



Naval Education and  
Training Command

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Training Manual  
(TRAMAN)

# Naval Safety Supervisor

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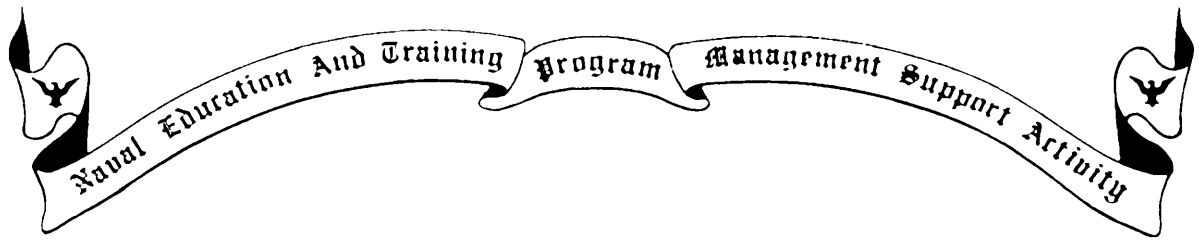


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Although the words "he," "him," and "his" are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this text.

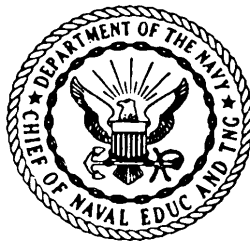
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# NAVAL SAFETY SUPERVISOR

NAVEDTRA 12971



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# PREFACE

This training manual (TRAMAN) and the accompanying nonresident training course (NRTC) are designed to give basic guidance to personnel stationed ashore and afloat who are assigned to safety billets.

The accompanying NRTC is designed for individual study and not formal classroom instruction. This TRAMAN provides information that relates to the duties of the safety officer, safety supervisor, and safety petty officer. The set of assignments in the NRTC provides supporting questions developed to emphasize the key points covered in the manual.

Chapters 1 through 9 discuss duties related to safety, and chapters 10 and 11 discuss off-duty mishap prevention. This TRAMAN and NRTC were prepared by the Naval Education and Training Program Management Support Activity, Pensacola, Florida, for the Chief of Naval Education and Training. Technical assistance was provided by the Naval Safety Center, Norfolk, Virginia.

This manual replaces NAVEDTRA 10808-2.

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# **THE UNITED STATES NAVY**

## **GUARDIAN OF OUR COUNTRY**

The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.

It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

## **WE SERVE WITH HONOR**

Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.

At home or on distant stations as we serve with pride, confident in the respect of our country, our shipmates, and our families.

Our responsibilities sober us; our adversities strengthen us.

Service to God and Country is our special privilege. We serve with honor.

## **THE FUTURE OF THE NAVY**

The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.

Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.

Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.

Never have our opportunities and our responsibilities been greater.

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# CHAPTER 1

## DEVELOPMENT OF THE NAVY SAFETY PROGRAM

We designed this training manual to help acquaint you with the Navy's safety and occupational health programs, their setup, management, and supervision. In addition to the Navy Occupational Safety and Health (NAVOSH) Program, we will discuss the Shore Safety Program, the Afloat Safety Program, the Aviation Safety Program, and your duties as a naval safety supervisor. We have provided the appropriate references for specific safety standards throughout this manual and various safety terms and acronyms. You will also find information on the following program elements:

- Safety program promotion and attitudes
- Mishap causes and prevention
- Mishap investigation and reporting
- Safety program evaluation
- NAVOSH Program elements
- Traffic safety
- Explosives safety
- Athletic, recreation, and home safety programs

In this chapter, we cover the history and development of the Navy Occupational Safety and Health Program and its current organization. We also describe the role of safety supervisors, their responsibilities, and the criteria for their selection as safety supervisors.

### HISTORY OF NAVY SAFETY PROGRAM

As your employer, the Navy is obligated by law to provide you with a safe and healthy work environment. Shipboard life, shipyard industrial activities, and aviation maintenance areas, especially, are inherently dangerous. We must keep our crewmembers, as well as civilian workers, healthy and ready to perform their missions.

The Navy has conducted safety and occupational health programs for many years. Historically, general and off-duty safety has been an element of the overall

Navy safety program managed by Navy line functions. The Bureau of Medicine and Surgery (BUMED) conducts the occupational health program element.

The following is a brief listing of the milestones in the Navy's safety program:

- |      |  |
|------|--|
| 1917 | Safety engineers were assigned to each naval shipyard.   |
| 1922 | Safety programs for civilian employees were introduced at all naval activities.  |
| 1929 | Enlisted personnel on shore duty were included in safety programs.   |
| 1947 | The Navy Department Safety Council was organized under the Director of Safety of the Office of Industrial Relations (OIR). Its original mission was to coordinate safety procedures and to provide communications between the bureau safety engineers and the technical staff of the OIR safety branch. In 1967, the council's mission was expanded to include the development and maintenance of the <i>U.S. Navy Safety Precautions Manual</i> , OPNAV 34P1. |
| 1951 | The transition from propeller to jet aircraft helped the Secretary of the Navy (SECNAV) to establish the Naval Aviation Safety Council. In 1955 the name was changed to the Naval Aviation Safety Center.  |
| 1963 | The Navy was shaken by the sudden loss of the USS <i>Thresher</i> (SSN-593), in which 129 sailors were lost. The Navy convened a court of inquiry to examine the circumstances leading up to and surrounding the incident. The court's findings resulted in the creation of the Submarine Safety Program (SUBSAFE).  |

- 1963-Cont. Its purpose was to impose high standards of quality control on submarine construction and operations. In 1964 the Chief of Naval Operations (CNO) established the Submarine Safety Center at the submarine base in New London, Connecticut, to examine and coordinate all matters of submarine safety.
- 1966-1967 SECNAV tasked CNO with reviewing the entire Navy Safety Program after a series of fires, collisions, and other mishaps involving surface ships resulted in more than 200 deaths and \$100 million in damages. On 3 May 1968, as a result of the CNO's findings, SECNAV established the Naval Safety Center.
- 1970 The Occupational Safety and Health Act (OSHA) of 1970 became law.
- 1973 The Commander, Naval Safety Center, was designated as the CNO's Safety Coordinator (N09F), reporting directly to the Vice Chief of Naval Operations. This designation made the Naval Safety Center's mission more specific and all-encompassing.
- 1983 The first *Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, was implemented.

Safety programs gained special prominence after passage of the Occupational Safety and Health Act on 31 December 1970. The primary thrust of the act was directed at the private-sector employer. However, section 19 of the act and several later Executive orders directed federal agencies to set up and maintain comprehensive and effective occupational safety and health programs.

On 26 July 1971, Executive Order (EO) 11612, the Occupational Safety and Health Programs for Federal Employees, was signed. This EO stated that the federal government, as the nation's largest employer, has a special obligation to set an example for safe and healthful employment. In that regard, the head of each federal department and agency was directed to establish an occupational safety and health program.

Over the next 3 years, federal agencies made only moderate progress. Congress received considerable criticism for a perceived double standard in occupational safety and health requirements between the private sector and federal agencies. As a result, EO 11807 replaced EO 11612 in 1974.

This new order more clearly defined the scope, requirements, and responsibilities of federal agency programs. In addition, EO 11807 tasked the Secretary of Labor to issue guidelines designed to help federal agencies in establishing their programs. These "guidelines" were issued on 9 October 1974 as Title 29, Code of Federal Regulations, Part 1960 (29 CFR 1960), Safety and Health Provisions for Federal Employees.

Some critics were still not satisfied by the actions described above. Several federal agencies questioned the regulatory authority of the Department of the Labor guidelines (29 CFR 1960). On 26 February 1980, EO 12196, Occupational Safety and Health programs for Federal Employees, superseded EO 11807. In addition, the Department of Labor guidelines (29 CFR 1960) were revised on 21 October 1980. They were reissued as Basic Program Elements for Federal Employee Occupational Safety and Health Programs.

During the past 10 years, the Department of Defense (DOD) has issued many directives and instructions to carry out the federal guidance outlined in the above paragraphs. Prominent among those directives and instructions is the *Safety and Occupational Health Policy for the Department of Defense*, DOD Directive 1000.3. This directive outlines general DOD policy and procedures for carrying out the Occupational Safety and Health Act and its associated Executive order. Another prominent instruction is DOD Instruction 6055.1, *Department of Defense Occupational Safety and Health Program*. This instruction provides the guidance needed to carry out the basic occupational safety and health program elements specified in 29 CFR. It also provides for variances in equipment standards that are unique to the military.

DOD Directive 1000.3 designates the Assistant Secretary of the Navy (Installations and Environment) as the safety and occupational health official for the Department of the Navy. He or she establishes, maintains, and modifies safety and occupational health programs. These programs carry out the requirements of DOD policy issuances and provide protection for both civilian employees and military personnel.

SECNAVINST 5100.10G, *Department of the Navy Policy for Safety, Mishap Prevention and Occupational Health Programs*, delegates the authority for the operational aspects of the NAVOSH Program to the Chief of Naval Operations (CNO). The CNO's responsibility includes issuing directives to enact program policies and defining specific safety standards and criteria.

## SAFETY POLICY

The Navy's policy is to enhance operational readiness and mission accomplishment by establishing an aggressive occupational safety and health program. This program reduces occupational injuries, illnesses or deaths, and material loss or damage. It also maintains safe and healthy working conditions for personnel. The program addresses the elimination or control of hazards that can result in injury or death. The occupational health aspects concern the effects of long-term exposures to toxic chemicals and harmful physical agents (for example, noise, heat, and radiation). The occupational health aspects involve the monitoring and treatment of work-related injuries and illnesses as well.

Each safety program, whether it concerns safety afloat, ashore, or in aviation, uses the chain of command to carry out the program. Safety programs apply to all military and civilian personnel (including off-duty military personnel). In addition to personnel, the program also applies to material afloat and ashore, on and off naval installations. The program requires Navy dependents and all other civilian personnel while embarked in naval ships or aircraft or while on naval shore installations to follow program directives.

The CNO is responsible for implementing the safety and occupational health programs. The largest of these programs is the NAVOSH Program. The NAVOSH Program addresses the maintenance of safe and healthful conditions in the workplace or the occupational environment. It applies to all Navy civilian and military personnel and operations ashore or afloat. OPNAVINST 5100.23C, *Navy Occupational Safety and Health (NAVOSH) Program Manual*, is the basic NAVOSH document used to carry out the program. It refers to both afloat and shore commands. However, many unique and specific situations are associated with forces afloat as well as the aviation community. For that reason, the NAVOSH information for forces afloat was separated into the *Navy Occupational Safety and Health*

(NAVOSH) *Program Manual for Forces Afloat*, OPNAVINST 5100.19B, *Afloat Safety Program*, OPNAVINST 5100.21B, directs forces afloat to use OPNAVINST 5100.19B for specific safety standards. OPNAVINST 3750.6Q, *The Naval Aviation Safety Program*, is the reference for safety within the aviation community. These instructions are discussed in later chapters.

## SAFETY IN TODAY'S MODERN NAVY

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The objective of the safety program is to enhance operational readiness by reducing the number of deaths and injuries to personnel and losses and damage to material from accidental cause.

—OPNAVINST 3120.32C, *Standard Organization and Regulations of the U.S. Navy*

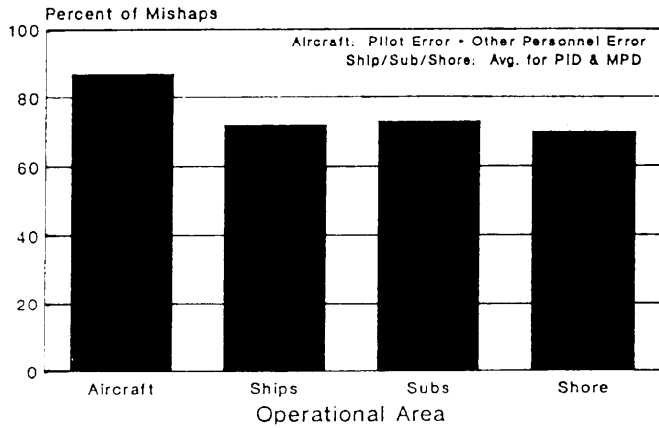
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Before we go any further, let us define some terms you will see throughout this chapter and book. We define **safety** as freedom from danger, risk, or injury. An unplanned event or a series of events that results in injury, death, or material damage is a **mishap**. A **hazard** is an unsafe or a dangerous condition that may exist before a mishap occurs. We measure a hazard according to its **severity** and **probability** of creating a mishap.

The overall objective of the NAVOSH Program is mishap prevention. If a mishap occurs, we provide for investigation of that mishap to prevent recurrence. Mishap prevention involves identifying a hazard; evaluating the hazard; and correcting, controlling, or eliminating that hazard. Training is a critical element of mishap prevention. Safety supervisors play a critical role in mishap prevention and hazard awareness and identification.

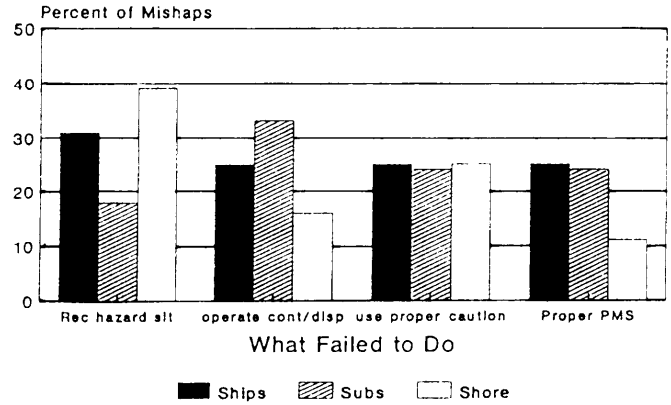
**Most mishaps are preventable.** However, through ignorance or misunderstanding, many people have the common belief that mishaps are the inevitable result of unchangeable circumstances or fate. That belief is untrue because it fails to consider the basic law of "cause and effect" to which mishaps are subject. Thus, mishaps do not occur without a cause. Few mishaps are the result of material failure or malfunction; most mishaps are the direct result of some deviation from prescribed safe

### Estimated Frequency of Mishaps Involving Personnel Error



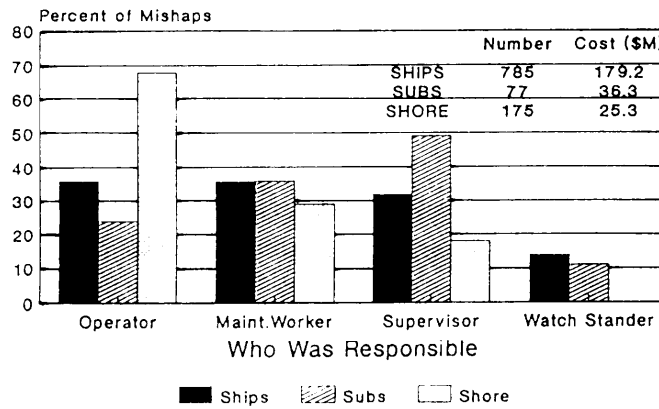
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### What Responsible Person Failed to Do that Caused Material Property Damage



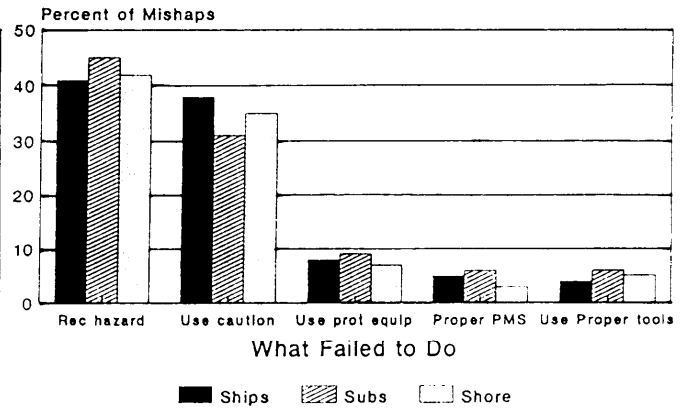
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### Distribution of Responsibility for Material Property Damage



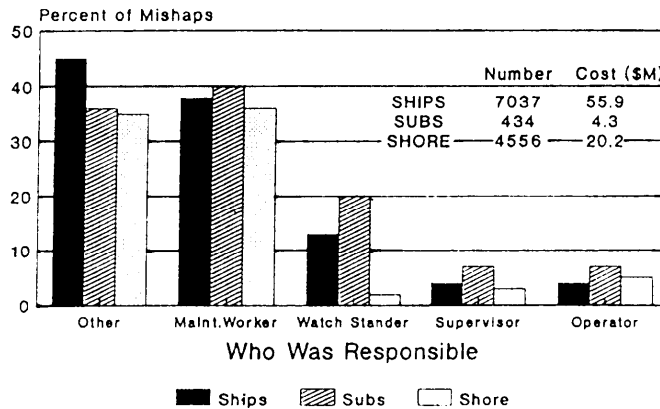
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### What Responsible Person Failed to Do that Caused Personnel Injuries/Death



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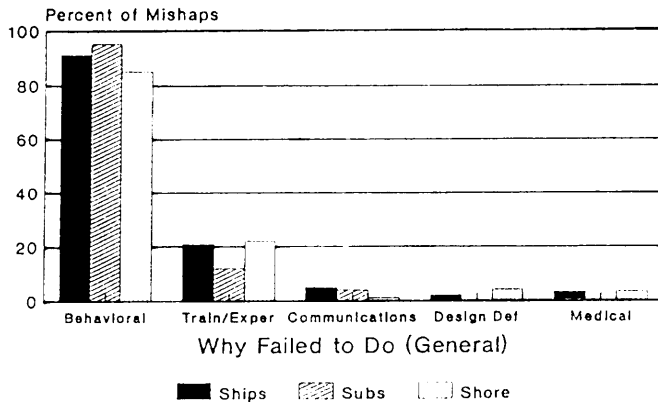
### Distribution of Responsibility for Personal Injuries/Death



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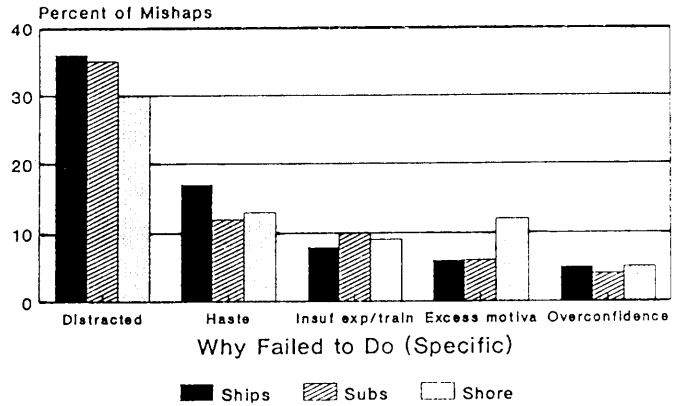
Figure 1-1.—Human error mishap statistics.

