NONRESIDENT TRAINING COURSE

April 1995

Utilitiesman (Advanced)

NAVEDTRA 14259

Although the words "he," "him," and "his" are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

COMMANDING OFFICER
NETPDTC
6490 SAUFLEY FIELD RD
PENSACOLA, FL 32509-5237

ERRATA #3 21 May 99

Specific Instructions and Errata for Nonresident Training Course

UTILITIESMAN ADVANCED

1. No attempt has been made to issue corrections for errors in typing, punctuation, etc., that do not affect your ability to answer the question or questions.

2. To receive credit for deleted questions, show this errata to your local course administrator (ESO/scorer). The local course administrator is directed to correct the course and the answer key by indicating the questions deleted.

3. Assignment Booklet

Delete the following questions, and leave the corresponding spaces blank on the answer sheets:

Questions

1-27
1-35
5-43
6-46
7-60
7-61
8-16
8-32
8-33
8-34
8-35
8-41
8-46
8-66
8-68

PREFACE

By enrolling in this self-study course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program.

THE COURSE: This self-study course is organized into subject matter areas, each containing learning objectives to help you determine what you should learn along with text and illustrations to help you understand the information. The subject matter reflects day-to-day requirements and experiences of personnel in the rating or skill area. It also reflects guidance provided by Enlisted Community Managers (ECMs) and other senior personnel, technical references, instructions, etc., and either the occupational or naval standards, which are listed in the *Manual of Navy Enlisted Manpower Personnel Classifications and Occupational Standards,* NAVPERS 18068.

THE QUESTIONS: The questions that appear in this course are designed to help you understand the material in the text.

VALUE: In completing this course, you will improve your military and professional knowledge. Importantly, it can also help you study for the Navy-wide advancement in rate examination. If you are studying and discover a reference in the text to another publication for further information, look it up.

1995 Edition Prepared by
UTCS(SCW) Paul W. Ross, Jr.

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Sailor's Creed

"I am a United States Sailor.

I will support and defend the Constitution of the United States of America and I will obey the orders of those appointed over me.

I represent the fighting spirit of the Navy and those who have gone before me to defend freedom and democracy around the world.

I proudly serve my country's Navy combat team with honor, courage and commitment.

I am committed to excellence and the fair treatment of all."

CONTENTS

REGULATIONS ON ENVIRONMENTAL POLLUTION AND HAZARDOUS MATERIALS

Environmental Pollution and Hazardous Waste Handling and Disposal programs have been Enacted and are United States Law. These programs are of immense importance and should be taken into consideration during the planning stages before beginning any new construction or rehabilitation project.

As a member of the Naval Construction Forces, United States law requires you to be constantly aware of potential environmental pollution hazards or hazardous material spills and to report them to your immediate supervisor or other senior personnel at the earliest possible time.

The following list of directives contains information on the cognizant government departments and the procedures for preventing, reporting, and correcting environmental pollution hazards and hazardous materials disposal worldwide:

- **Naval Occupational Safety and Health Program Manual, OPNAVINST 5100.23B**
- **Environmental and Natural Resources Protection Manual, OPNAVINST 5090.1**
- **Domestic Wastewater Control, MIL-HDBK 1005/8**

INSTRUCTIONS FOR TAKING THE COURSE

ASSIGNMENTS

The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions. Pay close attention to tables and illustrations and read the learning objectives. The learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS

Read each question carefully, then select the BEST answer. You may refer freely to the text. The answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the course.

SUBMITTING YOUR ASSIGNMENTS

To have your assignments graded, you must be enrolled in the course with the Nonresident Training Course Administration Branch at the Naval Education and Training Professional Development and Technology Center (NETPDTC). Following enrollment, there are two ways of having your assignments graded: (1) use the Internet to submit your assignments as you complete them, or (2) send all the assignments at one time by mail to NETPDTC.

Grading on the Internet: Advantages to Internet grading are:

- you may submit your answers as soon as you complete an assignment, and
- you get your results faster; usually by the next working day (approximately 24 hours).

In addition to receiving grade results for each assignment, you will receive course completion confirmation once you have completed all the assignments. To submit your assignment answers via the Internet, go to:

http://courses.cnet.navy.mil

Grading by Mail: When you submit answer sheets by mail, send all of your assignments at one time. Do NOT submit individual answer sheets for grading. Mail all of your assignments in an envelope, which you either provide yourself or obtain from your nearest Educational Services Officer (ESO). Submit answer sheets to:

COMMANDING OFFICER
NETPDTC N331
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

Answer Sheets: All courses include one "scannable" answer sheet for each assignment. These answer sheets are preprinted with your SSN, name, assignment number, and course number. Explanations for completing the answer sheets are on the answer sheet.

