements

  - Use of electronic media in preparing the Instruction Sheets/TG is highly encouraged
  - Review CCA and CCMM requirements for the word processing program to be used, font size, and formats beyond those established in this manual

- Multiple types of Instruction Sheets may be used throughout a Lesson Topic as well as a course.
- Review printing and publications guidelines in NAVEDTRA 135 (series) to ensure compliance.
- Use classified material only when absolutely necessary. Review OPNAVINST 5510.1 (series) to ensure compliance with marking and handling requirements.

- Coordinate quality assurance assistance review with the learning standards office or the Quality Assurance Officer.
- Coordinate review of instructional materials by the CCA, if appropriate.
- Determine if Instruction Sheets should be distributed separately or bound in a TG.
- Determine quantity of Instruction Sheets used.
- If the number of Instruction Sheet pages would exceed the number of Front Matter pages, create a TG.
- Determine requirement to control classified material: TGs should be unclassified whenever possible. Classified Instruction Sheets should be issued when needed
- Determine frequency with which the material must be updated. Instruction Sheets which require frequent updates should not be bound in a TG.
- Volume III of this manual and NAVEDTRA 135 (series) provide specific guidance on the management of curriculum development.

> Steps 4 and 5 will occur after all instructional material has been developed.

STEP 4: CONDUCT PILOT

- Conduct a pilot for an entire course or a major segment of the course, usually at least one Unit in length. This process is discussed in Chapter 10 of this volume and in Volume III, Chapter 7.

  - Review material for correctness and completeness.
  - The pilot itself will determine if the trainees have learned what the objectives called for and use the Instruction Sheets as designed.
  - A detailed "red-lined" copy will identify changes which must be incorporated.

STEP 5: FINALIZE INSTRUCTION SHEETS/TG

- Revise and prepare the final versions of the instructor, trainee, and support materials including tests and instructional media.

  - Chapter 8 of Volume III provides specifics on finalizing the material.

- Volume III of this manual and NAVEDTRA 135 (series) will describe the procedures for implementing the final material.

STAGE THREE

CHAPTER 8

TESTS FOR MEASUREMENT OF TRAINEE ACHIEVEMENT

INTRODUCTION

As a curriculum developer, your responsibilities include establishing methods for determining how well the trainees have achieved the objectives. Practical work is one such method and includes lab assignments, homework, and in-class assignments.

Tests must be developed when a grade (either within-course or end-of-course) is to be assigned, or a trainee's course PASSING/FAILURE must be decided and recorded. This chapter will provide you with guidelines for designing and developing Performance and Knowledge Tests, based on the development and use of job sheets, test items, and tests.

In most cases, the information provided in this chapter will suffice for the design, development, and scoring (grading) of performance and knowledge tests. A series of three appendices is included at the end of this chapter for those who require additional information in these subject areas.

> Development of the LESSON PLAN (LP), Trainee Guide (TG), and Tests, to a large extent, occurs simultaneously. That is, as you are creating an LP, TG, or Test you are shifting back-and-forth to the other two as good ideas come to mind. Hence, it is important to read all three chapters before attempting to develop either an LP, TG, or Test.

SCOPE

- To provide information on Test Development and Administration for those involved in developing Task Based Curriculum.
- The diagram below lays out the Testing process in the order that events should occur.

```
┌─────────────────────────────────────────────────────────┐
│                                                           │
│                  INTRODUCTION TO TESTING                  │
│                                                           │
└─────────────────────────────────────────────────────────┘


       PERFORMANCE TESTS                  KNOWLEDGE TESTS

    ┌──────────────────┐              ┌──────────────────┐
    │                  │              │                  │
    │   Test Design    │              │   Test Design    │
    │                  │              │                  │
    └──────────────────┘              └──────────────────┘
              │                                 │
              ▼                                 ▼
    ┌──────────────────┐              ┌──────────────────┐
    │                  │              │                  │
    │  Develop Tests   │              │  Develop Tests   │
    │                  │              │                  │
    └──────────────────┘              └──────────────────┘
              │                                 │
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    ┌──────────────────┐              ┌──────────────────┐
    │   Develop Test   │              │   Develop Test   │
    │  Administrator's  │              │  Administrator's  │
    │      Guide       │              │      Guide       │
    └──────────────────┘              └──────────────────┘
              │                                 │
              │                                 │
              ▼                                 ▼
         ┌─────────────────────────────────┐
         │                                 │
         │     Develop Testing Plan        │
         │        (NAVEDTRA 135            │
         │          (series))              │
         └─────────────────────────────────┘
                         │
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    ┌────────────────────────────────────────────┐
    │                                            │
    │   Pilot Tests As Part of Course Pilot      │
    │        and Implementation Phase            │
    └────────────────────────────────────────────┘
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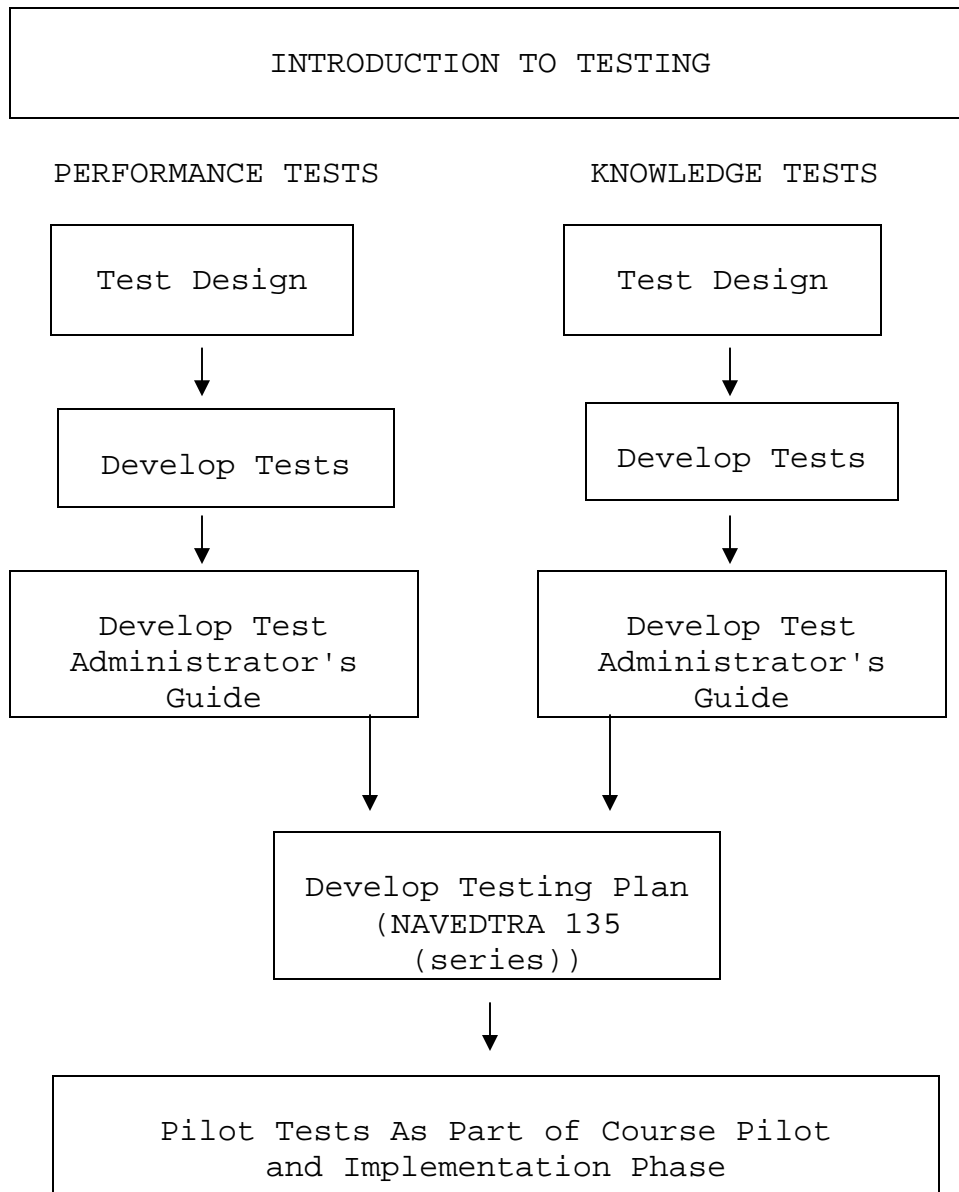
Figure 8-1:   INTRODUCTION TO TESTING

SECTION 1 - INTRODUCTION TO TESTING

1.1. Definitions

- Tests are the primary tool for determining trainee
  attainment of the Course Learning Objectives
  (CLO)/Training Learning Objectives (TLO) and, therefore,
  his/her relative success in the course.
  Progress/Comprehensive tests are considered formal tests.
  Critical Learning Objectives (LO) are always formally
  tested. Less critical LOs may be formally tested or be

informally measured by quizzes, homework assignments, or practical work.

- Performance tests measure a trainee's ability to perform a specific skill or behavior by using actual equipment or training devices.
- Knowledge tests are used to measure the trainee's achievement of theory and/or background knowledge in support of performance of a skill.
- Measurement is the process of assessing what the trainee has demonstrated by taking the Performance/Knowledge test.
- Evaluation is the process of comparing a measurement against an established standard.
- Grading is labeling (scoring) the evaluation, usually according to a level of success, e.g., go or no—go.

1.2. Required events for test development are:

- Design the Tests. Here decisions as to the What, When and How of testing will be determined.
- Develop the Performance Tests. Job Sheets will be developed and used as the basis for measuring trainee's ability to perform duties or tasks.
- Develop the Knowledge Tests. Decisions will be made as to where and what knowledge tests are required to measure trainee knowledge necessary to support the achievement of performance objectives.
- Develop Administrator's/Trainee Testing Information. Essential information will be developed for facilitating the administration of both Performance and Knowledge Tests

- Develop Testing Plan

Testing Plan development is contained in
NAVEDTRA 135 (series). A sample Testing Plan
is provided in Volume II.

SECTION 2 - DESIGN PERFORMANCE TESTS

- During Performance Test Design you will decide what skills to test by selecting TLOs, how to test for these skills and when in the testing program to test for this knowledge.

- Of these two processes, test design and test development, test design is most important and effective tests seem to follow naturally from a good test design.

2.1. Performance Test Design requires that you determine:

- Criticality of each performance topic learning objective and level of acceptance. This process will help you to decide which performance objectives to measure through testing and which should be measured by practical work.
- Whether to use the actual equipment in the test situation or to simulate performance on the equipment may also be a factor

  - In many cases this decision will already have been made.
  - If not, see Addendum 8-A for guidance in deciding whether to test using the actual equipment or simulation.

2.2. Decide Which Performance LOs to Test

- Criticality of Skill:

  - Refers to how important the skill is in relation to its application to actual job performance

    - High: Skill is used during job performance
    - Moderate: Skill influences job performance
    - Low: Skill has little influence on job performance

- Other Criticality Factors

  > *Criticality* refers to a TLOs importance as related to the performance of a job task.

  - Safety to personnel/equipment — Critical tasks are those which are considered high risk or dangerous
  - Frequency of performance — The more often a task is performed the more critical it becomes
  - TLO's importance to the overall course mission
  - TLO's importance to on-the-job performance

- Rank order or group TLOs by category of criticality:

  - Rank ordering of TLOs consists of placing them in a list ranging from most critical to least critical. If

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a course has 20 performance TLOs, rank them from 1
(most critical) to 20 (least critical).
- Group by categories of criticality—Establish 3 to 5
  categories ranging from highly critical to least
  critical.
- Highly critical TLOs must be formally tested. Less
  critical TLOs may be informally tested by other means
  such as practical work.

> Set a cut-off point between *most critical* and
> *least critical*. For instance: You decide that
> TLOs ranked in the upper 66 percent are most
> critical. They require formal testing. TLOs
> ranked in the lower 33 percent are less
> critical. Formal testing is not required.

- Performance Objective test guidelines. Those performance
  objectives having the highest criticality rating must be
  formally tested.

  - As a rule of thumb those performance objectives judged
    to rank in the upper one-third as to criticality
    should be tested by a Progress/Comprehensive
    Performance Test. This is formal testing.
  - Performance objectives judged to rank in the middle-
    to-lower one-third as to criticality should be tested
    by having the trainees complete job sheets in a
    laboratory as part of the application section of a
    Lesson Topic. This is informal testing, in that the
    performance evaluation lacks the controls of formal
    testing.
  - Performance objectives judged to rank in the middle-
    to-lower one-third as to criticality may also need to
    be tested to show the logic of the learning process.
    This can be accomplished by an informal quiz, or
    assigning problem sheets for evaluation.

- When you have completed this process you will have one
  set of Performance TLOs from which to build the tests.

2.3. Develop Performance Tests components are:

- Job Sheets
- Job Sheet Evaluation Instruments
- Performance Test Administrator's Guide

2.4. Develop Job Sheets

- For specific guidance on developing job sheets see Chapter 7, TG, of this volume.
- Job Sheet problems must be consistent with those used during the course. They may not be used to introduce unfamiliar information.
- Each Job Sheet must require the trainee to use the technical documentation just as he will upon reaching his ultimate job assignment. Amplifying information may be incorporated into the job sheet to compensate for inadequate/incomplete technical documentation.
- Each Job Sheet must be directly related to either a skill CLO or a skill TLO.
- Job Sheets also provide a means for the trainee to apply knowledge obtained during instruction and therefore, be used in place of a knowledge test for the information.
- Each Job Sheet will support one of these test types: A product, a process, or product and process combined.
- Performance Test types are:

  - Product
  - Process
  - Combination (of Product and Process)

- Performance Test types explained

  - Product:

    - A product is an observable result—something you can see, hear or touch.
    - A solder joint is a product because it can be seen and touched.
    - A completed form is a product because it can be seen.

  - Product testing is possible when:

    - The objective specifies a product
    - The product can be measured as to the presence or absence of certain characteristics, e. g., does it look right, have the right texture, sound the way that it should?
    - Procedural steps may be performed in a different order or sequence without affecting the product.

  - Process. A process consists of step-by-step procedures required to produce a product or complete a task. Process testing is appropriate when:

- The product and the process are the same thing—such as teaching a lesson
- There is a product, but safety, high cost, or other constraints prevent the product from being measured
- It is necessary to examine each step of the process in order to diagnose the reason for performance failure
- There may be a product, but there are critical points in the process which must be performed correctly because of the possibility of damage to personnel or equipment
- The objective specifies a sequence of steps that can be Observed
- The process does not result in a product
- Your interest is in the actual behavior itself

- Combination. His performance test is concerned with both an observable result, and the step-by-step process leading to the result.
- Combination testing is appropriate when:

  - Both product and process are equally important to the final result, or it is required so as to avoid hazards to personnel or equipment.
  - Safety considerations almost always dictate that the operation or maintenance of a device, i.e., the process, be done in a certain way. However, the outcome, i.e., the product, is just as important to successful job performance.

- Product/Process/Combination Learning Objectives Illustrated

Product Objective: Construct a box sill floor frame to within 1/8-inch of required dimensions (The final product will be graded for conformity to the specifications).

Process Objective: Measure a crankshaft journal for wear, taper, and out-of-roundness (exact measurements require that the measuring process is followed precisely).

Combination Objective: Perform a Daily System Operating Test (DSOT) on the Close-In Weapons System—CIWS—(A systematic, step-by-step process must be followed to ensure a fully operational CIWS, or product).

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- Deciding which Performance Test type to use:

  - Test for the product if the objective contains specific standards that the product must meet
  - Test for the process if the objective has specific standards that must be adhered to, including:

    - Safety procedures
    - Time standards
    - Requirements that the steps be performed in a certain order

  - Test for the process when diagnosis is important, i.e., if it is important to know when or where errors occur
  - If either process or product can be measured, select the one that is easiest to measure, using the following guidelines:

    - Time or number of personnel required to conduct the performance test
    - Can the product be tested without examining the process?
    - Can errors be made early in the process which might be costly or dangerous.

  > See Addendum 8-A: In—Depth Discussion of Performance/Knowledge Test Design, at the end of this chapter, for more information on this topic.

2.5. Develop Job Sheet Evaluation Instruments:

- Evaluation Instruments may include:

  A Checklist

  AND/OR

  A Rating Scale for use in evaluating the correctness of the product or performance of the process.

  AND

  Grading Criteria (Scoring Guide) to be used in determining a grade for the product or process required by the Job Sheet.

