MARINE CORPS INSTITUTE

THE AIRCRAFT MAINTENANCE NONCOMMISSIONED OFFICER

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THE AIRCRAFT MAINTENANCE NCO JOB AID

1. <u>Purpose</u>: The Aircraft maintenance NCO Job Aid has been published to provide a quick reference for safety and asset conservation in any aviation work center.

2. <u>Scope</u>: This job aid is designed for all Marines serving in an aviation environment.

3. <u>Applicability</u>: This job aid is intended as a guide only. It is designed for Marines of all grades and MOSs.

4. <u>Recommendations</u>: Comments and recommendations on the contents of this job aid are invited and will aid in subsequent revisions.

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CHAPTER 1

SAFETY

Overview

Introduction   This chapter focuses on safety issues common to most maintenance departments, regardless of the type aircraft, equipment supported, or maintenance level. Safety is the first item discussed when a Marine reports to his or her new work center. This discussion should provide a better understanding of the purpose and importance of the safety practices within each work center whether it is an avionics or airframes, an Organizational Maintenance Activity (OMA), or Intermediate Maintenance Activity (IMA).

Aviation Safety Definition   OPNAVINST 4790.2 defines *aviation safety* as…seeks to identify and eliminate hazards. Effectiveness and safety result from properly trained personnel using properly designed equipment under established procedures and competent supervision. It requires active participation by all personnel on a day-to-day basis to obtain desired results. Any safety effort must address the aviation and industrial aspects of safety.

Purpose   Asset conservation is the true goal of a safety program. Assets can be grouped as human or equipment. A more realistic purpose for the aircraft maintenance NCO is to facilitate maintenance activities without death or injury to personnel and without damage to aircraft or other equipment.

Overview, Continued

In This Chapter

This chapter contains the following topics.

Key Personnel and Responsibilities

The Individual Marine

Along with many other maintenance department programs, the safety program requires an "all hands" effort. The program relies on all Marines to be professional, mature, and responsible during the performance of their duties. All Marines must

- Report hazards to the work center supervisor or Quality Assurance (QA) NCO.

- Read and understand all regulations and information posted on the work center safety board.

- Adhere to all safety regulations.

Work Center Safety NCO

The work center supervisor assigns the safety NCO. He or she assists with safety issues and duties in the work center and is responsible to the work center supervisor. This Marine should have the interests of the Marines in the work center and the work center supervisor in mind when performing duties pertaining to safety. As a work center safety NCO, you must

- Familiarize yourself with applicable directives.

- Report all accidents, incidents, or unsafe conditions to the work center supervisor or QA immediately.

- Attend monthly squadron safety committee meetings and be an active participant.

- Maintain close liaison with the QA ground safety NCO on all matters concerning the safety programs for the work center.

Work Center Supervisor

The work center supervisor needs to be aware of all hazards present in the work center and safety regulations pertaining to hazards are in place and enforced. The supervisor must

- Brief all new work center personnel about hazards in the work center and all other hazards in the maintenance department before the new Marine performs any duties.

- Provide much of the initial and recurring safety training once a Marine checks into the work center.

Key Personnel and Responsibilities, Continued

Quality Assurance

OPNAVINST 4790.2 assigns Quality Assurance (QA) the overall responsibility for maintenance department safety. One Quality Assurance Representative (QAR) is assigned to manage the maintenance department's ground safety program. He or she ensures that maintenance practices within the department are conducted in accordance with all applicable safety requirements. The QAR is tasked to

- Disseminate safety posters and literature
- Report all hazards, mishaps, and unsafe maintenance practices in the department
- Conduct safety meetings within the department at least monthly
- Coordinate with the aviation safety officer
- Participate in the activity's safety surveys and stand downs

Key Components of a Work Center Safety Program

Safety Board   One of the most important items is the work center safety board. This board contains all the required safety information and all Marines in the work center are required to read the board. Material Safety Data Sheets (MSDS) are also maintained here.

Safety NCO   Once a safety NCO is assigned, he or she should know all of the hazards in a given work center and ensure that safeguards have been installed. He or she should also review the safety board regularly to ensure the information is current.

Safety Training   Training should focus on hazards that Marines encounter in the work center, including such hazards as electrical component maintenance or inhaling fumes from soldering operations. Another good topic is past accident/mishap reports from work center or division Marines. MSDS located on the safety board are also often used for training.

Safety Committee   To be effective and valuable to the work center, the work center safety NCO must be an active participant in representing his or her work center at the safety committee meetings. When you attend the monthly meetings, talk about preplanned agenda items or issues of concern generated by Marines in the work center. The safety committee is designed to provide all levels of rank an opportunity to interact and exchange information relevant to the department or work center safety program.

Types and Uses of Personal Protective Equipment

Background   Personal Protective Equipment (PPE) is any equipment, clothing, or substance designed to be worn or used to protect the user. As new hazards and safety technologies are discovered, new and improved types of PPE will become available for use in the aircraft maintenance department.

Types of PPE   The following examples do not represent every piece of PPE in existence, but do represent a mixture of different types of PPE currently available through the supply system. Included are typical hazards and potential injuries the PPE is designed to prevent.

PPE	Hazard	Potential Injury
Ear plugs, aural protection	Hazardous noise	Hearing loss
Cranial	Aircraft surfaces, deck, etc.	Head injury
Goggles	Fuel, chemicals, sharp objectives, jet blast, etc.	Eye damage, irritation
Respirator mask	Hazardous fumes, vapors, mists	Lung burning and irritation, loss of consciousness, nervous system damage
Safety boots (non-sparking, steel toe)	Electrical protection, foot protection	Toe and foot damage, electrical burns, and injury due to electricity
LOX gloves	Liquid oxygen and nitrogen	Serious burns, frostbite, and injuries can lead to amputation of fingers
Barrier cream	Airborne chemicals, mainly used for painting	Isocyanate skin contact, dermatitis, other skin problems
Rubber or insulated gloves	Electricity or hazardous chemical/waste	Electric shock, skin problems

When is Personal Protective Equipment Required

Material Safety Data Sheets

Material Safety Data Sheets (MSDS) are located on the work center safety board. Material located on this board is required reading for all work center personnel. The MSDS are maintained on the work center safety board for each hazardous material used by work center personnel. MSDS are frequently used for work center safety training and provides specific instructions regarding the use of PPE.