### Why Responsible Person Failed to Do Required Act Causing Property Damage



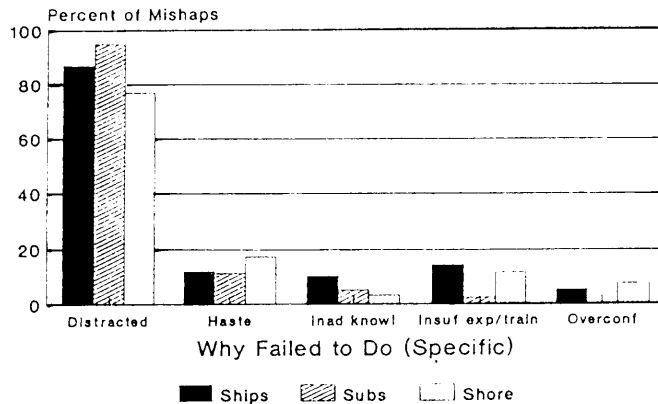
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### Why Responsible Person Failed to Do Req'd Act Causing Personnel Injury/Death



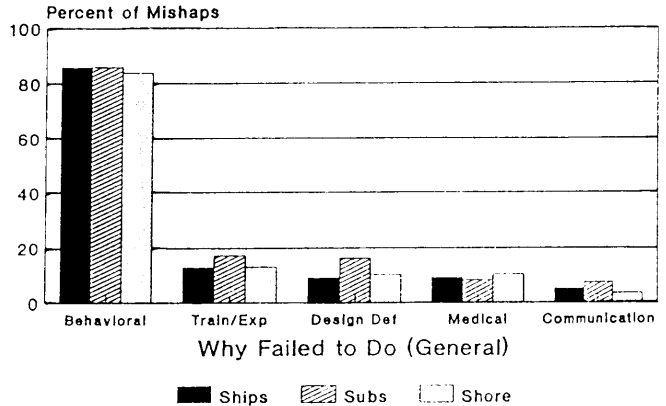
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### Why Responsible Person Failed to Do Required Act Causing Property Damage



1 Jan 86 - 31 Dec 90

### Why Responsible Person Failed to Do Req'd Act Causing Personnel Injury/Death



1 Jan 86 - 31 Dec 90

Figure 1-1.—Human error mishap statistics—Continued.

operating procedures. **Human error** is cited as the **most frequent** cause of Navy mishaps (fig. 1-1).

How do we keep personnel and working conditions as safe as possible? We include safety rules in our everyday workplace. One purpose of safety rules is to remind people of the inherent dangers of their work. Your job as a safety supervisor will require you to identify hazards and apply appropriate or required safety rules. Training personnel to observe safety precautions helps them avoid preventable mishaps, maintain a safe work environment, and conduct mishap-free operations. Operating procedures and work methods that include mishap prevention keep personnel from being needlessly exposed to injury or occupational health hazards. An effective safety program depends on worker cooperation and supervisor involvement.

### THE NAVAL SAFETY CENTER

The Navy recognized the need for centralized management of all safety efforts many years ago. A single command to deal with all Navy safety ashore and afloat evolved from the original Naval Aviation Safety Center. With the passage of the Occupational Safety and Health Act (OSHA) in 1970, increased emphasis on shore and shipboard safety demanded expansion and increased awareness.

Commander, Naval Safety Center (COMNAVSAFECEN), advises and assists the CNO in promoting, monitoring, and evaluating the Department of the Navy safety program. The commander advises and assists the CNO in determining safety program goals and policies. COMNAVSAFECEN also has the responsibility of



347.1

**Figure 1-2.—Naval Safety Center building.**

developing procedural guides and preparing directives to support and achieve program goals and policies.

#### **RESPONSIBILITIES OF THE NAVAL SAFETY CENTER**

The Naval Safety Center (fig. 1-2), located in Norfolk, Virginia, provides staff support to the CNO in executing the Navy safety program. The Safety Center also provides staff support to the Deputy Chief of Naval Operations (Logistics), N4. The staff support helps N4 carry out its overall Navy safety and occupational health coordination responsibilities. The Safety Center supports the Naval Inspector General and the President of the Board of Inspection and Survey.

As directed, the Naval Safety Center assists N4 in preparing and maintaining basic safety program manuals. The Safety Center does not issue Navywide safety directives. However, when requested, the staff helps the appropriate offices, commands, or agencies prepare general or specific safety-related operating instructions. It also conducts safety surveys of the naval operating forces and shore commands as requested by the CNO.

1. Other functions performed by the Naval Safety Center include:

2. Maintaining liaison with naval command bureaus, and offices to ensure knowledge of factors adversely affecting safety and to recommend remedial action
3. Maintaining liaison with other government agencies and private organizations engaged in hazard awareness
4. Maintaining a library of research, technical development, and survival information
5. Maintaining and evaluating mishap, occupational illness, and hazard reports; and publishing statistical data on mishaps
6. Providing mishap statistical research services and conducting special analytical studies on naval mishap data
7. Identifying human factors, inadequate maintenance techniques, deficiencies in design, insufficiency of technical publications, and shortage of repair parts and equipment
8. Developing and reviewing procedures and standards for conducting mishap investigations; assisting in investigations of significant mishaps involving naval aircraft, ships, and submarines; taking part, as requested, in

significant, nonaircraft mishap investigations occurring ashore

8. Representing or sponsoring conferences, symposia, seminars, and work and study groups to further the Department of the Navy mishap prevention programs
9. Promoting interest in mishap prevention through hazard awareness
10. Taking part in all aspects of Navy safety education and training
11. Providing, when directed, membership on review boards and advisory councils such as the Naval Aviation Training and Operations (NATOPS) Advisory Council and the CNO Ammunition and Hazardous Materials Review Board (AMHAZ)
12. Developing and providing a Motor Vehicle Mishap Prevention Program directed to Navy personnel on and off duty and all on-duty civilian personnel who use government or privately owned vehicles; developing traffic safety training courses
13. Managing the Individual Flight Activity Reporting System (IFARS) and maintaining flight time data for all aeronautically designated naval officers
14. Developing and administering safety award programs and recommending final selection of winning units
15. Reviewing and evaluating selected system safety engineering requirements on new systems or major systems changes
16. Maintaining a recognized data repository covering each dive made by U.S. Navy divers and providing information based upon analysis of this data; conducting divers' safety surveys and inspections, and publishing information concerning diving safety to forces afloat
17. Making appropriate and timely recommendations to the Chief of Naval Operations, Commandant of the Marine Corps, or other subordinate commands on remedial actions required in the interest of readiness through safety

Unless otherwise directed, the Safety Center's responsibilities do not include safety related to nuclear propulsion and nuclear weapons.

The Naval Safety Center receives and analyzes all mishap and injury reports submitted by aviation, ship, submarine, and shore commands. The staff indexes this information by phase of operation, material failure, personnel action, or cause factors. It then incorporates the information into the mechanized data bank, through which it can retrieve the mishap and injury records of any specific incident. In that way, the Naval Safety Center can monitor mishap trends and pinpoint areas requiring corrective action. Additionally, the Naval Safety Center maintains operational or exposure data such as the Individual Flight Activity Report and the Diving Log. It uses data from those documents with mishap data to determine the significance of factors involved in mishaps.

The Naval Safety Center conducts safety surveys upon the request of a unit's commanding officer. The purpose of each survey is to identify and analyze hazards and potential mishap situations to determine preventive action. The Naval Safety Center provides a team of officers and chief petty officers to conduct surveys. These personnel are experts in their fields, and most have been associated with mishap prevention for several years. The survey is informal. Only the commanding officer of the unit involved, and not superiors in the unit's chain of command, receives the survey results. The Naval Safety Center enters the results into its data base to help analyze and predict potential mishap areas. It also conducts safety surveys of high risk courses at training commands.

The Naval Safety Center also guides the incorporation of mishap prevention "lessons learned" with new construction and conversion for shipboard improvement and system safety. The center uses the safety recommendation (SAFEREC) system, ship safety information data base, and mishap and injury reports. In addition, it uses casualty reports (CASREPs) and maintenance data system (MDS) reports submitted according to the 3-M system. The center uses these data to recommend improvements in shipboard and system safety.

#### **SAFETY PERIODICALS PUBLISHED BY THE NAVAL SAFETY CENTER**

The Naval Safety Center advises and informs the operating forces, shore commands, and other

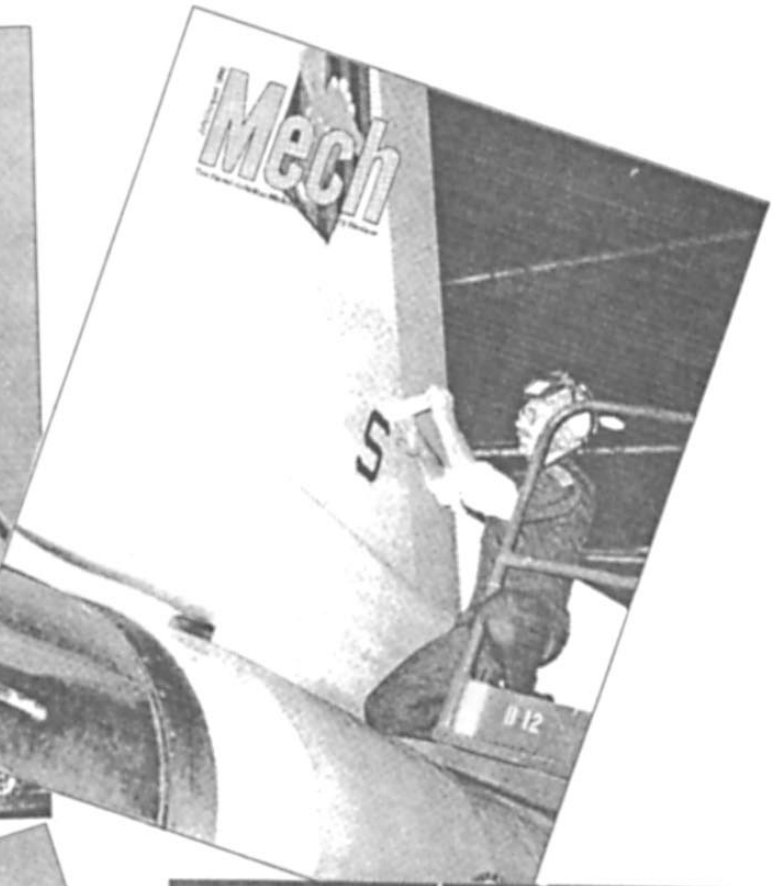


Figure 1-3.—Naval Safety Center publications.



commanders on mishap prevention through the following periodicals (fig. 1-3):

*Approach*, the Naval Aviation Safety Review, is published monthly for the professional benefit of all levels of **naval aviation**. It contains articles, commentaries, and short features about mishap prevention as well as articles about flight operations.

*Fathom*, the Afloat Safety Review, is published every other month for the professional benefit of all hands. It presents the most accurate information available on **surface ship and submarine mishap prevention**.

*Mech*, the Naval Aviation Maintenance Safety Review, is published bimonthly for the **naval aviation maintenance** community.

*Safetyline*, the Naval Safety Journal, presents information available on various **shore safety** subjects. These subjects include environmental and occupational safety, hazardous material, recreation, athletics, home safety, motor vehicle safety, ordnance safety, and occupational health. *Safetyline* is published six times a year.

*Ships Safety Bulletin* contains articles on **shipboard safety** problems, trends, mishap briefs, and statistics. Although it is published monthly, it is occasionally published as a special issue on one topic.

*FLASH* contains factual lines about submarine hazards. It is a monthly, mishap-prevention bulletin that provides a summary of research from selected reports of **submarine hazards**. It gives advance coverage of safety-related information.

*Aviation Safety Bi-Weekly Summary of aircraft mishaps* provides aviation mishap briefs, statistics, discussions, and safety tips. The Naval Safety Center sends this message summary every other week.

*Diving Safety Lines* is a mishap-prevention publication that provides a quarterly summary of research from selected **reports of diving hazards**.

The Naval Safety Center also sends out a biweekly message summary of mishaps. This summary can be published in the Plan of the Day, issued as general information, or used as training material.

## **OTHER PUBLICATIONS PUBLISHED BY THE NAVAL SAFETY CENTER**

In addition to the periodicals listed above, the Naval Safety Center also publishes the following materials:

- Posters concerning the drive-safe program and general, aviation, submarine, and surface ship safety
- Stickers informing people of foreign object damage (FOD), tower signals, and other topics
- Safety inspection checklists
- Naval Safety Center advisories
- Summaries of mishaps
- Safety program management guides
- Safety equipment shopping guides
- Mishap investigation handbooks

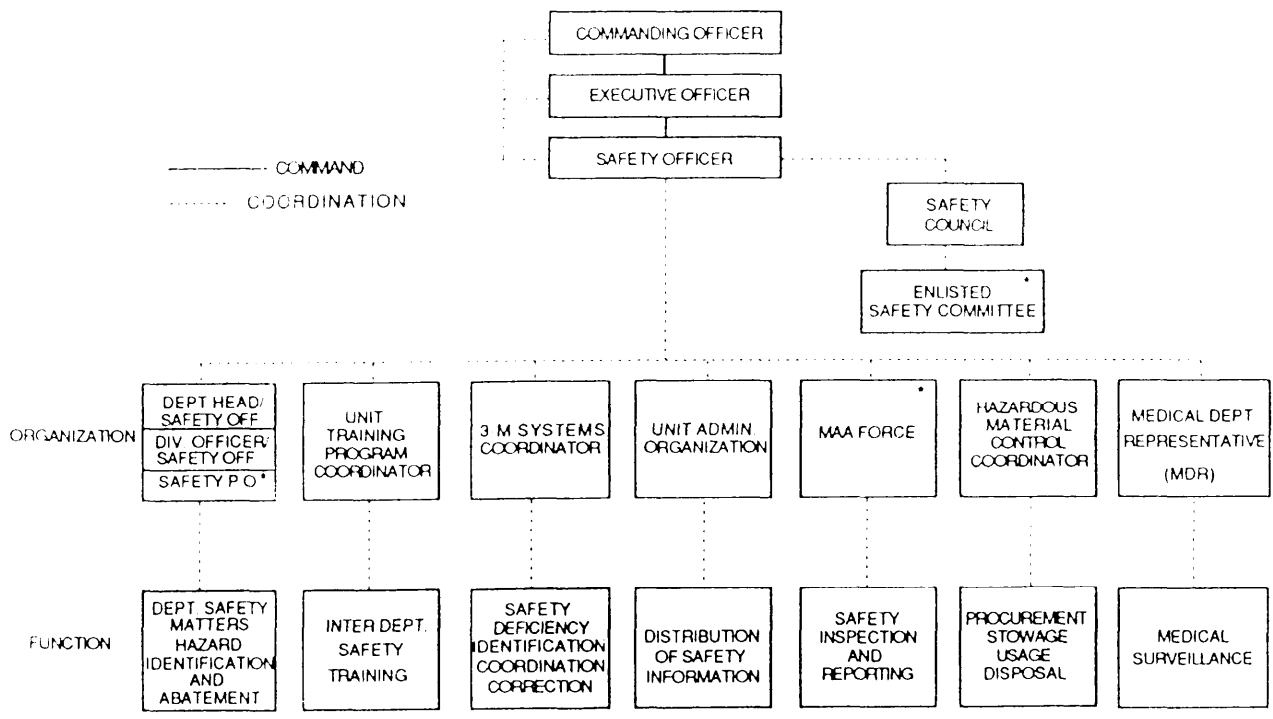
Additionally, higher authority distributes information to the operating forces through other publications and periodicals.

## **SAFETY CHAIN OF COMMAND**

The Chief of Naval Operations (Environmental Protection, Safety, and Occupational Health Division), N45, sets policy and establishes safety standards for the NAVOSH Program. N45 carries out the policies of the *NAVOSH Program Manual*, OPNAVINST 5100.23C, and *NAVOSH Program Manual for Forces Afloat*, OPNAVINST 5100.19B. N45 maintains close liaison with other agencies within the Office of the Chief of Naval Operations (OPNAV) to provide safety and occupational health standards for surface ships, submarines, and aviation commands.

OPNAVINST 5100.23C specifies the proper chain of command and responsibilities for the NAVOSH program. Ashore and afloat, all activities, commands, commanders, commanding officers, and officers in charge must carry out an effective safety and occupational health program. Administrative responsibility for safety extends from SECNAV to CNO to Commander in Chief, Atlantic Fleet (CINCLANTFLT) and Commander in Chief, Pacific Fleet (CINCPACFLT) for shore and afloat commands.

The CNO provides primary support for the NAVOSH Program. The various systems commands, the Naval Safety Center, Chief of Naval Education and Training, and the Navy's Inspector General provide specified support. Type commanders and afloat group and squadron commanders ensure their subordinate units carry out an effective safety and occupational health program.



\* Not applicable to submarines.

Figure 1-4.—Typical afloat safety organization.

## RESPONSIBILITIES FOR THE LOCAL SAFETY PROGRAM

The chain of command manages the local safety program, since that is a command responsibility. Each command level and supervisory level has responsibilities for supervising both routine and specialized tasks.

The commander, commanding officer, or officer in charge has ultimate responsibility for safety matters within his or her unit. He or she appoints a safety officer or safety manager to help carry out day-to-day safety-related activities. The duty of the safety officer or safety manager is to make sure all personnel understand and strictly enforce all prescribed safety precautions.

Afloat, the safety organization extends from the commanding officer down to the most junior sailor. Each department and division on board ship has safety program responsibilities. Ashore, although bases and tenant commands are staffed with military or civilian safety professionals, the safety organization includes every worker.

## AFLOAT SAFETY ORGANIZATION

*U.S. Navy Regulations* charges commanding officers with absolute responsibility for the safety, well-being, and efficiency of their commands. The surface ship or submarine safety officer reports directly to the commanding officer on safety matters. The safety officer reports to the executive officer about administrative matters. The safety officer assignment may be a primary or collateral duty, depending on the type of ship and its size.

The commanding officer assigns a collateral duty safety officer on all submarines and surface ships with a crew of less than 500 personnel. All aircraft carriers; amphibious assault ships—general purpose (LHA), multipurpose (LHD), and helicopter (LPH); and fast combat support ships (AOEs) assign a line officer as the primary duty safety officer. Repair ships (ARs), destroyer tenders (ADs), and submarine tenders (AS) assign an industrial hygiene officer as the primary duty safety officer. Aircraft carriers—both multipurpose (CVs) and nuclear propulsion (CVNs)—assign an industrial hygiene officer as the assistant safety officer. Readiness groups and squadrons serve in a primary duty billet as the staff safety officer.

