Naval Education and Training Command | **NAVEDTRA 130B August 2009** | **Support Manual for MIL-HDBK-29612-2A**

TASK BASED CURRICULUM DEVELOPMENT MANUAL
VOLUME I DEVELOPERS GUIDE

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DEPARTMENT OF THE NAVY
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LETTER OF PROMULGATION FOR NAVEDTRA 130B

1. This guidance manual has been extensively revised. Most of the revisions are in response to user comments and reflect a continuing effort to increase the manual's utility to the training field. NAVEDTRA 130B, Volumes I-III, supersedes and replaces NAVEDTRA 130A, dated July 1997.

2. The procedures in this manual follow a Task Based Curriculum Development method. This manual is intended for use by military, civil service, and contractor personnel engaged in Navy training materials development and modification.

3. Procedural guidance for development of training materials following a Personnel Performance Profile based method is published in NAVEDTRA 131 (Series).

4. This publication is available electronically at: Navy Knowledge Online (NKO) - NETC N74 Learning Standards Homepage; and Navy Marine Corps Intranet's (NMCI) Total Records and Information Management (TRIM).

5. Corrections and comments concerning this manual are invited and should be addressed to the Naval Education and Training Command, attention: N7.

6. Reviewed and approved.

G. R. JONES

PUBLISHED BY DIRECTION OF COMMANDER NAVAL EDUCATION AND TRAINING

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Naval Education and Training Command, and Director, Learning and Development Division (N7)

NAVEDTRA 130B

TASK BASED CURRICULUM DEVELOPMENT MANUAL

PROCEDURAL GUIDANCE

PUBLISHED BY DIRECTION OF COMMANDER NAVAL EDUCATION AND TRAINING

CHANGE RECORD

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

The NAVEDTRA 130 series of manuals provides fundamental guidance, within the Naval Education and Training Command (NETC), 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 Commander, Naval Education and Training Command Instructions (NETCINSTs) in these subject areas. Rather, they supplement the NETCINSTs in two important ways. First, they reflect the philosophical principles underlying NETC policy for curriculum, instruction, and evaluation and second, they provide procedures for carrying out that policy.

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

SCOPE:

NAVEDTRA 130B: Task Based Curriculum Development Manual provides guidance for developing training materials. This manual is a revision of the July 1997 issue. While the overall process of curriculum development remains unchanged, this revision incorporates changes and updates based on the experiences and feedback from NETC training activities. The processes and illustrations found in NAVEDTRA 130B reflect the experience of subject matter experts, curriculum developers and decision makers who approve Navy training material developed by Navy curriculum developers and civilian contractors. NAVEDTRA 130B describes and illustrates all facets of planning, analysis, design, and development of curricula. NAVEDTRA 130B provides

step-by-step guidance to curriculum developers for developing job efficient and effective training material. The revisions comprising NAVEDTRA 130B include:

- Revised and updated references and instructions.
- Revised Volume II Sample Products.
- Revised development information for Visual Information and Instructional Media Materials.
- Revised Training Materials Modification Information.

Volume I of this manual - Developers Guide, contains guidelines for the development of training programs. It is designed for use by the individual actually revising or developing training materials. This revision addresses legacy Instructional System Design (ISD) and curriculum technical documents as they also pertain in the Integrated Learning Environment (ILE). Use of Authoring Instructional Materials II (AIM II) as the curriculum authoring tool is strongly desired and encouraged for new and revised curriculum of both legacy development and ILE. The traditional module of AIM II supports the legacy approach. Until CPM is released for use, prepare documents for ILE through the analyze phase of the ISD Plan, Analyze, Design and Develop, Implement and Evaluate (PADDIE) model in AIM II.

Volume II of this manual - Sample Products, provides samples of each of the management and curriculum documents in a format that is consistent with the standards and conventions discussed in Volume I and are actual course examples from the AIM II database.

Volume III of this manual - Managers Guide, is 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 six phases of Task Based Curriculum Development.

RELATIONSHIP TO DOD STANDARDS/SPECIFICATIONS: Chapter titles in this manual were derived from various Department of Defense (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.

CONTRACTUAL USE OF MANUAL: NAVEDTRA 130B 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.

HOW TO USE NAVEDTRA 130B: NAVEDTRA 130B 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 sample document presented in Volume II of this manual. Open Volume I to the subject you wish to learn about. Open Volume II to the related sample document referenced in Volume I. It is important to go to Volume II when referenced and study the appropriate samples.

Volume II: When you have located the sample document in Volume II that corresponds to the chapter you have selected in Volume I, follow along in Volume II as you read Volume I. For example, if you are developing a COURSE TRAINING TASK LIST (CTTL), turn to the sample COURSE TRAINING TASK LIST in Volume II.

Volume III: 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.

NOTE

Take a few minutes and turn to the different volumes and see how they relate.

NAVEDTRA 130B - TASK BASED CURRICULUM DEVELOPMENT MANUAL
TABLE OF CONTENTS

FIGURE

FIGURE (CON'T)

TABLE

DIAGRAM

Introduction

Chapter 1

Training Materials Development Plan Phase

INTRODUCTION

The procedures for developing training materials following the Task Based Curriculum Development method are divided into six interrelated Phases — Plan, Analyze, Design, Develop, Implement and Evaluate (PADDIE).

- ***P****LAN PHASE* identifies resource requirements and the sequence of events in the development process.
- ***A****NALYZE PHASE* produces the job tasks, task sequence, level of performance, and the skills and knowledge which must be taught.
- ***D****ESIGN PHASE* produces the course learning objectives and an instructional sequence.
- ***D****EVELOP PHASE* produces the instructional materials for the instructor and the trainee.
- ***I****MPLEMENT PHASE* begins when the Curriculum Control Authority (CCA) has approved a course for use and the Learning Center or Functional Commander authorizes the course to be taught.
- ***E****VALUATE PHASE* consists of the evaluation and revision of the training materials based on assessment of the training materials and the performance of the graduates in the Fleet.

This manual covers the PADDIE phases. In the volumes composing this manual the steps required and approval points for products developed in each of these phases are discussed. The Implement Phase is introduced as part of Chapter 10 of this volume. Implementation and Evaluation are also addressed in NAVEDTRA 135(Series): Navy School Management Manual. The overall process is illustrated in Figure 1-1.

NAVEDTRA 130B: Task Based Curriculum Development Manual is designed to guide Navy training 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.

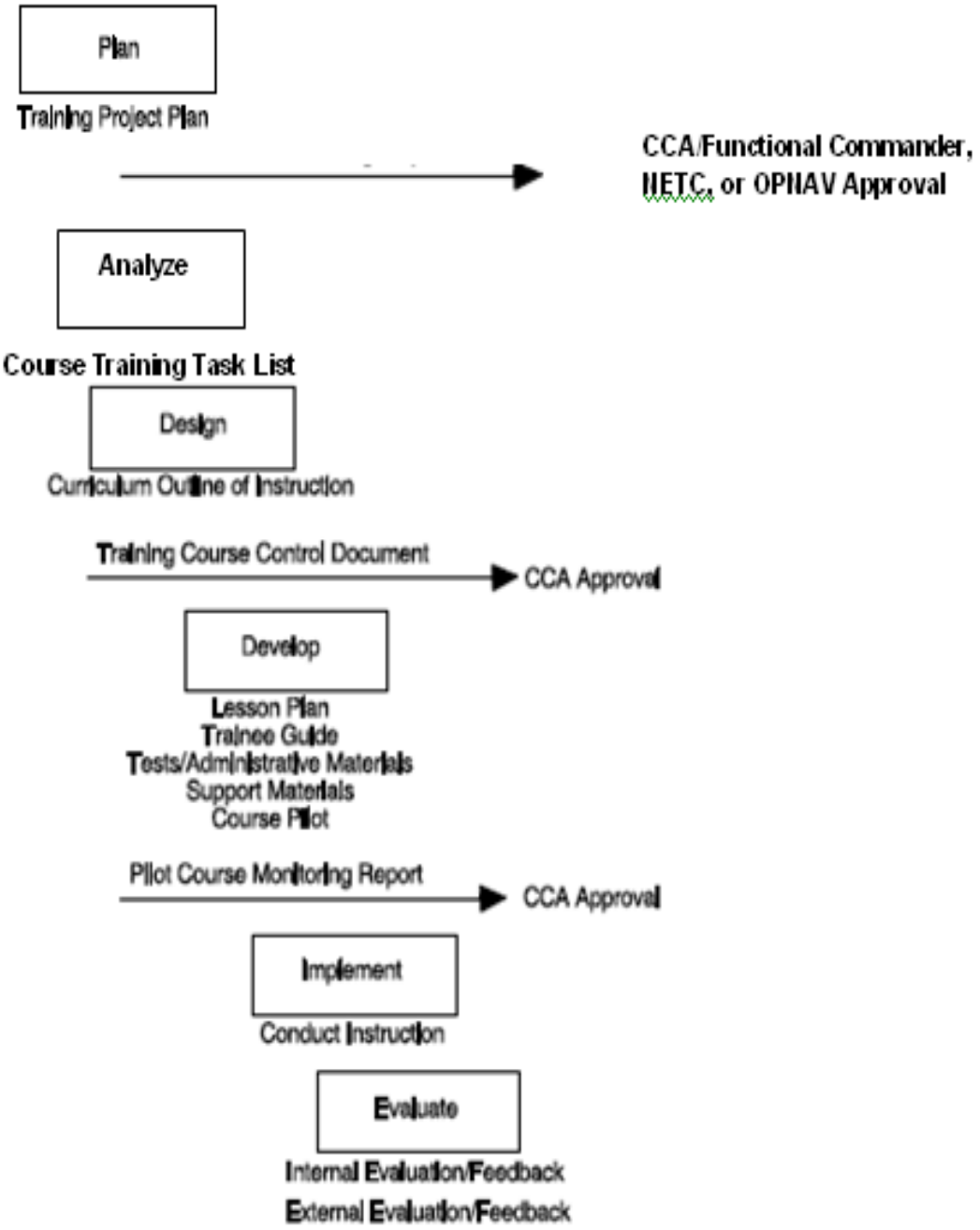

Figure 1-1: CURRICULUM DEVELOPMENT PROCESS

SECTION 1 - TRAINING MATERIALS

1. Training materials include management materials, curriculum materials, and support materials. The training materials produced by Navy in-house and contract developers follow the guidelines of this manual.

Recognizing the complexity of training materials development and the external factors which influence curriculum development projects. Waivers from the standard development standard may be authorized by the Curriculum Control Authority (CCA) ONLY.

AUTHORING INSTRUCTIONAL MATERIALS (AIM)

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 is compatible with the concepts of this manual and is deemed to be correctly formatted. NETC Learning Centers or as designated shall use the AIM II application for the plan, analyze and design phases of curriculum development. The develop phase may also be used if applicable and achievable. AIM II is for Task Based development and AIM I for Personnel Performance Profile (PPP) Based Development which is discussed in detail in NAVEDTRA 131 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 guidelines for the development of management materials. Management materials for training materials development include:

- **Training Project Plan** (**TPP**) – Discussed in Chapter 2.
- **Course Training Task List** (**CTTL**) – Discussed in Chapter 3.
- **Training Course Control Document** (**TCCD**) – Discussed in Chapter 5.
- **Test/Administrative Materials** – Discussed in Chapter 8 and NAVEDTRA 135(Series): Navy School Management Manual.
- **Pilot Course Monitoring Report** – Discussed in Chapter 10.
- **Documentation required or appropriate for audit trail** – Discussed in NAVEDTRA 135(Series): Navy School Management Manual.

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 development guidelines for curriculum materials. Under this definition, curriculum materials include:

- Lesson Plan (LP) — Discussed in Chapter 6.
- Trainee Guide (TG) (or Instruction Sheets) — Discussed in Chapter 7.
- Test/Administrative Materials — Discussed in Chapter 8 and in NAVEDTRA 135(Series): Navy School Management Manual.
- Other material used for instruction (such as an 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.
- IMM includes: On-the-Job Training (OJT) Handbook.
- Textbooks:
  - Technical Manuals to include Interactive Electronic Technical Manuals (IETM).
  - Training Devices.
  - Other materials helpful in the preparation and presentation of Lesson Topics, such as a Fault Insertion Guide, or Instructor Utilization Handbook.

SECTION 2 - TRAINING MATERIALS SUPPORT

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, for recommending changes, and for coordinating recommended changes are given in Volume III of this manual. Some triggers that may direct a surveillance action be taken are:

- Updated Occupational Standards.
- Job Duty Task Analysis.
- Rating Mergers / Consolidations.
- Rating Disestablishments.
- Requirements Sponsor Changes.
- Naval Training System Plan Revisions.
- Change to existing operating procedure or policy.
- Change in Technical Directives.
- Change in NMETLS.

2.2. Training Materials Modifications: There are four categories of training materials modifications: Interim Change, Change, Technical Change, and Revision. The 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 7 Section 5.0 of this manual.

SECTION 3 - PROGRAM PARTICIPANTS

3.1 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.

3.2. Training Agency (TA): A 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. The Commander NETC is a TA.

3.3. Training Support Agency (TSA): An office, command, or headquarters responsible for providing material and other forms of support to the TA. The TSA is normally a Systems Command (SYSCOM) responsible for providing training support to the TA for a piece of equipment, a subsystem, or a system.

3.4. Learning Centers (LS)/Functional Commander (FC): NETC has designated LCs/FC to plan, manage, and budget for training courses across broad functional areas.

3.5. 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 are designated as the CCA. Additionally, 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 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 Chapter 1 delineates the CCA duties and responsibilities that NETC has retained and is further amplified in NETC Chief Operating Officer (COO) Memorandum for distribution NETCNOTE 1500/N7 dated 23 Mar 09 concerning CCA duties retained by NETC.

3.6. 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 1st line of approval authority for in-house and contract developed curriculum.

3.7. Learning Site (LS): A Navy command which has a primary mission of conducting or supporting training. A school or institutions that offer's Navy courses. The LS has

responsibility for maintaining selected audit trail documents, annually reviewing training materials in the form of a Formal Course review, making recommendations to 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

5. In June 1994 the Secretary of Defense (SECDEF) directed that "Performance specifications will 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)." Source: SECDEF Memo, Subject: Specifications and standards - A New Way of Doing Business, dated 29 June 1994. Consequently, references to Military Standards (MIL-STDS) have been deleted.