Reference Manuals

The following manuals address PPE requirements and use:

- NAVAIR 01-1A-509, *Aircraft Weapons Systems Cleaning and Corrosion Control*, contains general corrosion control procedures and the associated safety precautions with which all Marines should be familiar.

- OPNAVINST 4790.2, *Naval Aviation Maintenance Program*, describes corrosion control as an "all hands" effort.

Maintenance Instruction Manuals

Maintenance instruction manuals contain warning and caution statements in the text to inform personnel of hazardous conditions or the use of hazardous materials. If the warning or caution does not specifically state the type of PPE to be used, the MSDS and the work center supervisor should be consulted.

Marine Corps Orders

The Marine Corps Order 5100.23, *Marine Corps Occupational Safety and Health Program*, also lists requirements for PPE. Although general in scope, the order covers hearing and foot protection. A copy of this order is normally maintained in QA or the squadron's safety office.

The Code of Federal Regulations

The Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health Standards is now enforceable on military installations. It is a detailed set of Federal Government safety regulations. It governs every industrial operation from grinding metals to repairing electrical equipment. Military organizations are subject to OSHA visits and inspections and are becoming more familiar with its regulations. The squadron QA and ground safety offices will have a copy of this document.

When and How to Maintain Personal Protective Equipment

Occupational Safety and Health Administration

The following OSHA 29 CFR, Part 1910.132, Subpart I, PPE lists general requirements for the minimum required standard, selection, use, care, and maintenance of PPE.

- 1910.133 Eye and Face Protection
- 1910.134 Respiratory Protection
- 1910.135 Occupational Head Protection
- 1910.136 Occupational Foot Protection
- 1910.137 Electrical Protective Devices

Local Procedures

Many squadrons and IMAs develop maintenance instructions that address PPE requirements. These maintenance instructions sometime require locally generated Maintenance Requirement Cards (MRCs) to be used in regulating the storage and maintenance of PPE.

Personal Responsibility

Every Marine must care for and maintain the work center PPE so that it performs as it was designed.

Material Safety Data Sheets

Background   Federal law requires manufactures of hazardous materials to provide users with Material Safety Data Sheets (MSDS) at the time of delivery. The information on the MSDS, providing you read and understand it, allows anyone using a given material to do so safely and to prepare themselves for any unexpected spill, bodily exposure, or other potential hazardous situation resulting from the use or exposure to the material.

MSDS Data Sections   Data on the MSDS is broken down into several sections. You should understand each section thoroughly before using the material. The typical MSDS consist of the following data sections:

Section	Description
General	• Item name • Manufacturer's name and address • Date the MSDS were prepared
Ingredients/ Identity	• Chemical name(s) • Percentage of each ingredient
Physical/ Chemical Characteristics	• Appearance and odor • Boiling and melting point • Vapor pressure and density • Radioactivity
Fire and Explosion Data	• Flash point and method • Explosive limits • Extinguishing media (type of fire extinguisher required) • Special fire fighting procedures • Unusual explosion hazards
Reactivity Data	• Stability • Conditions to avoid (heat, sparks, etc.) • Materials to avoid exposure to
Health Hazard Data	• Routes of entry (into the body) • Health hazards, acute and chronic (short and long term) • Signs/symptoms of overexposure • Emergency/first aid procedures
Precautions for Safe Handling and Use	• Steps if material is released or spills • Neutralizing agent • Waste disposal method • Precautions-handling/storage

> **Note:** MSDS provide a good tool for group discussion and evaluation during safety related work center technical training.

MSDS Location

Work Center   The work center location of MSDS may vary slightly from one command to the next. However, many work centers will post MSDS on the safety board, while others may maintain a separate read board just for MSDS posting. Regardless of their location in the work center, there are several common procedures required concerning the use of MSDS.

- MSDS are required reading for all work center personnel and must be documented.

- The MSDS must be maintained for each hazardous material used in the work center.

- Every Marine in the work center must read all MSDS before performing any maintenance using hazardous material.

Note: The use of handling any hazardous material is not authorized without first reading and understanding the MSDS for that material.

Hazardous Material/Waste Coordinator   Each maintenance department has one or more personnel as hazardous material/waste coordinators. They are normally the duty experts for the command and familiar with regulations pertaining to the use, handling, and storage of hazardous materials. The hazmat/hazwaste coordinator maintains MSDS for all hazardous material used within the command.

Base/Facility Group/Wing Safety Office   If a local squadron or IMA has a problem locating the MSDS for a material listed on the command's authorized user list, the next higher command will provide it through its safety office.

Determining PPE Requirements Using MSDS

MSDS Data Sections   Read each section of the MSDS thoroughly to fully understand the chemical properties, hazards, and possible means of exposure. More than one section may specifically mention that PPE is required. The section may also include other related safety information, so it is very important that you read the entire MSDS carefully. The work center supervisor is responsible for ensuring that adequate and appropriate PPE is available for use. The following sections of the MSDS provide information directly related to PPE.

- Health Hazard Data
- Precautions for Safe Handling and Use
- Control Measures

Hazardous Material and Waste

Hazardous Material

Hazardous material is a substance or material capable of posing an unreasonable risk to health, safety, and property.

Hazardous Chemical

Hazardous chemical is any chemical that is a physical hazard or a health hazard according to OSHA hazard communication standard criteria.