Whether a safety officer assignment is a primary or collateral duty, it should not be taken lightly. The assigned safety officer should be of department-head status and have the seniority to get the job done. Safety petty officers assigned to assist the safety officer must be E-5 or above. Figure 1-4 shows a typical afloat safety organization.

The safety officer, guided by the commanding officer, formulates and manages a safety program. The guidelines stated in OPNAVINST 5100.21B and OPNAVINST 5100.19B are the basis for the program. The safety officer checks the crew's activities and provides the coordination for keeping the program viable and visible to all hands.

The chain of command, which includes department and division safety officers, division safety petty officers, the master-at-arms (MAA) force, and the medical department, monitors the safety program. It informs the commanding officer of the command's progress in reaching mishap prevention goals and of the safety program's effectiveness. For example, under the guidance of the safety officer, safety organization personnel accomplish the following:

- Monitor mishap prevention standards by investigating all mishaps and near mishaps
- Evaluate the effectiveness of the safety program by analyzing internal and external reports including CASREPSs; binnacle lists; safety related messages; mishap and near mishap investigations; and various surveys, inspections, and zone inspections
- Coordinate distribution of safety information including lessons learned from official and nonofficial sources
- Coordinate shipboard training in general mishap prevention, especially for newly reported personnel
- Ensure commands prepare and submit occupational injury and illness reports to NAVSAFECEN based on OPNAVINST 5100.21B
- Perform trend analysis of injury and illness data
- Follow-up on reports of unsafe and unhealthful conditions as specified in OPNAVINST 5100.19B
- Track corrective action on safety and health items

- Maintain liaison with other commands and NAVSAFECEN in matters of mishap prevention
- Coordinate traffic and motor vehicle safety training
- Coordinate recreational and off-duty safety training

The commanding officer ensures personnel are instructed and drilled in applicable safety precautions and requires the posting of adequate warning signs in dangerous areas. He or she then establishes a force to see that the precautions are being observed.

### **The Safety Officer**

The safety officer is assigned administratively to the executive officer. However, the safety officer has direct access to the commanding officer in matters of safety. Normally, the safety officer has department-head status and seniority and is responsible for carrying out a comprehensive safety program. Objectives established by the commanding officer serve as the basis for this program. OPNAVINST 5100.19B and OPNAVINST 5100.21B outline the duties and responsibilities of the safety officer. The safety officer's responsibilities include the following:

- Acting as the principal advisor to the commanding officer on shipboard safety matters
- Promoting maximum cooperation in safety matters at all levels
- Ensuring wide distribution of safety information
- Monitoring the submission of required safety reports to ensure accuracy and timeliness
- Maintaining appropriate safety records and statistics
- Ensuring the program is evaluated and monitored
- Participating in mishap investigations and protecting mishap site evidence for mishap investigation boards
- Serving as the senior member of the Enlisted Safety Committee
- Serving as recorder for the Safety Council

The safety officer works with all department heads and division safety officers and petty officers in carrying out the safety program in their areas.

## Department Heads

The department head is the designated department safety officer. He or she coordinates the department safety program with the command safety officer. The department safety officer acts as a point of contact for coordinating and evaluating the ship's safety program. Further, the department safety officer ensures the correction of all hazardous conditions revealed by safety hazard reports. He or she maintains records of mishaps, safety hazards, and safety training within the department and maintains direct liaison with the unit safety officer. The department head is also a member of the Safety Council.

## Division Officers

Each division officer is assigned as the division safety officer. He or she advises the department safety officer on the status of the safety program within the division. That includes the status of any safety-related item revealed through the 3-M Systems. An example would be noncompliance with or a deficiency in the planned maintenance system (PMS). He or she also advises the department safety officer of any safety training needs within the division and ensures that assigned personnel are properly trained for their billet. The division officer appoints an E-5 or above to serve as the division safety petty officer.

## Division Safety Petty Officers

The division safety petty officer must become thoroughly familiar with all safety directives and precautions that apply to his or her division. He or she conducts assigned division mishap prevention training and maintains appropriate records. The division safety petty officer assists in safety investigations as directed and makes recommendations about the safety program. Further, the safety petty officer helps the division officer execute safety duties. He or she acts as the technical advisor on matters of mishap prevention within the division. The division safety petty officer is the division's representative to the Enlisted Safety Committee. Submarines are not required to assign division safety petty officers.

All shipboard safety petty officers must complete the division safety petty officer's "Watchstation" section of the *Personnel Qualification Standard (PQS) Safety Programs Afloat*, NAVEDTRA 43460-4A, within 6 months of assignment. At least 50 percent of the ship's safety petty officers must also attend the Safety Program Afloat course, J-493-2099.

## Medical Department Representative

The medical department representative provides direct support to the ship's NAVOSH Program. He or she provides or schedules medical surveillance services, such as hearing tests; arranges for outside industrial hygiene assistance; and maintains occupational health records. The medical department representative provides the safety officer with injury reports.

## The Master-at-Arms/Safety Force

Master-at-arms (MAA) force personnel serve as the ship's safety force, assisting the safety officer in program enforcement and hazard identification. During their *routine* inspections, MAA personnel identify and report *routine* hazards and carry out a system of internal reporting to focus attention on the safety program.

## Safety Council

The ship's Safety Council convenes quarterly to develop recommendations for policy in safety matters and to analyze progress of the overall safety program. The council consists of the commanding officer or executive officer (chairperson), the unit safety officer (recorder), and safety representatives from each department.

The safety officer may prepare an agenda for the chairperson's issuance before each meeting. This information should show the extent of any problems and suggested approaches to resolving the problems. The council reviews reports from the medical department representative and statistics compiled by the safety officer. In addition, it reviews inspection reports and safety-related directives and messages from higher authority. The safety council also performs the following duties:

- Reviews statistics compiled by the safety officer from mishap/near mishap reports, inspection reports, and other information
- Directs action to be taken to correct identified unsafe or unhealthful conditions
- Evaluates the ship's NAVOSH Program
- Reviews issues and recommendations submitted by the Enlisted Safety Committee

The safety officer keeps records of the Safety Council meetings and issues the minutes.

## **Enlisted Safety Committee**

The Enlisted Safety Committee makes recommendations about the command's safety program to the Safety Council. The safety committee convenes to exchange information; improve communications; review conditions, mishaps, and injuries; and suggest improvements. It makes written safety recommendations to the Safety Council and the commanding officer. These meetings convene at least quarterly to enhance interdepartmental communication in mishap prevention at division and work center levels. Committee membership is as follows:

- Command safety officer (senior member)
- Division safety petty officers
- Chief master-at-arms

On small ships, with less than 300 crewmembers, the Enlisted Safety Committee may be incorporated into the Safety Council. Since submarines are not required to appoint safety petty officers, they are not required to have an Enlisted Safety Committee.

## **Individual Crewmembers**

Safety program success depends on all-hands cooperation and support. The best safety program cannot prevent mishaps if the crew does not comply with safety precautions. All hands must follow posted safety precautions, comply with safety standards, and report unsafe or unhealthful conditions. They must report injuries and material damage immediately to their supervisor.

## **Safety Department Organization**

Ships with a primary duty safety officer will have a safety department. This department, headed by the safety officer, may have an assistant safety officer and other safety assistants assigned. Aircraft carriers have an aviation safety officer, usually a Commander, assigned as department head and an industrial hygiene officer assigned as the assistant safety officer. A carrier may have 5 to 10 additional safety assistants assigned, depending on its size and requirements. Large air-capable surface ships (LHDs, LHAs, and amphibious transport docks [LPDs]) normally have a lieutenant or lieutenant commander assigned as the aviation safety officer, with one to three assistants. Tenders have an industrial hygiene officer assigned as the safety officer, with one to five safety assistants. Safety department manning varies between ships.

During some special events, such as overhauls or deployment, the ship may assign additional personnel to the safety department.

## **SHORE ACTIVITY SAFETY ORGANIZATION**

The goal of any safety program is to enhance operational readiness. We enhance this readiness by reducing the frequency and severity of on- and off-duty mishaps to personnel. In addition, we must reduce the cost of material and property damage attributed to mishap causes. How do we do that? We must instruct each person in the command on general safety precautions. These precautions include mishap prevention and instructions on special hazards found in the daily work environment. We must also ensure continuing action and command interest in mishap prevention. Finally, we must evaluate the effectiveness of the program.

## **Echelon-Two Commands**

Within echelon-two commands, such as BUMED, Naval Sea Systems Command (NAVSEA), and Naval Air Systems Command (NAVAIR), authority and responsibility for performing the staff NAVOSH functions are under a separate Occupational Safety and Health (OSH) office. A civilian safety professional heads the OSH office and reports directly to the commander of the systems command. The civilian safety professional's duties are similar to those of the afloat safety officer in providing safety information and evaluations for the staff. The OSH office may also serve as technical advisor to the CNO on NAVOSH-related matters.

## **Shore Activity OSH Offices**

Each shore activity must establish and staff an OSH office. The OSH manager is placed on the immediate staff of the commander, commanding officer, or director or officer in charge. The minimum requirements for all OSH offices include the following:

- OSH Program management
- OSH reviews and inspections
- Deficiency abatement
- Consultation
- Investigation and reporting of mishaps

- Employee hazard reports
- Analysis of OSH Program effectiveness
- Attendance and conduction of OSH council and committee meetings
- OSH training, promotion, and education
- Implementation of NAVOSH Program requirements, depending on industrial activity at the shore command

Civilian staffing is based on the number of employees at the shore activity and tenant commands and on the extent of industrial activity. OPNAVINST 5100.23C discusses this staffing. This instruction also addresses occupational health medical staffing and industrial hygiene support. If a number of small bases are located in the same area, the OSH office may be consolidated and advise smaller commands through a services agreement.

Military commands at a shore activity may have a collateral duty safety officer assigned. This safety officer reports directly to the commander, commanding officer, or officer in charge for safety matters. Staffs, such as type commanders and support activities, may have both a military and civilian assigned as safety officer and OSH manager. If you are the collateral duty safety officer for your shore command, you may be dealing with the consolidated or base OSH office on a regular basis. You may consult the OSH manager or civilian staff of safety professionals concerning the program at your facility.

Aviation squadrons ashore have a military collateral or primary duty aviation safety officer assigned. That safety officer is assisted by aviation safety petty officers assigned to each division within the squadron. This safety organization remains in effect when the squadron deploys aboard ship or to remote shore stations. The base or naval air station OSH office maybe involved in the safety program as it pertains to the squadron's hangers and facilities.

### **Shore OSH Councils and Committees**

OSH councils and committees serve as sounding boards for multiple viewpoints and interests of various groups and individuals on matters relating to the NAVOSH Program. The OSH councils and committees have three basic functions:

- To create and maintain an active interest in occupational safety and health

- To serve as a means of communication regarding occupational safety and health
- To provide program assistance to commanding officers, including proposing policy and program objectives

The Federal Advisory Council on Occupational Safety and Health (FACOSH) acts in an advisory capacity to the Secretary of Labor. The council consists of 15 members appointed by the Secretary and includes representatives of federal agencies and of labor organizations representing employees. Field FACOSHs exist in many metropolitan areas; local Navy officials serve on this council. There is also a Department of Defense (DOD) Safety and Occupational Health Policy Council and a CNO Safety and Occupational Health Working Group (SOHWG). OSH councils, composed of both civilian and military members, may be established at major command headquarters.

At the activity level, Navy commands establish OSH councils, which meet at least quarterly. The commanding officer or executive officer chairs these councils. Members are appointed by local directive and include key safety professionals, military and civilian. OSH office representatives from each command, military collateral duty safety officers, aviation safety officers, and civilian employee representatives may be included in the membership.

Shore activities should also organize additional OSH committees at the supervisory or shop level. Provisions are made for their input to the OSH council. As a safety supervisor, you maybe involved in the OSH committee or the OSH council, depending on the size and function of the shore activity sponsoring the OSH council.

### **AVIATION SAFETY PROGRAM ORGANIZATION**

We will now discuss the various responsibilities for the command aviation safety program.

#### **Commanding Officer**

The commanding officer of an activity appoints an aviation safety officer as specified in the *Standard Organization and Regulations of the U.S. Navy*, OPNAVINST 3120.32C. This instruction lists the responsibilities of the command and dictates how the commanding officer should establish the program within the command.

## **Aviation Safety Officer**

The aviation safety officer (ASO) acts as principal advisor to the commanding officer on all aviation safety matters. He or she advises and aids the commanding officer in setting up and managing a command aviation safety program. The ASO is responsible for providing safety education throughout the command. He or she also ensures the incorporation of safety standards and procedures into all activity functions. The ASO coordinates safety matters among the organization staff. He or she maintains appropriate aviation safety records and mishap statistics. The ASO must be a primary billet assignment.

The aviation safety officer works with Quality Assurance/Analysis (QA/A) division personnel to develop a local maintenance instruction (MI) or command type of instruction. The ASO and QA/A division personnel investigate most mishaps/incidents and hazards in their activity.

A description of the command safety organization and tasks or functions of each member of the command safety organization must be issued. The flight surgeon or wing flight surgeon serving the command is responsible for the aeromedical aspects of the command safety program.

## **Aviation Safety Council**

If the command is a squadron, an air station, or larger, the command must form an aviation safety council. The council sets goals, manages assets, and reviews safety-related recommendations. The council keeps records of the meetings held. Members of the council review command plans, policies, procedures, conditions, and instructions to make sure they are current and correct. The council also responds to corrective recommendations. Standing members of the council include ground, aviation, and aeromedical (flight surgeon) safety officers.

## **Enlisted Aviation Safety Committee**

Representatives from each work center and other designated activities, such as the Medical Department and Aircraft Intermediate Maintenance Department (AIMD), form the Enlisted Aviation Safety Committee. The committee meets once a month to discuss safety deficiencies and to provide recommendations for improved safety practices and promotion of safety awareness. The committee keeps a record of attendance and of subjects discussed at the meetings. The

commanding officer makes a timely response in writing to all recommendations of the committee.

## **SAFETY TRAINING**

Training is a vital part of every effective safety program. The goal is to promote hazard awareness and to integrate safety into all unit training. An important task supervisors have is educating personnel within a division. Proper safety training will help all hands become effective safety monitors. Remember, one person cannot ensure safe working habits and conditions. You need an all-hands effort to achieve mishap-free working conditions.

The command's training program, and each departmental training program, should include a systematic approach to promote mishap prevention, both in unit and off-duty activities. Make effective use of educational materials from outside sources. These materials include Navy training films, safety notes, and various publications issued by the Naval Safety Center. Use these resources as aids in training. Display as many of these resources as applicable in division workspaces. That will increase personnel interest in safety.

Training in some OSH topics is mandatory, either as an indoctrination or periodically. OPNAVINST 5100.23C outlines the NAVOSH training requirements for shore activities. OPNAVINST 5100.19B defines indoctrination and annual NAVOSH training requirements for a ship's force. The *NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, provides onboard training materials as well as lists of training aids and formal safety courses for most required training.

The safety officer or safety manager ensures safety training is conducted. Frequently, the safety supervisor, work center supervisor, or safety petty officer conducts on-the-job or general military training (GMT). If these safety professionals do not actually conduct the safety training, they should at least monitor it for effectiveness.

All military and civilian workers must be introduced to the NAVOSH Program during indoctrination. Workers are made aware of the specific hazards in their work areas and general safety precautions. Additional training may be required for special evolutions such as the following:

1. Preparation for shipyard overhaul
2. Getting under way after a long in-port period
3. Seasonal weather changes or unusual weather
4. Unusual missions or operations

5. Increased industrial activity
6. After a serious mishap

## **TYPES OF SAFETY TRAINING**

Safety training is accomplished through **on-the-job training, general military training, indoctrination training, formal safety courses, safety standdowns, and safety surveys**. The command training officer schedules required safety training, such as GMT and indoctrination. This training then becomes part of the command training plan. Safety professionals and safety supervisors must attend formal safety courses as part of their assignment. Safety standdowns consist of periods, usually of 1 or 2 days, of intensive safety training and awareness.

### **On-the-Job Training**

Training, cross-training, and qualifying for specific skills require the use of proper safety precautions. Safety precautions are a part of all standard operating procedures (SOP).

By monitoring safety precautions during routine work situations, you can detect unsafe practices. Once detected, you can take immediate action by providing training to correct those practices.

Monitoring of on-the-job safety practices serves as an evaluation of the training provided by supervisory personnel. It checks the effectiveness of training in all aspects of everyday life aboard your command. Those aspects include the planned maintenance system (PMS), weapons systems operations, damage control, fire fighting, and general housekeeping. Mishap trends also help target needed mishap prevention training.

### **General Military Training**

Routine, shipboard general military training (GMT) must include safety topics. Aboard ship, the Planning Board for Training meets periodically to schedule training and ship's evolutions. The safety officer must ensure safety topics, especially the topic of required annual safety training, are included in the command training plan. General military training (GMT) can be accomplished through video tapes, stand-up lectures, drills, or a combination of methods. Training should be monitored and documented. Ashore, military personnel should also receive safety topic training as part of their regularly scheduled GMT.

## **Indoctrination Training**

All new workers or sailors receive some type of indoctrination training to help them become familiar with their new job. Aboard ship, that is accomplished through Indoctrination Division, School-of-the-Ship, or submarine Phase I training. New worker indoctrination must include safety topics.

OPNAVINST 5100.23C and OPNAVINST 5100.19B require indoctrination training on the command's overall NAVOSH Program. Federal Hazard Communication Standard training is required for all shore personnel who will be in contact with hazardous materials. Aboard surface ships, indoctrination training is required on back injury prevention, gas-free engineering, electrical safety, the tag-out program, and the radiation safety program.

### **Formal Safety Courses**

A variety of formal safety courses are provided for Navy safety professionals. All safety officers and one-half the safety petty officers assigned aboard ship must take part in formal safety training. Civilian safety managers must attend formal courses and refresher training. OPNAVINST 5100.23C and OPNAVINST 5100.19B provide course requirements. The Naval Safety School in Norfolk, Virginia, provides numerous shore safety courses. Fleet Training Centers in Norfolk and San Diego conduct safety supervisor and hazardous material training. The Surface Warfare Officer School in Newport, Rhode Island, presents the Afloat Safety Officer course. Submarine training facilities in Norfolk and Pearl Harbor conduct the Submarine Safety Officer course.

### **Safety Standdowns**

In 1989, in response to a rash of Navy mishaps, the Chief of Naval Operations called for a Navywide safety standdown. A safety standdown is a period, usually of 1 or 2 days, set aside for safety training, awareness, and drills. Type commander instructions require afloat units to conduct safety standdowns at least once a year, while yearly standdowns are recommended to other units. Shore commands may also take part in safety standdowns. A standdown may be called any time the command notes a particular safety problem or wants to reemphasize safety on a specific topic. For example, if a command has a serious mishap, it may have personnel take part in a safety standdown for a morning instead of working. Personnel may then review the events leading to the mishap and discuss the lessons learned.