5.1. Department of Defense: DODDIR 5000.01 MIL-HDBK 502

SECTION 6 - PUBLICATIONS

6.1 Secretary of the Navy:

- SECNAVINST 5870.4(Series) Permission to Copy Material Subject to 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 Occupational Safety and Health (NAVOSH) Program Manual
- OPNAVINST 3104.1(Series) Navy Visual Information (VI) Production, Replication, distribution and Management Information System Policy, Responsibilities, and Procedures
- OPNAVINST 5513.1(Series) Department of the Navy Security Classification Guide
- OPNAVINST 5510.10(Series) Corporate enterprise Training Activity Resource System (CeTARS) Catalog of Navy Training Courses and Training Reporting Requirements
- OPNAVINST 11102.2(Series) Training System Installation and Transfer
- NAVPERS 18068(Series) VOL I and VOL II Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards (NEOCS)

6.3. Commander, Naval Education and Training

- NETCINST 5100.1 Occupational Safety and Health, Training Safety and Firefighting Training Certification Programs
- 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 1500.1 Catalog of Navy Training Courses (CANTRAC) NAVEDTRA 10500)
- NETCINST 1500.3 Institutional Accreditation
- NETCINST 1500.4 Inter-service Training Review Organization (ITRO)

- NETCINST 1510.1 Navy Training Management
- NETCINST 1543.4 Technical Training Equipment (TTE)
- NETCINST 3104.1 Visual Information (VI) Program Management
- NETCINST 7500.2 Technical Training Audit Program (TTAP)
- Training Requirements Data Base Annual Report - Naval Education and Training Program Management Support Activity

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 (VOL 1-3)

SECTION 7 - SECURITY REQUIREMENTS

Classified information will be handled in accordance with the Department of the Navy Supplement to the DOD Information Security Program Regulation (OPNAVINST 5510.1 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 in NAVEDTRA 135(Series).

SECTION 9 - SUMMARY

This chapter presented an overview of the Task Based Curriculum Development method. The Task Based method involves six interrelated phases - PADDIE. In the following chapters are development guidelines for the PADDIE phases.

PLAN PHASE

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 becomes 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

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 six triggers. The triggers are a New Training Course, a Modified Training Course (Revision), a Change in Course Instructional Strategy or Delivery Method, a Change in Course Length, a Training Course Deletion, or a Training Course Transfer between CCAs.
- 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 will be developed and approved in accordance with NETCINST 1510.1 (Series).

COURSE REVISION: A TPP will be developed and approved in accordance with NAVEDTRAs 135, 130 and 131 as well as supplemental guidance provided by as specified in NETCNOTE 1500/N7 dated 23 Mar.

NEW COURSE DEVELOPMENT: Completing a TPP for new course development requires establishing a Course Identification Number (CIN), CDP, initiating entries for the CANTRAC and CeTARS, identifying preliminary resource requirements, and possibly planning for facilities requirements. This entails careful research and documentation. See NAVEDTRA 135(Series) for specific guidance of establishing a new course.

COURSE DEACTIVATION: NETCINST 1510.1 (Series), NECTNOTE 1500/N7 Dated March 2009, and NAVEDTRA 135B contain procedures for initiating and documenting the deactivation of an existing course or training program. A TPP is required.

SECTION 2 - JUSTIFICATION FOR COURSE DEVELOPMENT OR REVISION, AND DEACTIVATION

2. There must be a reason(s) 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.
- 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. 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. You will find detailed TPP content descriptions in Volume III, Chapter 2.

Each TPP will be as unique as the project it describes. The CCA, working with the 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: The 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 require 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 (by unfunded requirement) OPNAV requirement per Memorandum for Distribution 7000 N1 127189 of 15 September 2008, requires that a TPP be routed 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 from the commanding officer or officer in charge of the training activity or from higher authority.

- 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.

> 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.

SECTION 3 - SUMMARY

The TPP is often developed by senior course supervisors in conjunction with the learning standards functional area. Since it describes the scope and intent of the curriculum revision or development and describes the Fleet need which generated the training requirement, the curriculum developer should review the document before developing any other management or curriculum materials.

ANALYZE PHASE

CHAPTER 3

COURSE TRAINING TASK LIST

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 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, the Analyze Phase. Prior to a TPP input, a Front End Analysis (FEA) and a Business Case Analysis (BCA) will be accomplished. In developing a TPP, Learning Centers are directed to complete FEA and BCA prior or in conjunction with the TPP development and reference when reviewing submitted TPP for approval.

The purpose of the Analyze Phase is to determine what will be taught in the new or revised course. The analysis you will conduct is a continuation of the preliminary analysis completed during the Plan Phase. You will examine and analyze all available documents/data in order to determine what is necessary to do a job. The duties, tasks, and/or skills that you select for training will be organized in a Course Training Task List (CTTL). The CTTL is the output of the Analyze Phase and is the building block of the new/revised course. When developing the CTTL refer to OPNAVINST 1500.74 (Series).

In this chapter you will be given information and procedures that will help you develop a CTTL. Please read the following pages carefully before you begin.

SCOPE

- Provide an understanding of the Analyze Phase of curriculum development (or revision).
- Explain the terms which apply to the Analyze Phase.
- Describe the step-by-step procedures for developing a CTTL.
- Describe the guidelines for building the CTTL.

SECTION 1 - INFORMATION

1. With an approved TPP, you are now ready to begin the Analyze Phase of curriculum development. A CTTL is the output of this phase. Once developed, the CTTL is the building block of the course and will be used to develop the learning objectives and all other course materials.

1.1. A CTTL is: A list of Duties and Tasks to be trained in a course.

1.2. A CTTL describes:

- Duties/tasks that support the course mission.
- Job-related duties and tasks that will be performed by the end of the course.
- CTTL sample in VOLUME II, Tab A-2.

1.3. A CTTL is developed by analysis of the:

- Course Mission.
- Technical Documentation.

1.4. CTTL development requires:

- Subject Matter Experts (SMEs).
- Technical Documentation.
- Job Analysis Data/Courseware, if available.

> Job analysis data/information, in electronic media format, compatible with your system, is the preferred source for development of a CTTL.

1.5. CTTLs are used to develop:

- Learning objectives.
- Instructional strategies (Delivery Method. Pre-instructional Activities, Presentation, Participation, Testing).
- Techniques.
- Methodologies.

1.6. Basic terms: Before proceeding any further, please review the following terms.

- A Job: Is made up of duties/tasks and can be determined from either a top down approach or a bottom up approach where the tasks and duties are analyzed to determine what the job is. A listing of Enlisted Occupational jobs are contained within NAVPERS 18068(Series) which may provide some insight in your job selection criteria.

- A Duty:
  - Is a major part of a job
  - Collection of duties make up a job
  - Occupies a major part of the work time
  - Occurs often in the work cycle
  - Clusters of tasks constitute a duty
  - Must be observable and measurable
  - Involves a group of closely-related tasks
- A Task:
  - Is a major part of a duty (clusters of tasks make up a duty).
  - Is performed in a relatively short period of time.
  - Must be observable and measurable.
  - Each task is an independent part of the job; it is independent of other tasks. Tasks are NOT components of a procedure. The above relationship between the job, duty, and task is outlined in Figure 3-1.

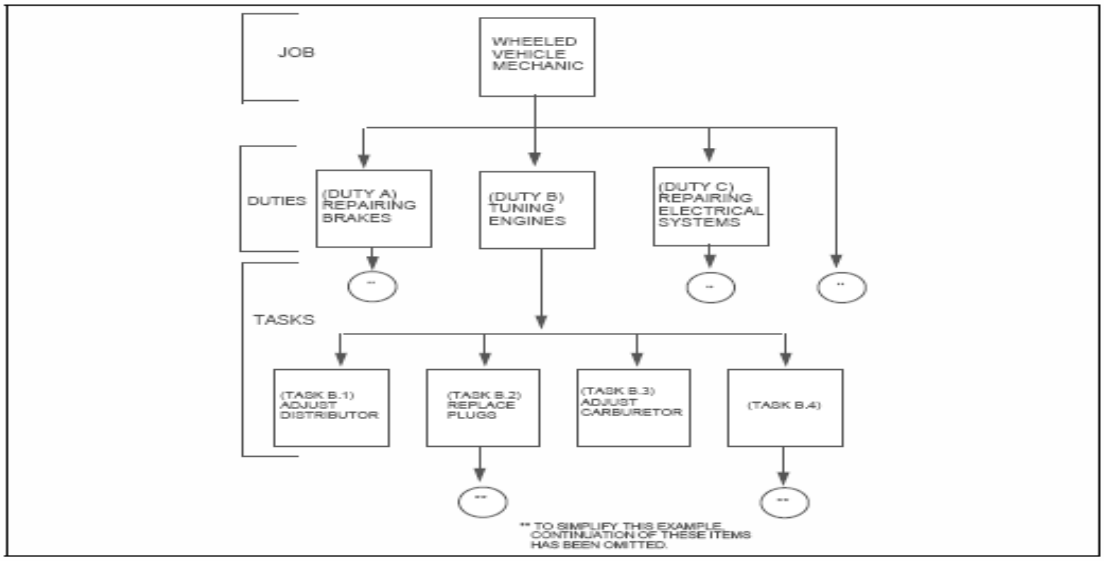

FIGURE 3-1: WHEELED VEHICLE MECHANIC

SECTION 2 PROCEDURES FOR DEVELOPING A CTTL

2. In-house development of a CTTL involves going through several steps and ending up with the finished CTTL. This CTTL will contain the duties/tasks necessary to perform the job in the area you have defined. There are several ways to identify

and record this information. The most direct way is to gather documents related to the job. Other methods include jury of experts, questionnaires, and on-site interviews. Each of these methods will help you identify most of the job data/information you will need to develop your course. These documents/data are then analyzed and the duties and tasks extracted and recorded. This list is then organized into a smooth CTTL. A sample is found in Volume II, Tab A-2.

2.1. Developing your CTTL: You will be involved with revising existing courses or developing new ones. Find out what is available and use it. If part or all of the analysis has been completed, your job will be a lot easier and considerable time and money will be saved.

2.2. Be aware of a change that takes place as the CTTL is developed. You start by analyzing a job and end with selecting duties and tasks that will be taught in a course. This change is shown in Figure 3-2.

2.3 CTTL development depends on the SME. For this reason it is important to select the most qualified SMEs available to do this development. You are now ready to begin. Many sources have been identified for your use. Be sure to follow the steps outlined on the following pages.

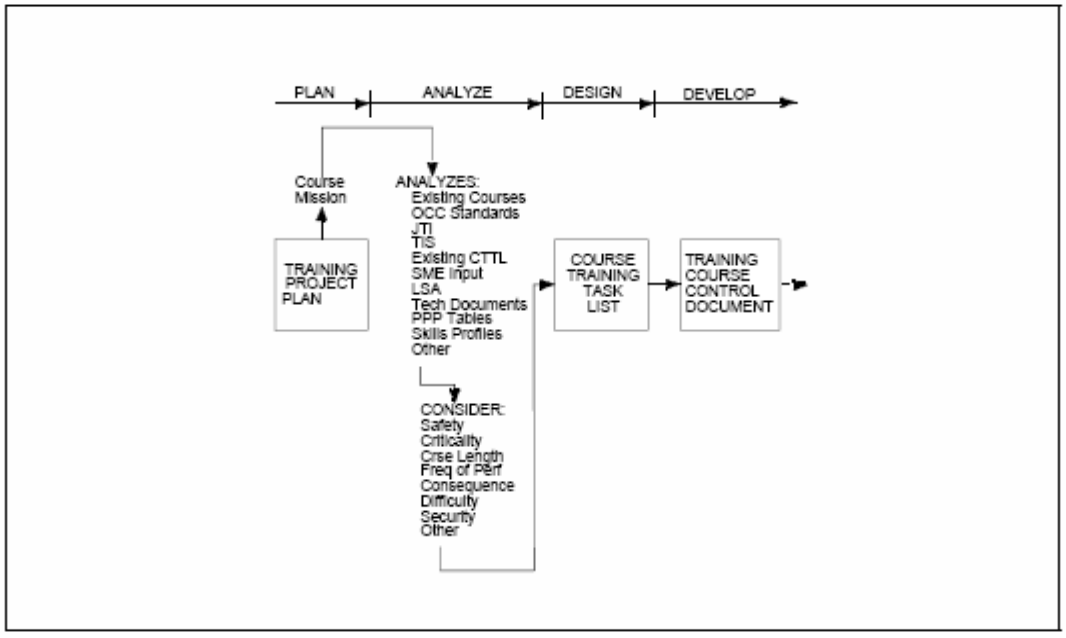

FIGURE 3-2: ANALYSIS PROCESS

STEP 1: READ THE COURSE MISSION STATEMENT

- Located in the TPP.
- Provides the "who", "what job", "degree of qualification", the "where", and "conditions" for training.

STEP 2: GATHER JOB ANALYSIS DATA THAT SUPPORTS THE COURSE MISSION STATEMENT

- Every job in the Navy has documents describing what to do and how to do it. The purpose of this step is to describe how to identify and obtain these documents. You will not necessarily need all of the types of documents listed. Other methods of gathering job-related data/information are presented. Obtain/use only those documents/methods that support the course mission.

- Whenever possible, gather the job-related data/information in electronic media format. This will facilitate your CTTL development. Examples of job information available in electronic media include Logistics Support Analysis Reports. These are explained in the following paragraphs.

- **CTTLs.** CTTLs for existing courses provide duties and support for a variety of jobs. In addition, the references listed provide an excellent source of job analysis information. If the specific equipment, system, subsystem, procedure, operation, function, etc., is not available, you may be able to use the line items as generic statements and modify each to meet your needs.

- **FEA Reports**. Conduct FEAs in accordance with NETC tasking. Skill and knowledge inventories are available for many Navy courses and ratings. These reports should be considered a primary source because they are based on many of the documents you will identify for analysis.

- **Logistics Support Analysis Record (LSAR) Nos. 014, 015, 023, and 024**. These documents provide very detailed sequential task descriptions for the operation and/or maintenance of equipment developed under contract. Specific duties and tasks are listed along with supporting data and information. Most courses developed by a contractor should have these reports available for your analysis.

- **Job Task Inventories (JTI).** These documents list duties and tasks for a specific job or rating. Supporting data and information are also provided. Your CCA will help you obtain these documents.

- **General Documentation**. One of the primary source documents used to identify documentation is the Bibliography for Advancement Study (NAVEDTRA 10052-AJ). This document lists publications that support military requirements for all ratings and apprenticeship and technical requirements for all Navy ratings by paygrade. SMEs should review this document for all applicable Navy Ratings and begin a list of publications that apply.