Hazardous Waste

Hazardous waste is any discarded or destined for disposal material regulated under the Resource Conservation and Recovery Act (RCRA) that exhibits the characteristic of ignitability, corrosivity, reactivity, or toxicity.

Note: The Environmental Protection Agency administers RCRA.

Directives and Instructions

OPNAVINST 4790.2 The Naval Aviation Maintenance Program lists specific instructions for the command (squadron or IMA) hazardous material control management officer and SNCO/NCO. But you, as the end user of these hazardous materials, have the greatest responsibility. The following paragraph from chapter 18 of this manual describes the responsibilities:

Each aircraft maintenance department will place special emphasis on the importance of the hazardous material control and management program and fully support conformance to all federal, state, and local environmental laws and regulations. Control and management of hazardous materials handling, storage, use, reuse, minimization, and disposal requires cooperation and proactive involvement within the maintenance department. Failure to comply with these regulations will result in civil or criminal liability and may negatively impact aircraft readiness.

29 CFR 1910 OSHA 29 CFR 1910 is part of the federal law (Title 29, Code of Federal Regulations), written by the Occupational Safety and Health Administration and Part 1910 is called Occupational Safety and Health Standards. The squadron hazardous material control program manager will have a copy of this regulation. This regulation provides a good deal of information regarding use, handling, storage, and disposal of hazardous material/waste.

Directives and Instructions, Continued

**HMC&M/
HMIS
CD-ROM
System**

The Hazardous Material Control and Management (HMC&M)/Hazardous Material Information System (HMIS) CD-ROM system was developed by the Naval Supply Systems Command and is currently distributed quarterly. Nearly every squadron/IMA receives these CD-ROM disks quarterly and uses them perhaps more than any other source of hazmat/waste related data. They also serve as a source for MSDS. The system is comprised of the following resources:

- Hazardous Material Information System (HMIS), a Department of Defense repository for MSDS information.

- Ships Hazardous Material List (SHML), provides ships with the capacity to maintain an inventory of chemicals and substances used aboard ship.

- Hazardous Material Users Guide (HMUG), provides information to supplement the technical data found in MSDS.

- The shipboard safety equipment-shopping guide provides National Stock Numbers (NSNs) for common safety equipment and personal protective clothing approved for shipboard use.

- Shelf life extension criteria manual.

- Glossary of hazardous terms, provides definitions of terms commonly used in the MSDS, as well as technical data on materials.

Safe Handling, Use, and Storage

Safe Handling, Use, and Storage

Once a hazardous material has been positively identified, you can take the appropriate actions to prevent injury, accidental spill, equipment damage, etc. To do so, you must

- **Read the label thoroughly.** A thorough understanding of the container's label will provide a good deal of information that pertains to safe handling.

- **Read the MSDS for the material.** A thorough understanding of the safety information is mandatory before using any hazardous material. The MSDS will provide the bulk of information that you will need to properly handle, store, and dispose all hazardous materials and waste.

- **Use the correct PPE and use it properly.** Once you determine the type of PPE to use, ensure it is in serviceable condition and worn properly. Ask your work center supervisor for help if needed.

- **Notify surrounding personnel.** If use of the hazardous material will take place in an area where other Marines are located, you must notify them of the potential hazard before you begin to use the material.

- **Dispose of waste in accordance with local procedures.** The waste must be disposed of in accordance with squadron/IMA policy. This normally requires gaining access to a secure area, disposing in a drum marked for specific types of wastes, and then making a logbook entry of the disposal and quantity.

- **Store materials with care.** Ensure storage is in accordance with regulations and safety data contained in the MSDS and HMIS. Some general items include storage of like chemicals and materials in the same location, keeping labels facing outward, not blocking fire extinguishers, keeping lids closed tightly, and not stacking materials too high.

Hazards in the Work Center

Common Work Center Hazards The table below shows some common work center hazards and precautions:

Work Center	Hazard	Remedy/Precaution
Airframe	• Shop machinery • Shop tools	• Hazard marking • Fixed and moveable guards • PPE
	• Painting • Hydraulic fluid testing • Chemical and solvent use	• Forced ventilation • Hazard marking • Dedicated restricted areas • PPE
Avionics	• Soldering • Test bench operations (high voltage)	• Hazard marking • Rubber floor mats • Special tools and equipment • PPE
ALSS	• Explosive cartridges • Stitching machines • Liquid oxygen servicing and storage equipment	• PPE • Fixed guards • Specialized training • Special tools and equipment
Ordnance	• Explosive cartridges, ballistics, etc. • Heavy lifting	• PPE • Specialized training • Special tools and equipment • Hazard marking • Dedicated restricted area

Avoid Hazards on the Hangar Deck

Common Hangar Deck Hazards

The table below shows some common hangar deck hazards:

Hazard	Remedy/Precaution
Noise	PPE
Support equipment exhaust	Ventilation and PPE
Moving aircraft control surfaces and components	Awareness and communication
Tools and parts falling from aircraft and work stands	Awareness and PPE

Avoid Flight Line Hazards

Common Flight Line Hazards The table below shows some common flight line hazards:

Hazard	Remedy/Precaution
Noise	PPE
Engine exhaust (heat and velocity	Awareness and caution hazard markings
Propeller and rotor blades (impact)	Awareness, caution hazard markings, and PPE
Support equipment and vehicle movement	Awareness and caution
Taxing aircraft	Awareness, caution, and PPE
Weather (lighting, wind)	Awareness, caution, and PPE

CHAPTER 2

NAVAL AVIATION LOGISTICS COMMAND MANAGEMENT INFORMATION SYSTEM (NALCOMIS)

Overview

Introduction   The Naval Aviation Logistics Command Management Information System (NALCOMIS) is a relatively new system that replaces the traditional five-part paper Visual Display System/Maintenance Action Form (VIDS/MAF). The NALCOMIS system provides an automated, on-line system for the input, transmission, and storage of data in support of the Naval Aviation Maintenance Program (NAMP). This chapter will

- Provide an overview of the system
- Explain its purpose
- Introduce basic information for Organizational Maintenance Activity (OMA) Marines who use NALCOMIS in the work center.