## Safety Surveys

Safety surveys are informal safety program evaluations conducted by the Naval Safety Center. These surveys are excellent training opportunities for safety supervisors. Checklists are used to determine safety requirements for each discrepancy. Shore, surface ship, submarine, and aviation safety surveys are available upon request from the Naval Safety Center. The results of safety surveys are provided directly to the commanding officer or commander, but to no one else in the chain of command.

## Video Tapes and Training Aids

Video tapes, films, and other visual training aids are good supplements to your safety training program. They should be used in conjunction with lectures or discussions. Since many young people are media-oriented, video tapes and films capture their attention. However, video tapes and films should never be used as a substitute for a monitored presentation.

Naval Education and Training Support Centers on each coast maintain libraries from which you may order training films. The addresses and phone numbers of those libraries are as follows:

Naval Education and Training Support Center,  
Atlantic  
Code N5, Bldg. W313  
Naval Station, Norfolk, VA 23511-6197  
Phone (804) 444-4011/1468,  
Defense Switched Network (DSN)  
564-4011/1468

Naval Education and Training Support Center,  
Pacific  
921 West Broadway  
San Diego, CA 92132-1360  
Phone (619) 532-1360, DSN 522-1360

*Catalog of Navy/Marine Corps Audiovisual Productions*, OPNAV P-09B1-01-88, and *NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, provide a list of safety training films. In some instances, you may borrow training aids from industrial hygiene or occupational health departments at medical clinics or naval environmental and preventive medicine units (NEPMUs).

Training aids for submarine force units are listed in the *Submarine On-Board-Training (SOBT) Products Catalog*. The catalog is available through COMSUB-GRU-2, Code N-24, Naval Submarine Base, New London, CT 06349-5100, commercial (203) 449-3485

or DSN 241-3485. SOBT distributes safety video tapes for permanent retention by submarine force units.

NAVOSH training topic video tapes are distributed to each afloat unit. These tapes are accompanied by a NAVOSH video tape user's guide. The user's guide explains the purpose of and provides an introduction to the video tape.

## BEING AN EFFECTIVE SAFETY TRAINER

The work center or area supervisor is an important link in the Navy's safety training program. These supervisors are responsible for specific training sessions, including monthly 5-minute stand-up training lectures. The success of training depends on the vigor and leadership demonstrated by the supervisor. The supervisor has the practical experience on the job to teach safety skills. But first, the supervisor must

- understand the subject matter,
- understand how to teach it, and
- understand how to motivate people to learn.

Training conducted by supervisors has special challenges. You are a busy person and have many concerns—of which safety is only one. A training session should be brief, clear, and to the point to be well received and effective. Keep an open mind and a helpful attitude. Use your experience and knowledge to help trainees relate to safety situations within the Navy and in their job. Your goals are as follows:

- To arrange for conditions that allow effective learning. Good environmental conditions won't make your training effective, but poor conditions can prevent personnel from learning even during the best training session. Arranging for a good learning environment is more of a challenge aboard ship.
- To clearly emphasize the most important points as they relate to the Navy.
- To impress your students with good safety attitudes.

To attain these goals you should take the following steps:

- Prepare an outline or lesson guide on your topic. The *NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, includes 20 NAVOSH lesson guides. You can adapt them to fit your audience.

- Preview the film or video tape before you conduct training. Before you begin training, you should

- Preview the film or video tape before you conduct training. Before you begin training, you should first go through the entire program at least once to become familiar with the subject. Anticipate questions people may ask and be prepared to answer them.

- Study the current Navy safety policies and regulations that relate to the program. List the references for your topic in the lesson guide.

- Use handout materials if they can add to the training. Handouts work two ways—they give students something to take back with them to the work area, and they are a good source of information for later reference or summary. The lesson guide that supports a specific topic may provide suggested handout materials you can easily reproduce on a copier machine.

- Acquaint yourself with your lesson guide or outline. If you get lost or confused, you will look unprepared. That can discredit you in the eyes of your students.

- Pay attention to class time. Keep the session moving and lively. Nothing is worse than a session that drags on aimlessly and painfully.

**KEEP TRAINING SHORT!**

**TRAIN EARLY IN THE DAY!**

At times you may have problems creating a good climate for learning; you may have to search for a place to conduct training. Aboard ship, you may find yourself teaching in a crew's mess area or a workshop. Ashore, you may have to teach in a lunchroom, conference room, or shop area. Students may have to stand. You may also have noise to contend with from ventilation or operating equipment. Understand that certain factors affect learning, including the "classroom" itself.

Simple human needs affect how well or how fast we learn. Physiological needs include being cold, hot, hungry, or tired. Having such needs will prevent personnel from learning because they will be

concentrating on their body's needs first. Social needs have an impact on any group of people. All people want to have a feeling of belonging and to feel needed by others. Personnel develop a sense of belonging more easily within familiar surroundings. Adults also have an ego need; that is, a need to feel useful and respected. Try not to talk down to your students or over their heads. **Never assume** they should know a safety precaution simply because it requires common sense, and never belittle them if they don't.

The safety instructor's style is also an important factor. In developing your own style, be sure you observe the following guidelines:

- Always accept a person's answer—don't embarrass a student who has given the wrong answer. Try to provide a positive statement. Say, "You're on the right track," rather than, "That's wrong."
- Talk to the entire group, not just to the front row. Move around. Speak loud enough that people sitting in the back of the room can hear you.
- Watch your mannerism. Relax. Take command of the group by your body language.

Safety training is often routine and repetitive. Impress upon your students the importance of safety training. Be prepared and present your training material in a professional and enthusiastic manner.

## **SUMMARY**

In this chapter you have learned about the history of the NAVOSH Program. We have introduced you to the current safety organization's program mission and objectives. We discussed the Naval Safety Center. We addressed safety and occupational health principles along with the elements of a local safety program. Remember, an effective safety program is everyone's responsibility. **Safety is a six-letter word for a 7-day job!**

## CHAPTER 2

# SAFETY PROGRAM PROMOTION AND ATTITUDES

This chapter deals with promoting your safety program and helping your workers develop a positive attitude toward safety. Sometimes people call this a “safety philosophy.” It is an essential part of any successful safety program.

Some safety supervisors believe that by providing safety training, they are promoting safety. While safety training is a vital element, training alone cannot change unsafe attitudes or promote safe workmanship. The advertising world calls promotional efforts “marketing.” A command must “market” its safety program and sell safety to the worker.

### SAFETY PHILOSOPHY

We often hear safety described as the use of “common sense.” That is, safety should be obvious—anyone should be able to see a missing safety guard and realize it is a hazard. Unfortunately, that is not the case. Safety is learned and experienced.

From a young age, other people warn us about dangerous situations and how to identify potential hazards. Without that training, you might receive injury from such hazards. If not seriously injured, you surely will learn from the experience.

You can easily recognize some safety hazards. However, hazards involving toxic chemicals and exposures may not be obvious. Some occupational illnesses, such as asbestos exposure, do not show symptoms for 10 to 35 years. You need to be trained to recognize these hazards.

Just as we cannot rely on common sense to prevent mishaps, we cannot assume that everyone has a good attitude toward safety. The following are some attitudes that can contribute to mishaps:

- **The immortal**— Young sailors and workers usually have this attitude. They feel immortal and cannot imagine that “it could happen to them.”
- **The accident-prone**— People who have this attitude seem to have a greater number of mishaps than their coworkers or shipmates.

The attitude of the safety supervisor, safety manager, or safety petty officer can help mold the attitude of the workers. Supervisors must constantly seek to develop good attitudes in their people. Train your people in safe workmanship and try to convince them the command is sincerely interested in safety. Enforce all safety regulations to emphasize that the command “expects” safety to be a standard operating procedure.

### RISKS

Risk taking is an inevitable part of our daily lives. Whether driving to work or getting under way, we face certain risks. However, we face different levels of risks. Some risks are considered acceptable or unavoidable. For example, we may have little choice but to drive to work, but we can reduce the hazard by using safety belts. An unacceptable risk would be to drive a motorcycle to work at a high speed without wearing a helmet.

Good risk taking can actually be considered a precaution against mishaps. In good risk taking, the person is trained to recognize the level of risk and choose whether the risk is worthwhile. A calculated risk based on the possible consequences of a hazard is safer than a haphazard risk based on poor judgment or ignorance. A lack of risk is not necessarily safer. A lack of risk sometimes means a person isn’t “aware” of the risks.

Minimizing risks is a vital element of mishap prevention. You may be aware that a machine part is badly worn, so running that machine involves a risk. Mishap prevention occurs when you reduce that risk by taking interim or permanent corrective action.

We can assess the risk of any hazard. This assessment is based on the *severity* of that hazard should a mishap occur and on the *probability* that it will occur.

- **The fatalist**— The people who have this attitude are sure that when “their time is up, nothing can be done about it.”
- **The risk-taker**— People who have this attitude feel certain risks are just part of the job and too often take unacceptable risks.

This risk assessment determines the level of risk involved. The level of risk is indicated by a risk assessment code (RAC). Chapter 3 discusses RACs.

A good safety attitude means the worker will perform work in a manner that will reduce risks. A worker with a poor safety attitude would merely accept the risks and put up with the results. A good safety attitude in workers depends on the safety supervisor. You can foster good safety attitudes through communication, motivation, and salesmanship.

## COMMUNICATION

Good communication between workers and safety supervisors helps maintain interest in safety. Afloat and shore safety committees and safety councils, discussed in chapter 1, bring workers' safety concerns to supervisors. Through these committees and councils, the commanding officer becomes aware of unsafe conditions and hazards that require corrective action. When workers see the command take action to correct a hazard, they understand that they play an important part in the safety program. They also see that the command cares enough about their safety to correct hazards.

We need hazard information so that we can correct hazards, not place blame or discipline a worker. We must never coerce or threaten crewmembers and workers to report hazards. They should feel comfortable in reporting a hazard to their supervisor or be able to report a hazard anonymously. Good communication between workers and their supervisors encourages safe attitudes and trust in their command. The sincerity of a safety supervisor is obvious in how he or she deals with safety problems and complaints.

## MOTIVATION

To ensure total participation in the safety program, the command must motivate its people. It must motivate personnel to behave in a manner that will meet the various goals of the command. Program success consists of determining each person's needs. It also consists of selecting and providing appropriate incentives (reinforcers) to meet those needs. It also should establish reasonable tolerance limits so that goals are achievable. Some incentives that serve to motivate people include the following:

- Instinct for self-preservation
- Desire for material gain

- Desire for praise and acceptance
- Fear of ridicule or disapproval
- Sense of humanity
- Sense of responsibility
- Sense of loyalty
- Competitive instinct
- Desire for power or leadership
- Peer pressure and a desire to conform

We cannot overemphasize the importance of matching each person's needs to the proper incentives. A basic principle of behavior reveals that workers will repeat desirable behavior if the supervisor reinforces or rewards their actions. If the supervisor doesn't reinforce or reward a behavior, workers will stop the behavior. Thus, a command must have an awards or incentives system. An incentives system not only determines how people will perform their various jobs, but how they think about them as well. An incentives system can reinforce mishap-free behavior and encourage safe performance. Similarly, it can discourage unsafe and reckless behavior through the withholding of reinforcement. For an awards system to be effective, however, we must provide timely reinforcement.

If a person is doing a good job, we should not wait until the end of the year to give that person a letter of appreciation or commendation. Immediately after the desired behavior occurs, we should provide positive reinforcement. That increases the chance of recurrence of good work. Too much time between behavior and reward may confuse the person. He or she may not know which behavior was noteworthy.

Reinforcement must also be sincere and relate to a person's needs. People will see an "attaboy" given for a job they know they did not do well for what it is: an insincere, meaningless pat on the back. A child may respond to such an act, but an adult will not. Similarly, people will view other incentives that fail to satisfy real needs as meaningless.

Providing feedback about job performance also motivates people to perform desired actions. Motivation increases when reward is inherent in the task itself. An example is a technician who achieves a sense of satisfaction from a job well done. Motivation is highest when opportunities exist for achievement, recognition, increased responsibilities, and advancement. Such factors should be part of the job itself.

In a dull and repetitive job, management can increase motivation by rewarding safe work performance. Rewards should include both formal and informal incentives. Formal incentives include promotions, awards, formal commendations, special privileges, and work schedule selection. Informal incentives include praise, encouragement, acceptance by fellow workers, reduced supervision, and respect by others. Through careful use of such incentives, we can effectively influence the practices of our workers.

Motivation works best when the job itself provides opportunities to achieve satisfaction. Commands create such opportunities by providing workers with a feeling of acceptance, a knowledge of where they stand, reasonable autonomy, and freedom to practice individual skills. We can reenforce that approach by using the following techniques:

- Communicating effectively
- Assigning jobs consistent with the abilities of the individuals
- Including all hands (when possible) in the decision-making process
- Highlighting program benefits (advantages versus disadvantages)
- Rewarding deserving personnel (official recognition, praise)

Occasionally people will be at odds with the goals of the safety program. Their behavior will conflict with the success of the program. Many managers assume that a lack of cooperation stems from a dislike of work. They also think that the main job of the supervisor is to find a way to coerce people to work. They try to control people through threats, reprimands, assignment of extra duty, and unusually close and strict supervision. Such external control approaches are only effective for short periods of time and do not encourage the self-motivation we desire in our workers.

Supervisors should know that external control is not the best way to ensure a good job. External control methods, if not appropriately applied, can breed dissatisfaction and frustration. Those feelings can negatively affect both morale and skill. Use of the positive management techniques discussed earlier makes the management-worker relationship more harmonious. As a result, when you discipline a worker, it does not have the same negative qualities as the external methods. The corrected worker will understand

the reason for the discipline, whether it is in the form of retraining, reminders, warnings, or penalties.

Providing meaningful mishap prevention orientations and adequate on-the-job training reduces the need for discipline. Setting the right example is also helpful. Emphasizing the risks of improper work practices may also be effective. Such actions help define good job performance, which, in turn, helps prevent workers from developing poor work procedures. That reduces the need for corrective disciplinary actions later.

Management within the Navy provides general guidance and a firm commitment to safety. Supervisors, as the key persons in mishap prevention, must make safety a prime and integral part of each job their workers perform. They must motivate and train people to develop and use safe work habits. They must build their workers' belief in mishap prevention. Finally, they must help all workers develop a strong personal commitment to mishap prevention. Once workers have made that commitment, they will consciously try to prevent mishaps. They will question unsafe acts, conditions, or instructions and follow established safety procedures and regulations.

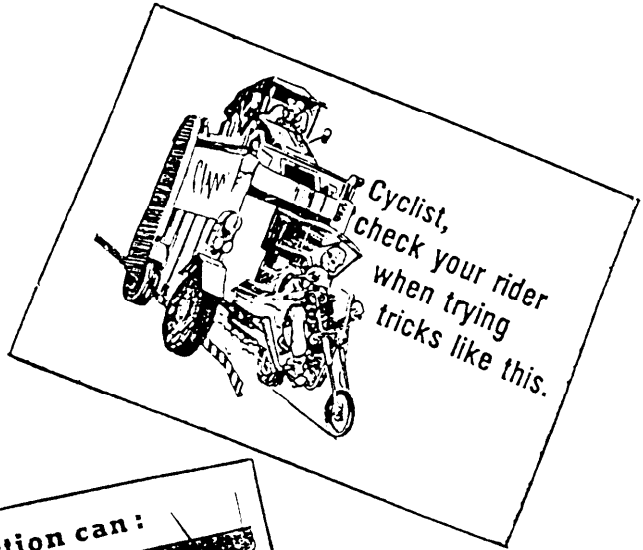
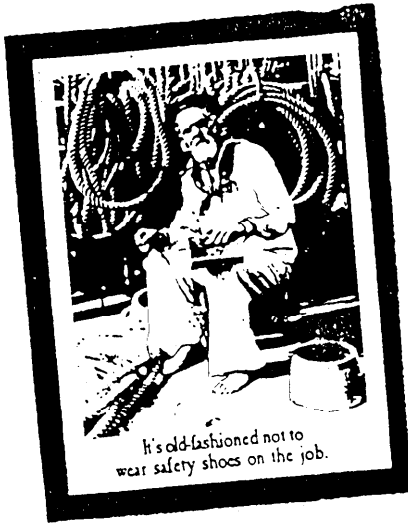
## **SALESMANSHIP**

Since the success of a safety program depends on worker cooperation, interest in the program must be "sold" to the worker. Good salesmanship involves three essential requirements: (1) a good product, (2) knowing your product, and (3) the ability to identify with the customer.

When you have a "product" to "market" or sell, the first requirement is to have a good product. Your product must provide something beneficial to the worker. Your product is freedom from loss of wages, from pain and injury, and from hardship for the worker's family.

Secondly, you must know your product. That takes study, attention to detail, and familiarity with safety standards. Your believability is a key to your ability to sell safety.

The third requirement is to put yourself in the place of your customer. Are the safety rules feasible? Can your workers comply with the safety standards and still get the job done? Do you require them to wear uncomfortable protective equipment for a long time in a hot environment? You should sell safety on an individual basis, attuned to what you know about your customer.



**a loose connection can:**

1. cause fires
2. be a direct cause of personnel injury
3. add many hours of unnecessary work
4. lead to overheating of cables
5. interrupt operation of vital loads




Figure 2-1.-Safety posters.

Every sale involves three steps: **preparation**, **presentation**, and **commitment**. **Preparation** is when you evaluate the hazards and risks of the job and the customer's ability to do the job. You research and observe the job or task determine the safety precautions that apply to the job, and target your safety efforts to address those precautions. **Presentation** is the use of your job knowledge to convince the worker of the need for safety. **Commitment** to a sale is when the customer agrees to "buy" the product. In other words, the worker decides to follow the safety precautions you have explained.

Safety must be sold to everyone in the chain of command, from the commanding officer down to the deck-plate workers. Command support is critical and may be your "hardest sell." All sales efforts start with the safety officer, manager, or supervisor.

### **SAFETY PROMOTION METHODS**

Advertisers develop campaigns to promote products. Safety officers and supervisors can also develop an advertising campaign to promote their safety program. Safety promotion methods include the following:

- Safety posters and stickers
- Promotional stunts
- Safety contests
- Safety suggestions
- Recognition and rewards
- Recognition organizations

### **SAFETY POSTERS AND STICKERS**

Colorful posters have been used to promote safety for over a century. Posters are a passive training method used to remind workers of a hazard, precaution, or idea. Posters must be current and have a message applicable to the audience. Change them frequently so they don't become part of the bulkhead.

Posters use both pictures and words to convey a safety message (fig. 2-1.) For workers with poor reading skills, posters are more effective than lengthy written text. Eye-catching, colorful pictures are as important to the effectiveness of a poster as clever text.