```
Figure 8-2 and Figure 8-3, several pages
further on, show examples of a Job Sheet
Checklist and Job Sheet Rating Scale,
respectively.

Figure 8-3 and Figure 8-4, several pages
further on, show examples of Grading Criteria
for the above-listed Job Sheet Checklist and
Job Sheet Rating Scale.
```

- Guidelines For Developing:

  - Develop one checklist and/or rating scale, and grading
    criteria, for each step or group of steps on the Job
    Sheet
  - For Product Performance Tests:

    - When a product trait is either present or absent and
      can be measured by checking yes or no a checklist
      may be the best to use.
    - When product quality can vary from high to low,
      adequate to inadequate, good to bad, or some other
      range; a rating scale may be the best to use.
    - Whether a checklist or rating scale is chosen will
      depend upon the particular situation and the
      developer's discretion - some situations/developers
      might use a checklist; others might use a rating
      scale; sometimes using both might seem the most
      appropriate thing to do.

- For Process Performance tests:

  - When a step is either done or not done and can be
    measured by checking yes or no, a checklist may be the
    best to use.
  - When performance of a step can vary in quality from
    high to low, best to worst, good to bad, or some other
    range, a rating scale may be the best to use.
  - A rating scale may also be the best to use when a step
    has more than two possible outcomes.
  - Whether a rating scale or checklist is chosen will
    depend upon the particular situation and the
    developer's discretion - some situations/developers
    might use a checklist; others might use a rating
    scale; sometimes using both might seem the most
    appropriate thing to do.

- Grading Criteria (Scoring Guide)

  - This may be the most critical step in performance test development because it ensures standardized grading
  - The scoring guide contains a description of how each step or group of steps is to be graded
  - When using knowledge test-items in a performance test indicate the correct response and how many points will be deducted for an incorrect response
  - When knowledge test-items are included as part of a performance test they will not constitute a major portion of the trainees' overall grade.

> If you require more information about developing grading criteria, see Addendum 8—C: Grading Criteria for Performance Tests at the end of this chapter and NAVEDTRA 135 (series), Appendix B.

- **Evaluation Instrument selection**

  - It may make no difference whether a checklist or rating scale is used because almost all rating scales can be turned into checklists, and some checklists can be made into rating scales.
  - Grading criteria for the course is a factor:

    - If the course is graded SAT or UNSAT, a checklist may be the most appropriate to use.
    - If the course is graded with a numerical grade, a rating scale may be the most appropriate to use.

- **It is important:**

  - To define checklist steps and rating scale decisions as precisely as possible. The more precisely you can describe the behaviors the more effective the Job Sheet Checklist/Rating Scale will be.
  - To make the grading criteria for each Job Sheet Checklist and Job Sheet Rating Scale as precise as possible. This helps remove instructor subjectivity from the grading process.

- **Construct the Job Sheet Evaluation Instrument.** Each Checklist/Rating Scale/Grading Criteria should include, as appropriate:

  - A list of steps to be evaluated. This information comes from the related job sheet.

- When impossible to evaluate each step separately, review the job sheet and, where possible, group individual steps into like areas and evaluate them as one step.
- Each step or group of steps will be numbered.
- Briefly describe the evaluation procedures.
- Indicate the type of instrument.
- Indicate critical steps.
- Provide space for comments or description of errors.
- Include space for required administrative information e.g., name, abbreviated Social Security Number, class, beginning and ending time, score, etc.
- Personal information consistent with Personal Identifiable Information (PII) directives.

```
┌─────────────────────────────────────────────────────────────────────┐
│                        PERFORMANCE TEST                               │
│                   JOB SHEET 5-1-5 CHECKLIST                           │
│                                                                       │
│ TITLE:  MEASURING A CRANKSHAFT JOURNAL                                │
│                                                                       │
│ TRAINEE NAME/RATING_____SSN_____   │
│ INSTRUCTOR/EVALUATOR_____   │
│ DATE_____ TIME STARTED_____TIME COMPLETED_____   │
│                                                                       │
│   Evaluation instructions:  This test evaluates procedures and use of │
│ measuring tools.  Observe trainee-taking measurements indicated.      │
│ Watch for correct application of tools, and ability to                │
│ interpret/record tool readings.  Observe that student uses correct    │
│ methods to move heavy parts.  If unsafe practices are observed, STOP   │
│ THE TEST.                                                             │
│                                                                       │
│   All recorded measurements for this Job Sheet must be +/- .0001" of  │
│ journal proof dimensions.  Mark each measurement as SAT or UNSAT.  If  │
│ UNSAT, comment as to why.                                             │
│                                                                       │
│ 1.  Measure and record outer end of journal                          │
│                                                                       │
│     a.  Vertical dimension                          (SAT) (UNSAT)     │
│                                                                       │
│     b.  Horizontal dimension                        (SAT) (UNSAT)     │
│                                                                       │
│ Comment:_____ │
│                                                                       │
│  2.  Measure and record center of journal                            │
│                                                                       │
│     a.  Vertical dimension                          (SAT) (UNSAT)     │
│                                                                       │
│     b.  Horizontal dimension                        (SAT) (UNSAT)     │
│                                                                       │
│ Comment:_____ │
│                                                                       │
│ 3.  Measure and record inner end of journal                          │
│                                                                       │
│     a.  Vertical dimension                          (SAT) (UNSAT)     │
│                                                                       │
│     b.  Horizontal dimension                        (SAT) (UNSAT)     │
│                                                                       │
│ Comment:_____ │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

FIGURE 8-2: SAMPLE PERFORMANCE TEST CHECKLIST

```
PERFORMANCE TEST
JOB SHEET 5-1-5 GRADING CRITERIA

TITLE:  Measuring a Crankshaft Journal

  Grading Criteria for Job Sheet 5-1-5 is "SAT/UNSAT".
There is no product created by the trainee during this
performance test.  The sequence in which measurements are
taken during the test is not as important as the correct use
of measuring tools, accuracy of the measurements and
interpretation of tool readings.

  A numeric score is derived from the following:

  All trainees start the test with 100 points.

  Ten points are deducted for any recorded measurement that
exceeds journal proof dimensions by +/- .0001" and results
in an UNSAT for that measurement.  Comments to aid
remediation are required for each UNSAT marked.

   A score of 80 points or above is SATISFACTORY completion
of the test.

  Procedures:  Steps 1, 2, and 3 relate to measurement
techniques, tool reading, and safe practices.  Three or more
incorrect readings results in failure of the test.  Safe
practices are mandated.  If unsafe practices are observed,
the instructor has two options:

  1.  Interrupt the test and correct the trainee.  Make
appropriate comment on Job Sheet check list.

  2.  If safety violation warrants; STOP THE TEST, AND
PROCEED IN ACCORDANCE WITH SCHOOL DIRECTIVES.  This results
in immediate test failure.
```

FIGURE 8-3: SAMPLE PERFORMANCE TEST GRADING CRITERIA

```
+-------------------------------------------------------------------------+
|                        PERFORMANCE TEST                                 |
|                 JOB SHEET 10-3-2 RATING SCALE                           |
|              TITLE:  CONSTRUCT A BOX SILL FLOOR FRAME                    |
|                                                                         |
| TRAINEE NAME/RATING _____SSN_____ |
| INSTRUCTOR/EVALUATOR_____ |
| DATE_____ TIME STARTED_____TIME COMPLETED_____     |
|                                                                         |
| Item No.   Step/Description/Observation                      Deduct      |
|                                                                         |
| 1.  Marked and cut all sill plates squarely to                          |
| proper length within 1/8 inch                                0,-5,-10    |
|                                                                         |
| 2.  Installed sill plates within 1/8 inch of                            |
| Specified location, ensuring they are square and                        |
| Level                                                        0,-5,-10    |
|                                                                         |
| 3.  Laid out header joists for floor joists 16" on                      |
| center, within 1/8 inch                                      0,-5,-10    |
|                                                                         |
| 4.  Measured, marked, and squarely cut each joist to                    |
| specified length, within 1/8 inch                            0,-5,-10    |
|                                                                         |
| 5.  Aligned header and floor joists (Crown up) within                   |
| 1/8 inch of specified locations and height                   0,-5,-10    |
|                                                                         |
| 6.  Snapped chalkline across floor joists on centerline                 |
| of building, within 1/8 inch                                 0,-5,-10    |
|                                                                         |
| 7.  Placed and secured bridging staggered 1 1/2 inch                    |
| Off center, within 1/8 inch                                  0,-5,-10    |
|                                                                         |
| 8.  Installed subfloor with joists staggered and                        |
| Butted tightly on center of the joists driven flush                     |
| with the surface                                             0,-5,-10    |
|                                                                         |
| 9.  Subfloor nailed 8 inch on center, with nails                        |
| driven flush with the surface                                0,-5,-10    |
|                                                                         |
| 10.  Used all tools and materials properly           0,-5,-10           |
|                                                                         |
| Critical OBSERVED ALL SAFETY PRECAUTIONS                        -10      |
| Evaluation Procedure:  Observe trainee during construction.             |
| Comment on safety observance and use of tools, as appropriate.          |
| Take measurements upon completion of project, and grade in              |
| accordance with Job Sheet 10-3-1 Grading Criteria.                      |
+-------------------------------------------------------------------------+
```

FIGURE 8-4: PERFORMANCE TEST RATING SCALE

```
┌─────────────────────────────────────────────────────┐
│                  PERFORMANCE TEST                     │
│        JOB SHEET 10-3-2 GRADING CRITERIA              │
│        TITLE:  CONSTRUCT A BOX SILL FLOOR FRAME       │
│                                                       │
│ Grading Criteria is SAT/UNSAT, based on a numerical   │
│ threshold.  A numeric value must be assigned to each  │
│ evaluated step.                                       │
│                                                       │
│   A safety violation will stop the performance test and│
│ the Administrator will immediately provide remediation.│
│ Safety violations that may have led to injury or damage│
│ to equipment will result in an UNSAT performance and  │
│ failure of the Test.                                  │
│                                                       │
│   Any product dimension within 1/8 inch of specification│
│ = -0 points.                                          │
│                                                       │
│   Any product dimension 3/16 inch out of specification│
│ = -5 points.                                          │
│                                                       │
│   Any product dimension more than 3/16 inch out of    │
│ specification = -10 points.                           │
│                                                       │
│   Each noted occurrence of improper tool usage = -5   │
│ points.                                               │
│                                                       │
│ * = Critical step.                                    │
│                                                       │
│ All students start with 100 points.  Minimum passing  │
│ score is 75 points.                                   │
└─────────────────────────────────────────────────────┘
```

