



**NONRESIDENT
TRAINING
COURSE**



November 1996

Steelworker, Volume 2

NAVEDTRA 14251

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
NETPDTIC
6490 SAUFLEY FIELD RD
PENSACOLA, FL 32509-5237

ERRATA #1

29 May 2001

Specific Instructions and Errata for
Nonresident Training Course

STEELWORKER, VOLUME 2, NAVEDTRA 14251

1. This errata supersedes all previous errata. 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, NAVEDTRA 14251.

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

Questions

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3-17
3-18
4-45
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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.

COURSE OVERVIEW: In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following subjects:

- Technical Administration
- Layout and Fabrication of Sheet Metal and Fiberglass Duct
- Structural Terms/Layout and Fabrication of Structural Steel and Pipe
- Fiber Line
- Wire Rope
- Rigging
- Reinforcing Steel
- Pre-engineered Structures: Buildings, K-Spans, Towers, and Antennas
- Pre-engineered Storage Tanks
- Pontoons
- Pre-engineered Structures: Short Airfield for Tactical Support
- Steelworker Tools and Equipment

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.

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SWC Michael P. DePumpo*

Published by
NAVAL EDUCATION AND TRAINING
PROFESSIONAL DEVELOPMENT
AND TECHNOLOGY CENTER

**NAVSUP Logistics Tracking Number
0504-LP-026-8850**

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.”

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SAFETY PRECAUTIONS

Safety is a paramount concern for all personnel. Many of the Naval Ship's Technical manuals, manufacturer's technical manuals, and every Planned Maintenance System (PMS) maintenance requirement card (MRC) include safety precautions. Additionally, OPNAVINST 5100.19 (series), *Naval Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, and OPNAVINST 5100.23 (series), *NAVOSH Program Manual*, provide safety and occupational health information. The safety precautions are for your protection and to protect equipment.

During equipment operation and preventive or corrective maintenance, the procedures may call for personal protective equipment (PPE), such as goggles, gloves, safety shoes, hard hats, hearing protection, and respirators. When specified, your use of PPE is mandatory. You must select PPE appropriate for the job since the equipment is manufactured and approved for different levels of protection. If the procedure does not specify the PPE, and you aren't sure, ask your safety officer.

Most machinery, spaces, and tools requiring you to wear hearing protection are posted with hazardous noise signs or labels. Eye hazardous areas requiring you to wear goggles or safety glasses are also posted. In areas where corrosive chemicals are mixed or used, an emergency eyewash station must be installed.

All lubricating agents, oil, cleaning material, and chemicals used in maintenance and repair are hazardous materials. Examples of hazardous materials are gasoline, coal distillates, and asphalt. Gasoline contains a small amount of lead and other toxic compounds. Ingestion of gasoline can cause lead poisoning. Coal distillates, such as benzene or naphthalene in benzol, are suspected carcinogens. Avoid all skin contact and do not inhale the vapors and gases from these distillates. Asphalt contains components suspected of causing cancer. Anyone handling asphalt must be trained to handle it in a safe manner.

Hazardous materials require careful handling, storage, and disposal. PMS documentation provides hazard warnings or refers the maintenance man to the Hazardous Materials User's Guide. Material Safety Data Sheets (MSDS) also provide safety precautions for hazardous materials. All commands are required to have an MSDS for each hazardous material they have in their inventory. You must be familiar with the dangers associated with the hazardous materials you use in your work. Additional information is available from you command's *Hazardous Material Coordinator*. OPNAVINST 4110.2 (series), *Hazardous Material Control and Management*, contains detailed information on the hazardous material program.

Recent legislation and updated Navy directives implemented tighter constraints on environmental pollution and hazardous waste disposal. OPNAVINST 5090.1 (series), *Environmental and Natural Resources Program Manual*, provides detailed information. Your command must comply with federal, state, and local environmental regulations during any type of construction and demolition. Your supervisor will provide training on environmental compliance.