Put posters in areas of high traffic, in places where workers linger or stand in line, or at entrances and exits. However, make sure you place them in appropriate areas. For example, you would place a poster about the use of safety belts near an exit to the parking lot rather than in the mess area. Put posters aboard ship near the mess line, in crew lounges, and near the quarterdeck. You can put large safety banners at the head of the pier or on the fence leading to the parking lot.

Posters are available, in limited quantities, from the Naval Safety Center and various commercial sources. The National Safety Council produces hundreds of posters, which you can procure through open purchase. Intermediate maintenance activities can make larger canvas banners upon request.

### **PROMOTIONAL STUNTS**

Commands can use promotional stunts effectively to emphasize safety. Many naval bases, around holidays, display a wrecked vehicle near the gate. They post signs near the wreck reminding personnel to wear safety belts and not to drink and drive. Dressed up skeletons, dummies in precarious positions, and dramatic photographs can be used to emphasize safety. Promotional stunts should be safe but vivid and timely.

### **SAFETY CONTESTS**

Most people are competitive and like contests, especially if they can win a prize. Competition can be between individuals, work centers, shops, divisions, or commands. Common safety contests involve mishap records, training accomplishments, or the reporting of hazards. Prizes can range from a safety "S" flag to a special liberty chit. You can stage a safety contest for the best command safety slogan, safety essay, or safety poster. You can track reported hazards and mishaps for a specific period so that you can recognize the division or shop with the fewest mishaps. You can create competition out of zone inspections and other safety inspections by recognizing those divisions or shops with the best record of safety compliance.

Each year, about 5 million American workers take part in safety contests sponsored by the National Safety Council. The Safety Council presents hundreds of awards in response to these contests. The success of the contests has proven they are good safety motivators.

## SAFETY SUGGESTIONS

The Navy's Beneficial Suggestion Program (Benny Sugg) applies to safety suggestions. Safety suggestions that could result in monetary rewards include those which accomplish the following:

- Decrease lost work time
- Eliminate a hazardous condition
- Recommend the use of a less hazardous material

Safety suggestions may be made internally (within the command) or externally (outside the command). External and internal safety suggestions should be considered for rewards. A properly designed safety suggestion program is an effective means of tapping into your workers' ingenuity. People who work with systems and equipment on a daily basis are in a better position to find a better, faster, easier, and safer way of working. A successful safety suggestion program must meet the following guidelines:

- The command must really want suggestions from its workers and sailors.
- Every suggestion must be taken seriously; if it is not usable, the person who made the suggestion must receive an explanation of why it can't be used.
- Action to incorporate the suggestion should be prompt or the reason for any necessary delay explained.
- Anonymity should be respected, if desired, by the person who makes the suggestion.
- Rewards should be reasonable in relation to the value of the suggestion.

Many safety suggestions have resulted in cash awards. For example, one suggested the use of biodegradable detergent in a solvent parts washer. Another suggested the inclusion of extra safety steps that eliminated frequent mishaps.

## RECOGNITION AND REWARDS

Everyone appreciates a pat on the back and positive reinforcement. Too frequently in safety, supervisors tend to notice only the wrong and not the right. We will stop a worker who isn't wearing safety goggles, but walk right past a worker who is wearing the correct

safety equipment. Recognition for correct behavior bolsters safety program compliance and safe attitudes.

Recognition can be as simple as mentioning the name of a worker or sailor in the Plan of the Day (POD) or Plan of the Week. Divisions or work centers with a superior mishap record can be recognized with a plaque or a notice on the safety bulletin board. Commands have used head-of-the-mess-line privileges, special liberty, and ship's store discounts as incentives and rewards for safe behavior. Recognition and rewards strengthen your safety program support, so make the extra effort to reward your people for safe practices.

Recognition also applies to your safety assistants. A special safety-green ball cap, lettered T-shirt, or safety petty officer name tag gives your safety team distinction. You can use the ball caps or name tags to motivate safety petty officers to complete their qualifications. All of these positive strokes make people feel good about their command's safety program.

## RECOGNITION ORGANIZATIONS

Awards provide an excellent opportunity to promote safety programs. Many nonprofit organizations throughout the United States award people who use certain articles of protective equipment to eliminate or reduce the chances of serious injury. The following lists some of those organizations:

- **Wise Owl Club**— Founded in 1947, this is the oldest of all such "safety clubs." Membership is restricted to workers who have saved their eyesight by wearing eye protection. Address inquiries to Director of Industrial Service, National Society for the Prevention of Blindness, Inc., 79 Madison Avenue, New York, NY 10016.

- **The Golden Shoe Club**— This club awards workers who have avoided serious injury by wearing safety shoes. The club's address is Golden Shoe Club, 1509 Washington Avenue, St. Louis, MO 63166.

- **Kangaroo Club**— Members of this club have averted serious injury or death by wearing safety belts. The club's address is Kangaroo Club International, P.O. Box 950, Coatesville, PA 19320.

- **"I Survived" Club**— The Naval Safety Center sponsors this club for naval personnel and members of their families whose lives have been saved by wearing safety belts or using child safety seats. The Naval Safety Center sends the survivor a certificate (fig. 2-2) signed



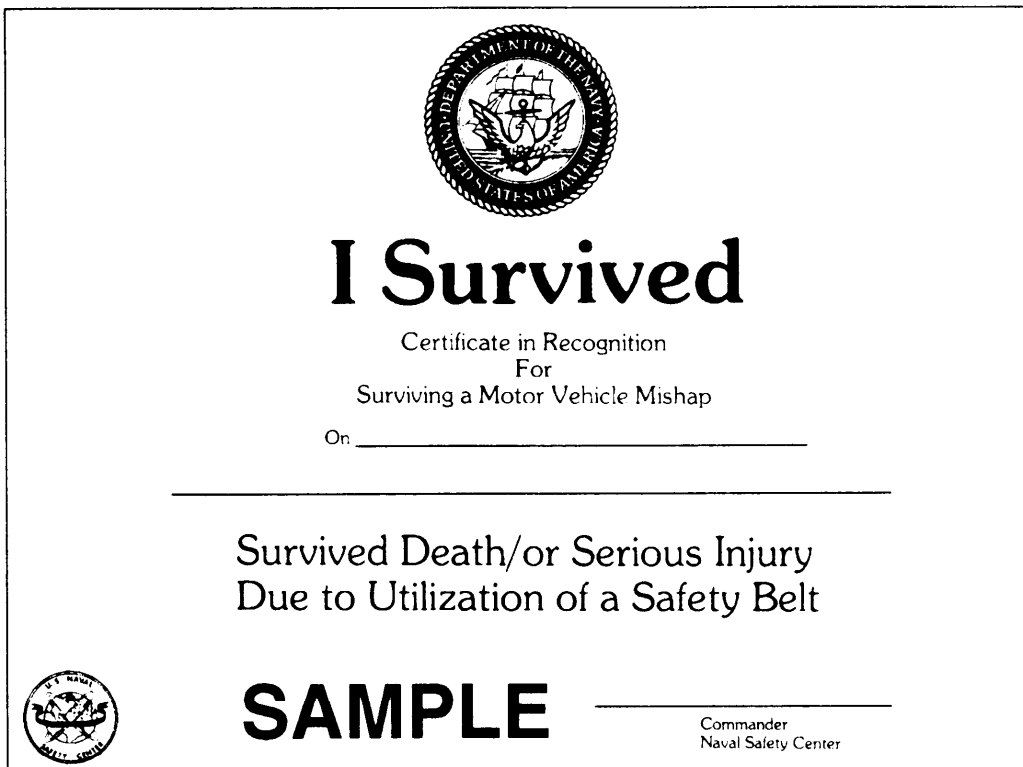


Figure 2-2.—NAVSAFECEN “I Survived” Club certificate.

by the Commander of the Naval Safety Center. The story may appear in the *Safetyline* magazine. For more information contact the Naval Safety Center, Naval Air Station, Code 42, Norfolk VA 23511-5796.

### SAFETY AND OCCUPATIONAL HEALTH MANAGEMENT PRINCIPLES

You should not question that safety and occupational health management go hand in hand. When you pursue one to the disadvantage of the other, the total outcome becomes less effective and less efficient. A common misconception is that safety is an isolated topic pursued by specialists and misunderstood by line management. That is true when managers have either ignored or been unaware of safety procedures. It is also true when managers have chosen to take risks without considering the impact on the total operation.

You must accurately assess the impact of your decisions on the organization and its goals. Then, if you must take risks, you will take them with full knowledge of the expected impact. You will achieve organizational goals by following prescribed safety precautions. You

can enhance occupational safety and health (OSH) management by following safety management principles and establishing safety policies.

The following are some OSH principles you may find useful:

**1. Good management fosters safety:** Safety management is the part of the management process that identifies potential hazards and failures that could result in injury and property damage. Management is part of the decision-making process that considers the effects of a possible hazard on workers, material, and organizational relationships.

**2. Safety is part of the professional job:** You should integrate OSH concepts and procedures into your professional approach to every job. That is something everyone, from top management through the first-line supervisor to the worker, should do. All training and apprentice programs should include OSH. Safety demands cooperation among all levels of management and workers.

**3. Top management and command must be involved:** Top management must take the lead in

organizing OSH, setting OSH policy, and assigning OSH accountability, Management must hold intermediate management levels accountable for all preventable mishaps. To be effective, a mishap investigation must not coerce, convict, or punish managers, supervisors, or workers. It should strive to be impartial when assessing the evidence and then develop recommendations to avoid future mishaps. The cause may not be one single event or design flaw. Management should work toward a safe and healthy operation or system through appropriate managerial methods.

**4. Safety is economical:** Mishaps cost money. Costs include those for damage repair, lost work time, worker replacement and training, and compensation claims. Safety specialists must advise management supervisors of how safety will reduce lost work time and enhance productivity, operational effectiveness, and morale. Money allotted to provide protective equipment and safe working conditions is a good investment.

**5. First-line supervisors are essential to safety management:** The first-line supervisor (shop foreman, work center supervisor, leading petty officer) needs time for stand-up briefings. He or she also needs the proper tools and personal protective equipment for safe operation. The first-line supervisor must have adequate resources and must be accountable for production and operation safety. Command support, including funding, is critical to safe operations.

**6. Eliminate unsafe acts to reduce mishaps:** Unsafe acts, unsafe conditions, and mishaps are symptoms of problems in the management system. You, as a manager or supervisor, must examine the symptoms to find and eliminate their causes. Lack of training, poor motivation, personality conflicts, drug or alcohol abuse, and bad attitudes are potential mishap causes. All of these problems are correctable through good management and supervision.

**7. Severe mishaps should receive first priority:** Certain circumstances and conditions carry a higher risk of producing severe injuries or costly damage. You can normally identify, anticipate, and control some of the following potentially hazardous conditions:

- a. Unusual, nonroutine activities, like weapons handling
- b. Nonproductive activities, during which boredom can lead to horseplay or unsafe acts
- c. Activities involving high-energy sources such as melting metals in a foundry

- d. Certain construction activities, such as demolition of a building
- e. Catastrophic conditions and recovery from such conditions
- f. Explosive operations
- g. Lack of proper on-site supervision
- h. Inadequate operator skills or untrained workers

**8. Safety is an administrative role:** The OSH manager, safety professional, or safety officer serves as an advisor. The manager is responsible for safety and safe decision making, including loss control and risk management. The safety advisor monitors and aids in the investigation of mishaps, collection of data, evaluation of trends, and development of analyses. He or she also promotes and educates workers in safety strategies, controls, and mishap prevention techniques. By definition, the safety officer, advisor, or manager is a spokesperson, cooperating with all levels of the organization. Each helps management and workers achieve a safe and healthy workplace.

**9. Setting a safety example is contagious:** If management ignores safety precautions or fails to wear protective equipment, workers receive the wrong message. Strict safety compliance by all levels of supervision sets the right example. When workers see others wearing proper protective equipment and following precautions, they are inclined to do the same. Management must never display the attitude that safety takes too much time or money.

**10. Safety is a commitment:** All levels of the organization must see management's motivation and commitment to safety. Therefore, management must issue safety policy and work closely with safety councils and committees. It must address hazard abatement, allocate resources for mishap prevention research, develop mishap prevention strategies and actions, endorse recordkeeping, and maintain accountability. Supervisors and middle management must follow safety precautions. They must convince workers that management is committed to safety. These efforts must be convincing to motivate workers to cooperate with safety policies. Real mishap rate reductions result in improved effectiveness and cost savings.

**11. Safety must be marketed:** Management must "sell safety" to the workers through a visible show of support. Promotions, contests, competitions, recognitions, and posters are ways of making your safety program visible to the workers. Positive program

support solicits worker cooperation and a good feeling about safety. If you need to threaten and coerce workers into complying with safety precautions, then your sales efforts have failed.

Commands should manage OSH just as they would manage any other organizational function. Management should direct the safety effort by setting achievable goals and by planning, organizing, and controlling the methods used to achieve the goals. Workers must take part in goal setting and in developing mishap prevention

strategies and actions to reduce injuries and material losses.

### **SUMMARY**

In this chapter you learned about the philosophy of safety and what motivates safe behavior. You learned methods of selling, marketing, and promoting your safety program. Although safety seems to be a matter of common sense, you learned that safety must be taught and reinforced.



## CHAPTER 3

# MISHAP CAUSES, PREVENTION, AND HAZARD ABATEMENT

The Navy spends millions of dollars each year on damage, fatalities, injuries, and occupational illnesses. Mishaps seriously degrade operational readiness and waste tax dollars. Preventing mishaps depends on identifying, controlling, eliminating, and correcting hazards. When preventive efforts fail and mishaps do occur, investigating them thoroughly helps to determine the causes and prevent recurrences. The lessons learned from a mishap or near-mishap can yield valuable safety information.

What is a mishap? *Mishap Investigation and Reporting* (OPNAVINST 5102.1C) defines a **mishap** as any unplanned or unexpected event causing personnel injury, occupational illness, death, material loss or damage, or an explosion of any kind.

Mishaps are usually a painful experience. After being involved in a mishap, most people look back and say those immortal words, “If only I...” They then finish the statement with “had or had not. . .” With that information in mind, you should work toward making the words *If only I* obsolete. How do you do that? You can’t be everywhere at the same time. To prevent mishaps, you have to get people to think about safety. You must promote enough interest to make people want to perform each task safely. We assume most people want to do their best; but remarkably, many people do not associate **best** with **safe**. All Navy personnel must commit themselves to “think smart, think safety.”

In this chapter, we discuss various statistics on mishap causes, prevention methods, and hazard abatement.

### MISHAP CAUSES

Seldom does a mishap have a simple cause. A combination of factors, coming together under just the right circumstances, usually cause the mishap. A specific chain of events often leads to a mishap. Breaking any link in that chain can usually prevent the mishap. To prevent their recurrence, we need to know what those events and the contributing causes were. Normally, we divide cause factors into the following broad classifications:

1. **Primary cause.** The primary cause, also called the immediate cause, is the actual, obvious cause of the mishap. For example, the cause of the sailor’s death was a head injury from a fall down a ladder. The primary cause of death was the head injury.

2. **Contributing causes.** Contributing causes are all the factors that made up the chain of events leading to the primary cause. Only through investigation can we determine these contributing causes. For example, the primary cause of death was a head injury from a fall down a ladder. The contributing causes could have been worn ladder treads, a missing heel on the sailor’s shoe, greasy hand rails, the sailor’s rushing down the ladder, or many other causes. The primary cause alone does not give you enough information to prevent recurrence of the mishap.

Unsafe acts and conditions are known causes. Knowing how these unsafe acts and conditions develop will make your mishap prevention training more successful.

You can stop mishaps by preventing or eliminating the causes. That is why all hands, especially supervisors, need to understand why mishaps occur. The more you know about the causes of mishaps, the better equipped you will be to prevent them.

A practical definition of a **mishap cause** is anything and everything that has contributed to a mishap. That includes the **primary** and the **contributing causes**. The purpose of this broad interpretation of a mishap cause is to encourage you to adopt a broad and open approach when identifying the cause of a mishap. Thus, do not focus all your attention on the mishap alone. Investigate everything that leads to the mishap both directly and indirectly before determining the probable cause or causes. We categorize causes as follows:

- Human error
- Maintenance and support factors
- Administrative and supervisory factors
- Material failures or malfunctions
- Environmental factors

## **HUMAN ERROR**

Human error causes an **alarmingly high number** of mishaps. Between 50 and 75 percent of mishap investigations conclude that the primary cause of the mishap was human error. Human error findings consider the human involvement before, during, and after the mishap.

We can reduce the number of mishaps by learning to identify and control the human factors that cause mishaps. Human error is part of nearly every mishap. Human error includes the actions of all personnel involved in the mishap. It includes those personnel who may have maintained or repaired equipment or even the worker at the factory where a part was manufactured. Human error involves both physical and mental factors, such as the following:

- Ergonomics (design of the workplace)
- Physical strength and condition of the individual
- Physical stresses and the body's subsequent responses
- Mental factors, including the person's attitude; behavioral factors; ability to retain and assimilate training; external mental stresses, such as interpersonal relationships; and mental illnesses

All of us mentally process information we receive. Factors such as personal experiences, emotions, knowledge, motivation, and attitudes influence how we interpret this information. They also cause us to respond in various ways to different situations. When a mishap occurs, we carefully examine each of these factors. Each one can cause the best trained and most skilled worker to make a wrong decision or response.

## **ERGONOMICS**

Ergonomics refers to the technology involved in helping people physically adjust to their workplace. It is also called biomechanics or the man-machine interface. Basically, ergonomics concerns the design of a workplace, space, or process to minimize stresses on the body and to maximize production. Ergonomics became important with the development of production lines that required constant, repetitive motions.

A workbench that is too high or too low can cause fatigue. Poor lighting can cause confusion. Emergency switches that are out of reach can impair a person from controlling them. All of these work area designs place stress on the body that could contribute to human error.

Controls that an operator cannot reach quickly and easily are examples of poor design. Other examples are emergency controls protected by cumbersome interlocks and displays that are difficult to read and interpret.

Poor functional layout within a space causes inefficient operations and maintenance difficulties, which breed jury-rigged shortcuts. When investigating a mishap, we must look at the work area in which the mishap occurred.

## **TEMPORARY PHYSICAL ILLNESSES**

Temporary physical illnesses, such as colds, flu, dizzy spells, heat stress, and nausea, affect our ability to work safely. These disorders can cause physical impairments that can contribute to mishaps. They can also disrupt concentration, mental alertness, memory, and reasoning ability.

## **PHYSICAL IMPAIRMENTS**

Physical impairments, such as back injuries or hernias, can make people susceptible to mishaps. The weakened physical condition accompanying such defects can impair strength, stamina, and agility.