FIGURE 8-5: SAMPLE GRADING CRITERIA FOR A RATING SCALE

2.6. Develop Performance Test Administrator's Guide:

- **Develop Instructions to the Trainee, including** (see figure 8-5 for an example):

  - A description of the test
  - Safety precautions which must be observed with specific warnings about any unusual conditions that exist
  - An explanation of the job steps to be performed and exactly what the trainee is required to do
  - The level of assistance permitted

- Information on how the grade will be determined, including a list of the critical steps which may result in mandatory failure of the test
- A list of tools, test equipment, and training material
- Allocated time limit and importance of time to test grade
- Relationship of the test to the performance objective

INSTRUCTIONS TO THE TRAINEE

1. Present the following to the trainee:

    a. This is a performance test for the _____. The test will consist of _____ tasks, and you will have _____ amount of time to complete the test. Prior to the beginning of each task, you will be given an explanation of the task, what to do and the time limit for each.

    b. All test equipment, tools, and materials are available to you. You must determine what is needed for each task.

    c. You may be required to leave the area after each task if additional preparation is required for the next task.

    d. You will be evaluated on your performance and your practice of safety precautions. The administrator will intervene to prevent or correct a violation of any safety precaution.

    e. You will not be assisted with your performance. The administrator may intervene after a task begins in order to correct a critical procedural error.

    f. The requirements may be restated or explained at your request. Do your best. If you cannot perform the task, inform the administrator.

    g. You will be observed closely. Try not to let this interfere with performance. All critical steps must be performed correctly. Some steps will be scored on a "Yes/No" basis and some will be scored with a rating scale.

2. Ensure that the trainee understands all of the above items before proceeding to the first problem.

FIGURE 8-6: SAMPLE TEST ADMINISTRATOR'S GUIDE INSTRUCTIONS TO THE TRAINEE

- Develop Instructions to the Administrator (see figure 8-6 for an example), including:

  - A brief description of the task to be performed
  - A list of required tools, test equipment, and training material
  - Specific instructions describing how to set up the equipment/job performance
  - Instructions on any special safety precautions/procedures that may be applicable
  - Instructions on the use of knowledge test-items (written and/or oral)
  - Guidance on the actions to be taken in the event that the trainee does not perform as anticipated e.g. If a critical step is improperly performed, remediation and retesting are in order.

```
┌─────────────────────────────────────────────────────────────┐
│                INSTRUCTIONS TO THE ADMINISTRATOR              │
│                                                               │
│ 1.  The trainee will be performing the _____ task(s).    │
│ The following tools and test equipment are required:          │
│                                                               │
│     a.                                                        │
│     b.                                                        │
│     c.                                                        │
│     d.                                                        │
│                                                               │
│ 2.  Preset the following controls on the _____.        │
│                                                               │
│     a.                                                        │
│     b.                                                        │
│     c.                                                        │
│     d.                                                        │
│     e.  Remove part no.____from the_____ and replace with     │
│ faulted part.                                                 │
│                                                               │
│ 3.  State the following special procedures to the             │
│ trainee:                                                      │
│                                                               │
│     a.  Briefly describe the task and its relationship to     │
│ the objective.                                                │
│     b.  State any special safety precautions/procedures       │
│ that may be applicable.                                       │
│     c.  Provide additional information specific to the        │
│ test.                                                         │
│     d.  Orally quiz student on applicable safety              │
│ precautions using questions from the evaluation               │
│ checklist.                                                    │
│     e.  If the trainee fails a critical step remediate by     │
│ _____.                                                   │
└─────────────────────────────────────────────────────────────┘
```

FIGURE 8-7:   SAMPLE INSTRUCTIONS FOR THE ADMINISTRATOR

```
┌──────────────────────────────────────────────────┐
│ This concludes the discussion on Performance       │
│ Test Design/Development.  Remember, if you         │
│ need more information see Addendum 8-A on           │
│ Performance Test Design/Development.                │
└──────────────────────────────────────────────────┘
```

SECTION 3 - DESIGN KNOWLEDGE TESTS

- During Knowledge Test Design you will decide what Knowledge to test by selecting TLOs, how to test for this knowledge and when in the testing program to test for this knowledge.

- Of these two processes, test design and test development, test design is most important and effective tests seem to follow naturally from a good test design.

3.1. Knowledge Test Design requires that you determine:

- Level of learning required of each knowledge TLO

  - This process requires you to examine how the knowledge will be used on-the-job and to design the test accordingly.
  - For instance, if instantaneous total recall to a situation is necessary (such as the proper response to an incoming Exocet Missile) your test must require the trainee to answer from memory - you could hardly give the trainee the time to locate the answer in the technical documentation.
  - If, on the other hand, a procedure will always be performed using the technical documentation then your test must allow the trainee access to this documentation.

- Criticality of each knowledge topic learning objective. This process ensures that knowledge deemed critical is measured over other, less important knowledge.

3.2. Decide Which Knowledge TLOs To Test: The Level of Learning is determined by:

- The conditions, behavior, and standards specified in each objective
- It is very important that you know how the information being taught will be used on the job and then test for the information at that level which it will be used
- Following are the different ways (or levels of learning) in which knowledge is used on the job:

      K1 - Recognize
      K2 - Recall
      K3 - Comprehend
      K4 - Apply
      K5 - Analyze/Synthesize/Evaluate

- Each piece of information used on the job will be used at one of these levels.
- It is absolutely imperative that the level chosen for construction of the knowledge test item match the level at which the corresponding information is used on the

job. Therefore, if your analysis determines that the information is used at the application level on the job then the corresponding test item must be at the application level.

- The levels of learning are described as follows:

  ▪ K1 – Recognize. Recognition is the process of verbatim identification of specific terms, facts, rules, methods, principles, procedures, objects, etc., that have been presented during training. The information to be identified is selected from two or more alternatives.

  EXAMPLE: Identify a particular switch on a piece of equipment by matching its name to a diagram of the switch.

  ▪ K2 – Recall. Recall is the verbatim remembering of specific terms, facts, rules, etc. In answering a recall test item, the trainee remembers and responds exactly as taught. For a recall test item, the trainee responds from memory instead of selecting the response from two or more alternatives. Recall is tested with closed book tests; otherwise the trainee's ability to remember information is not tested and the item becomes a recognition item.

  EXAMPLE: List the steps of an emergency procedure.

  ▪ K3 – Comprehend. Comprehension understands what was taught rather than simply memorizing the words. It can be demonstrated by interpreting, explaining, translating, or summarizing information. When measuring the trainee's understanding of an objective, verbatim recall or recognition must be avoided. This requires the developer to paraphrase the material presented rather than taking it word for word from the text.

  EXAMPLE: Explain orally how a steam turbine works.

  ▪ K4 - Apply. Application involves the ability to use acquired knowledge in a situation not specifically demonstrated during instruction, but job related. Application questions require trainees to demonstrate knowledge through mental skill exercises. The test items must be different than those used in class to be considered application. If the problem is exactly the

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same the trainee may be memorizing the problem and the item becomes a recall item.

EXAMPLE: Determine resistance values from circuit diagrams.

- ▪ K5 – Analyze/Synthesize/Evaluate. Analysis involves the understanding of the elements of data and relationships among the data that make meaning of information explicit. Synthesis is the ability to put parts together to form new patterns or structures such as a unique communication, a plan of operations, or a set of abstract relations. Evaluation involves the judgments of the value or effectiveness of procedures or solutions based on data, criteria and standards.

EXAMPLE: Determine the best method for stowing ammunition on a ship.

- Criticality of Knowledge: Refers to how important the knowledge is in relation to its application to actual job performance.

  - High: Knowledge is used during job performance
  - Moderate: Knowledge influences job performance
  - Low: Knowledge has little influence on job performance

- Other Criticality Factors Knowledge Applies To:

  > Criticality refers to a TLOs importance as related to the performance of a job.

  - Safety to personnel/equipment. Critical tasks are those which are considered high risk or dangerous
  - Frequency of performance. The more often a task is performed the more critical it becomes
  - TLOs importance to the overall course mission
  - TLOs importance to on-the-job performance

- Rank order or group TLOs by category of criticality:

  - Rank ordering of TLOs consists of placing them in a list ranging from most critical to least critical — A course has 20 knowledge TLOs. Rank them from 1 (most critical) to 20 (least critical).

- Group by categories of criticality. Establish 3 to 5 categories ranging from highly critical to least critical.
- Highly critical TLOs must be formally tested. Less critical TLOs may be informally tested by other means such as graded homework or problem sheets.

> Set a cut-off point between most critical and least critical. For instance: You decide that TLOs ranked in the upper 66 percent are most critical. They require formal testing. TLOs ranked in the lower 33 percent are less critical. Formal testing is not required.

- Knowledge Objective test guidelines. Those knowledge objectives having the highest criticality rating must be formally tested.

  - As a rule of thumb those knowledge objectives judged to rank in the upper one-third as to criticality should be tested by a Progress/Comprehensive Knowledge Test. This is formal testing.
  - Knowledge objectives judged to rank in the middle-to-lower one-third as to criticality may tested by having trainees answer questions on Job Sheets or other instruction sheets, such as Assignment Sheets. This is informal testing, in that the performance evaluation lacks the controls of formal testing.
  - Knowledge objectives judged to rank in the middle-to-lower one-third as to criticality may also need to be tested to show the *logic* of the learning process. This can be accomplished by an informal quiz, or assigning problem sheets for evaluation.
  - When completed, you will have one set of Knowledge TLOs from which to build the tests.

NOTE

See Addendum 8—B for an in-depth discussion of knowledge test designs.

3.3. Develop Knowledge Tests

- Knowledge Test components are:

  - Knowledge Test Booklets
  - Knowledge Test Administrator's Guide

- Knowledge Test Item Formats are:

  - Multiple Choices
  - True-False
  - Matching
  - Completion (e.g., labeling, short answer)
  - Essay

- Test item construction:

  - Multiple—Choice:

    - Have a stem containing the problem statement
    - A closed stem may either be written as a complete statement or as an incomplete statement
    - An open stem is an incomplete statement with the response positioned at the end of the statement
    - The EXCEPT format is not recommended but may be used in the stem if the word is capitalized or underlined
    - A list of possible answers (alternatives) which complete the stem or fill-in-the-blank within the stem

  - True—False: Consists of a direct statement and either a true/false or a yes/no alternative
  - Matching: Consists of directions to inform the trainee how to match the listed items. Normally has two columns listed below the directions with the questions/stimuli placed in the left-hand column and, answers/responses placed in the right-hand column.
  - Completion:

    - These consist of incomplete statements, containing a Blank to be filled in. The missing segment is an important part of the statement such as the key element of a process, an item of equipment
    - The response is positioned at or near the end of the incomplete statement
    - May also include diagrams with certain items in the diagram either highlighted or otherwise marked, with space provided for the response

  - Essay: Must state clearly and precisely what type of response is required

NOTE

See Addendum 8—B for an in-depth discussion of knowledge tests development.

3.4. Develop Knowledge Test Administrator's Guide

- Develop Test Booklet

    - The Test Booklet contains test items and a test answer key. It is constructed from the test item bank and serves as a guide for development of later alternate versions of the test.
    - Indicate how many points will be added for correct responses or deducted for an incorrect response.