- **Formal Navy Course Curriculum Outlines/Training Course Control Document (TCCD)**. Another source to identify documentation is those references that list formal Navy courses. Formal Navy courses which teach skills and knowledge pertinent to your area should be a part of your documentation. If an Navy Enlisted Classification (NEC**)** is involved, consult NAVPERS 18068(Series) dated July 2008, Manual of Navy Enlisted Manpower and Personnel Classification and Occupational Standards, Section II, which lists Navy courses supporting NECs. Also consult NAVEDTRA 10500 CANTRAC, Volume II, Course Descriptions and Convening Schedules, which is in CeTARS. "Key word" searches for course titles can be performed.

- **Training Manuals and Non-Resident Training Courses**. Consult https://www.advancement.cnet.navy.mil for a listing of Training Manuals and Non-Resident Training Courses. This lists all NAVEDTRA Training Manuals and Nonresident Training Courses, including training publications from additional Navy training agencies and other military services.

- **Standards**. Naval and Occupational Standards (OCCSTD), NEC descriptions and Navy Officer Billet Classification (NOBC) all list skills and knowledge and should be included on your documentation list, as appropriate. Consult NAVPERS 18068(Series) and NAVPERS 15839, Manual of Navy Officer Manpower and Personnel Classification. Personnel Qualification Standards (PQS) list skills and knowledge appropriate to your area. These PQS may be found in NAVEDTRA 43100-6.

- **On-site Observation or Job Interview**. Both are conducted by SMEs at the work site. SMEs observe personnel on the job and list duties and tasks required to complete the job. Additional amplifying information, as required, should also be listed that includes duration, frequency, types of working conditions, tools required, etc. Prepare a list of questions in advance for the job interview to help standardize your job information.

> Both the observation and interview methods involve considerable effort. Because of the massive amounts of data/information that must be tabulated and summarized, you may not have the resources to implement these methods.

- **Jury of Experts**. With this method, SMEs from various commands are assembled to record and organize the required job information/data. The SMEs are selected for their experience and knowledge of the job. This method is particularly useful in collecting job data in the following situations:

  - New jobs.
  - Managerial and supervisory jobs where some behaviors are not directly observable.
  - When time does not allow analysis by other methods.
  - To supplement other methods, (questionnaire, interview, written survey, etc.).

> Because of the personnel and travel funds involved, the jury-of-experts method can be very expensive, use of web meetings, video teleconference (VTC), and other distance support conferencing is recommended. Also, the SMEs should come from a number of different areas. If they all come from the schoolhouse, the decisions that are made tend to reflect what exists in training rather than what actually exists on the job.

- **Technical Manuals and other Technical Publications**. These documents give valuable job performance information on the operation and maintenance of equipment, weapons, and weapons systems. Every job task list should have duties and tasks taken from technical documents or a authorized requirements sponsor.

- **Maintenance and Material Management (3-M) System**. Consult the NAVSEAINST4790. 8 (Series) as these volumes provide detailed information on what is necessary to do a job.

- **Personnel Performance Profile (PPP) Tables**. PPPs provide:

  - Lists of required skills and supporting knowledge's.
  - Support systems, subsystems and equipment.
  - A PPP lists the minimum knowledge and skills required to operate and maintain a system, subsystem, or equipment. Existing PPP tables are listed in the NETPDTC NCMR Database. NETC N74 is the PPP manager/owner.

- **Others, such as, Navy Training Systems Plans (NTSP), Engineering Drawings, Service Manuals, etc**. Sources not mentioned may contain valuable job analysis information. All possible sources should be reviewed. Consult your CCA to ensure complete coverage.

Once you have secured all the documents, review their reference lists for additional publications, appropriate for your CTTL list. Continue this process until all available publications have been secured. At this point your list may contain Navy instructions, notices, manuals and other publications that list information or describe duties/tasks (skills) necessary to perform the work in your area.

STEP 3: REVIEW/COMPILE JOB ANALYSIS DATA/INFORMATION

In the previous step you gathered all the documents that contain job related data/information in the area you have defined. In this step you will systematically work your way through each of these documents, pulling out and recording each duty and task that supports the course mission statement. Be sure to annotate the source of each duty and task selected as you work through the document since you will use this information in Step 7. You will be reviewing many similar statements. In order to ensure complete coverage of the job, it is necessary to accept some extremely similar items at this point. Any duplication will be eliminated in later steps.

- Using the AIM II application vice Excel spread sheets will provide the linkage to the requirements and resources that you need for long term maintenance of your course. It is highly recommended that AIM II be used to create your CTTL.

- Experience in CTTL development has led to certain general rules for writing duty and task statements. These are shown in Table 3-1, Rules for Writing CTTL Statements. When completed, each CTTL statement will:

  - Support the COURSE MISSION STATEMENT.
  - Be SHORT.
  - Begin with a performance action VERB.
  - End with an OBJECT.
  - Be OBSERVABLE and MEASURABLE.
  - Meet ALL the guidelines listed in Table 3-1.

Job analysis includes safety knowledge that is required prior to performing duty/task and safety procedures that must be followed while performing a duty/task. Safety will be included as a CTTL line item as appropriate.

TABLE 3-1: RULES FOR WRITING CTTL STATEMENTS

RULE	CORRECT	INCORRECT
Each statement will begin with a *PERFORMANCE ACTION VERB* and contain the *OBJECT* of the action of that verb.	*Write* Enlisted Performance *Evaluation* *Develop* Skill/Knowledge *Inventory*	*Know* the contents of the Enlisted Performance *Evaluation*
If there are *multiple actions (two or more verbs)*, separate statements should be written unless there is no possibility the action would or could be trained separately.	*Develop* Duty/Task Inventory *Sort* Duty/Task Inventory	*Develop and Sort* Skill/ Task Inventory
The preposition "on" is used rather than "of" when referring to objects.	Perform weekly maintenance *on* typewriters	Perform weekly maintenance *of* typewriters
Latin abbreviations such as "i.e." and "e.g." are not used. Use "such as."	Fill out maintenance forms *such as* Job Log (JL-1) and Action Taken Form (ATF-1)	Fill out maintenance forms, *e.g.,* Job Log (JL-1) and Action Taken Form (ATF-1)
Excessive use of "a", "an" and "the" should be avoided.	Fill out description block of supply form (DD-1234)	Fill out description block of *a* supply form (DD-1234)
Vague, nonspecific adjectives, especially those that imply value or "goodness" should be avoided. Use adjectives with precise, specific meanings.	Boot up computer with *MS-DOS* program	Ensure MS-DOS program is working well
Do not use parentheses within parentheses.	Fill out parts ordering form (Standard for Navy Supply and Special for Local Purchase)	Fill out parts ordering form (Standard for Navy supply (and special for local purchases))
Do not specify object types if there are only a small number of types (three or less) and these types would be well known to people familiar with the job.	Verify leave and earnings	Verify leave and earnings *(Officer and Enlisted)*

TABLE 3-1: RULES FOR WRITING CTTL STATEMENTS (CON'T)

RULE	CORRECT	INCORRECT
Acronyms may be used, however, they must be spelled out the first time they appear unless they are acronyms in such common usage that they are thought of as words such as *Radar* and *Sonar*.	Prepare course training task list (CTTL)	Prepare CTTL
Objects are normally written in singular form unless the objects are normally taught together.	Fill out Travel Claim *form*	Fill out Travel Claim forms
Do not write statements with unnecessary phrases such as "Follow the procedures for....."	Trace supply spare part requisition action	*Follow the procedure for* tracing supply spare part requisition action
Do not specify objects by brand name or specific nomenclature if the object belongs to a class of objects found on the job and training could be provided on any one of the objects in this class.	Operate *word processing program*	Operate *Wordstar Release 4.0* word processing program
When specifying publications or forms, spell out the name of the publication or form, followed by the number or nomenclature in parentheses.	Fill out Joint Message Form (DD-93)	Fill out form DD-93
If there are *multiple objects (two or more)*, write a separate statement for each object unless the objects are normally taught together.	Fill out *Spare Parts Request (PR-471)* Fill out *Parts Consumption Log (PCL)* Fill out *Action Summary Log (ASL)*	Fill out *Spare Parts Request (PR-471), Parts Consumption Log (PCL), and Action Summary Log (ASL)*
Use *short words and phrases* in preference to long words or expressions.	Write Production Control Report	Accomplish necessary action to generate report involved in, and necessitated by, strict adherence to, and maintenance of, production control procedures
Write simple statements without qualifiers unless the qualifier is essential to the meaning of the statement.	Fill out spare parts request (PR-471)	Fill out spare parts request (PR-471) *to order spare parts*

RULE	CORRECT	INCORRECT
Do not write statements that are too detailed, such as minor steps of a procedure.	Complete Supply Action Form (SAF-1)	Complete: (1) Block 1, National Stock Number, of Supply Action Form (SAF-1) (2) Block 2, Item Name, of Supply Action Form (SAF-1)
Do not use unnecessary phrases such as "when appropriate" or "in accordance with prescribed directives."	Complete Joint Message Form (DD-93)	Complete Joint Message Form (DD-93) in accordance with prescribed directives
Do not specify conditions under which the action is performed nor standards to which it should be performed.	Prepare Standard Navy Letter	Prepare Standard Navy Letter using Wordstar word processing program and IAW Navy Correspondence Manual (SECNAVINST 5216.5C)
Do not write statements that refer to school training situations or devices.	Prepare Automated Supply Order Form (ASF1)	Prepare Simulated Automated Supply Order Form (ASF1) using Automated Supply Requisitioning Training Device 8A14
Do not write statements using "recognize" except where the recognition refers to characteristics such as physical shape, color, sounds, etc.	Recognize battleship silhouette	Recognize battleship effectiveness
Do not use the "ing" form of the verb.	Fill out Joint Message Form (DD-93)	Draft message, filling out Joint Message Form (DD-93)

- Use of electronic media to develop your CTTL. Using the rules for writing CTTL statements, follow the basic steps outlined below and begin analyzing each of the automated job data bases/documents you have assembled.

> If the specific system, subsystem, equipment, procedure, operation, function, etc., is not listed, locate a similar section in the data base/document. Use these items as generic statements. *Modify* each task selected for training, as required, by adding the equipment name, specific job performed, etc., to change the duty/task/skill from generic to course-specific. EXAMPLE: OCCSTD — "Perform maintenance on the missile tube;" CTTL statement — "Perform maintenance on the D-3 missile tube."

SECTION 3 - ANALYSIS OF DOCUMENTATION

3. Front End Analysis (FEA) Reports. FEA reports consist of duty and task statements. You may be able to record these duties and task statements verbatim on your CTTL.

> The FEA Training Decision Summary Report (TDSR) will indicate the source document for each statement contained in the report.

3.1 General Documentation. Because general documentation comes in many forms, there are no hard and fast rules for analysis. The idea is to extract each significant duty and task that applies to your job area. For a large manual, you might write a statement for each section, subsection, or other unit, depending on the organization of the document. As an example, consider the following Table of Contents from Navy Equal Opportunity (EO) Manual.

OPNAVINST 5354.1 SERIES, NAVY EQUAL OPPORTUNITY (EO) MANUAL

TABLE OF CONTENTS

Chapter I, Section 1a of the above document discusses the EO policy of the Navy. This can be written as shown below.

> **CTTL STATEMENT**: Write official policy of the Department of the Navy concerning equal opportunity for all Navy members.

Section 1b deals with the major elements of a headquarters EO program. This could be written as shown below.

> **CTTL STATEMENT**: Develop the major elements for a Headquarters level EO program.

Finally, Section 1c, a Fleet/Shore Command program, would appear as shown.

> **CTTL STATEMENT**: Develop the major elements for a Fleet/Shore Command level EO program.

For smaller documents you might write only one or two statements which cover the entire document such as "Retrieve information from OPNAVINST 1234.5C". The objective remains to capture the skills of each source document that are significant to your job area.

Formal Navy Course Curriculum Outlines/Training Course Control Documents. The analysis of these documents is very straight forward. Outlines/TCCDs consist of learning objectives which follow a set pattern. Objectives consist of an action verb (behavior), conditions, and standards. For your purpose *IGNORE* the conditions and standards. Concentrate on the action only. Write statements from *ONLY* those objectives which support the course mission statement. Ignore "orientation" objectives such as those that deal with schoolhouse organization, grading policy, or other information irrelevant to "on the-job" situations.

Objectives will be either skill or knowledge. If skill, isolate the "*action*" portion, consisting of a performance action verb, the object of that action, and the minimum qualifiers, so that the statement makes sense. Add the action statement to the CTTL using the rules which have been provided. Examples are shown below.

OBJECTIVE	CTTL STATEMENT
4.2 Given incomplete Pay Data Cards and a typewriter, fill out all blocks IAW OPNAVINST 1234.5C.	Fill out Pay Data Card (DD-21)
6.10 In a simulated counseling session, counsel personnel regarding Navy EO policy.	Counsel personnel Navy EO policy

If the objective consists of knowledge, isolate the "action" portion, consisting of an action verb, the object of that action and the minimum qualifiers, so that the statement makes sense. Write the statement with a performance action verb. Add the statement to the CTTL using the rules which have been provided.

Training Manuals and Non-Resident Training Courses. Two approaches can be used to analyze these documents. If they contain learning objectives, they can be handled in the same manner as learning objectives from course outlines as described above. If they do not contain learning objectives, write statements for each section, subsection, or paragraph in the same way as for instructions or technical manuals as described under General Documentation.