NALCOMIS Definition   OPNAVINST 4790.2 defines *NALCOMIS* as a modern, real time, on-line responsive, computer-based automated management information system (MIS). It allows U.S. Navy and Marine Corps aviation maintenance unit personnel to record flight and maintenance actions. OMA maintenance managers use this data to quickly

- Obtain timely and accurate aircraft and equipment maintenance status
- Schedule maintenance requirements
- Gain additional information they need for their day-to-day decision making

Composition   NALCOMIS is characterized as

- A local area network (LAN)
- Similar to an on-line system
- A much smaller closed system
- Dedicated to the naval aviation community

Overview, Continued

System Composition

NALCOMIS consists of nine subsystems and two utilities:

- Subsystems
  - Data Base Administration
  - Flight
  - Maintenance
  - Logs and Records
  - Personnel
  - Asset
  - Data Analysis
  - Technical Publication
  - Reports
- Utilities
  - Adhoc Query
  - System Administration

In This Chapter

This chapter contains the following topics.

Basic Use and Functions of NALCOMIS

Login Procedures

To get started:

- The system administrator will assign you an ID, along with your personally selected password.

- The system will prompt you for a login name and your password to gain access into the system.

The National Computer Security Center defines the following terms:

- **User ID:** A unique symbol or character string used by the system to identify a specific user.

- **Password:** A protected and private character string used by the system to authenticate an identity (user).

Your system administrator and end user manual are your main sources for expert assistance with NALCOMIS.

Logout Procedures

To quit:

- Press the *F3* key to return to the main menu.
- Press the *Escape (Esc)* key to exit to the server prompt.
- Type "Logout" and press the *Enter* key.

Note: You must logout whenever you are not physically in front of the screen to protect the integrity of the NALCOMIS data.

Maintenance Subsystem

Background

The maintenance subsystem collects and processes maintenance related data and then provides the data to other subsystems. It provides access to screens used to initiate, update, complete, and query maintenance actions forms (MAFs). This subsystem is designed for and used primarily by the work centers in the maintenance department.

Maintenance Subsystem Screen Access

The maintenance subsystem screen is selected from the NALCOMIS OMA main menu. You can select one of three choices from this screen.

- A choice of *A* through *J* to select a subsystem
- The *F1* key for help
- The *Esc* key to back out of the system

All choices are displayed on the screen and only the options shown are available to you.

Maintenance Subsystem Menu

An example of the maintenance subsystem menu screen is shown below:

RZW000000	NALCOMIS Main Menu		01 Apr (960401)
A	Database Administration	**F**	Reports
B	Flight	**G**	Adhoc Query
C	Maintenance	**H**	Asset
D	Logs and Records	**I**	Personnel
E	Data Analysis	**J**	Technical Publications
Enter Selection			
F1-Screen Help			**Esc**-Back Out

Maintenance Subsystem, Continued

Maintenance Subsystem Menu, continued

The maintenance subsystem menu is displayed by selecting "C" from the main menu. As you can see, this menu is self-explanatory and provides the options listed at the bottom of the screen.

R2WO0000	**Maintenance Menu**		**15 Dec 96 (96349)**
A	Initiate Maintenance Action Menu	**G**	Maintenance Query Menu
B	Mass Job Status Update	**H**	On-line MAF Processing Menu
C	Work Request MAF Deletion	**I**	Maint Action Upline Corr Menu
D	Print Maint Action	**J**	Acft Maint Status Add/Delete
E	MAF Update	**K**	Acft Remarks Update
F	Maint Action Completion	**L**	Material Control Menu
Enter Selection			
F1-Screen Help	**F3**-Main Menu		**Esc**-Back Out

Navigation and Assistance

As you can see in the two previous screen displays, all possible commands and options are displayed on each of the screens. Options displayed on the screen are the only options or a possible command available while that screen is displayed. All screens offer a help menu via the *Fl* key. This help option, along with the NALCOMIS OMA, Section 6 end user manual, will answer most of your questions. After consulting the help screens and the user manual and you still need assistance, see your work center supervisor. The work center supervisor will see the system administrator if he or she can not answer your question(s).

Contingency Processing Terms

Background   Downtime procedures and terms used to describe periods of system nonavailability are direct and to the point. The following block contains some primary terms and their meanings. For a complete list of terms, see the end user manual, NALCOMIS OMA, Appendix E.

Problem Severity Definitions   *Problem severity* is defined as the magnitude of the negative impact of any system failure on ongoing maintenance operations. The required response to correct system failures depends on the severity of the problem, which is classified as follows:

- **Critical:** Indicates total, uncontrolled failure of the entire NALCOMIS system. Return to normal operations is expected to take longer than six hours.

- **High:** Indicates total, controlled shutdown of the entire NALCOMIS system. Return to normal operations is expected to take longer than 6 hours.

- **Medium:** Indicates controlled shutdown of the entire NALCOMIS system for less than 6 hours or failure of a major component of the system (tape drive, communication line, main printer, etc.).

- **Low:** Indicates failure of one user-oriented peripheral hardware device (terminal, screen dump printer, etc.).

- **Contingency Operations:** Procedures, actions, and controls that should be performed during a system failure and during system recovery.

- **Downtime Even:** Any period of time when NALCOMIS OMA is inoperable or unavailable for use. The event may be scheduled or unscheduled.