- Develop Instructions to the Administrator

        See Figure 8—8 for an example

    - Prior to the start of testing:

        - How to prepare the test area
        - Instructions for trainees
        - Time limit allowed for testing
        - Instructions for the administrator at test completion

    - At the completion of testing:

        - How to secure the test area
        - How to review, evaluate, or critique the test and record the test results

```
┌─────────────────────────────────────────────────────────────┐
│           TEST INSTRUCTIONS FOR THE ADMINISTRATOR             │
│                                                               │
│  1.  Prior to the start of testing:                           │
│                                                               │
│      a.  Cover or remove all training aids that could         │
│  assist the trainee in answering test items.                  │
│                                                               │
│      b.  Have trainees clear their desks of all unrelated     │
│  testing material.                                            │
│                                                               │
│      c.  Inform the trainees of the test time limit(s), if    │
│  any.                                                          │
│                                                               │
│      d.  Provide pencils and scratch paper as necessary.      │
│                                                               │
│      e.  Read the test instructions to the trainees.          │
│                                                               │
│      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.  Check test for marks made by the trainees.           │
│                                                               │
│      c.  Review the test with the trainees.                   │
│                                                               │
│      d.  Evaluate any test items challenged by the            │
│  trainees.                                                     │
│                                                               │
│      e.  Carry out any other local instructions as            │
│  necessary.                                                    │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

FIGURE 8-8: SAMPLE INSTRUCTIONS FOR THE ADMINISTRATOR

- Develop Test Instructions to the Trainee, including:

┌─────────────────────────────────────┐
│   See Figure 8—9 for an example.   │
└─────────────────────────────────────┘

- How to fill out answer sheet administrative data
- The consequences of cheating

- How to handle the test answer sheets and test support materials

<div style="border:1px solid">

TEST INSTRUCTIONS TO THE TRAINEE

1. Print name, rating, rate, class number, and the date at the top of the answer sheet.

2. There will be no talking during the test nor are you permitted to leave your seat without permission. If you have a question, raise your hand and the administrator will come to you.

3. If you cheat during a test, your test booklet, answer sheet and all scratch paper will be confiscated. 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. (This instruction is included only when matching readable scoring sheets are used with true-false, multiple-choice and matching test items).

6. When you have finished the test, turn in the test booklet, answer sheet, and all scratch paper to the instructor. You may then quietly leave the room or remain at your seat while the proctor scores your answer sheet (if the test is not machine scored). There will be a complete review of the test.

7. If you have any questions regarding these instructions, notify the administrator immediately.

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

</div>

FIGURE 8-9: SAMPLE KNOWLEDGE TEST INSTRUCTIONS TO THE TRAINEE

> This concludes the discussion on Knowledge Test
> Design/Development. Remember; if you need more
> information see the Addendum 8-B on Knowledge
> Test Design/Development.

- Develop Testing Plan:

  - The Testing Plan documents the test procedures for the
    course. A Testing Plan is required, but the content
    and format can vary. See NAVEDTRA 135 (series),
    chapter 5 for information on developing a Testing
    Plan.
  - A representative sample of a Testing Plan is provided
    in Volume II of this manual.

SECTION 4 - PUTTING IT ALL TOGETHER

So Far you have developed a variety of documents that are
associated with Testing and the Measurement of Trainee
Achievement. These documents should include the following:

- Performance Tests/Job Sheets
- Performance Test Administrator's Guide
- Knowledge Test Booklet
- Knowledge Test Administrator's Guide
- Performance/Knowledge Test Design (OPTIONAL)
- Testing Plan

> As you assemble each document, look at the
> related example in Volume II for required
> headings/information and overall document
> format.

4.1. Assemble Job Sheets: As per Chapter 7 and the volume II
example, plus:

- Security classification, if applicable, must appear on
  the page
- All knowledge test questions must meet the requirements
  for writing knowledge test questions

4.2. Assemble Performance Test Administrator's Guide: The
Guide consists of the following:

- Cover Page
- Instructions to the Administrator
- Evaluation Instrument

- Grading Criteria
- Instructions to the Trainee
- Performance Record Sheet

> This list of elements for the Administrator's Guide is comprehensive. They are not necessarily those elements, which must be applied to every performance test.

4.3. Cover Page: As per the volume II example, plus:

- Security classification if applicable — must appear on the page

4.4. Instructions to the Administrator: Provide, as appropriate:

- Consecutive page numbering beginning with Instructions to the Administrator
- A brief description of the task to be performed
- Instructions on any safety and other special precautions or procedures that may be applicable
- Required tools, test equipment, and training material including the Job Sheets by title and number
- Specific instructions describing how to set up the equipment or laboratory configuration
- Specific instructions on what assistance the administrator may provide or any special tasks, steps, or actions the administrator is to perform and when
- Instructions on the use of knowledge test-items (written and/or oral), if applicable
- Guidance on the actions to be taken in the event that the trainee does not perform as anticipated
- The allocated time limit for individual trainee tests and any effect time spent on the test has on the grade
- Directions on when to present Instructions to the Trainee

4.5. Evaluation Instrument: As per the volume II example, plus:

- List and number the steps, or groups of steps, to be evaluated. This list will be consistent with the related Job Sheet.
- Step Description describes the type of instrument — checklist or rating scale and which steps are critical.

- Description of errors describes the most common errors trainees might make in completing the step(s).

4.6. Grading Criteria: Provide a scoring guide that describes how each step or group of steps is to be graded.

4.7. Instructions to the Trainee: Describe, as appropriate:

- The test
- Safety precautions which must be observed, with specific warnings about any unusual conditions that exist
- An explanation of the job tasks to be performed and exactly what the trainee is required to do
- The level of assistance permitted
- Information on how the grade will be determined, including critical steps which may result in mandatory test failure
- Allocated time for the test and its importance to the trainee's test grade
- Relationship of the test to the performance objective being tested
- The consequences of cheating

4.8. Performance Record Sheet: Used for administrative information, e.g., Abbreviated Social Security Number, class number, beginning/ending test times, score, etc.

- If automated record keeping support is provided this sheet may not be required. See NAVEDTRA 135 (series).

NOTE

Student and Staff administrative records/files must be guarded with current PPI Directives.

SECTION 5 - ASSEMBLE KNOWLEDGE TEST BOOKLET

5.1. The Booklet includes:

- Cover Page
- Test Questions
- Answer Sheets
- All pages are numbered consecutively, following the cover

5.2. Cover Page: As per the volume II example, plus: Security classification, if applicable, must appear on the page.

5.3. Test Questions: All test questions should be numbered.

5.4. Answer Sheet:

- Not required if the trainees are to enter their answers in the Test Booklet
- Required if the Test Booklets are reusable

SECTION 6 - ASSEMBLE KNOWLEDGE TEST ADMINISTRATOR'S GUIDE

The Guide consists of the following:

- Consecutive page numbering beginning with Instructions to the Administrator
- Cover Page
- Instructions to the Administrator
- Evaluation Instrument
- Grading Criteria
- Instructions to the Trainee

> If all knowledge tests are administered alike only one Guide may be required. If each test or group of tests has unique requirements, additional Administrator's Guides may be required.

6.1. Cover Page: As per the Volume II example, plus Security classification, if applicable, must appear on the page.

6.2. Instructions to the Administrator: As per the volume II example, plus:

- Describe, for Prior to the Start of Testing, as appropriate.

  - How to prepare the test area
  - Instructions for trainees
  - Time limit allowed for testing
  - A list of required materials, including manuals, equipment (i.e., calculators) scratch paper and answer sheets

- Describe, for at the completion of testing, as appropriate.

  - How to secure the test area

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- How to review, evaluate, or critique the test and record the test results

6.3. Evaluation Instrument: As per the Volume II example, plus:

- The answer key will be prepared at the time the test is developed and becomes part of the Administrator's Guide.

or

- When a test is generated by randomly selecting test items from a Test Bank immediately prior to test administration the answer key will be prepared at the same time.

6.4. Grading Criteria: This consists of a scoring guide to describe how each question/group of questions is graded.

6.5. Instructions to the Trainee:

- A description of the test
- Directions on how to fill out answer sheet's administrative data
- Correct handling of test answer sheets and test support materials
- The consequences of cheating
- Time allocated for the test and its importance to the test grade

SECTION 7 - ASSEMBLE TEST DESIGN

- Preparation and assembly of this document is optional, and at the discretion of the training activity.
- If criticality, level of learning and other criticality factors were arrived at by doing these tasks on paper, and/or other elements of the process were recorded as the decisions were being made, you may compile these documents as the Test Design.

SECTION 8 - ASSEMBLE TESTING PLAN

- See local directives for Testing Plan format and content requirements
- A representative Testing Plan is shown in Volume II

8.1. For additional guidance see the following ADDENDA:

- 8-A: PERFORMANCE/KNOWLEDGE TEST DESIGN
- 8-B: KNOWLEDGE TEST ITEM DEVELOPMENT
- 8-C: GRADING CRITERIA FOR PERFORMANCE TESTS

ADDENDUM 8-A

IN-DEPTH DISCUSSION

OF

PERFORMANCE/KNOWLEDGE TEST DESIGN

INTRODUCTION

Familiarity with the following terms associated with classification and types of tests will assist you in understanding this chapter.

- **Terms Associated with Developing Tests:**

<u>PERFORMANCE TYPES:</u>   <u>KNOWLEDGE TEST ITEMS:</u>

Process   Multiple Choice
Product   True-False
Combination   Matching Completion Essay

- **Terms Associated with Placement of Tests in the Course:**

PERFORMANCE TESTS/KNOWLEDGE TESTS
Pretest
Progress Test
Quiz
Within-Course Comprehensive Test
Comprehensive Test (Post-test)

SECTION 1 - TEST DESIGN

1.1. Test Design is the process of determining:

- What will be tested and to what learning level
- How it will be tested
- When it will be tested

1.2. The Process of Test Design requires that you:

- Determine objectives requiring formal testing
- Decide what you are testing for
- Determine appropriate type of test
- Determine test placement
- Classify each test
- General Guidelines for test administration
- Develop Performance Test types
- Develop Knowledge Test items

1.3. This is also the outline for this Addendum.

SECTION 2 - DETERMINE OBJECTIVES REQUIRING FORMAL TESTING

2.1. The following rules apply:

- All Learning Objectives (LO) must be measured
- Formal testing of Course Learning Objectives (CLOs) may be accomplished by:

  - Testing each CLO individually and none of its related Training Learning Objectives (TLOs)
  - Testing the TLOs which, as a group, equal the CLOs
  - Testing a CLO, or some part there of, and some of its supporting TLOs

- Any combination of the above during the course
- Informal measurement or testing of CLOs may be accomplished by:

  - Class work or homework assignment
  - Practical work supported by a Job Sheet
  - Informal quiz

- TLOs will be tested as necessary to ensure that the prerequisite skills/knowledge supporting the CLOs is being acquired.

2.2. When you have completed this process: You will have one set of Performance TLOs and one set of Knowledge TLOs from which to build the tests.

2.3. The next step in the process of test design is:

- To take each Performance TLO, one-by-one, and decide WHAT you will be testing for (a process or a product)
- When finished with these TLOs you will then take each of the Knowledge TLOs and, one-by-one, make a similar determination for them

SECTION 3 - DECIDE WHAT YOU ARE TESTING FOR

3.1. What you test for can be a:

- Process (Performance). Focus is on whether the trainee can correctly perform the steps of the procedure or process.

- Product (Performance). Focus is on whether the trainee can produce or construct a product that meets specifications.
- Combination (Performance). Focus is on both the correct performance of the procedural steps and construction of the product.

3.2. If operation/maintenance is to be taught: Most of the tests will probably be of the Process Type. This is because operation and maintenance revolves around the performance of step-by-step procedures.

3.3. If other duties/tasks are to be taught:

- Many of the tests will probably be of the Product Type. This is because many duties/tasks result in the making of a product. Yeoman and Personnel Specialists complete many different forms (products); Construction Electricians install electrical wiring and fixtures (products) and Builders construct buildings (products).
- Combinations (process and product) may also be prevalent. A Construction Mechanic overhauls an engine. The engine is the product but it is critical that an exacting process be followed in overhauling the engine.

SECTION 4 - SIMULATED OR ACTUAL EQUIPMENT PERFORMANCE

Performance Test Design also requires the developer to determine whether the trainee will demonstrate performance on the actual equipment or simulate equipment performance.

4.1. Use the actual equipment when: The objective requires product evaluation. Simulation cannot be used because simulated performance does not generate the same product as does real-world performance.

4.2. Simulation may be required when:

- The performance objective behavior, condition, or standard required for on-the-job performance cannot be performed in the training environment.
- Testing constraints, such as the following, make it impossible to test the task as it is performed on the job.

  - Lack of equipment
  - Insufficient instructor personnel

- Insufficient time for testing
- Risk to safety of personnel
- Risk of damage to equipment

4.3. Simulation may be desirable because:

- Simulation offers distinct advantages over actual
  equipment usage in the training environment, such as:

  - Simulation may make it possible to save time,
    equipment wear and tear, or personnel usage
  - Simulation may allow for more time to be spent on
    critical steps
  - Simulated performance may be accomplished in less than
    "real time"
  - Simulated performance may allow less critical steps or
    equipment start-up time to be skipped

- The simulator may allow more performance/diagnostic data
  to be recorded than can be obtained from real equipment.
- The simulator may allow "play back" so that trainees can
  critique their own performance.