OBJECTIVE	CTTL STATEMENT
2.1 Using OPNAVINST 5580.1, List criteria for selecting duty MA personnel	Select Duty MAA Candidates

Standards. Naval and Occupational Standards are statements of knowledge or skill requirements. Skill statements may generally be copied nearly verbatim. As an example:

OCCUPATIONAL STANDARDS (SH3) TECHNICAL ADMINISTRATION	CTTL STATEMENT
69303 PREPARE EXPENDITURE DOCUMENTS	Prepare expenditure document

Writing standards as knowledge CTTL statements is also straightforward. You will need to add a performance action verb or verb phrase. As an example:

NAVAL STANDARDS STATEMENT	**CTTL STATEMENT**
914 CHEMICAL, BIOLOGICAL AND RADIOLOGICAL (CBR) DEFENSE	
914401 DUTIES AND RESPONSIBILITIES OF MONITORING AND DECONTAMINATION TEAMS	Monitor decontamination

Naval Enlisted Classifications (NEC) and Navy Officer Billet Classifications (NOBC) are written in a "text" format but still contain skill/knowledge statements which are easily extracted. As an example:

NEC	**CTTL STATEMENT**
INTELLIGENCE SPECIALIST IS-3920 Operational Intelligence Analyst	
Evaluates all-source intelligence information, prepares intelligence plots, and current intelligence reports, maintains current intelligence files, and assists in intelligence administration	Evaluate all source intelligence information Prepare intelligence information. Prepare intelligence Plot. Prepare current report Assist in intelligence Administration

NEC	**CTTL STATEMENT**
GENERAL TRAINING GROUP 9502 Instructor, Academic	
Develops, coordinates, and instructs academic/professional education program. Evaluates trainees' performance and provides certification.	Develop academic/ professional education program. Coordinate academic/ professional education

Recommends improvement in curriculum.	Program; Instruct academic/ professional education program; Evaluate academic/professional performance; Maintain academic/professional education program documentation; Provide academic/ professional education certification; Recommend improvement in academic/ professional education curriculum.

Occupational Task Lists are lists of task(s) or skill statements compiled by NAVMAC. These lists are developed for each Navy Rating. You may transfer verbatim most of these statements. Do not include non-technical, non-job area related statements such as housekeeping tasks (cleaning compartments, sweep downs, etc.).
Equipment Lists are lists of equipment operated, used, or maintained by members of a rating. Write "operate", "use", or "maintain" followed by the equipment name for each item of equipment that is used in the performance of a job.

Personnel Qualification Standards (PQS). PQS generally contain a mix of equipment and non-equipment skill/knowledge qualification requirements. Work through the Fundamentals, Systems and Qualification section, transferring skill statements that pertain to your job area. A particular concern in PQS analysis is to ensure that the statements you write retain their context. You may have to add a performance action verb, verb phrase, and/or qualification statements. As an example:

PQS	**CTTL STATEMENT**
MK 41 VERTICAL LAUNCHING SYSTEM 302.2.5 Install/remove packaging, storage handling, and transportation	Remove packaging from equipment
1204 Radio Communications System 1204.1 What is the function of this system?	Write the function of the Radio Communications System

PPP Tables. Review all line items that support the course mission statement. Many of the statements can be used verbatim. Others will have to be modified. Ensure all statements that you transfer to your CTTL conform to the rules for writing CTTL statements as outlined in Table 3-1. The following example illustrates how one or more CTTL statements may be derived from one PPP line item:

STEP 4: REFINE DUTIES AND TASKS

PPP LINE ITEM	CTTL STATEMENT
S1286 MK 92 FIRE CONTROL SYSTEM 2-2-5. Perform intra- and/or inter-system documented procedures for alignment, calibration, and adjustment of the MK 92 FCS STIR Weapon Control Console Equipment for optimum Operation	Align MK 92 FCS STIR Weapon Control Console Calibrate MK 92 FCS STIR Weapon Control Console Adjust MK 92 Weapon Control Console

- In this step you will refine the list of duties and tasks you compiled in the last step. You will retain only duties and tasks that support the course mission statement. Remember, selecting duties and tasks for training is a "judgment call" and requires:

  - A clear understanding of the duties and tasks that are required to do the job.
  - Thorough analysis of all collected job data/information.
  - A clear understanding of the level and in what setting training is appropriate. For example, if the course mission reflects entry level skills, then advanced duties/tasks would be inappropriate. Does the data indicate that a duty/task should be taught OJT? The school setting may not be the best option.

Involve more than one person in this step. The best way to accomplish this is the *Jury-of-Experts* approach. SMEs from commands that provide and receive students from the course should be part of the Jury. This will ensure complete coverage and minimize the possibility of important duties and tasks being overlooked.

- You are now ready to begin looking at your list line by line. Give consideration to grouping items by subject/content area. Carefully do the following:

> **Ensure safety precautions and operational risk management are included where appropriate**

  - DELETE duties/tasks that do NOT support the course mission statement.
  - DELETE duties/tasks that do NOT require training.
  - DELETE duties/tasks that are listed but NOT performed on the job.
  - REVISE any statements that are written incorrectly.
  - ENSURE both knowledge (designated as "K" for training) and performance (designated as a “S” for skill) duties/tasks use performance action verbs.
  - ADD any duties/tasks that are required but not listed.
  - DELETE duties/tasks that are taught elsewhere at the same level.

STEP 5: SORT CTTL STATEMENTS BY DUTIES AND SUPPORTING TASKS. You are now ready to organize the refined list of statements developed in Step 4 into Duties with their supporting Tasks. This will be a lot easier if you pay attention to the organization of the Duty/Task list. Many of the statements are already grouped by subject/content areas, maintenance procedures, or operational steps. All you need to do is identify the Duties and their respective supporting Tasks. Proceed with the following:

- Identify DUTY line items on the CTTL.
- Remember, a DUTY directly supports the Course Mission Statement and is a major part of the job.
- It is possible there may be only one duty in the entire CTTL.
- For each DUTY identify all CTTL TASKS which directly support the duty and list these supporting tasks under the respective duty they support.

> If a line item does NOT support the Course Mission Statement, or a duty, *DELETE* the item from the CTTL.

- The result will be a list of duties with supporting tasks listed for each duty on the (CTTL).

  EXAMPLE: A CTTL lists 50 duties/tasks.

  Three of them are:

  Inspect service pistol.
  Maintain service pistol.
  Fieldstrip service pistol.

  Note: The second item, "maintain service pistol" is the broadest based line item and is therefore the DUTY. The CTTL line item "inspect service pistol" and "fieldstrip service pistol" support the duty "maintain service pistol" and are therefore supporting tasks which are listed directly under this duty. (See VOLUME II, Tab A-2 for samples of completed CTTL line items)

STEP 6: CHECK EACH DUTY WITH SUPPORTING TASKS FOR COMPLETENESS/ CONTINUITY:

- Although the (CTTL) should be a complete list of all the duties and supporting tasks necessary for training in a course, there may be items which were overlooked/omitted.
- Review the (CTTL) to ensure all duties required to support the Course Mission Statement are listed.
- Check to see that all duties are adequately supported by the task necessary to perform each duty.
- Add duties and supporting tasks as required to ensure complete coverage of the Course Mission Statement.

  EXAMPLE: Duty - Maintain service pistol.

  Tasks: Inspect service pistol.
  Fieldstrip weapon.
  Disassemble weapon.
  Reassemble weapon.
  Conduct functional check of weapon.

- In the preceding example several tasks that support the *DUTY* have not been listed. Assume that "*Conduct safety check of weapon*" is a supporting task which was never listed on the (CTTL). This supporting task should be added to your list under "Maintain service pistol."

- Update the (CTTL) to reflect any additions/deletions.

STEP 7: PREPARE THE CTTL. The exact format of the CTTL will be determined by the nature and extent of your curriculum development project. Requirements and formats will vary among Functional Commanders. The elements described below should be included in the CTTL as a minimum. A format sample may be found in Volume II, Tab A-2.

TOP OF PAGE:

- Heading. LIST, “COURSE TRAINING TASK LIST” plus course title and CIN.
- Course Mission Statement. COPY the statement directly from your approved TPP

COLUMN 1. NO. (NUMBER): ASSIGN a number to each line item for reference purposes only.

COLUMN 2. SOURCE:

- LIST the document(s), reference(s) and other information sources from which the duty or task was extracted. Be specific enough (chapter; paragraph, if necessary) so the person writing learning objectives can locate the information supporting the duty/task. See sample CTTL in Volume 2 for examples.
- INCLUDE, as appropriate, source names, acronyms, titles, and numbers.

COLUMN 3. DUTY/TASK: LIST the duties with their supporting tasks developed in STEP 5 that have been selected for training.

COLUMN 4. LEVEL:

- DETERMINE the level of training for each line item.
- Serves as the bridge between the job statement and learning objectives.
- "S" indicates the duty/task will be taught at the skill or "hands-on" level. Trainees will actually perform the duty/task in the schoolhouse.

- "K" indicates the duty/task will be taught to the knowledge level only. Trainees will recall/recognize names, dates, terminology, steps, procedures, shapes, sounds, characteristics, etc., and/or comprehend procedures, concepts, rules or principles.
- Reasons for using “S” or “K”
- The Course Mission Statement is used to determine which duties must be taught at the performance or “S” level in the course. Duties and supporting tasks should be taught at the skill level if possible.
- Constraints such as space, equipment, funding, personnel, facilities, course length, class capacity, etc., may require some duties/supporting tasks to be taught at the knowledge level.

COLUMNS 5 THROUGH (Add additional columns as needed):

- Only if required, desired, or advisable:
- Duties/tasks NOT selected for training.
- Duties/tasks selected for training but not taught due to facility, funding, personnel and/or other constraints.
- Duties/tasks recommended for follow-on training.
- Provide comments and/or any other required information.
- Clarify/amplify items in the CTTL.
- Provide a complete list of documents, acronyms, dates and/or numbers, etc.

STEP 8: PERFORM QUALITY ASSURANCE CHECK. Use the CHECKLIST in Table 3-2 to review the CTTL.

SECTION 4 - SUMMARY

4. You have just completed the Analyze phase of the Task Based Curriculum Development method. The output of the phase is a CTTL. This CTTL tells you exactly what will be taught in the new or revised course. In the next chapter, you will take the duties with their supporting tasks listed on the CTTL and develop learning objectives.

TABLE 3-2: QUALITY ASSURANCE CHECKLIST

HAVE ALL OPERATION RISK MANAGEMENT (ORM) AND SAFETY PRECAUTIONS BEEN INCLUDED?

1.	Do all statements begin with a performance action verb and end with an object of that action?
2.	Are there any multiple action skill statements (skill statements with two or more action verbs)? These should generally be written as separate statements unless normally taught together
3.	Is the preposition "on" used when referring to action on an object?
4.	Are any Latin abbreviations (i.e. or e.g.) used? Use "such as."
5.	Has the use of "a," "an," and "the" been kept to a minimum?
6.	Have any vague, nonspecific adjectives, especially those implying value been used? Only adjectives with specific meanings should be used.
7.	Are there any parentheses within parentheses? These should not be used
8.	Have any object types been specified when the object types are well known to people familiar with the content area? Do not specify object types if unnecessary.
9.	Are all acronyms spelled out the first time they appear in the CTTL?
10.	Are objects written in singular form unless normally taught together?
11.	Have any unnecessary phrases such as "follow the procedures for..." been used? These should be eliminated.
12.	Have any objects been identified by brand name or specific nomenclature? This is incorrect if the objects belong to a class, are found on the job, and training could be provided on any one of the objects in this class.
13.	Has the full name and nomenclature of publications and forms been used?
14.	Have all columns been completed for each line item?
15.	Have all statements been written with as few words as possible?
16.	Have unnecessary qualifier words been used? Qualifiers should only be used if essential to the meaning of the statement.
17.	Are any statements written at too detailed a level? Statements should be written to the procedure level but should not specify the steps of a procedure.
18.	Have redundant phrases such as "when appropriate" been used? These should be eliminated.
19.	Do any statements contain conditions or standards? These should be eliminated.
20.	Do any statements refer to schoolhouse training situations or training devices? These should be rewritten.
21.	Has the word "recognize" been used only to indicate recognition of physical characteristics (shape, color, etc.)?
22.	Are all acronyms, dates, reference lists, etc., clarified/amplified?
23.	Have all duplicate statements been eliminated?
24.	Are there any additional duties/tasks required to support the course mission statement?
25.	Are there any unnecessary duty/task statements?
26.	If you are using a word processing program, has a "spell-check" been performed?

DESIGN PHASE

CHAPTER 4

CURRICULUM OUTLINE OF INSTRUCTION

INTRODUCTION

In the last chapter you were told how to determine what will be taught in a new or revised course. The output of the chapter was a CTTL. This CTTL is the foundation for the entire curriculum development effort. During the next phase of the project, the Design Phase, you will write and sequence the Learning Objectives (LO) for the new/revised course. You will compile these objectives into the CURRICULUM OUTLINE OF INSTRUCTION.

The Design Phase is the transition between the job world and the schoolhouse. All duties and tasks listed on the CTTL will be developed into LOs. LOs tell exactly how the job duties and tasks will be performed in the schoolhouse.

When all the LOs have been written, you will arrange the objectives in the order in which they will be taught. This arrangement will help produce the most effective learning in the shortest time possible.

In this chapter you will receive information and procedures that will help you write and sequence LOs. Please read the following pages carefully before you begin.

SCOPE

- Provide guidance for writing Learning Objectives.
- Explain the terms which apply to Learning Objectives.
- Describe the step-by-step procedures for writing Learning Objectives.
- Describe step-by-step procedures for sequencing Learning Objectives.

ILE Learning Objective guidance is provided in MPT&EECIOSWIT-ILE-SPEC-1B

SECTION 1 - INFORMATION

With a completed CTTL, you are ready to begin the Design Phase of curriculum development. A list of learning objectives, arranged in a logical teaching sequence, is the output of this phase.

SECTION 2 - LEARNING OBJECTIVE (LO)

2.1. LO is a statement of what the trainee can do after training (completing the course or part of the course).

2.2 Based on the CTTL.

EXAMPLE: TROUBLESHOOT designated radar devices to a defective component in accordance with applicable technical manuals, using the necessary test equipment and observing applicable safety precautions.

- Additional examples are found in this chapter and in Volume II, Tab A-3.

SECTION 3.0 AN LO IS MADE UP OF THREE ELEMENTS.

3.1 Behavior. What the trainee is expected to do (performance) after training. The behavior element is made up of three parts:

- Subject. The trainee is always the subject. If not specifically stated, the trainee is understood to be the subject.
- Verb. Use a performance action verb to state what the trainee is expected to do. The action must be observable and measurable. Examples include adjust, align, troubleshoot, and operate. Figure 4-1 contains a more complete list of action verbs for your use. If you have any doubt regarding the performance validity of a verb, verify the verb in the dictionary.
- Object. The object is what the performance action verb acts upon. This may be a single word or group of words.

EXAMPLE: SOLVE addition, subtraction, and multiplication problems. In the example above the *subject* is the *trainee*, the *performance action verb* is *solve*, and the *objects* of the action verb are the *addition, subtraction, and multiplication problems*.