Mishaps also can stem from two other types of physical impairment—visual and hearing. Good vision is important to every job. A common visual impairment such as faulty depth perception can cause mishaps such as tripping or falling. Hearing impairments can cause mishaps when persons cannot understand audible communications and signals.

## **ALCOHOL**

Alcohol is a chemical depressant. It acts as a general anesthetic for those parts of the brain which suppress, control, and inhibit thoughts, feelings, and actions. Typical effects of alcohol consumption include impaired judgment, unrealistic confidence, and slowed coordination and performance. Such effects bring about risk-taking behavior associated with unsafe acts and mishaps.

## **DRUG ABUSE**

Drug abuse causes many mishaps. Some people die as a result of a drug overdose or respiratory depression caused by barbiturate intoxication. Sailors high on amphetamines and barbiturates sometimes fall

overboard and become lost at sea. Drug abuse or dependence is not only hazardous to the abuser, but also to other personnel, to equipment, and to the operational readiness of the command.

**Polydrugs** have created still another dimension of drug abuse. The term refers to the mixing of two or more drugs. Mixing alcohol with another drug is the most common form of polydrug abuse. This combination produces effects that can be fatal.

## **FATIGUE**

Fatigue begins when a person starts a task; the fatigue increases as the task continues. It decreases awareness and reflex actions while increasing the chance of error. Symptoms include lower quality of performance, irritability, impatience, forgetfulness, confusion, and increased errors. Hard work long hours, and lack of sleep produce fatigue. In addition, such stresses as vibration, heat, high or constant noise, inadequate illumination, anxiety, boredom, monotony, and change in routine can produce fatigue.

## **MOTION SICKNESS**

Since motion sickness produces severe nausea, it can weaken, distract, or disorient people. The most commonly experienced forms stem from the motions associated with aircraft, cars, trains, and ships. This illness is particularly dangerous because it causes a loss in normal alertness and decision-making abilities. Such a loss can cause a person to make serious mistakes. Once the body becomes adjusted to these movements, through training and adaptation, nausea disappears and normal functioning returns.

## **EXTREME TEMPERATURES**

Extreme temperatures impair a person's overall performance, which increases the chances of inefficiency and mishaps. Heat stress and temperature extremes cause problems such as fatigue, increased reaction time, decreased mental awareness, and loss of dexterity and coordination.

## **NOISE**

Unnecessary or unpleasant noise causes stress by overloading a person's nervous system. Stress can bring about emotional outbursts. Since emotional outbursts are impulsive and unrestrained, they can result in mishaps. Intense noise can cause hearing loss, both

permanent and temporary; headaches; fatigue; and nausea. Each of these effects can impair performance.

## **VIBRATION**

We often overlook vibration as a potential source of decreased work performance, and yet it routinely accompanies many activities. Very low-frequency, high-amplitude vibrations can cause motion sickness. Prolonged exposure to vibration commonly produces annoyance and fatigue, which can reduce performance and effectiveness. Exposure to levels of vibration that produce discomfort can induce permanent physical damage to the internal organs.

## **VISUAL ACUITY**

Mishap-free performance requires good visual acuity. Different problems can affect your vision during the day and at night. The most common problem during daylight is glare. Intense light reflected in random directions causes glare. Glare is hazardous because it can momentarily blind you. The blindness can continue for hours until your eyes have had time to adjust to low levels of light.

Even if your eyes adjust easily, your visual acuity at night is not as good as it is during the day. Night vision is extremely sensitive to stray light sources. When your eyes have adapted to darkness, a sudden flash of light can blind you, as glare does during the day. These conditions increase the chances of mishaps.

## **MENTAL FACTORS**

Mental factors have been cited as causes involved in numerous mishaps. Mental factors range from just being in a bad mood to having a serious personality disorder. Although medical professionals usually investigate mental factors, all mishap investigators should look at these factors. In serious mishaps, a medical officer is assigned to determine physical and mental causes of human error. Medical records, prior injuries, responses to stress, and documented personality disorders are reviewed and investigated.

## **BEHAVIORAL FACTORS**

Behavioral factors include actions such as skylarking, risk-taking, showing off, inattention, disregarding instructions or orders, and flaunting authority. Such behavior results when personnel ignore safe work procedures because of undesirable motives.

The following are examples of frequently seen displays of undesirable motives:

- Trying to save time and effort
- Trying to maintain personal comfort
- Trying to express resentment

An undesirable motive is clearly a complex problem. A person does not react simply to the basic needs of comfort, security, belonging, and self-fulfillment. Attitudes, feelings, and emotions stemming from a multitude of sources also affect a person's motives. Chapter 2 discussed attitudes and motivation.

### **LACK OF TRAINING AND EXPERIENCE**

Mishaps caused by a lack of training and experience occur most often when people tackle a task with which they are neither familiar nor qualified. Experienced personnel can clearly recognize hazardous conditions that inexperienced persons may not notice. Since the inexperienced persons' limitations then exceed their capabilities, a mishap may occur.

The imbalance between a person's skills and required levels of training shows through improperly followed procedures, shortcuts, errors in judgment, and improper maintenance and operations. Supervisory personnel sometimes contribute to mishaps by making assignments without adequate knowledge of the capabilities and limitations of their people and equipment.

When you are training inexperienced people for new jobs, their training needs are obvious. They need your help to gain the knowledge and skills they must have to do a job.

Even when you provide people with the basic skills to do a job, they may not thoroughly understand it. They may be unable to retain what you taught them. You must counterbalance this lack of understanding with close supervision.

As people become more experienced and less closely supervised, training deficiencies become more apparent. Finding people placed in tasks beyond their current skill development is not uncommon. When asked if they can handle the assignment, many respond positively. They do not want to appear incompetent.

Knowledge alone is not always enough to prevent a mishap. Most tasks in the Navy require a certain skill level. These skills can vary from those required to paint

a bulkhead to those required to operate a nuclear reactor. To properly accomplish any job, people must safely develop skills through practice.

### **INTERPERSONAL RELATIONSHIPS**

Since interpersonal relationships with our peers, supervisors, spouses, and parents can affect our mental attitudes and moods, they can contribute to mishaps. A worker's distraction because of worry about a pending divorce can lead to a mishap. A worker's disregard of an order because of a personality conflict with management or a supervisor can result in a mishap too. To avoid being labeled a "wimp," a person may give in to peer pressure and purposely take risks, such as working without eye protection. That can also result in a mishap.

When you investigate the causes of a mishap, carefully consider the personal lives of the people involved. Are they having problems at home? Are they under pressure because of financial troubles? Could peer interaction possibly have contributed to the cause of the mishap?

### **MAINTENANCE AND SUPPORT FACTORS**

Maintenance and support factors include improper maintenance, improper priority assignments on work requests, or lack of proper quality assurance (QA). Shipyards, intermediate maintenance activities, contractors, or a ship's force may be involved with maintenance and support.

Mishaps can result from the way the manufacturer made, assembled, or installed the equipment. They can result from premature equipment failure caused by a manufacturer's improper processing and fabrication, improper assembly, or use of improper materials. Mishaps can also result from part failures caused by a manufacturer's deviation from design specifications, such as incorrect size, weight, strength, and similar engineering characteristics.

Material damage and personal injury mishaps can result from improperly maintained equipment. A motor incorrectly rewound at a shipyard could short out and cause a fire. Improper QA or the lack of approved QA procedures can result in a mishap. These types of mishaps overlap with human error causes.



## **ADMINISTRATIVE AND SUPERVISORY FACTORS**

Reviewing whether regulations and their enforcement by all levels in the chain of command could have contributed to the mishap is essential during a mishap investigation. Standard operating procedures (SOPs) might be unsafe. Safety standards might be incomplete or missing from a technical manual. How the command views and enforces the use of SOPs and other procedures could contribute to the mishap.

Consider supervisory factors. Examine the proficiency and physical condition of the supervisor. Mishaps can result from an improper level of supervision or a failure to require personnel to meet personnel qualification standards (PQS). They can also result from a lack of formal and informal training of the supervisor and the crew.

Check the adequacy of the procedures and precautions of the task being performed when the mishap occurred. Examine these areas even when every action seems to have been appropriate and to have followed prescribed procedures. You may find procedures are incorrect or inadequate. For example, if you change, replace, or alter a piece of equipment, you must update the technical manual. If you do not, the operator or maintenance technician may accidentally use incorrect procedures for a particular task. Not posting the necessary instructions or removing them from the work area can lead to procedural problems. Instructions need to be available for reference in the work area.

Do not assume personnel already know the precautions to take when doing a job. Make sure they look them up in a procedural instruction or technical manual. Personnel must have these precautions available when needed. Make sure procedures contribute to mishap prevention by teaching personnel to follow the safety precautions for every procedure they perform.

## **MATERIAL FAILURES OR MALFUNCTIONS**

Consider all material failures and malfunctions thoroughly, whether the failures or malfunctions occurred because of faulty design, defective manufacture, or repair. That does not include failures caused by normal wear and tear. Most mishaps blamed on material failure may really involve maintenance factors or human error.

When investigating material failures, especially metal fatigue failures, never try to force the pieces back together. That could alter or destroy the evidence needed for more detailed laboratory analysis.

## **ENVIRONMENTAL CONDITIONS**

Environmental conditions are usually not cause factors. For example, a cause of a mishap might be excessive speed for existing sea conditions or failure to secure for sea; but the high sea state did not cause the mishap. We can attribute very few mishaps to “acts of God.” Being struck by lightning maybe an act of God, but being outside during a thunderstorm was a contributing cause; therefore, the mishap was probably preventable.

Environmental factors can damage equipment and cause injury to workers. Environmental factors include extreme exposure to heat, cold, vibration, noise, illumination, radiation, or atmospheric contaminants. You may require electronic equipment to operate within a narrow temperature range, for instance. Deviation degrades performance and causes system failure. Humidity also takes its toll through corrosion and moisture accumulation. Entire systems are susceptible to damage by extreme weather conditions that produce abnormal winds, seas, and rain.

## **MISHAP PREVENTION**

Although a mishap usually has only one primary cause, it may have more than one contributing cause. Alone, each contributing cause may not have caused the mishap. However, one contributing cause may have started a chain of events leading up to the mishap. Preventive efforts must be directed toward all the primary and contributing causes.

Mishap prevention is the process of eliminating mishap-producing causes before a mishap occurs. It is an **organized effort to eliminate unsafe acts** and unsafe mechanical, physical, or chemical conditions. The object of mishap prevention is to prevent mishaps from occurring. If they have already occurred, the object is to prevent them from recurring. Mishap prevention takes place through two means:

- The Navy Occupational Safety and Health Deficiency Abatement Program (NAVOSH-DAP), which identifies a hazard before a mishap occurs and takes action to prevent recurrence
- Mishap investigations, which reveal causes and identify action needed to prevent recurrence

## HAZARD PREVENTION

Three methods are used to control the impact of hazards. The first, and preferred, is to prevent the hazard at the design stage. The second is to identify and eliminate existing hazards. The third is to reduce the likelihood and severity of mishaps from hazards that cannot be eliminated.

Hazards may be prevented through appropriate actions during the design process, when operating procedures are developed, and when equipment is purchased. The hazard would never exist if we anticipated problems and eliminated them before they reached the worker. Systems commands are responsible for preventive actions such as system safety reviews, design reviews, and the development of operating and purchasing procedures designed to eliminate hazards.

Usually, ships and shore commands have little control over the design process. If the design of equipment currently in use is hazardous, retrofitting or redesign may be required. If redesigning the equipment is beyond the scope of the activity, it may request help from the systems command or higher authority. The activity can then use that redesign information for future designs and purchases.

Hazards in the workplace may arise as the result of an inadequate preventive maintenance program. An effective preventive maintenance program can keep equipment and material from degrading to the point that they become an operational hazard.

Standard operating procedures (SOPs), instructions, or similar directives that tell how to perform work can prevent hazards from occurring. Obvious examples include SOPs for tank cleaning, foul weather operations, and asbestos removal. Personnel must be familiar with appropriate SOPs and current updates applicable to their duties.

Many hazards may be prevented by including appropriate specifications in purchase orders for equipment/material. Normally, buyers have little control over specifications for equipment/material purchased through the Navy supply system. However, since a considerable amount of material/equipment is locally purchased, you can prevent hazards by purchasing the proper types of material in the proper amounts.

Hazardous material is of special concern. We must minimize all local purchases of potentially hazardous material. Afloat commands should purchase only material listed on the Shipboard Hazardous Material

List (SHML). Shore commands should purchase only material listed on the Authorized Use List (AUL).

## HAZARD CONTROL

When preventing hazards is impossible, we must control their effects by reducing the severity of the hazards. We use several methods to control hazard possibilities. The preferred order in which we use them is (1) substitution, (2) engineering controls, (3) administrative controls, and (4) use of personal protective equipment.

### Substitution

Replacing an existing process, material, or equipment with a similar item having a lower hazard potential may reduce risks of injury or illness. Be careful in substituting materials by making sure they are made of technically acceptable materials that will not create a new hazard. Contact NAVSEA/NAVAIR for substitution approval. Naval Supply Systems Command (NAVSUP) must approve hazardous material substitutions.

### Engineering Controls

Engineering controls used to control hazards include isolation and ventilation.

**ISOLATION.**— Isolation is the physical separation of people from contact with a hazard. This method involves the use of a barrier or limiter. It may be in the form of a physical barrier or involve separation by time or distance. Examples include machine guards, electrical insulation, sound barriers, and remote-controlled equipment.

**VENTILATION.**— Ventilation is the control of potentially hazardous airborne substances through the movement of air. Two methods are **general ventilation** (or dilution ventilation) and **local exhaust ventilation**. General ventilation is the dilution of an airborne substance by mixing it with the surrounding uncontaminated air. Local exhaust ventilation (fig. 3-1) is the removal of an airborne substance at its source or point of generation. This method of ventilation prevents the airborne contaminants from passing through the worker's breathing zone. Local exhaust ventilation is the preferred and more economical method. The use of general ventilation should be limited to the control of heat, humidity, or low toxicity solvent vapors when no other ventilation is possible.

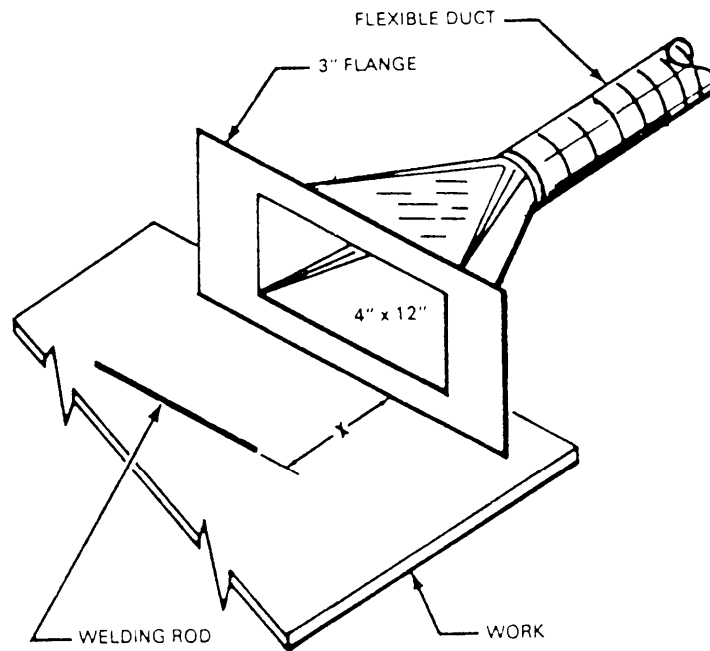


Figure 3-1.—Local exhaust ventilation.

### Administrative Control

Administrative control employs special operating procedures to reduce the exposure of personnel to hazards. Examples include procedures that limit access to high hazard areas and that provide for adjusted work schedules such as heat stress safe stay times. Another example is an operating procedure requiring the use of semiautomatic equipment that does not require constant attendance (time separation). Adjusted work schedules should be used only when personnel may be repeatedly exposed to the hazard without adverse effect.

### Personal Protective Equipment

The use of personal protective equipment (PPE) is the least preferred method of hazard control. With this method, any equipment breakdown, failure, or misuse immediately exposes the wearer to the hazard. The effectiveness of the PPE also depends on the conscious effort of the user to wear it properly. Nevertheless, when other methods cannot achieve adequate risk reduction, personal protective devices must be used, either alone or in conjunction with other protective measures.

### HAZARD IDENTIFICATION

Hazard identification occurs through observation and routine safety program evaluations, surveys, and formal inspections. The safety officer, safety manager,

safety petty officer, or safety supervisor trains people to recognize hazards. In chapters 6, 7, and 8, we discuss the program evaluation and hazard identification process for shore, afloat, and aviation activities.

### HAZARD REPORTING

The earliest possible detection of unsafe or unhealthful working conditions and the prompt control of hazards identified as a result of those conditions are essential. Encourage your subordinates to submit promptly a report of unsafe or unhealthful conditions.

All personnel should orally report unsafe or unhealthful working conditions to their immediate supervisor. That supervisor should promptly evaluate the situation and take appropriate corrective actions. Supervisors will contact the Occupational Safety and Health (OSH) office, safety manager, division safety petty officer, division officer, or safety officer for assistance, if needed. The person reporting the hazard must be kept informed of all actions taken.

After personnel orally report an unsafe or unhealthful condition, they may expect the supervisor to investigate the situation. If their supervisor takes no action to investigate the condition or they are unsatisfied with the result, personnel may submit a written report.

Ashore, the poster, DD Form 2272, DOD Occupational Safety and Health Protection Program, reminds employees that hazard reporting is their



SAFETY HAZARD REPORT		1. ID NO												
<b>A. SAFETY OFFICER SECTION</b>														
2. ISSUED BY		3. ISSUED TO												
4. HAZZARD NOTED		5. RISK ASSESSMENT CODE <i>(See explanation on back before completing)</i>												
a. DATE	b. TIME													
6. LOCATION OF HAZARD		7. NATURE OF HAZARD												
<b>B. DIVISION OFFICER SECTION</b>														
1. CORRECTIVE ACTION TAKEN														
2. INTERIM CORRECTIVE MEASURES														
4. NAME, RANK AND TITLE	5. SIGNATURE	6. DATE FORWARDED												
<b>C. DEPARTMENT HEAD SECTION</b>														
1. ACTION TAKEN		2. EXPLANATION OF ADDITIONAL ACTION TAKEN / REQUIRED												
<input type="checkbox"/> CORRECTIVE ACTION TAKEN IN ITEM B1 ADEQUATE  <input type="checkbox"/> ADDITIONAL ACTION TAKEN / REQUIRED (GIVE EXPLANATION IN C2)														
4. NAME, RANK AND TITLE	5. SIGNATURE	6. DATE FORWARDED												
<b>D. RECORD SECTION</b>														
1. INITIALS INDICATE ACTION TAKEN IN SECTIONS A, B AND C		2. IS CSMP ENTRY REQUIRED?												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">TITLE</th> <th style="width: 33%;">INITIALS</th> <th style="width: 33%;">DATE</th> </tr> </thead> <tbody> <tr> <td>SAFETY OFFICER</td> <td></td> <td></td> </tr> <tr> <td>EXECUTIVE OFFICER</td> <td></td> <td></td> </tr> <tr> <td>COMMANDING OFFICER</td> <td></td> <td></td> </tr> </tbody> </table>		TITLE	INITIALS	DATE	SAFETY OFFICER			EXECUTIVE OFFICER			COMMANDING OFFICER			<input type="checkbox"/> YES <input type="checkbox"/> NO
TITLE	INITIALS	DATE												
SAFETY OFFICER														
EXECUTIVE OFFICER														
COMMANDING OFFICER														
		3. IF YES, GIVE NAME OF SHIP BELOW:												
		USN _____												

Figure 3-3.-Safety Hazard Report.

seriousness of the reported condition. The safety officer advises the cognizant division officer that an unsafe/unhealthy working condition has been reported.