- The simulator may allow for more standardization and
  control of the test situation.

> Through the process of Performance Test Design you
> should now be able to examine all Skill LOs of the
> course and determine those to be formally tested,
> those requiring informal testing, how each objective
> will be tested, and whether actual or simulated
> performance is most desirable.

4.4. Some of what you test for will likely be: Knowledge.
Focus is on whether the trainee has acquired the necessary
knowledge to do the process or product; understands the
associated safety/hazard precautions; can use the technical
documentation.

In extreme situations, a knowledge test may be used in place of a product, process, or combination performance test. This is permissible only when facilities/equipment/material will not allow a performance test.

However, it is permissible, and often desirable, to construct/administer a knowledge test that closely duplicates on paper performance of the process or construction of the product, or both.

4.5. When it comes to Knowledge Tests:

- WHAT will be greatly influenced by HOW the knowledge will be used on-the-job
- You must also identify what Knowledge is critical to on-the-job performance, and build the tests around this knowledge
- You should attempt to use a form of Knowledge Test that closely matches how the knowledge is used on-the-job
- You will achieve these goals by determining the appropriate type of test for each Knowledge TLO (you should have already done this for the Performance TLOs, but if you encountered difficulty this next section will help you)

SECTION 5 - DETERMINE APPROPRIATE TEST TYPE

5.1. Recall that the test types are:

- PERFORMANCE: Process—Product—Combination
- KNOWLEDGE: Multiple Choice—True—False—Matching—Completion—Essay

5.2. Factors to consider:

- Behavior/Condition specified in the objective
- Availability of equipment/training devices
- Space availability
- Number of trainees
- Time required administering the test
- Use/Adequacy of technical documentation
- Aided or unaided performance
- Individual, team, or group performance

- Philosophical considerations

SECTION 6 - DISCUSSION OF THE IMPORTANT FACTORS

6.1. Behavior/Condition specified in the objective:

- These indicate what is to be tested and Helps or Constraints (conditions) that will affect the test taker's performance
- You must decide how best to test for the objectives' Behavior/Condition. Your goal must be to match what is done on-the-job as closely as possible: Allow technical documentation use if done on-the-job; Test for knowledge of safety by recall/observance; Test for time if it is important on-the-job. Figure 8-A-1 provides guidance for matching behavior to the test and test item type.

Behavior	Performance	Multiple Choice	True-False	Matching	Completion	Essay
Product	×					
Process	×					
Combination	×					
Recognition		×	×	×		
Recall					×	×
Comprehension		×	×	×	×	×
Application		×	×	×	×	×
Analysis/ Synthesis/ Evaluation		×	×			×

FIGURE 8-A-1: BEHAVIOR TEST ITEM COMPARISON

6.2. Availability of equipment/training devices

- Performance may be impossible because the equipment, or a training device, is not available. Try to construct, on paper, test situations that allow a judgment to be made as to the trainee's ability to perform given the equipment. Paper troubleshooting problems and scenarios requiring written responses are particularly good. Better still, perhaps you can devise some means of simulating the desired performance. See the guidance presented earlier in this chapter.
- The number of training devices/equipment may be insufficient to allow for adequate practice, remediation, or testing. The suggestions given above apply here also.

In either case, performance cannot be as good as desired
if the trainees cannot be given sufficient time for
practice and remediation.

6.3. Space availability: Available space for performance
testing is limited. You may not be able to conduct as many
performance tests as desired. Simulation or pencil and paper
performance tests can alleviate this situation to some degree.

6.4. Number of trainees: Design the tests to accommodate the
expected maximum trainee loading.

6.5. Time required administering the test:

- Performance Tests should constitute the major portion of
  testing time, in the absence of any of the above
  constraints "major portion" means that the time devoted
  to performance testing falls within a range of 51 percent
  to 100 percent of testing time.
- Time required to set-up the test situation, time
  allocated for taking the test, reviewing and grading,
  should also be considered.
- However, the Course Master Schedule reflects only the
  time allocated for the trainee's taking and reviewing the
  test.

6.6. Adequacy of technical documentation

- All technical documentation must be reviewed by Subject
  Matter Experts (SMEs) to determine if it is adequate to
  support performance.
- When technical documentation is inadequate, missing
  information or incomplete steps must be prepared and
  incorporated into the job sheets, evaluation guide, as
  well as an Information Sheet.

6.7. Aided or unaided performance

- Analysis of each task will determine if the technical
  documentation must be available during the test—technical
  documentation should be provided if it will also be used
  during on-the-job performance of the task.
- Most performance objectives will require the use of the
  technical documentation during the test.

- When on-the-job performance of a task is without reference to technical documentation, the test must do likewise with the following provision regarding safety:

  - When trainee injury or equipment damage is a test possibility then prior to the test, a knowledge test must be given to ensure the procedural steps and safety precautions are committed to memory or his practice performance may be observed and a judgment made that the trainee is adequately prepared to take the performance test.

6.8. Individual, team, or group performance

- When the trainee's on-the-job performance will be as a member of a team, the test must require the trainee to perform as a member of a team.
- When the trainees must qualify at each position on the team, then they must be tested in each position.

6.9. Philosophical considerations

- There must be a definite and valid reason for giving a test. This applies particularly to knowledge tests.
- A test will not be given for the sake of giving a test. Valid reasons for giving a test, particularly knowledge, include:

  - To reduce the possibility of Trainee injury and/or equipment damage a knowledge test allows a judgment to be made that the trainee is adequately prepared for equipment performance
  - To make a judgment as to whether the trainee is adequately prepared for the job at their next duty station
  - For grading purposes, either final comprehension, or within the course
  - To assign rank order to a class of trainees
  - For motivational purposes
  - To ensure that trainees are doing/continue to do any homework assignments

SECTION 7 - DETERMINE TEST PLACEMENT

- During Course Master Schedule (CMS) development you made a best guess as to where tests would be administered in the course
- You should now be at this point in curriculum development:

  - Instructional sequence has been finalized
  - Lesson Topics have been developed
  - Allocation of instructional time for each lesson topic is firmed up (as much as it can be prior to conducting the pilot course)

- There are a number of questions (see below) you should ask about each Lesson Topic or the course in general.

Answering a question "yes" means a test is possible at that point in the course. When finished, you will have decided where to place each test in the course.

7.1. There are a number of questions (see below):

- Is there a need to determine what the trainee knows before presenting additional instruction?
- Is there a need to assess how well the trainee has learned the material just taught?
- Is there a need to determine if the trainee has acquired certain prerequisite skills or knowledge before being allowed to progress further in the course - particularly to the next Lesson Topic or go into a performance lab?
- Is there a need to determine that the trainee requires remedial instruction before being allowed to progress further in the course, or go to the laboratory?
- Is there a need to assess whether the material taught matches the objectives, especially the performance ones?

SECTION 8 - CLASSIFY EACH TEST

8.1. This requires that you decide each test's purpose:

- Pretest: Given at the beginning of the course or unit of instruction

  - May be used to accelerate the course or unit of instruction, see NAVEDTRA 135 (series)

- May be used to assess whether the trainee has the required prerequisite skills and knowledge needed to have a fair chance at passing the course
- May be used, in conjunction with a post test, to determine how much learning has taken place

- Progress Test: Given at different points within the course to assess trainee progress. Frequently administered at the completion of a group of Lesson Topics, or a particularly lengthy Lesson Topic.
- Quiz: A short test, often devised by the instructor and used to assess understanding of recently taught material. These tests, as a rule, are unscheduled and not part of the formal test program.
- Final Comprehensive Test: Given at the end of the course: Used to measure mastery of the LOs particularly the critical performance Los.
- Within-Course Comprehensive Test: Administered for longer courses when it is not practical to administer one final test

> See NAVEDTRA 135 (series), Appendix B, for
> further discussion of test classification and
> uses.

SECTION 9.0 - GENERAL GUIDELINES FOR TEST ADMINISTRATION

9.1. The following information, along with that already compiled: Will further assist you in deciding how much time to devote to Performance and Knowledge Testing, where to locate each test within the course, and the purpose of each test (pretest, progress, Post-test, etc.).

9.2. In general, the following guidelines should be followed:

- Some type of test should be administered about every 40-50 periods of instruction.
- More frequent testing is warranted if critical skills or knowledge must be assessed before new skills are taught.
- Less frequent testing is appropriate when the trainee must be given the time to develop skills which can only be attained by laboratory practice sessions, or if significant preparation outside the classroom is required for proficiency.

- Tests are usually developed to assess mastery of a group of Lesson Topics, but may cover a single Lesson Topic, especially if the topic is a lengthy one.
- Time allowed for the administration of knowledge tests is usually limited to 10 percent of total instructional time.
- All tests should be sequenced so that the trainee has sufficient time to study the material before the test, the minimum time provided should be at least one overnight period set aside for preparation.

SECTION 10 - DEVELOP PERFORMANCE TESTS/KNOWLEDGE TESTS

10.1. Performance tests are developed first

- Process Performance Tests: Measure well-defined steps which the trainee must integrate or sequentially perform for the process to be done correctly. They require the trainee to use a Job Sheet, and:

  - Demonstrate all important and essential steps and factors required for successful performance of the behavior
  - Comply with safety precautions
  - Utilize tools and equipment correctly
  - Perform all steps within a given time frame
  - Perform all steps while under the direct observation of the instructor

- Product Performance Tests: Place importance on the final product or result. They also require the trainee to use a Job Sheet. Examples are to:

  - Complete a form to be compared to a completed document
  - Build/make an item, the dimensions of which will be measured against a standard/tolerance
  - Build/make an item to perform a certain function
  - Assemble/connect equipment to perform a certain function
  - Finish the task within a given time

- Combined Product and Process Tests: Incorporate the requirements of each of the two types of tests described above.

10.2. Knowledge Tests are developed next

- Knowledge Tests: Measure the trainee's knowledge or comprehension of certain facts or procedural steps:

  - Trainee answers may be oral or in writing
  - The test items include: multiple-choice, true-false, matching, completion and essay items
  - Knowledge test items, written to test a particular Topic, are assembled into a Test Item Bank

10.3. Determine number of knowledge test items

- There is no established formula for determining the most appropriate number of test items required to test any given topic learning objective. However, the below-listed guidelines are factors to consider:

  - Criticality of the objective. When both critical and less critical objectives are measured on the same test the critical objective(s) should have more items to ensure that the test reflects the critical aspects of the course.
  - Instructional time allotted to present the material. For example, if the majority of the material covers one objective, then the majority of the tests items should cover that objective. This ensures that the emphasis on the test is the same as the emphasis in the classroom.
  - Complexity of the material. The more complex the material, the more test items required to ensure understanding.

10.4. Regardless of the type of question each will:

- Be keyed to the TLO that it measures
- Include the correct answer(s) and, when appropriate, the discussion points covered by the test question
- Be marked if a critical question

NOTE

Guidelines for developing knowledge test items are discussed in Addendum 8—B, which begins on the next page.

ADDENDUM 8-B

IN-DEPTH DISCUSSION

OF

KNOWLEDGE TEST DESIGN/DEVELOPMENT

SECTION 1 - KNOWLEDGE TESTS

1.1. Knowledge Tests are: Required to evaluate the trainee's ability to recognize, recall, or comprehend facts, procedures, rules, principles, or concepts that are required to perform a skill.

1.2. The following steps are required to develop knowledge tests:

- Determine level of learning required to test the objective.
- Refer to the number of test items required per objective, developed previously
- Develop knowledge test items:

    - Multiple Choice
    - True-False
    - Matching
    - Completion
    - Essay

- Oral versus written testing
- Ensure appropriateness of test items

SECTION 2 - REFER TO NUMBER OF TEST ITEMS REQUIRED

2.1. This step was completed earlier: But the information is needed now so you will know how many knowledge test items to develop for each objective.

2.2. Most of the remainder of this Addendum focuses on:

- How to develop each of the five most often used knowledge test item types, and a brief description as to the best use for each type of test item.
- Types of knowledge test items are:

    - Multiple Choice
    - True False
    - Matching
    - Completion
    - Essay

- Each type will be discussed in the order listed above.

SECTION 3 - DEVELOP MULTIPLE CHOICE KNOWLEDGE TEST ITEMS

3.1. The multiple choice test items are:

- The most versatile of all knowledge test item formats. It can be used to test for all levels of knowledge except recall.
- A cardinal rule in test item development is to communicate effectively. Otherwise, the trainee must guess at what the test writer is asking. Following the guidelines discussed in this section on multiple choice test writing will ensure effective communications between the trainee and test writer.

3.2. The multiple-choice test item consists of:

- A stem containing the problem statement
- A list of possible answers, or alternatives
- As a rule there are four alternatives, or possible answers, but depending upon the nature of the content being tested, there can be more than or fewer than four possible alternatives
- Only one alternative is the correct answer

3.3. General Guidelines for Stem Construction:

- The stem must include all information, conditions, assumptions, and details required to correctly answer the question without requiring the trainee to refer to the alternatives.
- The stem should be phrased positively instead of negatively. If a negative must be used, it should be highlighted (in caps or underlined) so that the trainee will notice it and interpret the item correctly.
- Wording in the stem should be clear and unambiguous, so that only one answer is correct.