Contingency Processing Procedures

Background   Whenever NALCOMIS is down for any reason, the primary concern is performing the mission without delay or loss of data. Unlike banks, credit unions, or other institutions that rely on computers to function and experience delays or complete failures of customer service, NALCOMlS was built around an existing paper based system. The system is used for back up and to prevent any degradation in mission performance when NALCOMIS is down. The VID S/N4AF system has not gone away; it has just been automated and can be used readily during periods of NALCOMIS nonavailability.

Manual Downtime Processing Procedures   Maintenance control decides when to implement the manual downtime procedures detailed in the end user manual, NALCOMIS OMA, Appendix E. During a downtime event, MAFS, flight documents, and requisitions are manually processed**.** Data is recorded on source documents or annotated on NALCOMIS reports.

The emphasis is to sustain critical aviation maintenance and supply operations while retaining data for input when NALCOMIS becomes operational.

Tool Control Program

Objectives   In accordance with OPNAVINST 4790.2 (NAMP), the objectives of the Tool
Control Program (TCP) are to

- Improve flight safety by eliminating aircraft mishaps, incidents, and
  associated equipment damage caused by lost or misplaced tools, thus
  reducing the potential for foreign object damage (FOD).

- Reduce expenditures for additional outfitting and replacement of missing,
  defective, or pilfered tools; the reduction of man-hours for maintenance
  task completion; and a general improvement in the quality of aviation
  maintenance.

The potential reduction of FOD is especially important for power plants,
aviation life support system (ALSS) equipment, armament weapons support
equipment (AWSE), and support equipment (SE) division (900) work centers.

Tool Control Program Directives

OPNAVINST 4790.2 (NAMP)
The *NAMP* was established by the Chief of Naval Operations (CNO) and implemented by the Chief, Bureau of Aeronautics on 26 October 1959.

If you have any desire to become a shift supervisor or work center supervisor, you should learn how to use it to find needed information with relative ease. Volume I, chapter 10.4 discusses the tool control program. Chapter 15.5 discusses tool control in the work center.

Aircraft Tool Control Manual
There are aircraft tool control manuals for each type of aircraft that the Marine Corps operates. If you are part of the F/A-1 8 squadron, then your Aircraft Tool Control Manual is the NAVAIR17-IFA18-1. The tool control manuals

- Describe duties and responsibilities of key maintenance department personnel

- Address tool container construction and hardware to be used

- Describe the layout and tools to be included in each work center's tool containers

Along with the NAMP, these two directives provide the bulk of information required to manage and administer the tool control program. Get to know these two directives well and be prepared for a work center supervisor assignment.

Tool Control Practices

Inventories   Inventories are the primary means of ensuring the accountability of all tools, equipment, and hardware. Tool container inventories must be done throughout the day at specific times. The NAMP makes the following statements regarding inventories:

- The technician and supervisor or collateral duty inspector (CDI) will perform a sight inventory before starting each task and note all shortages.

- Inventories will also be performed before a shift change and when work stops.

- After maintenance has been completed and before an operational systems check on the equipment, the inspection process will once more be performed.

VIDS/MAF Documentation   Tool container inventories are documented on the VIDS/MAF in the "Tool Box" block. Although your local squadron maintenance instructions may require you to personally document inventories on the VIDS/MAF or other forms and records, the NAMP (1 5.5.2. 1) requirements are as the follows:

- Upon task assignment, note the tool container number on copy 1 of the VIDS/MAF in the "Tool Box" block.

- The supervisor or CDI will initial for tools in the "Tool Box" block of the accumulated work hours section.

- When all tools are accounted for and maintenance actions have been completed, the work center supervisor approves the MAF signifying that maintenance has been completed and that all tools have been accounted for.

Personal Habits   Your personal habits and accountability have very much to do with the success of the TCP. A mature and responsible approach to your everyday duties will help ensure success of the program. The good practices listed below are common among conscientious aircraft maintenance technicians.

- Return individual tools to the tool container when not being used.
- Wipe tools clean before turn in or shift change.
- Keep tool containers locked whenever possible.

Lost Tool Procedures

Procedures   In accordance with OPNAVINST 4790.2 (NAMP), Chapter 15 provides the following procedures:

- If any tool is missing

  - Maintenance/production control shall be notified immediately

  - An immediate search shall be conducted before reporting the work completed or signing off the VIDS/MAF

- If the tool **can not** be located by the work center

  - Quality Assurance shall be called upon to assist in the search

  - The aircraft maintenance Officer (MO) or acting MO shall be notified via maintenance/production control.

Procedures Aspect   The important aspect of the procedure above is to ensure that no aircraft, aircraft systems, or support equipment is operated until the tool, part, or consumable is located.

If the tool cannot be located after the MO's directed search, the investigator shall personally sign a statement in the corrective action block of the VIDS/MAF stating, *a lost tool investigation was conducted and the tool could **not** be found.* Subsequently, the normal VIDS/MAF completion process should be followed.

Note: The procedure described above is very seldom used. Given the potential for loss of aircraft and damage, it would not be unusual for you never to see an unsuccessful search for a lost tool. A search for a lost tool is just too serious of an issue to conclude without locating the tool.

Tool Control NCO

Assignment   All collateral duty assignments are communicated via a billet description, which is essentially a written assignment with a list of duties. The work center supervisor and the tool control NCO then sign the assignment letter. A copy of the letter is maintained in the Marine's training jacket. Copies are also maintained in several other locations. In the absence of the work center supervisor, the work center tool control NCO is the duty expert for all matters in the work center concerning the TCP.

Common Duties   The work center supervisor will usually include duties specific to the work center responsibilities or type aircraft. The duties may vary at different locations. The following is a list of duties commonly found on most tool control NCO billet assignment letters.

- Read and understand the TCP requirements for the work center in the following documents:

  - OPNAVINST 4790.2 (NAMP)
  - Type aircraft tool control manual
  - Squadron tool control maintenance instruction
  - Any additional directives related to work center tool control

- Periodically (weekly, monthly, or as directed), inspect all work center tool containers to ensure they are clean, complete, serviceable, properly marked, and in compliance with all tool control program directives.