PHYSICAL SKILLS		MENTAL SKILLS	KNOWLEDGE COMMUNICATION	ADMINISTRATIVE SKILLS
accomplish	isolate	achieve	communicate	administer
adjust	load	analyze	define	coordinate
align	locate	calculate	describe	decide
apply	manipulate	choose	explain	deliver
balance	measure	compare	express	draw
calibrate	move	compute	identify	fill out
change	operate	condense	illustrate	instruct
check	perform	decide	list	list
clean	plot	derive	name	manage
complete	position	determine	state	report
construct	remove	diagnose	summarize	submit
correct	repair	distinguish	tell	
de-energize	replace	evaluate	write	
demonstrate	show	interpret		
employ	start	monitor		
energize	stop	observe		
enter	test	recognize		
exchange	trace	select		
inspect	troubleshoot	solve		
install	use	synthesize		
	utilize			

FIGURE 4-1: ACTION VERBS

- **Condition**. Circumstances under which the behavior will be performed. You will select these circumstances to clarify the manner in which the behavior in the schoolhouse will be performed.

  EXAMPLE: Given a trainer having a solid state trapezoidal wave generator circuit, multimeter, and oscilloscope.

- Some condition elements list the help or assistance given the trainee in performing the behavior.

  EXAMPLES are in *italics:*

  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.*

- Other condition elements set limits or restrictions on the trainee in performing the behavior element.

  EXAMPLES are in italics:

  FIELDSTRIP the .45 caliber pistol while blindfolded.
  COMPUTE the surface area of a sphere without the aid of a calculator.

3.2 A learning objective may require more than one condition in describing the circumstances in which the trainee will perform the desired behavior in the schoolhouse. In such cases, additional circumstances can be included.

EXAMPLE: The trainee could be required to,
"Use the proper tools to build a frame house,
given boards cut to size."

In writing LOs you can assume that the trainee is to perform under normal classroom conditions -- given paper, pencil, and appropriate instruction. Therefore, these conditions are NOT stated in the LO. Include only meaningful conditions. Do NOT list a condition just to have a condition.

3.3. Standard. How well the trainee is expected to do the behavior. Reflects the quantity and/or quality of trainee performance. Do not state a standard unless the standard is meaningful to the objective. Usually, safety objectives (either knowledge or performance) require 100% correct response. Processes must be "in correct order." Products are +/- a tolerance.

EXAMPLE: Within +/- 10 percent accuracy
and while observing all applicable personnel
and equipment safety precautions.

- See Figures 4-2 and 4-3 for guidelines you can use when writing the standard element of your LOs.

Standards for knowledge objectives are *100 percent unless otherwise stated.*

CRITERIA	WHAT IS SPECIFIED
COMPLETENESS	The precise nature of the output. Number of steps, points, pieces, etc. that must be covered or produced Any quantitative statement that indicates an acceptable portion of the total
ACCURACY	How close to correct the performance must be Exact numbers reflecting tolerances Values or dimensions that the acceptable answers/performance assume
TIME	Exact time to demonstrate the behavior

FIGURE 4-2: CRITERIA FOR STANDARDS IN LEARNING OBJECTIVES

DESCRIBE STANDARDS BY	EXAMPLE
Referring to a Standard Operating Procedure	PERFORM the procedure the pilot follows to complete an instrument landing, given the situational requirements for an instrument approach and the local airfield regulations. The performed steps will be *IN CORRECT ORDER AND WILL COMPLY WITH NAVY INSTRUCTIONS AND LOCAL REGULATIONS.*
Imply the standard of NO ERROR	COMPUTE the surface area of the sphere to *TWO DECIMAL POINTS*, given the diameter of a sphere and a calculator. Adding he/she will perform *"without error"* would not increase the requirements for accuracy.
Specifying minimum acceptance level of performance	MULTIPLY two three-digit numbers, given a calculator, and write the *ANSWER TO THE NEAREST TENTH.* This clearly states the degree of accuracy required for satisfactory achievement of the objective.
Specifying the time requirements	*TYPE* a letter, from a 200-word draft, *WITHOUT ERROR AT A MINIMUM RATE OF 40 WORDS PER MINUTE*. Time is an important factor, so it is included in the objective.
Specifying the rate of production	*TYPE* final report from a draft copy, without error *AT A MINIMUM OF 20 PAGES PER DAY*. The amount produced daily is an important factor, so it is included in the objective.
Specifying qualitative requirements	*ADJUST* a misadjusted carburetor to idle *SMOOTHLY* at 500 rpm, given the necessary tools. Smoothness is a qualitative standard.

FIGURE 4-3: LEARNING OBJECTIVES WITH STANDARDS IN ITALICS

SECTION 4 - UT THE THREE ELEMENTS TOGETHER TO FORM AN LO

Example: MEASURE the output, amplitude, rise time, and jump voltage within +/- 10 percent accuracy, given a trainer having a solid state trapezoidal wave generator circuit, multimeter and oscilloscope, while observing all applicable personnel and equipment safety precautions.

4.1 ALL LOs must have these three elements, whether written or implied:

- BEHAVIOR.
- CONDITION(s).
- STANDARD.

4.2. When possible, write the behavior element first in your LO.

4.3. Before you begin writing LOs from the CTTL, you will need to know the difference between *Terminal Objective (TO)* and *Enabling Objective (EO)*.

SECTION 5 - A TERMINAL OBJECTIVE.

5. Terminal objective:

- Is developed from one or more duties listed on the CTTL.
- Is a learning objective that the trainee will accomplish by the end of the course?
- Indicates the ability to perform those tasks selected for training.

The Course Mission Statement might be confused with a TO. The primary difference is that a TO relates to trainee behavior, while the Course Mission Statement is descriptive of the course – not the trainee.

SECTION 6 - AN ENABLING OBJECTIVE

6. Enabling Objectives:

- Is developed from one or more Tasks listed on the CTTL.
- Is a learning objective that the trainee may accomplish at any point in the course after receiving appropriate training.
- Supports directly the achievement of a TO.
- May support other EOs.
- Identifies the behaviors necessary to demonstrate the achievement of a particular task.

Course indoctrination lessons and course introduction lessons are not supported by duties and tasks listed on the CTTL. In such cases LOs are not required.

SECTION 7 - PROCEDURES FOR WRITING LOs

7. The finalized CTTL completed during the Analyze Phase will contain a listing of all duties and tasks a trainee must complete during a specific course. These duties and tasks become LOs for a course only when appropriate conditions and standards have been added to each statement. All the LOs for the course must support the CTTL items which in turn support the Course Mission Statement. As you go through the steps outlined below, give consideration to the following items:

- Write only LOs that you will measure. If you cannot measure the LO, do not write the objective.
- Write the least number of objectives as possible to support all the CTTL items.
- Use knowledge level verbs such as "explain, describe, and state" to write knowledge TOs and supporting knowledge Eos.

7.1. If you follow the above guidance, you will increase the developer's flexibility in writing curriculum and testing materials.

SECTION 8 - STEPS USED TO WRITE LOs

Consider using the "*Learning Objective Analysis Worksheet*", Figure 4-5, (or similar form) for steps 4 through 8. An example may be found at the end of this chapter.

COURSE:	UNIT:	LESSON TOPIC:	DUTY/TASK I.D. NO.:
FILL OUT ONE SECTION ONLY			
☐ TERMINAL OBJECTIVE NUMBER		☐ ENABLING OBJECTIVE NUMBER	
BEHAVIOR			
CONDITION			
STANDARD			

FIGURE 4-4: LEARNING OBJECTIVE ANALYSIS WORKSHEET

STEP 1: IDENTIFY DUTY CTTL LINE ITEMS

- These will become terminal (end-of-course) objectives.
- It is possible there may be one duty in the entire CTTL.
- Remember, DUTIES directly support the Course Mission Statement.

STEP 2: IDENTIFY THE CTTL TASKS WHICH SUPPORT EACH OF THE DUTIES

- These will become EOs.
- Supporting tasks include all task statements listed under each duty.

If a line item does *NOT* support the Course Mission Statement or a duty, *DELETE* the item from the CTTL.

STEP 3: WRITE A TO FOR EACH DUTY LISTED ON THE CTTL

- Each TO must support the Course Mission Statement.
- Use only performance action verbs for all duties listed on the CTTL with a "S" in the level column.
- Use knowledge verbs for all duties listed on the CTTL with a "K" in the level column.
- Keep the behavior SHORT.
- You may be able to use the exact CTTL duty statement for the behavior element of the TO.
- Modify the behavior element, if necessary, to reflect what the trainee will do in the schoolhouse. The modified behavior must support the Course Mission Statement.
- Add conditions as appropriate.
- Add standards as appropriate.

STEP 4: WRITE PERFORMANCE EOs to SUPPORT PERFORMANCE TOs FIRST

- For all supporting task statements listed on the CTTL with a "S" listed in the level column.
- Use only performance action VERBS.
- Keep the behavior SHORT.
- You may be able to use the same CTTL task statement for the behavior element of the EO.
- Modify the behavior element, if necessary, to reflect what the trainee will do in the schoolhouse. The modified behavior must support the TO.
- One task may result in multiple objectives.
- Tasks may be combined to produce one objective.
- Add conditions as appropriate.
- Add standards at 100 percent unless another standard is listed.

STEP 5: WRITE SUPPORTING KNOWLEDGE EOs

- For all supporting tasks listed on the CTTL with a "K" in the level column.

- To provide information a trainee will need to know in order to master a terminal or enabling objective.

- Knowledge EOs support both performance and knowledge TOs and EOs. Develop at least one Knowledge EO to support Skill TOs.
  - Generate knowledge EOs to support performance TOs if appropriate.
  - Generate knowledge EOs to support performance Eos.

Example: EO behavior element: "INSPECT service pistol."

Knowledge the trainee must learn in order to complete this behavior might be:

Steps required to inspecting the service pistol.
Part/functions of a service pistol.
Safety precautions to be followed while inspecting a service pistol.

A supporting knowledge EO would be written for each of the three supporting knowledge's listed above.

- Follow the basic procedures outlined in steps 4 and 5 to write your supporting knowledge EOs.
- Use knowledge verbs such as describe, explain, or state to write the behavior element.
- The implied standard for knowledge EOs is 100 percent unless another standard is listed.
- The implied condition for knowledge EOs is "from memory" unless otherwise stated.
- Other examples are found in Volume II, Tab A-3.

STEP 6: ASSIGN NUMBERS TO ALL TOs FIRST

- Number each TO with a whole number: 1.0, 2.0, 3.0, 4.0, etc.
- The number assigned to a particular TO should be based on some logical order.

EXAMPLE: In most equipment courses, "operation" would be taught prior to "maintenance." Therefore, the terminal task covering operations will be numbered 1.0, while maintenance will be numbered 2.0.

- See Volume II, Tab A-3 for more numbered TOs.

Learning objective numbering is INDEPENDENT of all other LESSON PLAN numbering.

The following example illustrates the numbering and relationships between TOs and EOs presented in this chapter.

EXAMPLE:

TO 1.0 PERFORM corrective maintenance to the prescribed level (under limited supervision) on a simulated Integrated Weapons System using documented procedures, appropriate test equipment, and applicable safety procedures. (CTTL #16)

EO 1.1 DESCRIBE the characteristics of an Integrated Weapons System.
1.2 EXPLAIN the theory, interfacing, and operation of an Integrated Weapons System.
1.3 STATE the documented maintenance procedures for an Integrated Weapons System.
1.4 DESCRIBE the safety precaution to be observed while operating and troubleshooting an Integrated Weapons System.
1.5 OPERATE a simulated Integrated Weapons System using documented procedures, appropriate test equipment, and applicable safety procedures.
1.6 PERFORM corrective maintenance to the prescribed level on the communication subsystem of an Integrated Weapons System under limited supervision using documented procedures, appropriate best equipment, and applicable safety procedures.

STEP 7: ASSIGN NUMBERS TO EOs

- Assign numbers to supporting EOs according to the TO the EO supports.
- Use decimal numbers to number EOs.
    - First is the number of the TO the EO supports.
    - Second is a sequential number indicating the EO's position among other EOs supporting the TO.

EXAMPLE: An EO numbered 3.5 would be the fifth EO supporting terminal objective 3.0.

- See Volume II, Tab A-3 for more examples.

STEP 8: CROSS REFERENCE EACH TERMINAL OBJECTIVE TO THE CTTL DUTY LINE ITEM NUMBER SUPPORTED

- All duties listed on the CTTL have a number, usually a sequential whole digit: 1, 2, 3, 4, etc.

- List this number in parentheses following each TO.

EXAMPLE: If a TO is "MAINTAIN service pistol, under battlefield conditions per the service manual" and the duty is number "16" on the CTTL, the cross reference would appear:

MAINTAIN service pistol, under battlefield conditions per service manual. (16)

NOTE:

As an aid to tracking, ALL LOs may be identified with their CTTL number. This is an optional practice.

STEP 9: PERFORM QUALITY ASSURANCE CHECK:

9.1. Before you continue, please check your LOs for the following:

- Ensure all CTTL items are supported.
- All have a behavior, condition, and standard.
- All TOs are supported by EOs.

9.2. With a completed set of LOs, you are now able to arrange these objectives in a logical teaching sequence. TOs with their supporting EOs will be listed in the order in which the LOs will be taught. Sequencing procedures are presented in the next section.

SECTION 9 - SEQUENCING LEARNING OBJECTIVES

9.1 Information: You have just completed writing all the LOs for your course. You will now arrange these LOs in a logical teaching sequence. The sequenced LOs are the building blocks for the other course materials.

9.2 Methods of Sequencing LOs:

- Job Performance Order. The order in which the duties and tasks are performed. The sequence is the same as the job sequence. For example, a gunner may learn to load, aim, and then fire the weapon.
- Chronological Order. The sequence flows from Lesson Topic to Lesson Topic on the basis of the order in which the events covered occurred in time. For example, Sailors may be taught about World War I, then World War II, then the Korean War, Viet Nam, and finally Gulf War.
- Critical Sequence. Ordered in terms of their relative importance. For example, a first aid course may address potentially fatal injuries, then permanently disabling injuries, and finally minor injuries.
- Simple to Complex. The 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. Familiar topics are considered before unfamiliar ones. Submariners should study familiar American submarines before attempting to study less familiar foreign submarines.
- Relationships between Objectives. First, determine the relationship between the Los.

    - Dependent Relationship. To master one LO, you must first master some of the other LOs. These are sequenced and taught first.
    - Supportive Relationship. The learning in one LO transfers over to another LO and makes mastery of the second LO easier. These should be sequenced and taught as closely 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. One LO is not related to another LO. You can sequence and teach these as appropriate.