- Words, phrases, etc., that pertain to all alternatives must be included in the stem rather than being repeated in the alternative.
- Information not essential to the interpretation of the test item must be omitted.
- If the test item uses an illustration on a separate sheet of paper, that illustration must be referenced in the stem by figure number.

- Test items in the form of questions must be complete sentences ending with a question mark.
- The completion position (blank) of an incomplete statement test item must be near or at the end of the stem.
- There should be only one completion position (blank) in a stem.
- Stems prepared in question forms are preferred over the incomplete statement form except when it would make the test item grammatically clumsy or difficult to understand.
- Test only one idea or central thought.

3.4. General Guidelines for Constructing Alternatives:

- The test item developer must exercise care when designing alternatives for the test items.
- Alternatives must be plausible but clearly incorrect and should fit well with the stem.
- The difficulty of the item will depend largely upon the alternatives.
- The more closely related the alternatives are, the more difficult it is for trainees to select the correct answer.
- A good rule is to develop alternatives based upon common misconceptions by trainees and inexperienced job incumbents.
- Alternatives may be prepared based on how trainees might incorrectly manipulate terms, symbols, etc.
- An additional rule is to look at the correct answer and determine how it may be made incorrect.

3.5. Specific Guidelines for Constructing Alternatives:

- The item must have only one correct answer.
- Alternatives should be closely related.
- Alternatives must be meaningful and not subject to automatic elimination by the trainees because they are irrelevant or unrelated to the question.
- Do not use interrelated answers, such as C is true if A and B are false.
- Use a vocabulary which is familiar or can be explained within the limits of the test item.

- All alternatives must be of approximately the same length and complexity.
- Do not use words such as always, never, etc.
- Do not use as alternatives—all of the above, none of the above.
- Express all alternatives in similar form.
- Avoid negative wording, which is confusing. However, if used, highlight negative wording by capitalizing, underlining or italicizing.
- Punctuation of alternatives must conform grammatically with the structure of the stem.
- When the stem is a question and the alternative is a complete sentence, begin the alternative with a capital letter and end it with a period.
- When the stem is a question and the alternative is an incomplete sentence, begin the alternative with a capital letter and end without a punctuation mark.
- When the stem is an incomplete sentence, with the response (blank) position at the end of the stem, begin the alternatives with lower case letters—except for proper nouns—and end with a period.
- When the stem is an incomplete sentence, each of the alternatives should be worded so that it forms a logical sentence when written into the incomplete position (blank).
- The position of the correct answer among the alternatives must be determined by a random selection process to avoid any patterns which may bias the test.
- For multiple-choice items that involve numerical answers the alternatives must be arranged in ascending or descending order.

3.6. Discussion of Types of Stems:

- Closed Stem: So-called because the stem begins with a capital letter and ends with a period or question mark; may take the form of:

  - Closed Stem as a Question
  - Closed Stem as an Incomplete Statement

- Open Stem: So-called because the stem is in the form of an incomplete statement with no ending punctuation (until the stem is completed by the alternative, which has the correct ending punctuation).

3.7. Examples of Closed Stem Test Items:

- Closed stem as a question:

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

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

- Advantages/Disadvantages to closed stem as a question:

    - The stem must clearly state the problem
    - The possibility of giving trainees grammatical clues is reduced
    - However, lengthier alternatives (responses) may be required

- Closed stem as an incomplete statement:

    - The setting of the AN/ABC-3Q flip-flop ___ indicates that intent-to-fire has been energized.

        (a) B43
        (b) C2l
        (c) C24
        (d) D32

- Advantages/Disadvantages to closed stem as an incomplete statement:

    - Note that the completion position appears within the stem and not at the end of the stem — also that seven ellipses (periods) are always used to indicate where the incomplete portion of the stem lies.
    - This type is easier to write than the closed stem as a question format.
    - This type encourages memorization and the taking of test items verbatim from the material — hence, use sparingly.

3.8. Example of Open Stem Test Item:

- When crimping both a stranded wire and a solid wire in the same contact, the solid wire's position in relation to the stranded wire is ___.

     (a) Above
     (b) Below
     (c) Beside
     (d) Diagonal

- Advantages/Disadvantages to open stem test items: Note that the response position is always at the end of the statement, and that each alternative provides a logical conclusion to the stem:

  - Open Stem items are easier to write than closed stem test items.
  - There is a tendency to avoid thinking about the question before the alternatives are developed, resulting in illogical and unrelated alternatives.
  - The less similar alternatives are in content the easier it becomes for trainees to select the correct alternative.

3.9. Formats for Multiple Choice Test Items:

- Standard Format: Use this format when you just want the trainee to select the correct answer from among the four alternatives provided.
- Except Format: Use this format when you want the trainee to recognize the correct alternatives and select the one, which is incorrect.

3.10. Example of Standard Format: This format is straightforward and easiest to develop.

- KNOWLEDGE TEST

3.11. Example of Except Format:

- A specific torque pattern and associated torque values can be found in the SINS technical manual for all of the following assemblies or components EXCEPT _____.

     (a) An azimuth synchro assembly mounted to the stem

      (b) A velocity meter mounted to the platform

      (c) A replacement gyroscope mounted to the stable
           platform

      (d) A platform stem mounted to the bedplate

- The EXCEPT in the stem must always be capitalized, bolded, and underlined or italicized.
- Use this format sparingly.

3.12. Common Errors in Writing Multiple Choice Test Items:

- Using similar wording in both the stem and only the correct alternative. This suggests the correct answer.
- Example—error underlined:

  - What is the purpose of the MARDAN maintenance test set?

    (a) Monitors the C.P. operations
    (b) Furnishes power to MARANDA
    (c) Functions as a running time meter
    (d) Provides static <u>testing</u> of MARANDA

- Stating the correct alternative in greater detail than the other alternatives. This often cues the correct answer.
- Example—error underlined:

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

    (a) All power is lost to the MCC equipment
    (b) The MCC equipment is furnished power from NAV via the MSR
    (c) The DCCs have heater power applied
    (d) <u>Power from the ship control center may be present in MCC since it only goes through the SHIP JP</u>

- Using two or more alternatives with the same meaning. This eliminates them as useful alternatives and simplifies the choice
- Example—error underlined:

  - What is the final step in performing post-maintenance checks?

(a) <u>Secure the front panel to the chassis</u>
    (b) <u>Make sure the front panel is secure</u>
    (c) Set manual test switch to "OFF"
    (d) Rerun the diagnostic tests

- Using alternatives that are included in other alternatives causes confusion for the trainee.
- Error underlined (note that alternative 2 includes alternative 1. Therefore, if alternative 2 is correct, then so is alternative 1):

    Example:

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

    (a) 1 to 3
    (b) 1 to 4
    (c) 4 to 6
    (d) 9 to 11

SECTION 4 - DEVELOP TRUE-FALSE KNOWLEDGE TEST ITEMS

4.1. The true-false test item is:

- A two-response multiple-choice item that is used when only one plausible alternative to an item exists
- The true-false test item's primary drawback is its susceptibility to guessing. The trainee has a 50 percent chance of responding correctly even though he does not know the correct answer.
- True-false items may be written to test recognition, comprehension, application, or evaluation.

4.2. Format of true-false test items is straightforward:

- The stem is a direct statement
- The two alternatives are labeled a. True and b. False, or a. Yes and b. No, depending on whichever is most appropriate. See below:

    Example:

    When placing the CA in stowage, CA temperature must be normal prior to securing heater power.

a. True
b. False

4.3. Construction of True-False Test Items:

- The stem (descriptive statement) must include all relevant information required to correctly answer the item.
- The stem must be concise and clear — the proposition to be judged as true or false must be evident.
- The identification (TRUE/FALSE) must precede the descriptive statement, or stem.
- A false statement must be consistent with a commonly held misconception.
- Specific determiners, such as always, never, none, all, may, sometimes will not be used.
- Keep descriptive statements short. Long statements are harder to read and more difficult to judge true or false.
- When possible, state each item positively to minimize confusion.
- True-False test items will not be lifted verbatim from the curriculum.

4.4. This concludes the discussion: On developing true-false test items. Next we will discuss developing matching test items.

SECTION 5 - DEVELOP MATCHING KNOWLEDGE TEST ITEMS

5.1. Description and Use of matching test items

- The matching test form consists of two lists containing related words, phrases, or symbols.
- The trainee is required to match elements on one list with associated elements on the other list according to specific instructions.
- The trainee pairs the elements in each list and records the answer.
- Matching test items are ideal for testing recognition but may also be used to test comprehension and application.

5.2. Format for Constructing Matching Test Items

- The matching test item consists of directions and two columns listed below the directions stem.
- The directions explain how to match the items in the two columns.
- One column lists the questions or problems to be answered.
- The other column lists the answers. See below:

    Example:

    DIRECTIONS: Using the FCDs in OP 1324, MATCH the circuit element listed in column B to the signal that it generates (column A).

- Write the letter representing your answer 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. _____EQ CONT RST 2	d. B46
5. _____DATA CHK REQ	e. B49
6. _____DATA CJJK ALM	f. C30
	g. D56

5.3. Construction of Matching Test Items

- Stem directions must clearly describe how the trainees are to match the question and the answer.
- Questions are always placed in the left-hand column. Answers are always placed in the right-hand column.
- When possible, the answer list should consist of single words, numbers, codes, symbols, short phrases, etc.
- All answers should appear to be related to the questions to help prevent elimination of unrelated answers.
- Directions must state how often the answers may be used.
- Arrange the answers in a logical order.
- Place the entire matching test item on one page.

5.4. This concludes the discussion: On developing matching test items. Next we will discuss developing completion knowledge test items.

SECTION 6 - DEVELOP COMPLETION KNOWLEDGE TEST ITEMS

6.1. The completion test item is:

- A free response test item type that requires the trainee to provide the missing information from memory, as compared to the recognition of information as per multiple choice, true-false, and matching type test items.
- The completion test may also require the trainee to list a series of part names, procedural steps, etc., from memory.
- Another format of completion testing requires the labeling of a diagram from memory.

6.2. Advantages/Disadvantages of Completion Test Items:

- Guessing is minimized
- This type of test item is easy to construct
- Completion test items are useful in situations where trainees must write a computational equation, define terms, list part names and functions, etc.
- However, they are more difficult to score and must be accompanied by grading criteria

6.3. Formats of Completion Test Items:

- Complete a statement by providing the missing word or phrase:

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

- State a definition or computational formula or define a term in response to a question:

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

- List a series of procedures, steps, etc., from memory. This test item may be written as a question or statement:

Example: What are the steps in ordering DLR equipment?

6.4. Construction of Completion Test Items:

- Wording must be clear and comprehensive so that the trainee who is knowledgeable in the subject area can answer correctly.
- Missing segment of the incomplete statement must be important, such a key element of a process, piece of equipment, etc.
- Provide adequate space on the answer sheet for the response to be entered.
- Use a direct question to test for comprehension of technical terms or knowledge of definitions.
- Do not make the correct answer give away words, which may be guessed by those who do not really know the information.
- Also, avoid giving grammatical or other cues which may indicate the correct answer.
- Avoid using statements taken directly from the curriculum.
- Develop grading criteria which lists all acceptable answers.
- For incomplete statement test items:

  - Do not omit so many words that the statement becomes unclear, forcing trainees to guess.
  - Place the response position near, or at the end of the stem. A response position near the beginning is harder to read and takes longer to answer.

6.5. This concludes the discussion on: How to develop completion test items. Next, we will discuss essay test item development which is the last of the five types of knowledge items.

SECTION 7 - DEVELOP ESSAY KNOWLEDGE TEST ITEMS

7.1. Essay type test items:

- Require the trainee to answer a question with an original, written response
- Are useful for testing one's ability to organize data and express thoughts clearly in writing

- Require a relatively subjective scoring process since many factors may affect the correctness of a response
- Must be scored by someone knowledgeable in the subject area, unless there is only one possible response
- Are time consuming and difficult to score

7.2. Construction of Essay Test Items:

- An essay question is especially useful for assessing learning of a comparatively large body of information as well as individual elements within that body.
- The test item must state clearly and precisely the type of response that is required.
- Limits for the response must be identified by specifying the points to be addressed. Limits include length of response and time allowed to respond:

    Example: Compare and contrast gas turbine and 1200 PSI propulsion plants. Your discussion should include descriptions of the major components of each system. Partial credit will be given.

7.3. Essay Test Items are useful for:

- Comparison or contrast of items and procedures
- A decision for or against system or equipment operation
- Relationships such as causes and effects
- Illustration (sketch) of principles learned
- Statement of purpose in selecting a method or technique
- Criticism of the adequacy/correctness of a diagram or procedure
- Discussion of primary, alternate, and/or emergency procedures
- Explanation or definition of tasks
- Observation from illustration or operation
- Evaluation of the appropriateness of a procedure, technique, etc.

7.4. A Model Answer or Grading Criteria is required:

- When the grading criteria should list all essential data a knowledgeable trainee can be expected to provide