Do not use answer sheet reproductions: Use only the original answer sheets that we provide—reproductions will not work with our scanning equipment and cannot be processed.

Follow the instructions for marking your answers on the answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

COMPLETION TIME

Courses must be completed within 12 months from the date of enrollment. This includes time required to resubmit failed assignments.

PASS/FAIL ASSIGNMENT PROCEDURES

If your overall course score is 3.2 or higher, you will pass the course and will not be required to resubmit assignments. Once your assignments have been graded you will receive course completion confirmation.

If you receive less than a 3.2 on any assignment and your overall course score is below 3.2, you will be given the opportunity to resubmit failed assignments. **You may resubmit failed assignments only once.** Internet students will receive notification when they have failed an assignment--they may then resubmit failed assignments on the web site. Internet students may view and print results for failed assignments from the web site. Students who submit by mail will receive a failing result letter and a new answer sheet for resubmission of each failed assignment.

COMPLETION CONFIRMATION

After successfully completing this course, you will receive a letter of completion.

ERRATA

Errata are used to correct minor errors or delete obsolete information in a course. Errata may also be used to provide instructions to the student. If a course has an errata, it will be included as the first page(s) after the front cover. Errata for all courses can be accessed and viewed/downloaded at:

http://www.advancement.cnet.navy.mil

STUDENT FEEDBACK QUESTIONS

We value your suggestions, questions, and criticisms on our courses. If you would like to communicate with us regarding this course, we encourage you, if possible, to use e-mail. If you write or fax, please use a copy of the Student Comment form that follows this page.

For subject matter questions:

E-mail: n314.products@cnet.navy.mil
Phone: Comm: (850) 452-1001, Ext. 1826
DSN: 922-1001, Ext. 1826
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N314)
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32509-5237

For enrollment, shipping, grading, or completion letter questions

E-mail: fleetservices@cnet.navy.mil
Phone: Toll Free: 877-264-8583
Comm: (850) 452-1511/1181/1859
DSN: 922-1511/1181/1859
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N331)
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 12 points. (Refer to *Administrative Procedures for Naval Reservists on Inactive Duty*, BUPERSINST 1001.39, for more information about retirement points.)

COURSE OBJECTIVES

In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following: Blueprint Reading and Technical Drawings; Planning, Estimating and Scheduling; Planning Plumbing Projects; Fire Protection Systems; Water Treatment and Purification; Sewage Treatment and Disposal; Compressed Air Systems; Boilers; Duct and Ventilation Systems; Air Conditioning and Refrigeration; and Environmental Pollution Control.

Student Comments

Course Title: *Utilitiesman (Advanced)*

NAVEDTRA: 14259 **Date**: _____

We need some information about you:

Rate/Rank and Name: _____ SSN: _____ Command/Unit _____

Street Address: _____ City: _____ State/FPO: _____ Zip _____

Your comments, suggestions, etc.:

Privacy Act Statement: Under authority of Title 5, USC 301, information regarding your military status is requested in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.

NETPDTC 1550/41 (Rev 4-00)

CHAPTER 1

ADMINISTRATION

The information in this chapter has been removed because it is of a general nature and pertains to all seven Seabee ratings. The subject matter has been revised and placed in the Naval Construction Force Seabee/PO 1 & C, NAVEDTRA 12543.

CHAPTER 2

LEADERSHIP AND SUPERVISION

The information in this chapter has been removed because it is of a general nature and pertains to all seven Seabee ratings. The subject matter has been revised and placed in the Naval Construction Force Seabee/PO 1 & C, NAVEDTRA 12543.

CHAPTER 3

FACILITIES MAINTENANCE MANAGEMENT

The information in this chapter has been removed because it is of a general nature and pertains to all seven Seabee ratings. The subject matter has been revised and placed in the Naval Construction Force Seabee/PO 1 & C, NAVEDTRA 12543.

CHAPTER 4

BLUEPRINT READING AND TECHNICAL DRAWINGS

Blueprints, sometimes called prints, are reproduced copies of mechanical or technical drawings. Drawing or sketching is the universal language used by engineers, technicians, and skilled tradesmen.

The term *reading print* is defined as the ability to interpret the ideas of others expressed on drawings and sketches. This chapter has been developed to give you some insight into the preparation and use of blueprints.