Cautions and warnings of potentially hazardous situations or conditions are highlighted, where needed, in each chapter of this TRAMAN. Remember to be safety conscious at all times.

SUMMARY OF STEELWORKER TRAINING MANUALS

VOLUME 1

Steelworker, Volume 1, NAVEDTRA 14250, consists of chapters on the following subjects: properties and Uses of Metal; Basic Heat Treatment; Introduction to Welding; Gas Cutting; Gas Welding; Soldering Brazing, Braze Welding and Wearfacing; Shielded Metal-Arc Welding and Wearfacing; and Gas Shielded-Arc Welding.

VOLUME 2

Steelworker, Volume 2, NAVEDTRA 14251, consists of chapters on the following subjects: Technical Administration; Layout and Fabrication of Sheet Metal and Fiber-Glass Duct; Structural Steel Terms/Layout and Fabrication of Structural Steel and Pipe; Fiber Line; Wire Rope; Rigging; Reinforcing Steel; Pre-engineered Structures: Buildings, K-Spans, Towers, and Antennas; Pre-engineered Storage Tanks; Pontoons; pre-engineered Structures: Short Airfield for Tactical Support; and Steelworker Tools and Equipment.

CREDITS

The following copyrighted illustrations in this TRAMAN are included through the courtesy of MIC Industries:

Figure 8-11

Figure 8-24

Figure 8-25

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 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 N331
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you may earn retirement points for successfully completing this course, if authorized 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.)

Student Comments

Course Title: Steelworker, Volume 2

NAVEDTRA: 14251 **Date:** _____

We need some information about you:

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

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

Your comments, suggestions, etc.:

<p>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.</p>
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NETPDTC 1550/41 (Rev 4-00)

CHAPTER 1

TECHNICAL ADMINISTRATION

When you achieve the status of PETTY OFFICER, it becomes your most important advancement in the Navy. Sewing on your first chevron carries many responsibilities with it. Among these responsibilities is the commitment to become an effective supervisor/leader, instructor, and administrator in all military, technical, and safety areas of your rating.

As a petty officer, you will begin to develop your ability to manage the work that is done by your personnel as well as to supervise/lead them.

As you gain experience as a petty officer and increase your technical abilities as a Steelworker, your skill as leader becomes more and more important as you lead/supervise personnel assigned to you. At each rating level, you will be given more responsibility and will be expected to seek the responsibility associated with that particular rating level. The intent of this chapter is to help you understand the importance of leadership, to show you the practical aspects of applying leadership principles coupled with sound administrative practices, and to help you use and prepare the administrative “paperwork” that you will be involved with as a crew leader.

CONSTRUCTION ADMINISTRATION

As your crew leader or supervisor experience grows, you begin to assume greater responsibility for the work of others. As this is occurring, you will also assume greater administrative duties. For this reason, you must understand that proper administration is the backbone of any project. You will have personnel assigned to your project who must be employed effectively and safely. Therefore, you not only have to meet production requirements and conduct training but also must know and apply the procedures required to process “paperwork” correctly,

Administration is the mechanical means that a person or an organization uses to plan, organize, supervise, manage, and document activities. It provides a means of telling you such things as what has been planned, what is required, what has occurred, what is completed, what personnel are assigned, and so on. Try keeping all that information in your head

for even a small assignment/project. You will begin to understand the variety of methods used to administer the job. Administration ranges from just keeping a notebook in your back pocket to filling out a variety of reports and forms.

As a growing leader in the Navy, you must learn about and become effective in the use of administrative tools as well as the tools of your trade. Once you become comfortable with using these tools, you will then develop the skill of a successful administrator who can lead and direct people in getting the job done right and done well.