Alleged critical danger situations will be evaluated immediately. If possible, potentially serious or moderate situations will be evaluated within 3 days.

The aviation community has its own hazard report (HR) system, covered in OPNAVINST 3750.6Q. Aviation hazard reports (HRs) are used as follows:

- To report a hazard and the remedial action taken so that others can take similar action to eliminate the hazard
- To report a hazard and recommend that another organization take corrective action to eliminate the hazard
- To report a hazard so that some other organization may determine the proper corrective action to eliminate the hazard

Personnel in aviation squadrons and wings must submit an HR whenever they detect a hazard. Command aviation safety programs must encourage personnel to report hazards. Personnel send HRs by mail or message directly to the Naval Safety Center (NAVSAFECEN). The NAVSAFECEN will guard the report's confidentiality and distribute a sanitized report, as it believes necessary. Reports may include recommendations for corrective action within the command.

Four aviation hazards require special formats: bird (and bat) strikes; near mid-air collisions; physiological episodes; and embarked landing hazards. When these hazards occur, but they do not meet the criteria of a defined aircraft mishap, you must submit an HR using the proper, prescribed format.

### **Hazard Report Responses**

The shore OSH office or afloat safety officer will provide an interim or final response in writing to the originator of the reported condition within 10 working days of receipt of the report. Interim responses will include the expected date for a final response. If the evaluation identifies a hazard and its cause, the final response will include a summary of the action taken for abatement of the deficiency. If no significant hazard is found to exist, the reply will include the basis for that determination.

The final response shall encourage the originator to contact the OSH office or afloat safety officer if he or she desires additional information or is dissatisfied with the response. If the originator remains dissatisfied after discussing the matter, the individual must be advised of the right to appeal to the commanding officer.

The commanding officer, or his/her representative, will respond to the originator of the appeal within 10 working days. An interim response will suffice if the evaluation is incomplete at that time. If still dissatisfied, the military or civilian employee has the right to further appeal. Personnel may appeal all the way through the chain of command to the Deputy Assistant Secretary of Defense (DASD) (Environment, Safety & Occupational Health [ES&OH]). Civilians may continue their appeal to the Department of Labor.

Encourage the reporting of hazards, but make sure employees and military members understand that you are taking corrective action. As a supervisor you must take all reports of hazards seriously, no matter how minor.

The Naval Safety Center tracks aviation hazard report corrective actions.

### **SAFETYGRAM Reports**

Aboard ship, safety officers and personnel may submit a SAFETYGRAM, OPNAV 5102/4 (fig. 3-4), to report a hazard, voice a concern, or ask a safety question. They do not need to send the SAFETYGRAM through the chain of command, but can mail it directly to the Naval Safety Center. Usually, this type of hazard reporting is not used for hazards within a particular ship, but for those that may affect other similar units. OPNAVINST 5100.19B, chapter A6, explains how to submit a SAFETYGRAM.

SAFETYGRAMs can be used to report near-mishaps. A near-mishap is an occurrence that, except for proximity or timely action, would have resulted in damage or injury to personnel. While the near-mishap does not cause personnel injury or damage to equipment or material, it does serve notice that a hazardous condition exists. This condition could result in a future mishap. The near-mishap is significant because it can serve as a warning to supervisors of an unsafe condition.

When a near-mishap occurs, personnel can submit a Safety Hazard Report to their supervisor or the command's safety officer. They can also send a SAFETYGRAM to the Naval Safety Center. The safety



INTERNAL MISHAP/NEAR MISHAP INVESTIGATION REPORT

From: \_\_\_\_\_ Division Officer

To: Commanding Officer

Via: (1) \_\_\_\_\_ Department Head  
(2) Safety Officer  
(3) Executive Officer

Date/Time of Mishap: \_\_\_\_\_ Mishap Category: \_\_\_\_\_

Location of Mishap: \_\_\_\_\_

Brief Description of Mishap (Including extent of injury and property damage):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Work/Task Supervisor (at time of mishap): \_\_\_\_\_

Witnesses: \_\_\_\_\_

Photos taken (circle one)?    YES        NO        N/A

Cause of Mishap: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Corrective Action Taken or Recommended: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Signature/Date

2nd Endorsement

Does Mishap Meet External Reporting Requirements (circle one)?    YES        NO

If yes, indicate the DTG or letter serial number of report: \_\_\_\_\_  
(Attach copy of report)

\_\_\_\_\_  
Safety Officer

RETURN COMPLETED INVESTIGATION REPORT TO SAFETY OFFICER

Figure 3-5.-Internal Mishap/Near Mishap Investigation Report.



officer reports the findings of the near-mishap investigation on an Internal Mishap/Near Mishap Investigation Report (fig. 3-5). If you ignore the conditions that cause near-mishaps, you are sure to invite a real mishap.

## Injury Reports

Injury reports and trends in minor injuries can identify hazards and problem areas. Trends may reveal a lack of training, poor enforcement of PPE use, or an incorrect operating procedure.

Reports of injuries are treated as follows:

- Afloat, the medical department treating a crewmember completes an injury report and forwards it to the safety officer for investigation.
- Ashore, the OSH office or command keeps a log of Navy injuries and occupational illnesses (civilian and military ashore). It also submits a quarterly report of Navy and civilian occupational injuries and illnesses, as well as an annual report.

Shore activities also maintain records of all Federal Employees Compensation Act (FECA) claims. These claims can also alert a safety manager to local mishaps and hazard trends.

## HAZARD ABATEMENT

Once we have identified and reported a hazard, the next step is corrective action. How do we get it fixed? Some remedies are simple. If someone is not wearing goggles, you provide a pair of goggles. Some corrective actions may be extensive and expensive. Renovation of a ventilation system to remove acid mist may take years. We can take temporary measures to protect workers, but we must take permanent measures to decrease the hazard.

One of the first steps in a hazard abatement program is to prioritize the hazards. That requires assessing the hazard and assigning some type of quantifier. Each identified hazard that cannot be corrected immediately is assigned a risk assessment code (RAC). The RAC represents the degree of risk associated with the deficiency based on the combined elements of **hazard**

**severity** and **mishap probability**. You derive the RAC as explained in the following paragraphs.

## HAZARD SEVERITY

The hazard severity is an assessment of the worst potential consequence that is likely to occur as a result of a deficiency. The most unfavorable degree of injury, occupational illness, or property damage defines the “worst potential consequence.” The OSH office or safety officer assigns roman numerals to hazard severity categories using the following criteria:

- Category I– Catastrophic: The hazard may cause death or loss of a facility.
- Category II– Critical: May cause severe injury, severe occupational illness, or minor property damage.
- Category III– Marginal: May cause minor injury, minor occupational illness, or minor property damage.
- Category IV– Negligible: Probably would not affect personnel safety or health, but is nevertheless in violation of a NAVOSH standard.

## MISHAP PROBABILITY

The mishap probability is the likelihood that a hazard will result in a mishap. The mishap probability is based on the assessment of such factors as location, cycles or hours of operation, and affected population. The OSH office or safety officer assigns an arabic letter to the mishap probabilities according to the following criteria:

- Subcategory A: Likely to occur immediately or within a short period of time.
- Subcategory B: Probably will occur in time.
- Subcategory C: May occur in time.
- Subcategory D: Unlikely to occur.

## RISK ASSESSMENT CODE

The risk assessment code (RAC) is an expression of risk that combines the elements of hazard severity and

**Table 3-1.—Risk Assessment Code (RAC)**

**A. Risk Assessment.** Each identified/validated hazard shall be assigned a Risk Assessment Code (RAC) by the activity safety office. The RAC represents the degree of risk associated with the deficiency and combines the elements of hazard severity and mishap probability. The RAC is derived as follows:

1. **Hazard Severity.** The hazard severity is an assessment of the worst potential consequence, defined by degree of injury, occupational illness or property damage which is likely to occur as a result of a deficiency. Hazard severity categories shall be assigned by Roman numeral according to the following criteria.

(a) **Category I - Catastrophic:** The hazard may cause death, or loss of a facility.

(b) **Category II - Critical:** May cause severe injury, severe occupational illness, or major property damage.

(c) **Category III - Marginal:** May cause minor injury, minor occupational illness, or minor property damage.

(d) **Category IV - Negligible:** Probably would not affect personnel safety or health, but is nevertheless in violation of a NAVOSH standard.

2. **Mishap Probability.** The mishap probability is the probability that a hazard will result in a mishap, based on an assessment of such factors as location, exposure in terms of cycles or hours of operation, and affected population. Mishap probability shall be assigned an Arabic letter according to the following criteria:

(a) **Subcategory A - Likely to occur immediately or within a short period of time.**

(b) **Subcategory B - Probably will occur in time.**

(c) **Subcategory C - May occur in time.**

(d) **Subcategory D - Unlikely to occur.**

3. **Risk Assessment Code (RAC).** The RAC is an expression of risk which combines the elements of hazard severity and mishap probability. Using the matrix shown below, the RAC is expressed as a single Arabic number that can be used to help determine hazard abatement priorities.

HAZARD SEVERITY	MISHAP PROBABILITY			
	A	B	C	D
Category I	1	1	2	3
Category II	1	2	3	4
Category III	2	3	4	5
Category IV	3	4	5	5

RAC
1 - Critical
2 - Serious
3 - Moderate
4 - Minor
5 - Negligible

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mishap probability. Using the matrix in table 3-1, we express the RAC as a single arabic number that we use to help determine hazard abatement priorities. RACs are used on the various hazard reports, mishap reports, and mishap investigation reports.

**NAVOSH DEFICIENCY NOTICE**

Ashore, civilian and military hazard correction is documented on a NAVOSH Deficiency Notice, OPNAV 5100/12 (fig. 3-6). Section A describes the

NAVOSH DEFICIENCY NOTICE		
SECTION A - DEFICIENCY INFORMATION	I.D. NO.:	
Organization:	Location:	
Description:		
Standard Violated:	RAC:	
OSH Official:	Date:	
SECTION B - ABATEMENT STATUS (COMPLETE ONE OF THE FOLLOWING)		
• DEFICIENCY CORRECTED		
Corrections Made:	Date:	
	Cost	
	Labor:	Material:
• ABATEMENT PROJECT INITIATED		
Project Description:	Action Taken (Included Work Orders/Purchase Request numbers and date as appropriate):	
	Cost Estimate:	Completion Date (Est):
• INTERIM CONTROLS		
SECTION C - COMMENTS		

OPNAV 5100.12

Figure 3-6.—NAVOSH Deficiency Notice.

hazard/deficiency. The activity safety office forwards a copy to the official in charge of the operation where the deficiency occurs. Copies of OPNAV5100/12 for RAC 1, 2, and 3 deficiencies must be posted in the area of the deficiency until the hazard has been abated.

The official in charge of the operation takes prompt action to correct the deficiency. Within 30 days of the date of the notice, he or she completes section B and returns a copy to the activity safety office. Work areas awaiting permanent abatement initiate interim

protective measures. The report should show the status of the deficiency in one of the following categories:

- The deficiency has been corrected
- An abatement project has been initiated.

### INSTALLATION HAZARD ABATEMENT PLAN

Ashore, a formal installation hazard abatement plan records deficiencies assigned RACs 1, 2, and 3 that

require more than 30 days for correction. This plan should include the following standard data for each deficiency (or logical grouping of similar deficiencies):

- Dates of hazard identification
- Location of the hazard(s)
- Description of the hazard(s), including reference to applicable standards
- Estimated RAC (with hazard severity, probability of single occurrence, and annual personnel exposure cited separately) or calculated RAC
- Interim control measures in effect
- Description of the abatement action, including estimated cost and completion date
- Closeout statement, showing: completed abatement action and actual cost, with date of completed action; or process discontinued or work site vacated

The installation abatement plan is available for review locally by recognized employee organizations, where applicable.

#### **AFLOAT HAZARD ABATEMENT PLAN**

The safety officer usually maintains a record or some type of log of safety hazard reports. This log is recommended but not required. This log can be used to track hazards that are corrected immediately or quickly. Hazards that require additional time to correct are entered into the 3-M Systems. Such hazards/deficiencies should be the subject of a 4790/2K and entered into the current ship's maintenance project (CSMP).

A safety hazard code, similar to an RAC, is placed in block 15 of the OPNAV 4790/2K; the safety hazard is explained in the Description/Remarks block. The CSMP is the Hazard Abatement Plan for forces afloat. Option "D" of the CSMP lists the OPNAV 4790/2Ks that were marked as safety hazards. The safety officer maintains the CSMP listing of NAVOSH hazards/deficiencies that require authorization of funding by higher authority. A ship, shipyard, or intermediate maintenance activity that has NAVOSH deficiencies it cannot correct should submit a request to the type commander for either an alteration equivalent to repair or a ship alteration.

#### **INTERIM HAZARD CORRECTION**

We recognize that immediate abatement of deficiencies in working conditions may not always be possible and that some temporary deviation from NAVOSH standards may be required. Therefore, you must establish appropriate interim controls as soon as you note the deficiency. Ashore, you should document such controls on the NAVOSH Deficiency Notice as prescribed in chapter 9 of OPNAVINST 5100.23C. The activity safety office approves interim protective measures in effect for more than 60 days. Afloat, the interim action should be documented on the Safety Hazard Report. For an RAC 1 (critical) or 2 (serious) hazard, the commanding officer must personally approve the interim control.

When you must delay correcting an unsafe condition for reasons such as a shortage of funds, personnel, or equipment, take appropriate temporary precautions to protect workers until the correction is made. Such precautions may include securing hazardous areas, disconnecting power sources, removing equipment from service, posting warning signs, or even verbally warning workers of the hazardous condition. Take temporary precautions promptly to reduce the hazard to personnel.

We need to address your authority to correct unsafe conditions at this point. Sometimes an unsafe condition may arise that requires immediate corrective action because it poses an immediate danger to life or limb. We call that an imminent danger situation. Act as your judgment tells you to act to meet the emergency. **Do not delay!** Do not worry about whether or not you have the authority. YOU HAVE IT!

#### **HAZARD AWARENESS DEVELOPMENT**

When we were young, adults tried to prepare us to live safely. They cautioned us over and over about the hazards we would encounter. "Look both ways before you cross the street." "Never swim alone." "Stay out of the medicine cabinet." These are some of the safety-related litanies adults repeated to us day in and day out. In school, our teachers also gave us safety instructions. Today, we are still learning about hazards.

As we grew, our own experiences made the warnings we received by word of mouth even more vivid. We slipped in the bathtub, broke our toys, cut ourselves with knives, damaged our bicycles, and soon. We not only encountered hazards, but experienced the results of failing to heed warnings about hazards.

Since we obviously cannot expect to experience everything in life ourselves, we must learn from the experiences of others. We need to heed the lessons learned by those who have gone before us.

Safety precautions and operating instructions provide documentation of experiences that teach us clear lessons. By heeding these precautions and instructions, we can prepare ourselves to live successfully and safely in our everyday environment.

We can learn about mishap prevention from actual mishaps. Experience shows what went wrong and how often. It also shows what has to be done to correct a potential mishap problem. Safety rules and operation and maintenance procedures and practices reflect lessons learned from past mishaps.

Environment, equipment design, or lack of finding or training increases the hazards of some conditions. For example, the best setting for a piece of equipment and its operator is a stable platform. However, the shipboard environment cannot always provide the ideal setting.

The environment of a naval ship is potentially dangerous. Fuel, ammunition, high temperatures, electrical circuits, steel decks, salt water, ladders, voids, and machinery create conditions that can catch the unwary. In the aviation community, high-performance aircraft make the hazards even greater. Everyone in the Navy must be aware of these hazards.

Make sure you provide hazard awareness training. The hidden hazards are the ones that often cause mishaps. Routine tasks may lull people into a false sense of security; they may then be tripped up by something that appeared irrelevant or that they did not notice. A detailed review of the conditions that existed at the time of a mishap might reveal hazards that would have been obvious to the trained observer.

Teach people that they should not take risks when they suspect something is wrong or take shortcuts to

avoid the inconvenience of safe practices. Make them realize that a disabling injury or lost or damaged equipment is much more inconvenient in the long run.

Use formal and on-the-job training to develop hazard awareness. Measure that awareness by the ability of your people to identify hazards. Although you can teach people to identify known hazards, you may have difficulty teaching them to recognize hidden hazards. Their skill level, experience, attitude, and sense of responsibility may affect their ability to identify hidden hazards. You must be able to recognize and evaluate those areas that affect your people's ability to learn. You must be able to teach others what you know and what you have learned through experience.

As a result of changing technology, the working environment constantly undergoes new developments and receives new equipment. Therefore, in spite of conscientious mishap prevention, you must always watch for hazards in the work environment. Hazards may exist because of mistakes made by others or because of your own behavior. Although hazard awareness training teaches people to be more observant of hazardous conditions, it requires a certain amount of self-awareness by the trainee. Education, training, and experience improve the trainee's awareness.

## SUMMARY

In chapter 1 we reviewed safety training requirements. In chapter 2 we discussed safety attitudes and promoting a safety program. All of that information involves hazard awareness.

This chapter exposed you to some of the causes of mishaps and ways to prevent them. For further information and guidance, you may find the following references in Appendix I helpful. Remember, take steps to prevent mishaps BEFORE they happen.



## CHAPTER 4

# MISHAP INVESTIGATION FUNDAMENTALS

Mishaps seriously degrade operational readiness and waste tax dollars. Mishap prevention depends on hazard identification, elimination, control, and correction. We discussed these concepts in chapter 3. Despite all our best intentions to prevent mishaps, they still occur. When that happens, we must thoroughly investigate the mishap to prevent its recurrence. We must review every possible primary and contributing cause. From those causes we can learn and distribute lessons and plan corrective actions.