DEVELOPMENT OF CONSTRUCTION DRAWINGS

Drawings are generally categorized according to their intended purposes as follows:

- Preliminary drawings
- Presentation drawings
- Shop drawings
- Working drawings

PRELIMINARY DRAWINGS

A building project may be broadly divided into two major phases: the design phase and the construction phase. Preliminary drawings are prepared by the A and E (architects' and engineers') firm during the design phase to promote building development. These drawings are used for exploring design concepts between the designer and the user (customer), making material selection, determining preliminary cost estimates, and as a basis for preparing the finished working drawings.

PRESENTATION DRAWINGS

Presentation drawings show the proposed building or facility in an attractive setting in its natural surroundings at the proposed site. Since presentation drawings are actually used to sell an idea or a design, your only contact with such drawings will be as a cover sheet for a set of construction drawings.

SHOP/WORKING DRAWINGS

After approval has been given for construction, the shop and working drawings are developed. Throughout your career, you will hear these drawings referred to as construction drawings, prints, or plans. Basically, these terms are all correct; they can be used interchangeably.

As mentioned earlier, the construction drawings are developed from the preliminary drawings. With the collaboration of the designer or the architect and the engineer, both the materials to be used and the construction methods to be followed are decided. The engineer determines the loads that the supporting (structural) members will be required to bear and then designs the mechanical systems for the structure; for example, heating, power, lighting, and plumbing.

You will find the construction drawings, the specifications, and the bill of material (BM) your chief source of information during the construction phase of the project.

BLUEPRINT READING

There are several reasons for having construction drawings and why you need

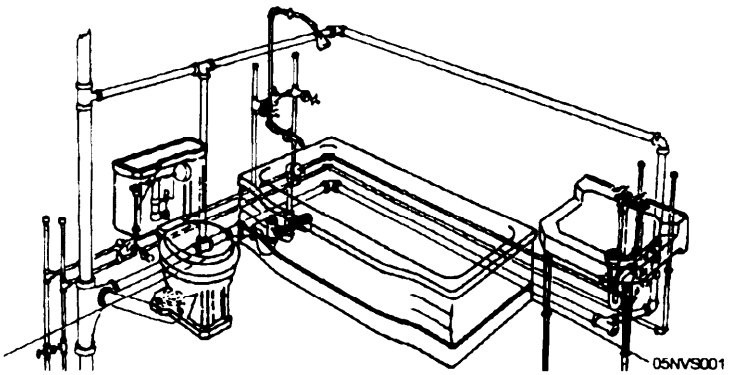

Figure 4-1(A).—Pictorial view of a typical bathroom.

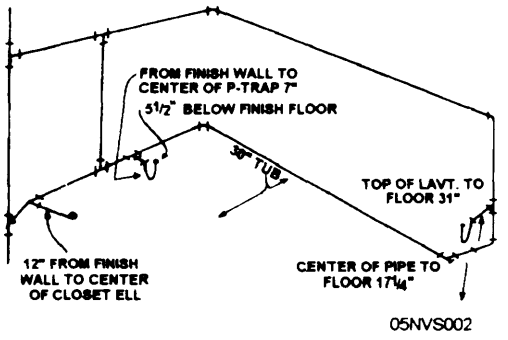

Figure 4-1(B).—Waste and vent.

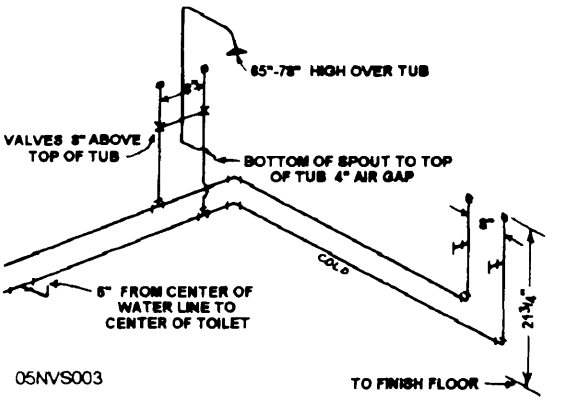

Figure 4-1(C).—Water service.

ability to read and interpret them. Imagine using only written instructions for the construction of a small building. It would take volumes of written material. Trying to understand and visualize all the details involved in a construction project would present a very difficult problem for anyone. For this reason, prints are used. They are also used by the supervisor to monitor the progress of construction.

You must be able to interpret the details, perform the work, and follow directions from these drawings. You must be capable of reading prints and passing along the information contained on the drawings. Figure 4-1(A) shows a typical bathroom. Compare the relationship between the views in figures 4-1(B) and 4-1(C) with 4-1(A)

BLUEPRINT LANGUAGE

There are various ways that a blueprint shows work to be done. Since the written word can be confusing and take up valuable time and space, other means have been developed. These means include various types of lines, symbols, abbreviations, and other methods of providing dimensions and working directions.