- You may want to reverse one of the sequencing techniques. Lesson topics may be ordered in reverse chronological order or from least critical to most critical. Give consideration to these approaches. The best sequence is the one that works best for the trainees.
- Use one or a combination of the methods described to sequence the LOs in a logical teaching order. Consider this a tentative sequence for the course. The final sequence will be made after the pilot (course tryout). After sequencing, LOs may not be in their original numerical order.

9.3 Major Divisions of the Course:

- When all of the LOs for the course are properly sequenced, the divisions of the course can be identified.

  - The course is first broken down into one or more major divisions called UNITS.
  - UNITS are then broken down into LESSON TOPICS.

- Use the "natural breaks" method to determine both Units and Lesson Topics.

  - Look at your list of sequenced LOs for "major changes" in subject matter content.

EXAMPLE: One system to another.
One subsystem to another
Going from theory/knowledge to performance/skill
Going from operations to maintenance

  - Consider these points as candidates for UNITS.

EXAMPLE: If a course is to provide training on the operation and maintenance of a hardware system, the "natural breaks" would be System Operation, then (depending on the size of the system) Preventive Maintenance, and Corrective Maintenance. Possible UNITS might be Systems Operation, Preventive Maintenance, and Corrective Maintenance.

- Apply a similar process to each UNIT. The "natural breaks" that appear within each unit will be your Lesson Topics.

- In a larger system the Preventive Maintenance (PM) and Corrective Maintenance (CM) "natural breaks" may encompass such a large number of tasks that the divisions would be more properly broken down on the basis of PM and CM on the various subsystems that comprise the system. The sequence would then be System Operation, PM and CM on subsystem "a," PM and CM on subsystem "b," etc., until all subsystems are completed.
- After all LOs have been sequenced into Units and Lesson Topics, assign titles to each Unit and Lesson Topic.

  - Be descriptive of the content of the Unit or Lesson Topic.

EXAMPLE: SCUBA Diving Equipment
Single-Hose Regulators
Universal Gas Laws
Diver Air Supply
SCUBA Equipment Maintenance
Diving Medicine

9.3.1. Assign consecutive numbers to the sequenced Units and Lesson Topics.

- Unit Number. Use whole number digits. Number the first Unit 1, the second 2, the third 3, and continue using consecutive whole numbers until all Units have been numbered.
- Lesson Topic Number. Use digits. The first digit(s) indicates the Unit supported by the Lesson Topic. The second digit(s) indicates the sequence the Lesson Topic is taught.

EXAMPLE: UNIT 3: Power Distribution.
Lesson Topic 3.1: Pole Climbing
Lesson Topic 3.2: Power Distribution Blueprints
Lesson Topic 3.3:
Lesson Topic 3.4:
Lesson Topic 3.5: Setting Utility Poles

In this example the Unit Number is 3. The first Lesson Topic number in the Unit is 3.1; the second Lesson Topic number is 3.2. The remaining Lesson Topics are numbered sequentially in the order in which they are taught.

- See Volume II, Tab A-3 for more samples.
- Frequently the developer must make trade-offs when sequencing the Units and Lesson Topics.
- Such things as the availability of equipment and the amount of time required to prepare for a laboratory session may influence the sequence.

- Whatever the sequence, it must support and help achieve the learning goals established in the objectives.

SECTION 10 - SUMMARY

You will now take the LOs, numbered and sequenced into Units and Lesson Topics, and combine them with other course-related information to produce a document. See Volume II, Tab A-3, TRAINING COURSE CONTROL DOCUMENT (TCCD), for sample CURRICULUM OUTLINE OF INSTRUCTION pages. In the next chapter you will learn how to develop a TCCD for your course. Fortunately, most of the work is already done.

DESIGN PHASE

CHAPTER 5

TRAINING COURSE CONTROL DOCUMENT

INTRODUCTION

The **Training Course Control Document (TCCD)** is the output of the Design Phase and serves as the primary development and management document for a course. The approved TCCD serves as the authority for further development and consolidates the information needed by curriculum developers to create the curriculum and support materials for a course. Thus, careful attention must be paid to the detail, content, and structure of the TCCD.

SCOPE

- Provide an understanding of the purpose of the TCCD.
- Explain the terms which apply to the TCCD.
- Provide guidelines for building the TCCD.

SECTION 1 - DESCRIPTION OF THE TCCD

1. The TCCD is a collection of products that expresses, in summary form, the content, structure, and essential management information for a course. Most of the information has already been developed; in the TCCD it is consolidated in a single document for submittal. The TCCD consists of the following items:

- Front Matter
- Curriculum Outline of Instruction.
- Annexes.

A sample of a typical TCCD can be found in Volume II, Tab A-3 of this manual.

SECTION 2 - TCCD Components

2.1. Front Matter contains:

- Cover Page. The cover page contains the same information as the TPP cover page, with the identifier "Training Course Control Document for (course title)." The cover will be page "1" in the table of contents, but the number will not be printed on the cover page. The cover will carry the original and revised publication dates as appropriate.

- Letter of Promulgation. Issued after successful course pilot, a page is "reserved" as a place marker at this point in the development.
- Record of Changes.
- Table of Contents.
- 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. This data should reflect the course(s) as will be taught from implementation onward. Most times the course data will be the same as the "planned" course data in the TPP.
- Trainee Data. Consists of the following:

    - Personnel Physical Requirements. Physical requirement for a rating (YN, RP, AT, etc.) may be found in the Manual of Navy Enlisted Manpower and Personnel Classification and Occupational Standards, NAVPERS 18068 (Series).
    - Additional physical requirements may be imposed by specialty groups (aircrew, submarine, diver, etc.) which involve many ratings.
    - The current list of specialty groups is located in the Navy Military Personnel Command (NMPC) manual, article 1830180.
    - The specific physical requirement for each of the current specialty groups is found in the Manual for the Medical Department, NAVMED P-117.
    - Physical requirements for training are entered in CANTRAC and revised as necessary.

- Security clearance. This is the security clearance necessary for the course. It is also possible that, and should be noted if, a higher security clearance is required by the teaching site.
- Prerequisites. List the prerequisites required of the trainees that are scheduled to attend the course. Prerequisites may be equipment, rate or rating specific, basic skills, or course specific. Prerequisites normally relate to prior training or skills, not ASVAB scores.

- Obligated service. This information is available in NAVMILPERSCOM manuals. An entry of "In accordance with the Enlisted Transfer Manual" may also be used.
- NOBC/NEC/Military Occupational Specialties (MOS) earned. This information may be copied from the same entry on the Course Data Page.

2.2. Curriculum Outline of Instruction (COI): Guidelines for the COI are discussed in Chapter 4 of this Volume. See Volume II, TAB A-3 for sample COI pages.

2.3. TCCD Annexes: TCCD annexes provide the resource requirements and time allocations for the training course.

- Resource Requirements List (RRL). The RRL is a composite listing of all the material needed to conduct training. For example:
    - Items listed in the TPP RRL such as facilities modifications are now assumed to be in place and are not included in the TCCD RRL.
    - Quantities of training items listed are the numbers required to conduct the course. A TPP RRL for Revision may require only six more of an item to support the revision, but a total of 30 items are needed to support the revised course.
    - The TCCD RRL may contain more line items within a category of items, or more categories of items than the TPP RRL. This is because the development effort is further along and requirements may have been identified which were not known at the time the TPP was developed.

- Items to be included:
    - Texts. List all the text materials, such as LESSON PLAN (LP), instruction sheets NOT contained within a TRAINEE GUIDES (TG), that are used in the course. Identify texts by Navy number and title, and indicate the number of copies allocated per instructor, per trainee, and per class for one convening of the course.

- References. List, in alphanumeric order, all the reference documents used in conducting the course. Again, indicate the number of copies allocated per instructor, per trainee, and per class for one convening of the course.
- Equipment. This includes all the equipment, special tools, and test equipment required to conduct the course. List as appropriate:

  - Technical training equipment by Make (Mk), Model (Mod), and official name

  - Specialized test equipment and instructional tools such as mock-ups and models.

  - Computer terminals used in support of computer-based instruction.

  - Common hand tools and general purpose test equipment. Do not individually list tools and equipment that are given a group listing in a technical manual, such as TM-09-2320-289-30 Tools and Test Equipment.

- Pre-faulted modules:

  - VI and IMM. List films, videotapes, videodiscs, transparencies, wall charts, photographs, slides, etc., used in the course. Interactive Courseware (ICW) packages will be included in this grouping.
  - Other. If required, list any other materials not applicable to the other headings.

- Course Master Schedule (CMS). The CMS and Master Schedule Summary Sheet will be developed in accordance with NETCINST 1510.1. The CMS places the Units and Lesson Topics of the Curriculum Outline of Instruction into a time schedule.
- Consideration must be given to grouping topics for continuity. For example, a practical application session is best if carried through to its conclusion on the same day.
- Try to keep closely related Lesson Topics grouped so that one topic is not left to the next day or over a weekend.
- Tests are usually placed at approximately 40-50

- Instructional hour intervals throughout the course or at any point in the course deemed necessary to properly evaluate knowledge/skill level. Test development is the subject of Chapter 8 of this volume. Here, the consideration is to place knowledge and performance tests at points where evaluation should occur. Decisions made here will form the basis for developing tests and a testing plan in accordance with NAVEDTRA 135(Series).
- The periods shown for each Lesson Topic contain the total course periods required to present the Lesson Topic. Here, it is important to differentiate between curriculum periods (the unconstrained time that would be required to teach the lesson topic classroom and labs, as shown in the LESSON PLAN) and course periods (the periods needed to teach all sections of the class, including bottleneck periods). Curriculum periods do not include testing. The total course length will be the sum of the course hours, testing periods, and authorized administrative periods.
- The development of the Course Master Schedule and Course Master Schedule Summary Sheet are important because of their use for instructor/support personnel computations.
- See NETCINST 1510.1 for detailed instructions.

SECTION 3.0.

SUMMARY: The CCA will review and approve the TCCD for compliance with NAVEDTRA 130 (Series) guidelines. The developer will review the TCCD throughout the development process for currency, adequacy, and accuracy. Changes in subsequent documents, such as changes in objectives which may be made during the development of the LESSON PLAN, will affect the TCCD.

DEVELOP PHASE

CHAPTER 6

LESSON PLAN

INTRODUCTION

Curriculum materials are a plan for learning. The care and accuracy devoted to developing them will affect the quality of the results. Curriculum materials consist of a LESSON PLAN, a TRAINEE GUIDE (TG) or individual instruction sheets, Tests/Test Items and support material.

During the Plan Phase, the need for new or revised training is identified and documented in the TPP. The scope of the training required is determined in the Analyze Phase and summarized in the CTTL. The CTTL duties and tasks selected for training in a particular course are then translated during the Design Phase into terminal and enabling objectives which are recorded in the TCCD. In the Develop Phase, curriculum materials are developed to support the objectives.

This chapter will discuss LESSON PLANS. The following chapters will discuss the remaining curriculum materials designed to supplement the instructor's presentation or to assist the trainee.

> Development of the *LESSON PLAN, TRAINEE GUIDE* 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

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

> *COURSE MODIFICATIONS*
> Course revisions and modifications are discussed in Volume III, Chapter 7
>
> Identification of LESSON PLAN elements/pages affected by a revision or modification are 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

2.1. The LESSON PLAN, depicted in Figure 6-1, consists of the following minimum elements:

- Front Matter.
- Lesson Topics.

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 LESSON PLAN. Volume II, Tab A-4, contains a sample of a LESSON PLAN which meets the minimum requirements of this manual.

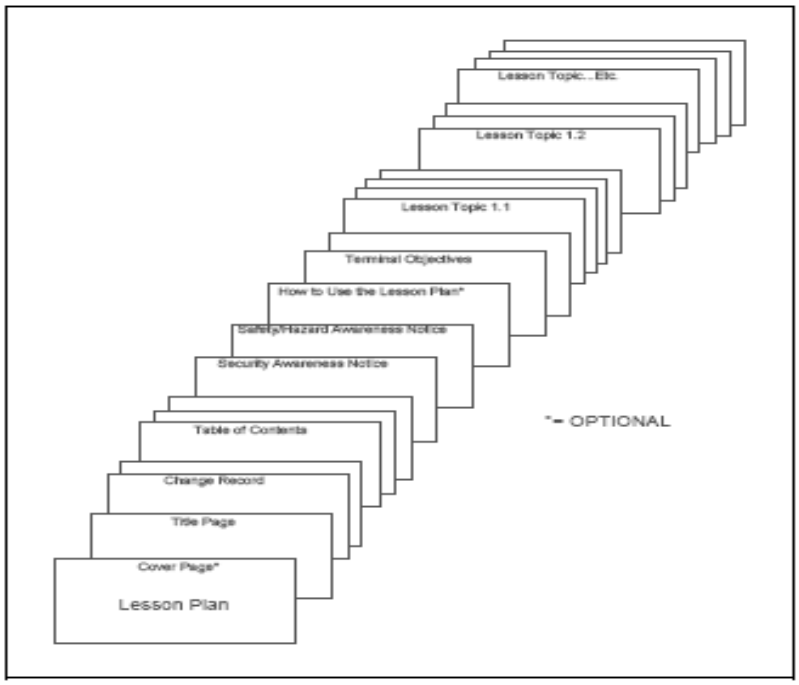

FIGURE 6-1: LESSON PLAN ORGANIZATION

2.2. 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 LESSON PLAN (Optional).
    - Terminal Objectives Page(s).
- Each page except the Cover and Title pages:
    - Has a two-line running header consisting of:
    - The phrase LESSON PLAN.
    - The course CIN.
    - See LESSON PLAN in Volume II, Tab A-4, for an example of the layout.
    - If there are multiple volumes, the volume number will follow the CIN.

2.3. COVER PAGE (Optional)

- Printed on heavy paper stock or equivalent material.
- Optional at the CCMM's or the CCA's direction.
- If required, the Cover will contain:
    - The phrase LESSON PLAN.
    - Course title.
    - CIN.
    - Security classification (if applicable).
    - CCMM's name and address.
    - CCA's name and address.
    - Date the LESSON PLAN was prepared.
    - An identification seal such as the Navy seal, community logo, or similar illustration may also be added.