- Identify to the work center supervisor any problems with the work center's tool control program, such as

  - Noncompliance by any work center Marine
  - Recurring problems and trends, such as broken or defective tools

- Identify and assist the work center supervisor with work center training for key tool control program items and program and compliance items that need re-enforcing within the work center.

- Perform administrative duties such as the reporting, replacement, and recording of broken and defective tools used in the work center.

Quality Assurance and the Tool Control Program

QA Monitoring Definition

OPNAVINST 4790.2 defines *monitoring* as a periodic assessment of the effectiveness of programs or processes managed within the department.

If you expect to advance to positions of authority and increased responsibility, you must

- Understand the role and importance of QA in the maintenance department
- Ensure that you perform your maintenance duties in accordance with all tool control program requirements

The QA monitoring is designed to identify program deficiencies and any issues related to noncompliance.

QA Monitoring Duties

The QA division normally assigns one quality assurance representative (QAR) as the sponsor or manager of the tool control monitoring program. The QAR is responsible for

- Ensuring that the QA tool control monitoring program is in compliance with OPNAVINST 4790.2 and all other pertinent directives

- Inspecting your work center regularly for tool control practices and tool containers

- Developing a checklist that contains all program requirements so any QAR can determine if a given work center is in compliance with the TCP

Marines in the work center must understand that the NAMP mandates QA division monitoring duties and that the monitoring has a positive effect on the mission capability of the squadron or IMA.

Continued on next page

Quality Assurance and the Tool Control Program, Continued

QAR Monitoring Duties

In accordance with OPNAVINST 4790.2, the following QA duties are quoted from the NAMP and represent the basic tool control program fundamentals. These items are valid throughout the naval aviation maintenance community and provide QARs with the authority and general guidance for TCP monitoring in the maintenance department.

- Ensure that TCP procedures are verified periodically and during work center audits.

- Ensure that tools received damaged from supply or of poor quality are reported to the Fleet Material Support Office via category 11 quality deficiency reports (CAT II QDR).

- Ensure that Maintenance Action Forms (VIDSIMAF) are annotated with tool container number upon task assignment and with appropriate initials following task completion or work stoppage as appropriate. Personnel from power plants, ALSS, AWSE, and SE division, for example, may initial.

- Ensure that tool control practices are adhered to when work is to be performed by contractor maintenance teams or depot field teams. The QAR will brief the field team or contractor supervisor or leader about the activity's TCP upon arrival. Depot teams working in organizational or intermediate level facilities shall comply with the host activity's TCP.

Foreign Object Damage

Foreign Object Damage Definition
OPNAVINST 4790.2 (NAMP) defines *foreign object damage (FOD)* as damage to aeronautical equipment--aircraft, engines, missiles, drones, and support equipment--caused by an object or objects external to the equipment. Gas turbine engine FOD is damage that exceeds serviceable limits caused by ingestion of objects not organic to the damaged engine.

Foreign Objects
The most common objects referred to as FOD are aircraft hardware such as screws, bolts, nuts, washers, rivets, cotter pins, safety wire, electrical connectors, shrink tube, etc. However, the list of potential FOD items that can be found in any maintenance department is endless. The following are some of the more common items known to have caused engine or system damage:

- Hardware
- Tools
- Pens and pencils
- Buttons
- Safety and shear wire
- Parts
- Wrist watches
- Jewelry
- Dirt
- Stones
- Concrete
- Ice and snow
- Water
- Rags
- Hand cleaner
- Solder
- Chipped paint
- Oil
- Hydraulic fluid
- Fuel

Foreign Object Damage, Continued

Types of Damage

Listed below are types of damage:

- **Engine:** Turbojet and turbofan engines are most susceptible to FOD because most aircraft are designed with engines or engine air inlet ducts located near the ground. However, most gas turbine engines are susceptible to FOD of some kind regardless of their application. Engine FOD is extremely expensive to repair due to the extensive maintenance involved and the high cost of materials.

- **Other:** Micro FOD is often to blame when hydraulic systems become contaminated. Chipped plating from handtools, metal shavings, dust, dirt, etc. can present a micro FOD hazard. Black boxes are susceptible to FOD when opened and worked on. Bits of solder, smoking materials, or a variety of other seemingly insignificant items can damage the inner workings of today's sophisticated avionics and associated mechanical components.

Purpose of the FOD Program

Purpose   The following list represents the primary issues the FOD program was
             designed to address and control:

- Ingestion of foreign objects by gas turbine engines
- Personnel and material hazards resulting from FOD
- Consumption of valuable maintenance man-hours
- Additional unscheduled workloads on both OMA and supporting IMA activities
- Shortages of assets (engines, parts, personnel, etc)
- Wasted tax dollars
- Reduced operational readiness

Work Center FOD Program

Directives

- **OPNAVINST 4790.2 (NAMP).** OPNAVINST 4790.2 is the main directive that outlines the FOD program for the naval aviation maintenance community. This directive provides basic guidance for all maintenance departments.

- **Local instruction.** All organizational level activities develop and maintain a local FOD instruction that addresses local operating conditions and FOD program policies and practices unique to that maintenance department. These local instructions consider conditions or problems peculiar to a specific geographical location and the operating environment of the various aircraft at the organization.

- **Other instructions.** Often there are group, wing, or other upstream command directives that also address FOD and control procedures to be implemented.

Note: The work center supervisor is responsible for ensuring that you are aware and fully informed of all FOD program requirements, but it is your personal responsibility to understand and perform maintenance in accordance with all of these directives.

Work Center FOD Program, Continued

Work Center Practices and Duties

The following items are requirements listed in the NAMP. These may or may not represent all FOD program requirements at your location; your local FOD program instruction will explain additional program requirements.

