NONRESIDENT TRAINING COURSE

July 2002

Aviation Structural Mechanic (AM)

NAVEDTRA 14315

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."

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.

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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:

https://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:

https://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: n315.products@cnet.navy.mil
Phone: Comm: (850) 452-1001, ext. 1714
DSN: 922-1001, ext. 1714
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N315)
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 20 points. These points will be credited as follows:

12 points for the satisfactory completion of assignments 1 through 8.

8 points for the satisfactory completion of assignments 9 through 13.

(Refer to *Administrative Procedures for Naval Reservists on Inactive Duty,* BUPERSINST 1001.39, for more information about retirement points.)

CREDITS

The following are trademarks used in this Nonresident Training Course.

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Student Comments

Course Title: *Aviation Structural Mechanic*

NAVEDTRA: *14315* **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

GENERAL AIRCRAFT MAINTENANCE

INTRODUCTION

This chapter discusses the various types of routine aircraft maintenance performed by the AM ratings. When performing any type of maintenance, it is your responsibility to comply with all safety procedures and tool control requirements. Because no one set of rules applies to all aircraft, you should refer to the maintenance instruction manual (MIM) for the tools, materials, and procedures required for that particular aircraft or piece of equipment.

TOOL CONTROL PROGRAM

LEARNING OBJECTIVE: Recognize the importance of the Navy's Tool Control Program (TCP).

Major problems, such as aircraft accidents and incidents, may result from tools left in an aircraft after maintenance has been performed. Tools out of place may result in foreign object damage (FOD). To reduce the potential for tool FOD-related mishaps, the Tool Control Program (TCP) provides a means of rapidly accounting for all tools after completing a maintenance task on an aircraft or its related equipment.

TOOL CONTAINERS

The means by which tools can be rapidly inventoried and accounted for is accomplished by using silhouetted tool containers. All tools have individual silhouetted locations that highlight a missing tool. These containers are called "shadow boxes." A shadow (silhouette) of the tool identifies the place where the tool belongs. The TCP is based on the instant inventory concept and is accomplished, in part, through the use of shadow boxes. See figure 1-1. On containers where silhouetting is not feasible, a note with the inventory and a drawing of the container is included. Either system enables the work center supervisor or inspector to quickly ensure that all tools have been retrieved after a maintenance action.

The material control officer is responsible for coordinating the TCP and for ensuring that tools are procured and issued in a controlled manner consistent with the approved tool control plan (TCPL). A TCPL

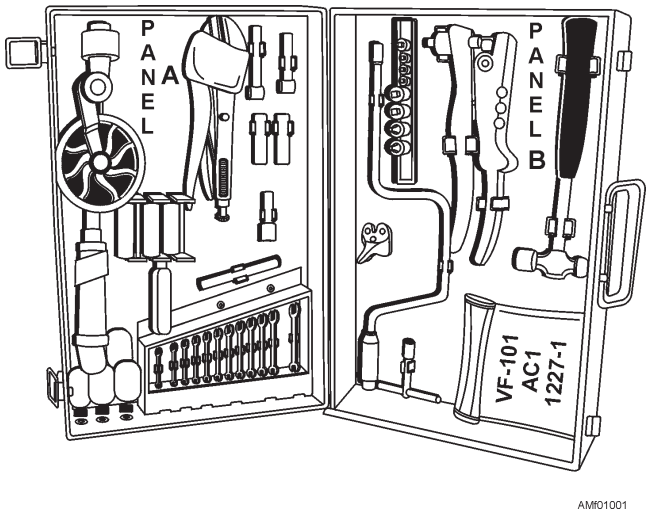

Figure 1-1.—Typical silhouette toolbox.

contains information that includes material requirements, tool inventories, and detailed instructions for the implementation and operation of the TCPL for a specific type/model of aircraft. But the main responsibility relies with the work center and quality assurance.

QUALITY ASSURANCE/ANALYSIS (QA/A) RESPONSIBILITIES

The QA/A division is responsible for monitoring the overall Tool Control Program in the command. While monitoring the program or performing "spot checks," the QA/A division will ensure that tool control procedures are being adhered to. Some of the special requirements are to ensure the following:

1. That all tools are etched with the organization code, work center, and tool container number.

2. That special accountability procedures are being complied with for those tools not suitable for etching; for example, drill bits (too hard) and jewelers screwdrivers (too small).