2.4. 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 LESSON PLAN.
    - 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 LESSON PLAN).
    - Security classification (if applicable).
    - Name and address of CCMM.
    - Name of CCA.
    - Month and year the LESSON PLAN was prepared. If a revision, the later date is placed in parentheses under the original promulgation date.

2.5. CHANGE RECORD PAGE: The Change Record provides space for recording information related to training materials modifications incorporated into the LESSON PLAN 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.

2.6. TABLE OF CONTENTS PAGE(S)

- Under the heading Table of Contents, for a single volume LESSON PLAN 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 LESSON PLAN:

    - In the first volume, list the complete contents of all volumes in the LESSON PLAN.

- In subsequent volumes, only the Lesson Topics in that volume will be listed by unit, number, and complete title in the order they are taught.

2.7. SECURITY AWARENESS NOTICE PAGE(S): Each LESSON PLAN 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.

2.8. 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.

2.9. TERMINAL OBJECTIVES PAGE(S): Under the heading Terminal Objectives (TO):

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.

- List the TOs in numeric sequence.
- After each TO list the Identification Number of the CTTL item from which it was developed.

Terminal Objectives will be the same as the TCCD CURRICULUM OUTLINE OF INSTRUCTION.

2.10. Lesson Topics

- Lesson Topics are organized into Units and Lesson Topics.
    - Units and Lesson Topics are numbered the same as the TCCD Curriculum Outline of Instruction.
    - 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 LESSON PLAN.
      -Second line contains the Unit number, title and 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.

2.11. TOPIC PAGES:

- The Topic Pages list:

  - Allocation of classroom and laboratory time.
  - Enabling 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 Enabling Objectives, list the enabling objectives in the order they are taught.

- Objectives will be the same as the CURRICULUM OUTLINE OF INSTRUCTION.

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 CURRICULUM OUTLINE OF INSTRUCTION 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 TRAINEE GUIDE, 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.

2.12. DISCUSSION-DEMONSTRATION ACTIVITY (DDA) PAGES

- DDA pages consist of two columns labeled:
  - Discussion Point (DP).
  - Related Instructor Activity (RIA).

- Under the heading Discussion Point list 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 EOs.
-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 Drop on Request (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 EOs.
  -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.

  -Should not usually exceed the fourth level of subheadings

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 LESSON PLAN 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 EOs.
  - 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.

  - 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 TRAINEE GUIDE.
- 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 greater 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 LESSON PLAN 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 that are presented with interesting support materials and which are arranged in a way that enhances learning.

- LESSON PLANS will be oriented horizontally, that is, 11"x 8 1/2" on standard paper. This is often referred to as landscape layout.
- Lesson Plans 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.
- Lesson Plans 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:

Unit number.
Lesson Topic number.
Sequential number, starting with 1.

EXAMPLE: 4-10-3

Note: In this example, 4 is the Unit number, 10 is the Lesson Topic number, and 3 is the sequential page number within the lesson topic.

Revision/Change Date

SECTION 4 - TRAINING MATERIALS MODIFICATIONS

- If components of a LESSON PLAN (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 LESSON PLAN 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 LESSON PLAN 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 part of personalization. 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 - LESSON PLAN/LESSON TOPIC DEVELOPMENT

Lesson Plan/Lesson Topic Development: Some developers can use the content and format guidelines presented in the previous sections to develop new and revised LESSON PLANS or individual Lesson Topics. If a more structured approach is desired, the following seven-step development plan will aid in development of a LESSON PLAN and Lesson Topics:

- Review the Learning Objectives.
- Review the technical documentation.
- Organize the individual Lesson Topics.
- Choose or develop Visual Information (VI) aids and Instructional Media Material (IMM).
- Prepare initial Lesson Topics/LESSON PLAN.
- Conduct Pilot.
- Finalize Lesson Topics/LESSON PLAN.

STEP 1: REVIEW THE LEARNING OBJECTIVES

- Review the CURRICULUM OUTLINE OF INSTRUCTION in the TCCD to determine:
  - The course's Terminal and Enabling Learning Objectives.
  - The course sequence.
  - Any modifications required in the objectives or sequence.
- Objectives may be modified because:
  - The costs associated with performance objectives are 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 Topics may be re-sequenced for reasons such 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 DISTRIBUTION 7000 Serial N1/127189 Dated 15 Sep 2008 and NETCNOTE 1500 N7 Dated 23 Mar 2009. 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 will 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-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 visual information (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.

- 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 LESSON PLAN.

  - Use of computers/word processing equipment in preparing the Lesson Topic/LESSON PLAN 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 6.

- 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/LESSON PLAN: 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.

SECTION 6 - SUMMARY

There should be a smooth transition between points within a Lesson Topic, from Lesson Topic to Lesson Topic and from Unit to Unit. It is the curriculum developer's responsibility to ensure that the instructional material developed makes efficient and effective use of both the instructor's and the trainee's time. The LESSON PLAN described here and the TRAINEE GUIDE, Test Package, and VI/IMM should mutually support one another.

DEVELOP PHASE

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 TRAINEE GUIDE leads the trainee through the Course just as the LESSON PLAN guides the instructor.

Development of the *LESSON PLAN, TRAINEE GUIDE* 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 TRAINEE GUIDE.
- Provide a step-by-step procedure for developing Instruction Sheets/TRAINEE GUIDE.

COURSE MODIFICATIONS Training materials and modifications are discussed in Volume III, Chapter 7 Identification of TRAINEE GUIDE 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-5 of this manual.

SECTION 2 - ELEMENTS OF THE TRAINEE GUIDE

2.1 The TRAINEE GUIDE, as shown in Figure 7-1, consists of the following:

- Front Matter.
- Instruction Sheets.

Occasionally, both individual Instruction Sheets and a TRAINEE GUIDE will be used due to security requirements or changes in equipment or procedures.

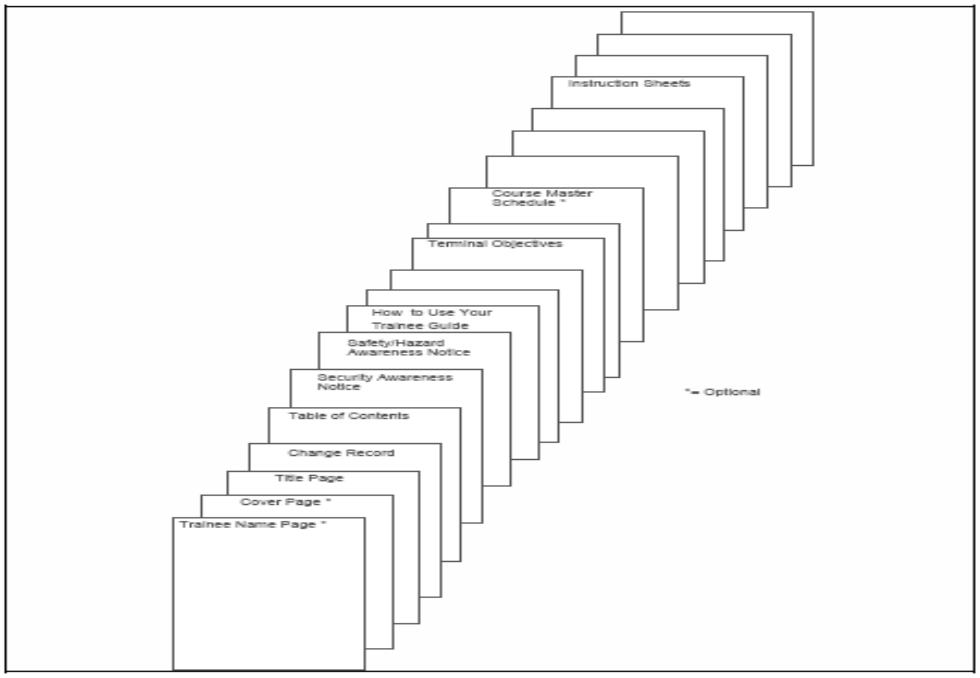

FIGURE 7-1: TRAINEE GUIDE ORGANIZATION

2.1. Front Matter:

- The front matter of the TRAINEE GUIDE 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 TRAINEE GUIDE Page(s).
  - Terminal Objectives Page(s).
  - Course Master Schedule (Optional).

- TRAINEE NAME PAGE:

  - Is optional at the CCMM's or the CCA's direction.
  - Is used to track copies or to hold a trainee accountable for the TRAINEE GUIDE.
  - If required, the Trainee Name Page provides space to record:
  - Between five and ten trainee names.
  - Class number.
  - Each volume of the TRAINEE GUIDE 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 TRAINEE GUIDE for.
    -Course title.
    -Course Identification Number (CIN).
    -Security classifications (if applicable).
    -CCMM’s name and address
    -CcA’s name and address
    -Date the TRAINEE GUIDE 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 TRAINEE GUIDE for.
  - Course title.
  - Course Identification Number (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 TRAINEE GUIDE.
  - Security classification (if applicable).
  - Security classification (if applicable).
  - Trainee Name Block (Optional).
  - Name of CCA authorizing publication.
  - Name of CCMM.
  - Month and year the Trainee Guide 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 TRAINEE GUIDE 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 TRAINEE GUIDE, 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 TRAINEE GUIDE, list:

-In the first volume, a complete listing of the contents of all volumes in the TRAINEE GUIDE.
-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 TRAINEE GUIDE 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 TRAINEE GUIDE shall bear the highest security classification demanded by its contents.

  - Refer to the latest OPNAVINST 5510.1 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, the 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 TRAINEE GUIDE.
  - Under the heading How To Use Your TRAINEE GUIDE, discuss:

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

- TERMINAL OBJECTIVES (TOs) PAGE(S): Under the heading, Terminal Objectives, list the terminal objectives in numeric sequence.

Terminal Objectives will be consistent with the TCCD Outline of Instruction both in content and sequence.

- COURSE MASTER SCHEDULE (CMS) (Optional if not using AIM II):

  - CMS should be made available to each trainee as a handout, part of the TRAINEE GUIDE, or posted in a conspicuous place.
  - If included in the TRAINEE GUIDE, under the heading Course Master Schedule (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 TRAINEE GUIDE 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 Curriculum Outline of Instruction.
  - Units and Lesson Topics are listed in the Table of Contents in the Front Matter for organizational purposes but there are 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 LESSON PLAN. 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 TRAINEE GUIDE.
    -CIN.
    -Revision number in Alpha characters (if appropriate).
    -The phrase Change with number in Arabic numbers (if appropriate).
    -Volume number if a multi-volume TRAINEE GUIDE.
    -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:

- Is titled the same as the Lesson Topic in the LESSON PLAN.
- Under the heading Introduction, has statements concerning the overall scope and content of the Lesson Topic.
- Under the heading Enabling Objectives, lists the enabling objectives.
    - 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.
    - Usually, space will not be provided for note taking.

2.4. Assignment Sheets:

- Is 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 Enabling Objectives, lists the enabling objectives.
    - They will be identical to those listed in the Lesson Topic in the LESSON PLAN.
    - 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:

- Is 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:

- Is titled so as to describe the subject matter of the sheet.
- Is 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:

- Is 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 TRAINEE GUIDE 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:

- Is 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 TRAINEE GUIDE

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 TRAINEE GUIDE, except the following will be omitted from the running header:
    - Volume identification.
    - The phrase TRAINEE GUIDE.

Instruction Sheets and the TRAINEE GUIDE are important parts of the total instructional package. As much thought and attention should go into them as into the LESSON PLAN.

SECTION 4 - TRAINEE GUIDE SPECIFICATIONS

4.1. All TRAINEE GUIDES 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.

Will repeat all elements of the Front Matter for each volume, except for How to Use Your TRAINEE GUIDE, Terminal 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 TRAINEE GUIDE material.

- Generally, a TRAINEE GUIDE 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 LESSON PLAN 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 TRAINEE GUIDE (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 TRAINEE GUIDE 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.

SECTION 6 - TRAINEE GUIDE/INSTRUCTION SHEET DEVELOPMENT

Some developers can use the content and format guidelines presented in the previous sections to develop a new or revised TRAINEE GUIDE or individual Instruction Sheets. If a more structured approach is desired, the following five-step development plan will aid in development of a TRAINEE GUIDE or Instruction Sheet.

- The five steps are:
  - Review the Lesson Topic and technical documentation.
  - Select appropriate Instruction Sheet.
  - Prepare initial Instruction Sheets/TRAINEE GUIDE.
  - Conduct Pilot.
  - Finalize Instruction Sheets/TRAINEE GUIDE.

STEP 1: REVIEW THE LESSON TOPIC AND TECHNICAL DOCUMENTATION

- Review the Lesson Topic to determine the topic's:

- Place in the course sequence.
- 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 TRAINEE GUIDE.

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.
  - 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, Instructional Media Material (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/TRAINEE GUIDE

- Prepare Instruction Sheet drafts which meet the Instruction Sheet format requirements.

  - Use of electronic media in preparing the Instruction Sheets/TRAINEE GUIDE 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 TRAINEE GUIDE.

- Determine quantity of Instruction Sheets used.

  -If the number of Instruction Sheet pages would exceed the number of Front Matter pages, create a TRAINEE GUIDE.

- Determine requirement to control classified material.

  -TRAINEE GUIDES 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 TRAINEE GUIDE.

- 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 6.

  - 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/TRAINEE GUIDE

- Revise and prepare the final versions of the instructor, trainee, and support materials including tests and instructional media.

- Chapter 6 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.

SECTION 7.0 SUMMARY

Instruction Sheets and the TRAINEE GUIDE reinforce or supplement training provided in the formal training environment by the instructor. Instructions Sheets should be used when the material is not available or not easily found in the technical manuals and other official documents the trainee will use on the job.

DEVELOP PHASE

CHAPTER 8

TEST 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.