- **FOD walks.** FOD walks involve the daily ritual at most squadrons of lining up and slowly walking across the flight line in search of FOD. This practice is the first line defense against engine FOD.

- **Accountability.** Each tool, item of support equipment, and consumable item must be accounted for before the start of any job, before any operational check, and at the end of all jobs.

- **Inspections.** Perform thorough pre-maintenance and post-maintenance inspections of tool containers, ducts, plenum chambers, work areas, crevices, and engine cavities.

- **Cleanliness.** Keep the work area and all support equipment (SE) free of foreign and loose objects.

- **Covers and Closures.** Install closures or duct covers when not actively engaged in maintenance on or adjacent to gas turbine engines.

Work Center FOD Program, Continued

Work Center FOD Control NCO Duties

At the squadron level, it is common and in some cases required that the work center supervisor appoint a FOD control NCO for the work center. His or her duties would include

- Participating in a FOD committee if one exists

- Assisting the work center supervisor with ensuring FOD program compliance within the work center

- Identifying potential FOD related problems to the work center supervisor

- Assisting the work center supervisor with compliance with local FOD program requirements, such as tool container surveillance and cleanliness, control and accountability of consumable items used by the work center, etc.

Quality Assurance Monitoring

Monitoring Definition

OPNAVINST 4790.2 (NAMP) defines *monitoring* as a periodic assessment of the effectiveness of programs or processes managed within the department.

FOD Program Monitoring

When monitoring the maintenance department's FOD program, the QA division ensures that

- All instructions issued by the FOD prevention officer and pertaining to FOD prevention are complied with.

- All work centers have instituted procedures that comply with applicable instructions and the relationship between FOD prevention and safety is adequately addressed. Evaluation of FOD prevention measures shall be included in all audits.

- Maintenance methods and procedures support the FOD prevention program.

- The FOD prevention officer is aware of FOD related problems.

- Contractor and field maintenance teams are briefed regarding the command's FOD prevention program requirements. A deficiency that teams display in FOD performance is reported to the FOD prevention officer.

Purpose of the Technical Publications Library Program

Importance   The two main purposes for the Technical Publications Library (TPL) program are

- It ensures the work center or organization have all required publications to perform maintenance in accordance with all procedures and directives.

- It provides a system for maintaining and ensuring that publications are updated when changes occur.

Work Center Library

Description   The work center's library (located in the work center) is

- The library of all publications and directives the work center supervisor and assigned Marines need to perform their required duties. The past, present, or future media format (CD-ROM, microfilm, paper, etc.) pertains only to issues of information accessibility and storage and retrieval methods.

- Both advisory and directive in nature; this is why the library should be readily accessible and referred to daily. To allow the library to be used effectively, training should be conducted on the use, location, and applicability of publications maintained there.

- A satellite of the CTPL and must be maintained in accordance with CTPL policies and procedures.

Technical Publications Library NCO Duties

TPL NCO Assignment

Assignment as a TPL NCO requires you to dedicate a certain amount of time each day or week to maintain the work center's library. One way to do this is to dedicate one or several hours on a certain day of the week to perform maintenance and duties related to the upkeep of the work center library. As the TPL NCO, you should use the NAVAIR 00-25-100 to answer most questions regarding the maintenance of the work center library.

Duties

The duties that you will most likely be assigned as the TPL NCO are as follows:

- Ensure that publications are stored in binders similar to those used in the CTPL or as prescribed by the CTPL librarian (for publications requiring the use of a binder).

- Ensure that publications are readily accessible to Marines in the work center (ease of use).

- Ensure that manuals and binders are numbered and arranged identical to the CTPL (common system throughout the department).

- Incorporate all changes to the work center's library publications (an extremely important function thoroughly described in NAVAIR 00-25-100).

- Use the training and assistance provided by the CTPL librarian (required by NAVAIR 00-25-100).

- Represent and/or assist the work center's supervisor during quarterly TPL audits conducted by the CTPL librarian. NAVAIR 00-25-100 requires additional audits be conducted each time a new work center supervisor or TPL librarian is assigned.

Publication Changes

Overview   Changes and updates to publications are normally handled based on the urgency of the new information to be incorporated. Sometimes the failure to make a seemingly insignificant or minor change to a maintenance manual causes a problem that could prove disastrous to an aircraft and its crew. This might involve an addition to a routine scheduled inspection or a requirement to inspect a particular component or structural member that has recently failed on several aircraft. The change could also be viewed or described as the communication of a potential problem with the operation and maintenance of an aircraft, support equipment, or any associated weapon system. The technical manual program (NAVAIR 00-25-100) categorizes changes under the following categories.

* Rapid action changes (RACS)
* Changes
* Revisions
* NAVAIR technical manual notices (TM)

Rapid Action   RACS are the most urgent types of changes or corrections to a publication.
Change (RAC)   The TPL NCO or work center supervisor should brief everyone in the work center concerning the contents of the change. There are two types of RACS.

* Interim RAC (prepared and delivered in electronic message format)
* Formal RAC (prepared as normal replacement pages)

RACS are numbered consecutively through the life of the manual, beginning with the number 1. All RACS incorporated in a manual are listed on page A, which immediately follows the title page of the manual.

Interim RAC   To incorporate an Interim RAC (message format) into a manual, use the following procedure.

* Insert a copy of the interim RAC message directly behind the title page.
* Note its existence on the affected page(s) of the manual with a vertical line in the margin of the nonbound edge.
* Maintain the interim RAC until the formal RAC is received.
* Pen and ink or any physical changes to the technical content of the manual are not authorized.

Publication Changes, Continued

Interim Rapid Action Changes (IRACS)	Interim rapid action changes (IRACS) that pertain to a manual on CD-ROM should be handled as follows:
	
	• File the IRACS in an appropriately marked binder.
	