- When the model answer/grading criteria are used as the standard answer by which all other answers are scored

- When they set the weight (value) of each item or part of an item
- When to use oral tests and written tests follows

SECTION 8 - ORAL VERSUS WRITTEN TESTING

- Oral tests are best used when the trainee is exposed to this type of test on the job, such as propulsion engineering boards, safety reviews, and so forth. They are usually administered in a board type format with trainees responding to questions asked by a panel of evaluators.
- Written tests are of two types:

  - Open book tests evaluate a trainee's ability to locate and record information using technical documentation — they are used whenever the on-the-job situation requires the use of technical documentation.
  - Closed book tests are used when the knowledge being tested for is normally required on-the-job without reference to the technical documentation.

8.1. Factors may limit your choice of oral or written test:

- Trainee Instructor Ratio/Class Size: **Oral Tests are not recommended if the trainee/instructor ratio exceeds 10/1 or class size is over 20**, because of time constraints.
- Environmental Limitations: Written Tests are recommended when other trainees may overhear the test examiner or if there is excessive noise involved.
- Number and Format of Test Items: Written Tests are suggested if there are many test items or if they take the form of multiple choices or matching test items.

8.2. Next you will learn: How to determine if all of the many knowledge test items you have written meet standards for correctness.

SECTION 9 - ENSURE APPROPRIATENESS OF TEST ITEMS

9.1. SMEs should answer these questions for each test item:

- Is the item technically correct and is the correct response keyed?
- Does the item test the objective?

- Does the item test; knowledge critical to the task associated with the objective?
- Is the item written to the appropriate learning level?
- If recognition, recall, or comprehension of the knowledge being tested is required for competent performance on-the-job, is the item a closed-book item?
- If the knowledge being tested is normally looked up during performance of on-the-job task(s), is the item an open-book test and is the essential technical documentation furnished?
- Are all words spelled correctly, is the grammar correct, and does the item meet format construction guidelines?

9.2. If the answer is NO:

- To any of these questions, correct the discrepancy and try again to answer the question.
- Does each knowledge test item meets all criteria above it are approved for use in a knowledge test?

9.3. This finishes the discussion of this Addendum: Go to Addendum 8-C if you need to learn more about developing performance test grading criteria.

ADDENDUM 8-C

IN-DEPTH DISCUSSION

OF

GRADING CRITERIA FOR PERFORMANCE TEST

SECTION 1 - GRADING CRITERIA—PURPOSE

Grading criteria describe the standards by which the trainees will be measured and factors that will be considered in determining the trainee's grade on an individual performance or knowledge test/test item.

1.1. Use of grading criteria:

- They enable the instructor to determine whether or not an individual trainee, or team, has met the objective(s).
- Grading criteria provide for an unbiased and non-subjective evaluation of the trainee's ability with respect to a particular area of performance or knowledge.

1.2. Grading criteria for performance tests:

- YES/NO Checklist: Describe in detail what constitutes satisfactory and unsatisfactory performance.

  - For Process Testing: Describe the correct procedure, including the following:

    – Number of points each step or group of steps is worth
    – Number of points to be deducted for specific errors
    – Number of trials allowed per step or group of steps
    – Procedural steps which, if performed improperly, cause trainee failure and test stoppage

  - For Product Testing: Describe the characteristics of a good product, including:

    – Point value assigned each characteristic
    – Number of points to be deducted for specific errors
    – Number of trials allowed for each product
    – Any omitted characteristic that is cause for failure

- Rating Scale: Describe in detail how the trainees' grades will be determined.

1.3. Other important grading criteria factors:

- Compliance with required safety precautions
- Correct operation of equipment after completed assembly
- Physical testing of the finished job

- Time required completing the job
- Skill in using tools
- Care and use of the equipment

> The grading criteria should describe what the
> trainee is expected to do and what happens if
> the requirements are not met.

STAGE THREE

CHAPTER 9

VISUAL INFORMATION (VI)

AND

INSTRUCTIONAL MEDIA MATERIAL (IMM)

INTRODUCTION

In the previous chapters you were told how to develop and revise curriculum materials for new and existing courses. The output of those chapters was Lesson Plans (LP), Trainee Guide (TG), and Test Packages. You are now ready to begin work on the Visual Information (VI) that supports the LP's and TG's that you have already developed.

Additionally, information will be provided for developing the On-the-Job (OJT) Training Handbook, one form of Instructional Media Material (IMM). Note that VI, either singly or in combination with other VI, may be transformed into IMM by making it a self-supporting package.

Selecting VI materials always begins with a careful analysis of learning objectives (LOs) to determine the most appropriate VI and ends with course promulgation. In this chapter, step-by-step procedures for the analysis of objectives, selection of the most appropriate VI product(s) based on the analysis, are outlined.

Production of VI materials, other than simple graphics and overhead transparencies, is seldom accomplished directly by in-house curriculum developers. This is because VI production is governed by detailed OPNAV and NETC instructions. VI products must be developed in accordance with the latest regulations. Your command's VI Manager will assist you in gathering information and completing required forms.

OPNAVINST 5290.3 (series), SECNAV 5870.4 (series), and NETCINST 3140.1 (series) defines the VI products exempt from production reporting requirements. Exemptions include graphics and overhead transparencies. Ensure all Copyright procedures are followed per previous instructions.

SCOPE

- Define types and applications of VI materials
- Determine the need for VI materials
- Determine the type(s) of VI materials which best support training
- Explain the VI development process
- Provide an overview of OJT Handbook development, one form of IMM

DEFINITIONS

VI: Use of one or more of the various visual media devices with or without sound. VI includes still and motion picture photography, video recording with or without sound, graphic arts, visual aids, models, displays, visual presentation services, and the support processes (NETCINST 3104.1 (series) and Military Handbook (MIL-HDBK) 29612-3 (series)).

IM: Instructional materials that present a body of information and are largely self-supporting rather than supplementary in the teaching-learning process. These materials have applications for independent study/skill acquisition.

INFORMATION

VI materials are used to introduce, reinforce, or supplement training provided in the formal environment. They are primarily used in conjunction with a LP.

> Because of its wide range of applications and uses, interactive courseware (ICW) is *NOT* addressed in this chapter as audio/visual media. MPT&E CIOSWIT-ILE-STD-1B and MPT&E CIOSWIT-ILE-Guide-3B addresses analysis, development, and application of ICW.

SECTION 1 - VI MATERIALS AND IN-HOUSE CURRICULUM DEVELOPERS

- Because of the requirements of covering instructions, VI materials development is generally limited to simple transparencies and schoolhouse produced training aids.
- Complex transparencies requiring graphics arts services and VI products meeting the definition in current instructions need to be produce in accordance these directives.

1.1. Procedures for Selecting VI Materials: Each item of VI material has its own unique application and contribution to learning. While some approaches are better than others, many factors must be considered by the curriculum developer when determining the type(s) of VI materials to be used for a given situation. Application, advantages, disadvantages, and cost for development and maintenance must be considered in the selection process. However, the final VI item(s) selected should be that

which, in the Curriculum Developer's judgment, best supports the LOs, based on an evaluation of the course. VI materials selection and application has three basic components:

> Development of professional-looking, instructionally effective VI materials is costly and time consuming. NETC has been criticized for failure to properly manage VI production to reduce duplication of effort. Therefore, VI materials of greater complexity than what can be produced by in-house developers must adhere to the requirements of NETCINST 3104.1 (series) and its supporting instructions. Use your initiative and imagination to identify and select appropriate VI materials; leave production to the professionals. "Free lance" VI production is definitely discouraged and may be contrary to regulations.

- Needs Assessment. Evaluates learning objectives for a given Lesson Topic/Course to determine if VI support is required and, if a need is determined, which type(s) should be developed.
- Development. Provides the necessary information needed to develop the selected type(s) of VI items to support given LOs.
- Pilot. Evaluates all VI materials developed for a given Lesson Topic/Course in the actual training environment to determine accuracy and adequacy in support of the Learning Objectives. VI materials should be completed and available at the same time other course materials are ready for pilot.
- VI selection factors are discussed in the following paragraphs.

1.2. Needs Assessment: Follow the steps listed below to complete your VI materials Needs Assessment.

- Evaluate the LOs in a Lesson Topic using the questions below:

  - Would VI Aids enhance "Hands On" Training? (Skill enhancement)
  - Would VI Aids enhance understanding of the Learning Objective? (Knowledge enhancement)

- Continue with the following steps if you answered "Yes" to either of the above questions. A "No" response indicates VI materials may not be appropriate.
- Evaluate the LOs against the VI characteristics (applications, advantages, disadvantages and cost considerations) listed in the VI characteristics outline to determine the type(s) of VI which best supports the LO(s).
- Review LOs to determine if multiple learning objectives could be supported by a single VI item
- Select the next LOs and repeat the process until the VI Needs Assessment has been completed for each Lesson Topic

1.3. VI Development: Other than creating simple transparencies and training aids within the capability of in-house developers, all development of VI products must comply with current directives. Because professional VI production is costly and takes time, early liaison with the command's VI Manager is essential.

SECTION 2 - VI CHARACTERISTICS TABLE

Applications, advantages, disadvantages, and cost considerations

AUDIO PRESENTATION

2.1. Applications:

- When sound is critical to training
- Large group instruction
- Small group instruction
- Individual instruction
- May support a slide presentation
- Augment other VI and IMM packages

2.2. Advantages:

- Provide alternate information sources for trainees with low reading skill levels
- Permit the rearrangement of sound materials through editing
- Playback units can be small and portable
- Tapes may be erased and reused

2.3. Disadvantages:

- Susceptible to outside distraction if earphones are not used
- Fixed rate of information flow; therefore, adjustments to learning rate are difficult

2.4. Cost Considerations: When recordings are produced locally with existing recorders the cost is very low. Audio tape recorders/players are inexpensive.

2.5. Development Procedures: In accordance with NETCINST 3104.1 (series), (see your command's VI Manager).

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SECTION 3 - SLIDE PRESENTATION

</div>

3.1. Applications:

- Presentations consist of a series of 35mm slides which are developed to assist and supplement instruction by providing a sequential visual presentation of materials, ideas, or concepts.
- Present a complete subject within a self-contained package.
- Programmed by a LP, audiocassette or other software.
- Supplement or reinforce discussion points within a topic.

3.2. Advantages:

- The full range of photographic techniques (stop action, selected depth of field, microphotography, air brushing, etc.) is available.
- Slide sequence may be rearranged easily to meet specific needs. Slide update is easily accomplished without extensive changes or expensive equipment.
- Slides can be made with any 35mm camera.
- The projected image can be seen by large groups.
- Can easily be produced by computer graphics packages.

3.3. Disadvantages:

- Full motion cannot be shown
- For group use, the room must be partially darkened for good visibility

- The instructor cannot provide additional visual data as with a transparency

3.4. Cost Considerations: Individual slides are relatively inexpensive to produce. The major cost of slide presentations is development of the Audio-Visual concept of the program itself. Transparencies and other single visual media do not require the planning and coordination necessary to build an entire slide presentation.

3.5. Development Procedures. Per NETCINST 3104.1 (series) (see your command's VI Manager).

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SECTION 4 - TRANSPARENCY AND DIGITAL STILLS

</div>

4.1. Applications: Transparencies and digital stills are the most frequently used VI aid in support of instruction. Discussed here are basic transparencies containing text and graphics can be developed on most desktop computers and produced on office reproduction equipment. A threshold is reached when the services of graphics arts is required (engine cutaway drawings, hydraulic flow diagrams, etc). Take the time to have your ideas expressed in a professional-looking product by your VI support personnel.

- Assist and supplement instruction by providing a visual presentation to the trainees.
- Supplement, do not replace, the spoken word.
- Present one central idea with maximum clarity and simplicity.

4.2. Advantages:

- Easy to prepare
- If you have a copy machine, you can make transparencies
- Easy to revise and re-sequence
- Require few environmental adjustments
- Require an overhead projector and appropriate PC software per format of digital stills

4.3. Disadvantages:

- Very few
- In large quantities, may be difficult to use and store

4.4. Cost Considerations: Simple text and graphics transparencies and digital stills are 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.

4.5. Development Procedures: OPNAVINST 3104.1 (series), enclosure (1), paragraph 7 defines the VI products exempt from production reporting requirements. Exemptions include graphics and overhead transparencies. Development of transparencies is accomplished by any means available to the developer.

SECTION 5 - VIDEO TAPES/DIGITAL MEDIA

5.1. Applications:

- Provide one of the best means of conveying an idea or series of ideas where complex or dangerous operations or motion must be presented. Video tapes/video media can be provided as stand-alone
- May be programmed or specialized presentations, depending on the need and conditions surrounding the training
- Designed to support a central theme by developing several major points into a continuous flow of information
- Generally do not require any specific programming however, where applicable, they may be programmed from LP
- Designed to support a central idea by developing several major points into a continuous flow of information
- Present one or a related series of segments, each designed to illustrate a single concept or idea
- Developed when motion or a complex operation is difficult to present using transparencies or other conventional media

5.2. Advantages:

- The immediate search and playback capabilities permit greater utilization of the learning effort
- Familiarity of the average trainee with the equipment minimizes distracting novelty effects