PLANNING PERSONNEL WORK ASSIGNMENTS

While planning for a small or large project, you must consider the abilities of your crew. Use PRCP data, which will be discussed later in the chapter. Next, consider any special tools and equipment you will need and arrange to have them at the jobsite when the work is started. Determine who will use these tools, and ensure the crew members assigned know how to use them Properly and safely.

To assure that the project is done properly and on time, you should consider the method of accomplishment as well as the skill level (PRCP level) of your crew. When there is more than one way of constructing a particular project, you must analyze the methods and choose the one best suited to the project conditions and the skill levels of your crew. Listen to suggestions from others. If you can simplify a method and save time and effort, by all means do it.

As the petty officer in charge of a crew, you are responsible for crew member time management as well as your own. You must plan constructive work for your crew. Always remember to PLAN AHEAD! A sure sign of poor planning is that of crew members standing idle each morning while you plan the events for the day. At the close of each day, you should confirm the plans for the next workday. In doing so, you will need answers on the availability and use of manpower, equipment, and supplies. Keep the following questions in mind:

1. Manpower. Who is to do what? How is it to be done? When is it to be finished? Since idleness will breed discontent, have you arranged for another job to start as soon as the first one is finished? Is every crew member fully used?

2. Equipment. Are all necessary tools and equipment on hand to do the job? Is safety equipment on hand?

3. Supplies. Are all necessary supplies on hand to start the job? If not, who should take action? What supply delivery schedules must you work around?

Have a definite work schedule and inspection plan. Set up realistic daily goals or quotas. Personally plan to check the work being done at intervals and the progress toward meeting the goals. Spot-check for accuracy, for workmanship, and the need for training.

Organizing

As a crew leader or supervisor, you must be able to ORGANIZE. This means that you must analyze the requirements of a job and structure the sequence of events that will bring about the desired results.

You must develop the ability to look at a job and estimate how many man-hours are required for completion. You will probably be given a completion deadline along with the job requirements. Next (or perhaps even before making your estimate of man-hours), plan the job sequences. Make sure that you know the answers to questions such as the following:

- What is the size of the job?
- Are the materials on hand?
- What tools are available, and what is their condition?
- Is anyone scheduled for leave?
- Will you need to request outside support?

After getting answers to these questions, you should be able to assign your crews and set up tentative schedules. If work shifts are necessary, arrange for the smooth transition from one shift to another with a minimum of work interruption. How well you do is directly related to your ability to organize.

Delegating

In addition to organizing, you must know how to DELEGATE. This is one of the most important characteristics of a good supervisor. Failure to

delegate is a common failing of a new supervisor. It is natural to want to carry out the details of a job yourself, particularly when you know that you can do it better than any of your subordinates. Trying to do too much, however, is one of the quickest ways to get bogged down in details and to slow down a large operation. On some projects, you will have crews working in several different places. Obviously, you cannot be in two places at the same time. There will be many occasions when a crew member needs assistance or instruction on some problem that arises. If he or she has to wait until you are available, then valuable time will be lost. Therefore, it is extremely important for you to delegate authority to one or more of your experienced crew members to make decisions in certain matters. However, you must remember that when you delegate authority, you are still responsible for the job. Therefore, it is very important that you select a highly qualified individual when you delegate authority.

Coordinating

A supervisor must be able to COORDINATE. When several jobs are in progress, you need to coordinate completion times so one can follow another without delay. Possessing coordinating skill is also very helpful when working closely with your sister companies or shops. Coordination is not limited to projects only. You would not want to approve a leave chit for a crew member and then remember a school during the same time period. Nor would you want to schedule a crew member for the rifle range only to find the range coaches unavailable at that time.

Production

The primary responsibility of every supervisor is PRODUCTION. You and your crew can attain your best by doing the following:

- Plan, organize, and coordinate the work to get maximum production with minimum effort and confusion.
- Delegate as much authority as possible, but remain responsible for the final product.
- Continuously supervise and control to make sure the work is done properly.
- Be patient (“Seabees are flexible and resourceful”).