	• Affix an adhesive label to the CD-ROM case and annotate the label with the following information:
	
	    • The NAVAIR publication number to which it applies
	    • The IRAC number and date time group (DTG) IRAC
	
	• Maintain the IRAC on file until receipt of the superseding CD-ROM.

Change	As defined by NAVAIR 00-25-1 00, a *change* is just a routine official release of new or correction pages to a part or portion of an existing document (manual prepared in accordance with MIL-M-38784). The change procedure is very simple as follows: • Remove the superseded (old) pages. • Insert replacement (new) pages in the same location. • Return old pages to the CTPL librarian for disposal. **Note:** *Change* pages are identified with the word *Change* in the same corner of the page and on the same line as the page number.
Revision	As defined by the NAVAIR 00-25-100, a *revision* is a second or subsequent edition of an existing manual, which has all previously changed information incorporated. Simply stated, it is a replacement. Upon receiving a revision • Remove the superseded (old) manual from its location/binder. • Place the revised (new) manual in the same location/binder. • Return the old manual to the CTPL librarian for disposal.

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Publication Changes, Continued

NAVAIR Technical Manual (TM) Notices

The NAVAIR 00-25 -1 00 describes a *technical manual (TM) notice* as the method for correcting minor errors in NAVAIR technical publications that do **not** require the issuance of a formal change.

TM notices

- Apply only to unclassified publications
- Are not used for changes to the technical content of a manual
- Are incorporated by removing the superseded (old) page, inserting the corrected (new) page, and returning the old pages to the CTPL librarian for disposition

Technical Publication Deficiency Reporting

TPDR Program   The technical publication deficiency report (TPDR) program provides a procedure for reporting technical publication safety hazards and routine deficiencies found in manuals or publications. A technical publication deficiency report (TPDR) is one element of the naval aviation maintenance discrepancy reporting program (NAMDRP).

OPNAVINST 4790.2 defines *NAMDRP* as the method by which hazardous situations, material and publication deficiencies, substandard workmanship, and improper quality assurance procedures are reported. It consists of the Hazardous Material Report (HMR), Engineering Investigation (El) request, Quality Deficiency Report (QDR), Technical Publication Deficiency Report (TPDR), and the Aircraft Deficiency Report (ADR).

The Quality Assurance division is responsible for managing the NAMDRP program and assists work centers with the reports. This is not unusual considering the QA division is also responsible for the CTPL.

Technical Publications Definition   OPNAVINST 4790.2 defines *technical publications* as

- Maintenance requirement cards (MRCS)
- Checklists and shop process cards
- Work unit code (WUC) manuals
- Maintenance instruction manuals (MIMS)
- Weapons or stores loading manuals
- Conventional or nuclear weapons checklists
- Stores reliability cards
- Illustrated parts breakdowns (IPBS)
- Technical directives (TDs)
- Technical manuals (TMs)

Technical Publication Deficiency Reporting, Continued

Deficiency Report Categories and Procedures

Deficiencies are grouped into two categories and reported as follows:

- **Category I (CAT I):** An electronic message is required when a technical publication deficiency is detected which, if not corrected, could result in death or injury to personnel or damage to or loss of aircraft, equipment, or facilities.

  - The electronic message format is used to deliver the information as soon as possible due to the critical nature of the deficiency.

  - If you discover a publication deficiency and feel it could meet the criteria for a CAT I TPDR, then discuss the discrepancy with your work center supervisor and QA representative immediately!

  - The QA division will assist you with message preparation and delivery.

- **Category II (CAT II):** Publication deficiency is to be used for technical errors, wrong measurement values, incorrect use of support equipment (SE), wrong sequence of adjustments, part number (PN) errors or omissions, and microfilm deficiencies.

  - CAT II deficiencies are to be reported using the "technical publication deficiency report" (OPNAV 4790/66).

  - The OPNAV 4790/66 can be found in the OPNAVINST 4790.2, and the NAVAIR 00-25-100.

  - The QA division will assist you with completion of the form.

Technical Directives

Technical Directive Definition

OPNAVINST 4790.2 defines *technical directive (TD)* as a document authorized and issued by Commander, Naval Air Systems Command to provide technical information necessary to correctly and systematically inspect or alter the configuration of aircraft, engines, systems, or equipment, subsequent to the establishment of each respective baseline configuration. The TDs include all types of changes and bulletins that consist of information, which cannot be disseminated satisfactorily by revisions to technical manuals. Naval Air Technical Services Facility controls assignment of TD numbers.

TD System Definition

NAVAIR 00-25-100 defines the *TD system* as the only authorized medium for directing the accomplishment and recording of modifications and one-time inspections of NAVAIR accepted equipment.

Types of TDs

There are four types of TD changes listed below:

- **Change:** A change directs the accomplishment and recording of configuration or material change, the repositioning, modification, or alteration of equipment. Changes are normally titled as follows:

  - Airframe change
  - Avionics change
  - Support equipment change

- **Interim Change:** When urgency dictates, the electronic message format is used to speed the distribution of the change. When this is done, the message format change is called an *interim change.*

- **Bulletin:** A one-time inspection to determine if a given condition exists and a specific action to be taken if the condition is discovered.

- **Rapid Action Minor Engineering Change (RAMEC):** RAMECs direct the accomplishment and recording of configuration changes within the limits of the RAMEC program (NAVAIRINST 5215.10).

Technical Directives, Continued

Categories of TDs

TDs are categorized based on the degree of urgency and risk involved as follows:

- **Immediate:** Used when a condition exists that, if uncorrected, could result in fatal or serious personal injury.

- **Urgent:** Used when potentially hazardous conditions exist that could result in injury to personnel, damage to valuable property, or unacceptable reductions in operational efficiency.

- **Routine:** Used when risk is determined to be minimal.

- **Record purpose:** Used to confirm modifications that have been incorporated by a contractor or in-house activity before issuance of the TD.