TYPES OF LINES USED ON DRAWINGS

The main types of lines a Utilitiesman should be able to read and understand are depicted in figure 4-1(D).

ELECTRICAL SYMBOLS AND ABBREVIATIONS

In addition to using different types of lines, both the architect and the engineer's intentions are communicated through the use of symbols and abbreviations. In the preparation of electrical drawings, most engineers use symbols adopted by the American National Standards Institute (ANSI).

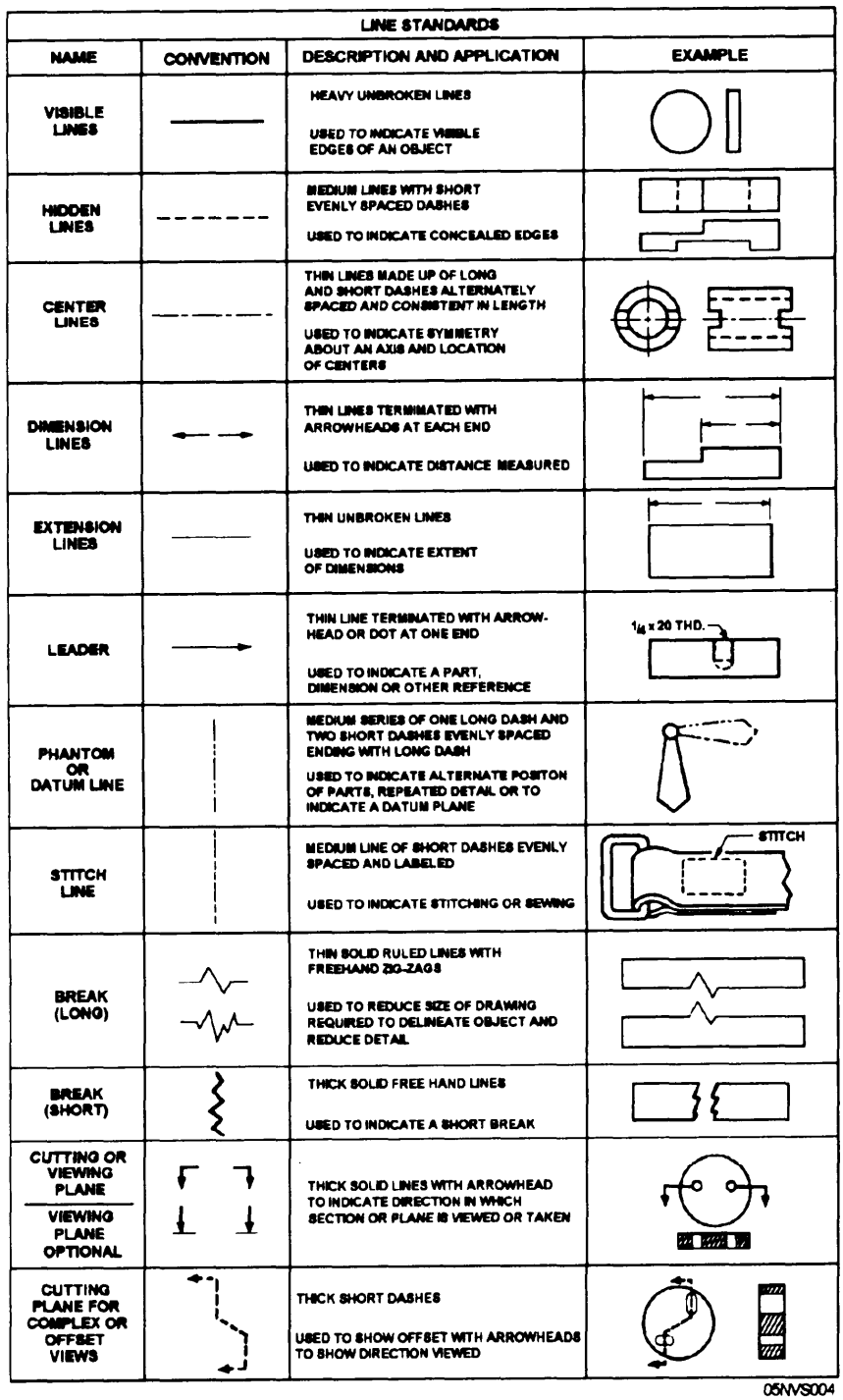

Figure 4-1(D).—Construction drawing lines.