3. That work center inventories are being conducted and procedures are being adhered to during work center audits and periodic spot checks.

4. That all equipment, in the work centers or tool control centers, that require calibration is scheduled and calibrated at the prescribed interval.

5. That defective tools received from supply are reported to the Fleet Material Support Office (FLEMATSUPPO) via CAT II Quality Deficiency Reports (QDRs).

6. That tools of poor quality are reported to FLEMATSUPPO via CAT II QDRs.

7. That VIDS/MAFs are annotated with a tool container number, and appropriate initials are obtained following task completion/work stoppage.

8. That the department's tool control environment is maintained when work is to be performed by contractor maintenance teams or depot field teams. A QAR will brief field team/contractor supervisor/leader(s) upon their arrival regarding the activity's TCP. Depot teams working in O- or I-level facilities will comply with the host activity's TCP.

WORK CENTER RESPONSIBILITIES

All work center supervisors have specific responsibilities under the TCP. All tool containers should have a lock and key as part of their inventory. The supervisor should be aware of the location of each container's keys and have a way of controlling them. When work is to be completed away from the workspaces (for example, the flight line/flight deck), complete tool containers, not a handful of tools, should be taken to the job. If more tools are needed than the tool container contains, tool tags can be used to check out tools from other tool containers in the work center or from another work center. The following is a list of additional responsibilities of the work center supervisor:

1. Upon task assignment, note the number of the tool container on copy 1 of the VIDS/MAF, left of the accumulated work hours section. A sight inventory will be conducted by the technician prior to commencement of each task, and all shortages will be noted. Every measure must be taken to ensure that missing tools do not become a cause of FOD. Inventories will also be performed before a shift change, when work stoppage occurs, after maintenance has been completed, and before conducting an operational systems check on the equipment.

2. When all tools are accounted for and all maintenance actions have been completed, the work center supervisor signs the VIDS/MAF, signifying that maintenance has been completed and that all tools have been accounted for.

3. If any tool is found to be missing during the required inventories, conduct an immediate search prior to reporting the work completed or signing off the VIDS/MAF. If the tool cannot be located, notify the maintenance officer or assistant maintenance officer via the work center supervisor and maintenance control to ensure that the aircraft or equipment is not released.

If the tool cannot be located after the maintenance officer's directed search, the person doing the investigation will personally sign a statement in the Corrective Action block of the VIDS/MAF that a lost tool investigation was conducted and that the tool could not be found. Subsequently, the normal VIDS/MAF completion process will be followed.

The flight engineer/crew chief (senior maintenance man in the absence of an assigned crew chief) will assume the responsibilities of the work center supervisor applicable to the TCP in the event of in-flight maintenance or maintenance performed on the aircraft at other than home station.

Q1-1. The tool control program is based on what inventory concept?

Q1-2. What officer is responsible for coordinating the tool control program?

Q1-3. What division is responsible for monitoring the tool control program?

Q1-4. Tools of poor quality are reported to what office?

Q1-5. Who has the overall responsibility for control of all tool containers and their keys?

Q1-6. What officer must be notified that a missing tool cannot be found?

OCCUPATIONAL AWARENESS

LEARNING OBJECTIVE: Identify sources of information regarding hazards within the AM rating. Recognize terms applicable to hazardous situations and materials.

Many different materials are used in the workplace. Some are hazardous. You must know where to retrieve information on these materials used in and around naval aircraft. The MIMs give information on correct maintenance practices, but may not always give complete information regarding necessary safety practices.

The Navy Occupational Safety and Health (NAVOSH) program was established to inform workers about hazards and the measures necessary to control them. The Department of Defense has established the Hazardous Material Information System (HMIS), which is designed to acquire, store, and disseminate data on hazardous material procured for use. The primary source for you to get the necessary information before beginning any operation involving the use of hazardous material is the Material Safety Data Sheet (MSDS). The MSDS, known as Form OSHA-20, is shown in figure 1-2. This nine-section form informs

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R 1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION 1

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (Number, Street, City, State, and ZIP Code)	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H20 = 1)	
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Le1	Ue1
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

PAGE (1) (Continued on reverse side) Form OSHA - 20
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Figure 1-2.—Material safety data sheet (page 1).