Organization of this chapter. 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 8-1 below lays out the Testing process in the order that events should occur:

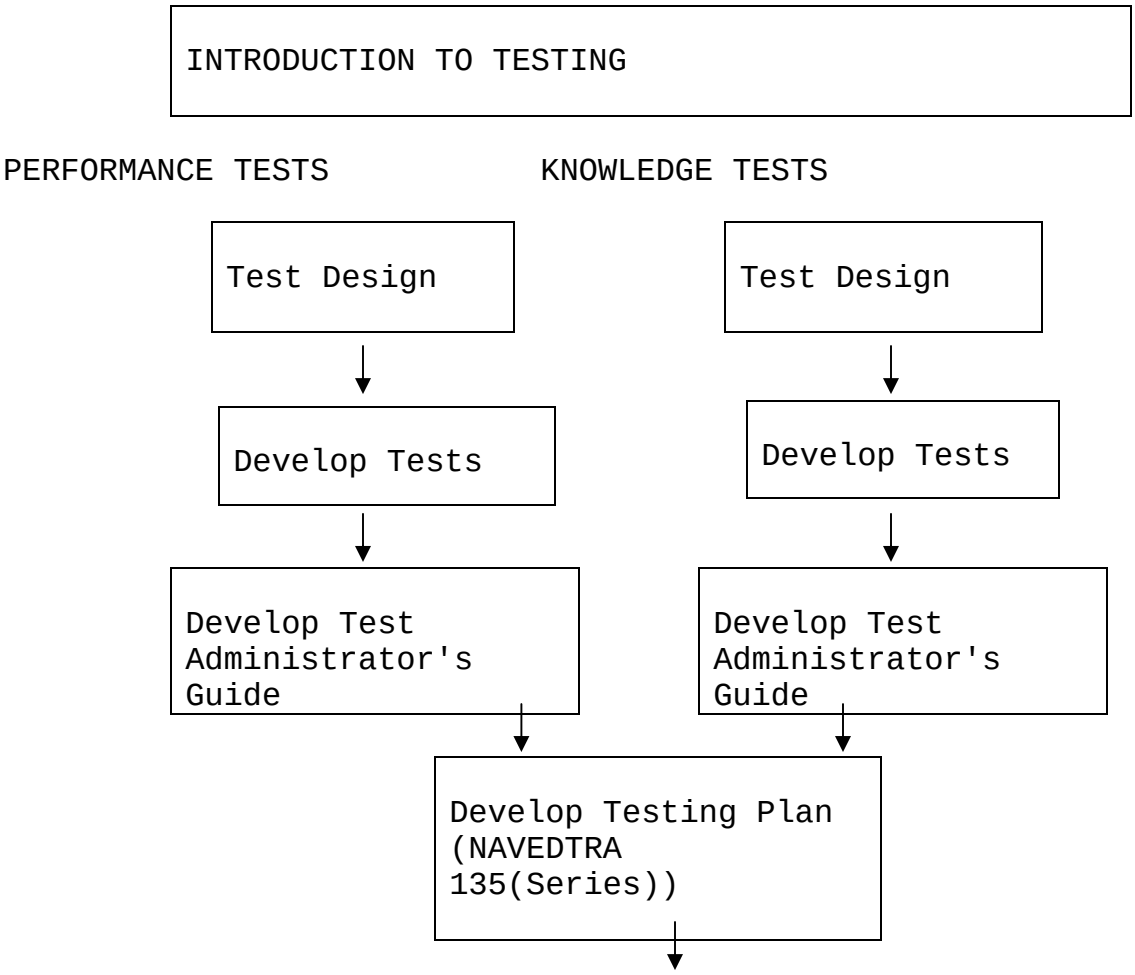
INTRODUCTION TO TESTING
PERFORMANCE TESTS
KNOWLEDGE TESTS
Test Design
Develop Tests
Develop Test Administrator's Guide
Test Design
Develop Tests
Develop Test Administrator's Guide
Develop Testing Plan (NAVEDTRA 135(Series))
Pilot Tests As Part of Course Pilot and Implementation Phase

Diagram 8-1

SECTION 1 - INTRODUCTION TO TESTING

1.1. Definitions:

- Tests are the primary tool for determining trainee attainment of the TOs/EOs and, therefore, his/her relative success in the course. Progress/Comprehensive tests are considered formal tests. Critical LOs 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 evaluations, usually according to a level of success, e.g., go/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 LOs, 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 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 LOs 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.

  - LOs importance to the overall course mission.
  - LOs importance to on-the-job performance.

- Rank order or group LOs by category of criticality:

  - Rank ordering of LOs consists of placing them in a list ranging from most critical to least critical. If a course has 20 performance LOs, 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 LOs must be formally tested. Less critical LOs 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 LOs ranked in the upper 66% are most critical. They require formal testing. LOs ranked in the lower 33% 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 LOs from which to build the tests.

2.3. Develop Performance Tests:

- 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, TRAINEE GUIDE, 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 TO or a skill EO.
- Job Sheets also provide a means for the trainee to apply knowledge obtained during instruction and may, 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 present 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. This 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).

- 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 - 1 and Figure 8 - 2, 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.

- For 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 8-1: 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 (10) 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 8-2: 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".	0, -5, -10
2.	Installed sill plates within 1/8" 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".	0, -5, -10
4.	Measured, marked, and squarely cut each joist To specified length, within 1/8”	0, -5, -10
5.	Aligned header and floor joists (Crown up) within 1/8" of specified location and height	0, -5, -10
6.	Snapped chalkline across floor joists on centerline of building, within 1/8”	0, -5, -10
7.	Placed and secured bridging staggered 1 1/2" off center, within 1/8”	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" 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 8-3: 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 which 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" of specification	= -0 points
Any product dimension 3/16" out of specification	= -5 points
Any product dimension more than 3/16" 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 8-4: 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 8-5: 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. 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.
    e.
    f. 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.

4. Orally quiz student on applicable safety precautions using questions from the evaluation checklist.

5. If the trainee fails a critical step remediate by _____.

FIGURE 8-6: 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 LOs, 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 LO:
    - 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 LOs 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 is understanding 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 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 an LOs 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.
  - LOs importance to the overall course mission.
  - LOs importance to on-the-job performance.

- Rank order or group LOs by category of criticality:

  - Rank ordering of LOs consists of placing them in a list ranging from most critical to least critical—A course has 20 knowledge Ls. 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 LOs must be formally tested. Less critical LOs 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 LOs ranked in the upper 66% are most critical. They require formal testing. LOs ranked in the lower 33% 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 LOs from which to build the tests.

NOTE:

See Addendum 8—B for an in-depth discussion of knowledge test design.

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 test 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 8–7 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 8-7: SAMPLE INSTRUCTIONS FOR THE ADMINISTRATOR

- Develop Test Instructions to the Trainee, including:

See Figure 8—8 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.

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.

FIGURE 8-8: 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

4. 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. The Booklet includes:

- Cover Page.
- Test Questions.
- Answer Sheets.
- All pages are numbered consecutively, following the Cover.

5.1. Cover Page: As per the Volume II example, plus:

- Security classification if applicable—must appear on the page.

5.2 Test Questions:

- All test questions should be numbered.

5.3. 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) scratches paper and answer sheets.
- Describe, for At the Completion of Testing, as appropriate.
- How to secure the test area.
- 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: This includes:

- 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.

Note: 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:

PERFORMANCE TYPES:	**KNOWLEDGE TEST ITEMS:**
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.
- This is also the outline for this Addendum.

SECTION 2 - DETERMINE OBJECTIVES REQUIRING FORMAL TESTING

2.1. The following rules apply:

- All LOs must be measured.
- Formal testing of LOs may be accomplished by:
    - Testing each TO individually and none of its related EOs.
    - Testing the EOs which, as a group, equal the TO.
    - Testing a TO, or some part there of, and some of its supporting EOs.
    - Any combination of the above during the course.
- Informal measurement or testing of LOs may be accomplished by:
    - Class work or homework assignment.
    - Practical work supported by a Job Sheet.
    - Informal quiz.
    - EOs will be tested as necessary to ensure that the prerequisite skills/knowledge supporting the TOs is being acquired.

2.2. When you have completed this process: You will have one set of Performance LOs and one set of Knowledge LOs from which to build the tests.

2.3. The next step in the process of test design is:

- To take each Performance LO, one-by-one, and decide WHAT you will be testing for (a process or a product).
- When finished with these LOs you will then take each of the Knowledge LOs 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 duty/tasks result in the making of a product. Yeoman and Personnel Specialist 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

4. 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 LO (you should have already done this for the Performance LOs, 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 vonstraints (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 to administer 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% to 100% 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 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 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 - 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— As a rule, 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/less critical objectives are measured on the same test the critical objective(s) should have more items to ensure 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 LO 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 item is:

- 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 capita 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.

3.11. KNOWLEDGE TEST.

- 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 testing of MARANDA.

- Stating the correct alternative in greater detail than the other alternatives. This often clues 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) Power from the ship control center may be present in MCC since it only goes through the SHIP JP.

- 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) Secure the front panel to the chassis.
(b) Make sure the front panel is secure.
(c) Set manual test switch to "OFF."
(d) Rerun the diagnostic tests.

- Using alternatives that are included in other alternatives. This causes confusion for the trainee.
- Example—error underlined (note that alternative 2 includes alternative 1. Therefore, if alternative 2 is correct, then so is alternative 1):

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.

3.13. This concludes the discussion:

- Of how to develop Multiple Choice Test Items.
- Next, we will discuss how to develop True-False Test Items.

SECTION 4 - DEVELOP TRUE-FALSE KNOWLEDGE TEST ITEMS

4.1. 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% 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.

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.

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. Bl0
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:

- The 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.
- The 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:

- The grading criteria should list all essential data a knowledgeable trainee can be expected to provide.
- The model answer/grading criteria are used as the standard answer by which all other answers are scored.
- 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

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 — 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 meet all criteria above?

9.3. This finishes the discussion of this Addendum:

- Go next 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.

DEVELOP PHASE

CHAPTER 9

VISUAL INFORMATION

AND

INSTRUCTIONAL MEDIA MATERIAL

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, TRAINEE GUIDES, and TEST PACKAGES. You are now ready to begin work on the Visual Information (VI) that supports the LESSON PLANS and TRAINEE GUIDES 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 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 Video Information Manager will assist you in gathering information and completing required forms.

OPNAVINST 5290.3, SECNAV 5870.4A, and NETCINST 3140.1 defines the VI products exempt from production reporting requirements. Exemptions include graphics and overhead transparencies.

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:

- Visual Information (VI). Use of one or more of the various visual media 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 and MILHDBK 29612-3A)
- Instructional media materials (IMM). 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 LESSON PLAN.

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

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 learning objectives, based on an evaluation of the course.

Development of professional-looking, instructionally effective VI materials is costly and time consuming. NAVEDTRACOM 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 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.

- VI materials selection and application has three basic components:

  - 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 Learning Objectives.
  - 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)

Note: 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 Learning Objective(s).
- Review LOs to determine if multiple learning objectives could be supported by a single VI item (such as a videotape or slide presentation).
- 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

2. Audio Presentation: (Applications, advantages, disadvantages, and cost considerations).

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. See your command's VI Manager.

SECTION 3 - SLIDE PRESENTATION

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.
- May be programmed by a LESSON PLAN, audio cassette 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. In accordance with NETCINST 3104.1. See your command's VI Manager.

SECTION 4 - TRANSPARENCY AND DIGITAL STILLS

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, Encl (1), para. 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 LESSON PLANS.
- 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. In accordance with NETCINST 3104.1. 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 LESSON PLAN.
    - Directs the Instructor to provide information while addressing the Wall Chart as a visual to amplify the information being presented.
- In general, Wall Charts:

- 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. In accordance with NETCINST 3104.1. 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:

- Consists of a single lesson or a series of lessons designed to support selected learning objectives.
- In effect, a self-study learning package.
- Requires 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 proceed 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.

SEE ADDENDUM 9-A FOR DEVELOPMENT PROCEDURES.

SECTION 8 - SUMMARY

Development of the appropriate VI materials and IMM starts when all Learning Objectives 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 Learning Objectives 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 Learning Objectives do not currently exist, refer to Chapters 3, 4 and 5 of this manual for analysis and development procedures prior to continuing.

- Evaluate Learning Objectives and determine the overall goal or theme of the OJT Handbook.
- Evaluate Learning Objectives 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 Learning Objectives of the OJT Handbook in a logical teaching sequence.
- The Learning Objectives 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 Learning Objectives. 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:

- LEARNING OBJECTIVES: 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 Learning Objectives.

  - The results of the Lesson Pretest are used to direct trainees to specific study assignments to correct the identified weaknesses.
  - Use the procedures for Test Item Development contained in Chapter 8 of this manual.
  - One question per Learning Objective 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. 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 Learning Objectives 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 Learning Objectives 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 Learning Objectives, 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 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 Learning Objective(s) being supported.
- Classification markings are appropriate.
- Lesson sequence supports the OJT Handbook outline.
- Each knowledge lesson Learning Objective is tested on the Lesson Pretest.
- Each question on the Lesson Pretest has a corresponding question on the End-of-Lesson Test.

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).

Piloted 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 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/Sub-activity 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
CCA	Curriculum Control Authority
CCMM	Course Curriculum Model Manager
CDP	Course Data Processing
CeTARS	Corporate enterprise Training Activity Resource System
CARIS	Corporate Automated Resource Information System
CIN	Course Identification Number
CM	Corrective Maintenance
CMS	Course Master Schedule
CNP	Chief of Naval Personnel
COG/NIIN/SMIC	Cognizance Code/National Item Identification Number/Special Material Identification Code
CPATS	CNET Program Automated Tracking System
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
FEA	Front End Analysis
ICW	Interactive Courseware
IETM	Interactive Electronic Technical Manual
ILE	Integrated Learning Environment
IMI	Interactive Multimedia Instruction
IMM	Instructional Media Material

ISD	Instructional Systems Design
ITRO	Interservice Training Review Organization
JDTA	Job Duty Task Analysis
JTI	Job Task Inventory
KM	Knowledge Management
LC	Learning Center
LO	Learning Objective
LP	Lesson Plan
LS	Learning Site
LSAR	Logistics Support Activity Record
LSO	Learning Standards Officer
MCFR	Master Course Reference File
MILCON	Military Construction
NALC	Navy Ammunition Logistics Code
NCMR	Navy Curriculum Materials Repository
NEC	Navy Enlisted Classification
NETC	Naval Education and Training Command
NETPDTC	Naval Education Training Professional Development and Technology Center
NITRAS	Navy Integrated Training Resources Administration System
NKO	Navy Knowledge Online
NOBC	Navy Officer Billet Classification
NPC	Navy Personnel Command
NTFS	Navy Training Feedback System
NTSP	Navy Training System Plan
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
SM&R	Source, Maintenance, and Recoverability code
SME	Subject Matter Expert
SYSCOM	Systems Command
TA	Training Agency
TCCD	Training Course Control Documents
TDSR	Training Decision Summary Report
TG	Trainee Guide

TO	Terminal Objective
TPP	Training Project Plan
TSA	Training Support Agency
TTE	Technical Training Equipment
TTO	Training Time Out
VI	Visual Information
WC	Wall Charts