- Video Tapes/digital media are relatively inexpensive to duplicate, either one time or in large quantity
- Provide alternate information channels for trainees with low reading skills
- Provide continuity of action, showing events as they actually occur

- "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 the best analysis and learning
- Skills can be learned by watching a task performed on film and subsequently practicing the task
- Dangerous or expensive procedures can be shown

5.3. Disadvantages:

- Tape size and format differences make video tapes incompatible with some types of video playback equipment
- Playback units/systems are expensive

5.4. Cost Considerations: Development of high quality videotaped studio productions requires a large and highly skilled staff. As technology continues to grow, better 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

5.5. Development Procedures: Per NETCINST 3104.1 (series) (see your command's VI Manager).

SECTION 6 - WALL CHARTS (WC)

6.1. Applications:

- Used much like transparencies to assist and supplement instruction by providing a visual presentation to the trainees
- Programmed by the Related Instructor Activity (RIA) column of the LP
- Directs the Instructor to provide information while addressing the WC as a visual to amplify the information being presented
- In general, WCs:

  - Supplement, do not replace, the instructor
  - Focus rather than divert attention
  - Present one central idea with maximum clarity and simplicity
  - Can be used to provide visual support to more than one discussion point

6.2. Advantages:

- Require fewer environmental adjustments than projected visuals
- Not dependent upon availability and operability of projection equipment

6.3. Disadvantages:

- Rely heavily on the effectiveness of the instructor
- May contain too much detail
- In large quantities, more difficult to use and store in comparison to projected visuals
- Relatively long lead time for revision

6.4. 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.

6.5. Development Procedures. Per NETCINST 3104.1 (series) (see your command's VI Manager).

SECTION 7 - INSTRUCTIONAL MEDIA MATERIAL (IMM) ON-THE-JOB TRAINING (OJT) HANDBOOK

7.1. Information: For our purposes, IMM is considered to be "stand alone" instructional packages. The OJT Handbook is the most common, and is the IMM most commonly produced by in-house curriculum developers. IMM can:

- Provide training for which formal schools have a lack of equipment, space, time, or instructors
- Provide training that may be used for remedial or accelerated instruction
- Provide prerequisite training for advanced courses
- Fill gaps in training that occur within or between courses
- Provide instruction in subjects which are difficult to present in the lecture environment or skills which cannot be performed in the laboratory environment
- Generate/maintain trainee interest in a Lesson Topic

7.2. Applications:

- Consist of a single lesson or a series of lessons designed to support selected learning objectives
- In effect, a self-study learning package
- Require little or no assistance to complete
- May use support materials such as audio tapes, slides or videotapes as part of the presentation
- Can be used as stand-alone training or remedial training

7.3. Advantages:

- Each trainee can precede at a rate in accordance with his/her particular abilities
- Training may be accomplished at convenient times and places
- Topics can be repeated or restudied as desired or required
- Difficulty and level of training may be adapted to varying trainee populations
- Cost per trainee is quite low, if throughput is high and content stable

7.4. Disadvantages:

- Long development time
- Rely heavily on the reading ability of the trainee
- Hard to ensure configuration control

7.5. Cost Considerations: The initial cost for development, including writing and piloting OJT Handbooks may be higher than other printed materials. Maintenance costs depend on the revision requirements, but will normally be higher than for other materials. When augmented by audio and/or visuals, development and maintenance costs are even higher.

NOTE

See Addendum 9-A for development procedures.

SECTION 8 - SUMMARY

Development of the appropriate VI materials and IMM starts when all LO for the course have been evaluated and the type or types of instructional support have been selected. VI

materials, other than simple transparencies that can be developed locally, require liaison with the command's VI Manager. A step-by-step procedure for the development of the OJT Handbook form of IMM is included in this chapter. All VI materials and IMM are piloted to determine if the LOs are adequately supported.

ADDENDUM 9-A

ON-THE-JOB TRAINING HANDBOOK

SECTION 1 - DEVELOPMENT

STEP 1 - VISUALIZE OBJECTIVES

Before an OJT Handbook can be developed, the overall goal or theme must be established. The developer must determine what ideas or concepts should be learned and develop the OJT Handbook to enforce these ideas or concepts. If LOs do not currently exist, refer to chapters 3, 4 and 5 of this manual for analysis and development procedures prior to continuing.

- Evaluate LOs and determine the overall goal or theme of the OJT Handbook.
- Evaluate LOs for key elements that need support materials to illustrate overall goal or theme.
- Determine the support materials needed to illustrate key elements.

STEP 2 - DEVELOP OJT HANDBOOK OUTLINE

- List the LOs of the OJT Handbook in a logical teaching sequence.
- The LOs should now be arranged into logical groupings of knowledge and/or skills.
- These groupings provide the outline for the lessons in the OJT Handbook.

STEP 3 - DEVELOP LESSONS

Materials are developed for the lessons identified in STEP 2 of this procedure. They are designed to meet specific knowledge and/or skill requirements as called for in the LOs. Each lesson should be designed so that an average trainee can complete the lesson within 20 to 45 minutes. Generally, lessons consist of the following elements:

- **LOs.** Provide a list of the objectives that will be accomplished upon completion of the OJT Handbook
- **LESSON PRETEST**

  - For lessons which have a knowledge requirement
  - Designed to identify weaknesses in the trainee's knowledge of the lesson LOs
  - The results of the Lesson Pretest are used to direct trainees to specific study assignments to correct the identified weaknesses

9-A-2

- Use the procedures for Test Item Development contained in Chapter 8 of this manual
- One question per LO should be the minimum
- Include an evaluation procedure to help the trainee develop a personalized study plan for the lesson. Include directions on where to locate the answers to the pretest

- **ASSIGNMENT SHEETS CONTAIN THE FOLLOWING:**

  - Introduction: States the purpose of the assignment
  - Learning Objectives: List the objectives that will be accomplished upon completion of the assignment
  - Related Materials: List all materials not contained in the OJT Handbook but required to complete the lesson
  - Study Assignments: Contains a listing of study assignments relating to each Lesson Pretest question and instructions for completing each study assignment

- **INFORMATION SHEETS:**

  - Develop when the information needed to complete the OJT Handbook is not found in sources available to the trainee or if the available information is inadequate to meet the goals of the lesson
  - Use the same procedures as development of an Information Sheet for a Trainee Guide (TG). See chapter 7 of this manual

- **WORK SHEETS:**

  - Assign knowledge skill or physical skill tasks for the trainee to perform
  - Can be used as the lesson itself or as part of the lesson

- **CONTAIN THE FOLLOWING ELEMENTS:**

  - Introduction. States the purpose of the worksheet and lists the LOs to be met by the lesson
  - Related Materials. List all materials not contained in the OJT Handbook but required to complete the lesson
  - Equipment. List all equipment to which the trainee must have access in order to complete the work sheet

- Work Assignments Instructions. Direct the trainee to proceed to the next OJT Handbook element upon completion of the assigned tasks or to postpone the tasks if the equipment and/or supervision are not available
- Tasks Paragraph. Lists the work assignments which may involve the use of a system, subsystem and/or equipment in conjunction with standard operation and maintenance procedures or may direct the trainee to exercise mental skills

- **END-OF-LESSON TESTS:**

  - Each lesson concludes with an End-of-Lesson Test. The test contains instructions directing the trainee through the test and on to the next OJT Handbook element upon successful completion.
  - Use the procedures for Test Item Development contained in chapter 8 of this manual.
  - Include questions that directly correspond to the lesson LO and questions asked on the Lesson Pretest.

- **ANSWER SHEETS:**

  - Develop for both the Lesson Pretest and the End-of-Lesson Test
  - Designed to provide immediate feedback to the trainee
  - May consist of a separate blank question form with a corresponding list of answers

> VI used as supporting materials for an OJT Handbook is developed using the procedures contained in the VI portion of this Chapter.

STEP 4 - DEVELOP FRONT MATTER

- Designed to introduce and describe the contents of the OJT Handbook
- Consists of the following elements:

  - Title Page. Lists the title and other identifying information for the OJT Handbook
  - Contents Page. Lists the lesson subject titles and the beginning page numbers for each element of the lessons
  - Introduction. Informs the trainee of the purpose of the OJT Handbook, approximate completion time, OJT

Handbook LOs, recommended prerequisites, and safety and/or security requirements associated with the OJT Handbook. Additionally, the introduction provides a description of each element of the OJT Handbook and any related materials needed to complete the OJT Handbook

STEP 5 - ASSEMBLE OJT HANDBOOK

When all materials have been developed, the OJT Handbook is assembled into a single document following the outline developed in STEP 2 of this procedure.

STEP 6 - REVIEW OJT HANDBOOK

Review OJT Handbook to verify that:

- Content is technically accurate. This should be done by a Subject Matter Expert (SME).
- The overall goal or theme of the OJT Handbook has been met
- The key elements that needed illustration have been supported by other IMM
- Detail of the OJT Handbook is at the same level and depth as the LO's being supported
- Classification markings are appropriate
- Lesson sequence supports the OJT Handbook outline
- Each knowledge lesson LO's is tested on the Lesson Pretest
- Each question on the Lesson Pretest has a corresponding question on the End-of-Lesson Test

STAGE FOUR

PILOT COURSE DEVELOP PHASE

CHAPTER 10

PILOT AND IMPLEMENTATION APPROVAL

INTRODUCTION

In previous chapters, the products of the Plan, Analyze, Design, and Develop Phases have been created and assembled. In this chapter, the products are presented as a full length course of instruction, conducted at a Navy School by Navy instructors — a pilot. The output of a successful pilot is approval of the curriculum materials for implementation.

SCOPE

- Provide an understanding of the process of validating curriculum materials
- Explain the terms which apply to the pilot and implementation
- Describe the step-by-step procedures for piloting curriculum materials

SECTION 1 - PILOT

A pilot is defined as the first full length course conducted at a Navy school, by Navy instructors, using the Curriculum and Supporting Training Materials prepared specifically for that course. The purpose is to validate the Curriculum and Materials, and to determine trainee effectiveness in attaining the Course Objective(s).

NOTE

Piloted Course of Instruction (COI) enrolled student population are actual trainees, not conducted with available staff in lieu of trainees.

1.1. Implementation: At the conclusion of the course pilot, and after corrections indicated by the pilot have been incorporated into the course material, the course is implemented by issuance of a Letter of Promulgation by the Course Curriculum Authority (CCA). Formal training commences at all designated sites.

1.2. Pilot Procedures:

- Volume III, chapter 6 provides detailed information on conducting a course pilot trial and subsequent implementation
- The procedures of Volume III, chapter 6 are generally applicable to pilot convenes of contractor-developed courses

1.3. Implementation Procedures

- A pilot serves to validate a Curriculum and its Supporting Materials. The Pilot Course Develop Phase includes formal approval of the course for instruction and placing it on line.

    - Revise the material as indicated by pilot
    - CCA issues Letter of Promulgation

- Following implementation, emphasis shifts to training course management and curriculum maintenance — the subjects of NAVEDTRA 135 (series).

LIST OF ACRONYMS

AAC	Acquisition Advice Code
AG/SAG	Activity Group/Subactivity Group
AIM	Authoring Instructional Material
AIM I	PPP Based Authoring Tool NAVEDTRA 131
AIM II	Task Based Authoring Tool NAVEDTRA 130
AOB	Average On Board
ASVAB	Armed Services Vocational Aptitude Battery
BCA	Business Case Analysis
CAGE	Commercial and Government Entity Code
CAIMS	Conventional Ammunition Integrated Management System
CANTRAC	Catalog of Navy Training Courses
CARIS	CNETC Automated Resource Information System
CBT	Computer Based Training
CCA	Curriculum Control Authority
CCMM	Course Curriculum Model Manager
CDA	Curriculum Developer Aids
CDP	Course Data Processing
CeTARS	Corporate enterprise Training Activity Resource System
CIN	Course Identification Number
CLO	Course Learning Objectives
CM	Corrective Maintenance
CMS	Course Master Schedule
CNP	Chief of Naval Personnel
CO	Commanding Officer
COI	Curriculum Outline of Instruction
COG/NIIN/SMIC	Cognizance Code/National Item Identification Number/ Special Material Identification Code
CPM	Content Planning Module
CTTL	Course Training Task List
DDA	Discussion-Demonstration Activity
DOD	Department of Defense
DOR	Drop On Request
DP	Discussion Point
DSOT	Daily System Operating Test
EO	Enabling Objective
FAL	Fault Applicability List
FC	Functional Commander
FEA	Front End Analysis
HPRR	Human Performance Requirements Review
ICW	Interactive Courseware
IETM	Interactive Electronic Technical Manual
IG	Instructor Guide

ILE	Integrated Learning Environment
IMI	Interactive Multimedia Instruction
IMM	Instructional Media Material
IPR	In Process Reviews
ISD	Instructional Systems Design
ITRO	Inter-service Training Review Organization
JDTA	Job Duty Task Analysis
JTI	Job Task Inventory
KM	Knowledge Management
LC	Learning Center
LCMS	Learning Content Management System
LMS	Learning Management System
LO	Learning Objective
LP	Lesson Plan
LS	Learning Site
LSAR	Logistics Support Activity Record
LSAR	Logistics Support Activity Record
LSO	Learning Standards Officer
LT	Lesson Topics
MCFR	Master Course Reference File
MILCON	Military Construction
MIL-STDS	Military Standards
NALC	Navy Ammunition Logistics Code
NCMR	Navy Curriculum Materials Repository
NEC	Navy Enlisted Classification
NETC	Naval Education and Training Command
NITRAS	Navy Integrated Training Resources Administration System
NKO	Navy Knowledge Online
NMETLS	Navy Mission Essential Task Lists
NOBC	Navy Officer Billet Classification
NPC	Navy Personnel Command
NTFS	Navy Training Feedback System
NTSP	Navy Training System Plan
OAC	Item-to-Objective Assignment Chart
O&MN	Operation and Maintenance Navy
OCCSTD	Occupational Standards
OJT	On-The-Job Training
PADDIE	Plan, Analyze, Design, Develop, Implement and Evaluate
PM	Preventive Maintenance
POA&M	Plan of Action and Milestones
POM	Program Objective Memorandum
PPP	Personnel Performance Profile
PQS	Personnel Qualification Standards
RIA	Related Instructor Activity

RIT	Revolution In Training
RRL	Resource Requirements Listing
SCORM	Shareable Content Reference Model
SME	Subject Matter Expert
SYSCOM	Systems Command
TA	Training Agency
TAM	Table Assignment Matrix
TCCD	Training Course Control Documents
TD	Training Devices
TDSR	Training Decision Summary Report
TG	Trainee Guide
TLA	Training Level Assignments
TLO	Topic Learning Objectives
TO	Terminal Objective
TOS	Training Objective Statements
TPC	Training Path Chart
TPP	Training Project Plan
TPS	Training Path Systems
TRR	Training Requirements Review
TSA	Training Support Agency
TTE	Technical Training Equipment
TTO	Training Time Out
TYCOM	Type Commander
VI	Visual Information
WC	Wall Charts