In this chapter, we will discuss the following information:

- Mishap investigation responsibilities
- Words and definitions associated with mishap investigations
- Privileged information
- Testimonial immunity
- Pre-mishap plans
- Investigator training
- Investigation kits
- Investigative procedures

### MISHAP INVESTIGATIONS

The purpose of a mishap investigation is to determine the primary and contributing causes of the mishap. From those causes we can then plan corrective action to prevent a recurrence of the mishap. To limit mishap losses, we must analyze the frequency of potential mishaps and identify mishap causes.

Always investigate and report any mishap, near mishap, or situation that could result in a mishap; but conduct mishap investigations with care. You can use a number of investigative techniques to collect and examine evidence, take good witness statements, and determine the chain of events. Whether you are assisting a safety officer with a command or local investigation or serving as a member of a mishap investigation board, the same techniques apply.

You may be required to help conduct a safety investigation of a mishap, personal injury, or fatality. OPNAVINSTS 3750.6Q, 5100.21B, 5100.23C, and

5102.1C contain the requirements for safety investigations. *Afloat Mishap Investigation Handbook*, NAVSAFECEN 5102/30, contains the procedures the investigator should follow for afloat mishaps.

Certain mishaps are reportable to the Naval Safety Center. Chapters 6, 7, and 8 discuss mishap reporting for shore, afloat, and aviation mishaps. Each community has its own reporting requirements. All mishaps, though, require investigation, whether or not they are reported outside the command.

Investigation of mishaps is the responsibility of all levels of supervision, from the first-line supervisor to the commanding officer. Division officers, department heads, or representatives appointed by the commanding officer usually investigate serious injury or major property damage mishaps. First- and second-line supervisors investigate nondisabling injury or minor property damage mishaps.

An investigation is best conducted by the lowest level of supervision involved in the job or event that resulted in the mishap. For instance, if improper maintenance or operation of a pump causes a mishap, the immediate supervisor of the maintenance person or operator often provides the best investigation.

You should investigate mishaps that occur under your supervision for several reasons. You are close to the jobs, working conditions, and your personnel. You know the details of jobs, procedures, hazards, environmental conditions, and any unusual circumstances that might arise. You also know the experience and personal characteristics of your personnel. This knowledge provides you with a good background for conducting a thorough investigation.

Conducting mishap investigations yourself strengthens your sense of responsibility for mishap prevention. While conducting mishap investigations, you will learn about the hazards, causes, and mishap conditions that are likely to recur. You must train new personnel, check for unsafe conditions and practices, and remind personnel about hazards.

Since a supervisor has the greatest influence on mishap reporting, you must take positive steps to ensure the prompt reporting of all mishaps. Teach subordinates, especially new arrivals, to report all mishaps, including the “near mishaps” when only chance prevented a mishap. Make sure personnel understand that hazardous

conditions cannot be corrected unless they are reported. To fully support these efforts, follow up on all reported mishaps with an investigation and corrective measures,

## **MISHAP INVESTIGATION RESPONSIBILITIES**

The commanding officer ensures all mishaps are investigated, no matter how minor. Serious mishaps will be investigated by the cognizant Echelon 2 command (ashore), a mishap investigation board (afloat), or a standing aviation mishap board (aircraft mishaps). The safety officer or manager, as principal assistant to the commanding officer, will ensure a mishap investigation is conducted for less serious mishaps. The actual informal investigation may be conducted by a safety petty officer, safety supervisor, division officer, or safety manager.

The investigator's responsibilities include answering the following questions: What? Where? When? How? and Why? Notice that you are not trying to find **WHO** caused the mishap. Your job is to make an objective inquiry to learn the circumstances and causes, not to place the blame.

Each mishap shows a failure or defect in a person's actions, a piece of equipment, an environmental condition, a procedure, or a combination of these items. You should thoroughly examine each situation to determine all causes, both primary and contributory.

An important concept for you to understand is that mishaps and injuries are two separate occurrences. An injury is not the mishap; it is the result of the mishap. The investigation of an injury or damage uncovers the cause of a mishap.

## **WORDS AND DEFINITIONS ASSOCIATED WITH MISHAP INVESTIGATIONS**

Before continuing, let's define some of the terms with which you as an investigator need to be familiar:

**Evidence**— Any parts, pieces, wreckage, logs, statements, records, photographs, or other items that may provide insight into the mishap. Physical evidence consists of only tangible materials that were not staged or derived by the investigator.

**JAG Manual Investigation**— An official legal search to uncover facts concerning a mishap. The JAG manual investigation is conducted separately from the safety investigation and can result in punitive or administrative action.

**Mishap**— Any unplanned or unexpected event causing personnel injury, occupational illness, death, or

material loss or damage. It also could be an explosion of any kind whether or not damage occurs.

**Mishap investigation**— A review of the events leading to, during, and following a mishap. The command involved conducts the investigation using the procedures outlined in OPNAVINSTS 3750.6Q, 5100.21B, 5100.23C, or 5102.1C.

**Mishap Investigation Board**— A formally appointed body assigned to investigate a serious mishap. Boards are appointed for shore, afloat, and aviation activity mishaps, depending upon the seriousness of the mishap. A mishap investigation board provides its findings in a Mishap Investigation Report (MIR) or a Shore Safety Investigation Report (SSIR).

**Near Mishap**— A hazardous or potentially risky occurrence in which injury or damage was avoided merely by chance.

**Witness Statement**— An oral, written, recorded, or dictated account of what the witness to a mishap saw, heard, felt, or perceived. Witness statements taken for safety investigations are never taken under oath. They can contain opinions, beliefs, and perceptions. Statements taken by an afloat or aviation mishap investigation board may become privileged information. If a shore mishap investigation board takes witness statements, the statements are covered under testimonial immunity.

Additional definitions are given in enclosure (2) of OPNAVINST 5100.21B, *Afloat Mishap Investigation and Reporting*.

## **PRIVILEGED INFORMATION**

Privileged information is that information voluntarily provided under a promise of confidentiality or information that would not have been discovered but for information voluntarily provided under a promise of confidentiality. The analyses of findings, conclusions, and recommendations of the afloat and aviation mishap investigation boards and any endorsements made by the board are privileged information. Also privileged are the calculations and deductions the board used in making those analyses.

A complete and comprehensive mishap investigation is an essential tool in identifying the cause of a mishap and thereby preventing recurrence. Traditionally, the only source of mishap information is a Judge Advocate General (JAG) investigation. This investigation determines accountability and culpability.



*The Manual of the Judge Advocate General, JAG Instruction 5800.7C*, governs the JAG Manual investigation. In a JAG Manual investigation, however, the reluctance of witnesses to divulge information for fear of being punished might lead to the loss of valuable safety information. The sole purpose of the safety investigation is mishap prevention, not the determination of accountability. That is why we invoke the concept of privileged information for afloat and aviation investigations.

Individuals may be reluctant to reveal information pertinent to a mishap because they believe certain uses of the information could be embarrassing or detrimental to themselves, their fellow service members, their command, their employer, or others. They may also elect to withhold information by exercising their constitutional right to avoid self-incrimination.

Individual members of the armed forces **must be assured** that they may confide in others for the mutual benefit of fellow service members without incurring personal jeopardy in the process. Witnesses **do not** provide statements to mishap investigation boards under oath, and requiring them to do so is prohibited. Mishap investigators must advise witnesses, in writing, of the purpose for which they are providing a statement and of the limited use to be made of the statement. The witnesses' statements are not limited to matters they could testify about in court. They may be invited to express opinions and speculate on possible causes of the mishap.

Mishap investigation boards who believe their deliberations, opinions, and recommendations could be used for other than safety purposes might be reluctant to include vital safety information in their reports. Likewise, endorsers of MIRs may be reluctant to include vital safety information in their MIR endorsements (MIREs).

Should the Department of the Navy (DON) use privileged information for any purpose other than safety, it would lose the trust of its people in future assurances of privilege. To protect privileged information against unauthorized disclosure, the Navy must safeguard the entire reporting cycle. That cycle includes assurances of confidentiality given; privileged information obtained, developed, and reported; privileged information protected against misuse or public disclosure; and trust in assurances of privilege and confidentiality. If any segment of the cycle fails, we may lose vital safety information. Privileged information will not be used as follows:

- In making any determination affecting the interest of an individual involved in a mishap or

making a statement under assurances of confidentiality

- As evidence, or to obtain evidence, in determining misconduct or line-of-duty status
- As evidence, or to obtain evidence, to determine the responsibility of personnel from the standpoint of discipline
- As evidence, or to obtain evidence, to assert affirmative claims on behalf of the government
- As evidence, or to obtain evidence, to determine the liability of the government for property damage caused by a mishap
- As evidence, or to obtain evidence, before administrative bodies, such as officer evaluation boards (USN) or field performance boards (USMC)
- As evidence, or to obtain evidence, in any other administrative or judicial proceeding(s) to determine misconduct or line-of-duty status, or governmental liability

Not all evidence collected by a mishap investigation board is privileged. Logs, most photographs, physical evidence, and copies of instructions are commonly available to anyone with no promises of restricted use. The source of physical evidence is privileged if divulged under the promise of confidentiality. Other privileged items include the following:

- Witness statements to an afloat or aviation mishap investigation board.
- Preplanned photographs staged or posed by the afloat or aviation mishap investigation board to illustrate a specific condition or situation. All captions or markings placed on photographs suggesting the mishap board's deliberative process are also privileged. Photographs of human injuries/remains that are not staged are not privileged, but may be exempt from disclosure under exemption b(6) of the Freedom of Information Act.
- Notes made on the board's deliberations, including personal notes made by board members.

The concept of privilege has been successfully used by the Navy aviation community and U.S. Air Force to gather vital mishap information. This concept was

applied to afloat units in OPNAVINST 5100.21B, *Afloat Mishap Investigation and Reporting*.

## TESTIMONIAL IMMUNITY

Federal law requires the U.S. Navy to make available to other federal agencies copies of mishap investigations occurring ashore. Because of this potential widespread distribution, we don't use the concept of privilege to gather information for shore mishaps. Instead, we use a similar concept that promises the witnesses "testimonial immunity."

We grant testimonial immunity to gather information that might not ordinarily be volunteered. Although less encompassing than the concept of privilege used by the mishap investigation boards for afloat and aviation mishaps, testimonial immunity protects individuals from adverse action based solely on the information they provide.

As we saw with afloat and aviation mishaps, a complete and comprehensive mishap investigation is an essential tool in identifying the cause of a mishap and thereby preventing recurrence. The primary source of shore mishap information in the past was a Judge Advocate General (JAG) investigation. However, the JAGMAN investigation can be used to determine accountability and culpability.

The *Manual of the Judge Advocate General*, JAG Instruction 5800.7C, governs the JAG Manual investigation. In a JAG Manual investigation, however, the reluctance of witnesses to divulge information for fear of being punished might lead to the loss of valuable safety information. The purpose of the safety investigation is mishap prevention, not the determination of accountability. That is why we use the concept of testimonial immunity for shore mishap investigations.

Individuals may be reluctant to reveal information pertinent to a shore mishap because they believe certain uses of the information could be embarrassing or detrimental to themselves, their fellow service members, their command, their employer, or others. They may also elect to withhold information by exercising their constitutional right to avoid self-incrimination.

We must assure members of the armed forces that they may confide in others for the mutual benefit of fellow service members without incurring personal jeopardy in the process. Witnesses **do not** provide statements to shore mishap investigation boards under oath, and requiring them to do so is prohibited. Mishap investigators must advise witnesses, in writing, of the purpose for which they are providing a statement and of

the limited use to be made of the statement (fig. 4-1). The witnesses' statements are not limited to matters they could testify about in court. They may be invited to express opinions and speculate on possible causes of the mishap.

The Department of the Navy will not use information gathered under the concept of testimonial immunity as follows:

- In making any determination affecting the interest of an individual providing the information
- As evidence, or to obtain evidence, in determining misconduct or the line-of-duty status of an individual providing the information
- As evidence, or to obtain evidence, to discipline the individual providing the information
- As evidence, or to obtain evidence, to assert affirmative claims on behalf of the government against an individual providing the information
- As evidence, or to obtain evidence, before administrative bodies, such as officer evaluation boards (USN) or field performance boards, (USMC) pertaining to the individual providing the information
- As evidence, or to obtain evidence, in any other administrative or judicial proceeding affecting the individual providing the information

## PRE-MISHAP PLANS

No one plans to have a mishap, but your effectiveness in conducting an investigation may depend on preplanning in case a mishap happens. Aviation squadrons have pre-mishap plans. These plans tell who to call and what actions to take when you are first notified of a mishap. Nearly every airport and large community has drills and plans to combat disasters. Pre-mishap plans are highly recommended for every ship and occupational safety and health (OSH) office.

Pre-mishap plans can range from one page to volumes. They may consist of checklists for each type of mishap. They must provide clear, concise instructions on what to do and when to do it. They should provide for

- saving and maintaining an alarm system or method,
- saving lives,
- protecting lives and property from more loss, and

ADVICE TO WITNESSES

THIS IS PART OF A LIMITED USE MISHAP INVESTIGATION REPORT.  
LIMITED DISTRIBUTION AND SPECIAL HANDLING ARE REQUIRED  
AS PROVIDED FOR IN OPNAVINST 5100.21B.

THIS STATEMENT IS PRIVILEGED AND IS EXEMPT FROM DISCLOSURE UNDER FOIA.

DO NOT FILE THIS STATEMENT IN A SYSTEM OF RECORDS SUBJECT TO THE PRIVACY ACT. FOR  
EXAMPLE, THIS STATEMENT MUST NOT BE RETRIEVABLE BY NAME,  
SOCIAL SECURITY NUMBER, DATE OF BIRTH, OR OTHER UNIQUE  
IDENTIFIER ASSOCIATED WITH AN INDIVIDUAL.

Authority: 10 U.S.C. 5031

**Principal Purposes:** To determine the cause of the mishap so the U.S. Navy can improve equipment design, safety, and warning devices; operating and maintenance procedures and training; administrative and engineering controls; and personal protective devices to prevent or reduce to a minimum the accidental loss of naval personnel and materials.

**Official Use(s):** The information requested will be used by the mishap investigation board, officials and employees of the Naval Safety Center, and other DOD officials to prevent mishaps and to promote and monitor safety and safety programs. Collective or individual mishap investigation reports form the basis for safety advisories to the fleet, for material for safety publications, and for recommendations to higher authority involving human factors and equipment design to prevent mishaps.

**Mandatory or Voluntary Disclosure:** The information being requested is voluntary. However, your failure to provide the requested information will diminish the overall understanding of the causes of the mishap.

PLEASE READ THIS STATEMENT CAREFULLY.  
CERTIFY YOUR UNDERSTANDING BY SIGNING AT THE BOTTOM.

I understand:

- a. I have been requested to provide information to a mishap investigation board.
- b. My statement will not be under oath or affirmation.
- c. Disclosure of information is voluntary; my election or refusal to provide such information will have no adverse effect upon me.
- d. The mishap investigation board and the Department of Defense will use the information I provide solely to determine the cause(s) of the mishap and to make safety evaluations for future prevention of loss of life/material.
- e. The information I provide shall not be used as evidence or to obtain evidence in any other administrative or judicial proceeding(s) to determine misconduct or line-of-duty status, or governmental liability.
- f. Examples of situations where the information provided by me shall NOT be used include:
  - (1) In any determination affecting me.
  - (2) As evidence in determining misconduct or line-of-duty status of other personnel.
  - (3) As evidence in any disciplinary proceedings.
  - (4) To assert affirmative claims by the government or to defend the government against claims.
  - (5) Before any administrative boards, such as officer evaluation boards (USN) or field performance boards (USMC).

1. PRINTED NAME

2. SIGNATURE

3. DATE

4. RANK/RATE

5. SERVICE

6. TELEPHONE NO.

7. YOUR ADDRESS

8. PRINTED NAME OF BOARD MEMBER

9. SIGNATURE

10. STATEMENT (Continue on reverse or attach separate sheets)

Figure 4-1.—Advice to witnesses form.

- assuring a timely investigation.

The pre-mishap plan should also provide for protecting the mishap scene as much as possible. For example, if a ship spills a hazardous substance into the harbor, what local agency or office do personnel from the ship report that spill to? Is there assistance available from a shore command? Can the local medical clinic accept personnel contaminated with a chemical? All of these questions can be answered with a pre-mishap plan.

Vital evidence can be lost if steps are not taken quickly to secure the area. If feasible, the plan should include phone numbers and points of contact for each type of emergency. Pre-mishap plans are usually part of the Command Duty or Staff Duty Officer's Notebook.

## INVESTIGATOR TRAINING

Whether a safety petty officer (SPO) or an experienced safety manager, mishap investigators need some training to ensure they can conduct a useful investigation. Aviation safety officers receive extensive formal training in aircraft mishap investigation techniques. The Afloat Safety Officer Course currently devotes 3 days to mishap investigation and training. The Naval Safety School provides a mishap investigation course for shore activities.

Most investigator training is done in house or on board by a trained safety manager or safety officer. Good training is the key to a good investigation; a good investigation is the key to preventing mishaps. The following example demonstrates the importance of a good investigation:

A Seaman fell down a ladder and broke his ankle. He lost more than 5 work days, so his divisional safety petty officer (SPO) had to do an investigation and prepare a report. The SPO talked to one person who saw the SN fall. That person said the SN was hurrying to get to chow and slipped on the middle step. The SPO listed the cause of the mishap as inattention and rushing. The resulting mishap report was three sentences long. The next week another sailor fell down that same ladder and died.

What is wrong with this story? Perhaps the SPO was not trained in conducting a mishap investigation. Perhaps the SPO didn't realize the importance of the mishap investigator's job. When a formal mishap investigation board investigated the second mishap, it found the following evidence:

- Worn ladder treads
- No nonskid at either end of the ladder
- Dirty ladder treads and greasy hand rails
- A burned out light at the top of the ladder
- Missing pins from the bottom handrail attachment
- The routine practice of requiring personnel who used that ladder to work until chow was nearly over resulted in personnel hurrying to the mess decks

A thorough investigation of the first mishap may have prevented the fatality. The training of that investigator may have saved a life.

## INVESTIGATION KITS

In the movies we see civilian investigators with their cameras, fingerprint kits, and magnifying glasses. Although you may not investigate enough mishaps to justify having a professional kit, you may find the following equipment useful during evidence collection and mishap scene evaluation. Most of the equipment is common and will be available on board ship or at your activity.

- Blank labels or tags
- A camera with flash (black and white/color film)
- China marking pencils (red and black)
- Manila envelopes
- Felt-tip markers (red and black)
- A two-cell, explosion-proof flashlight (with spare batteries)
- Graph paper
- A hacksaw (frame and blades)
- A 2 1/4-inch adjustable inspection mirror
- A notebook
- Plastic envelopes or small plastic bags with scalable openings
- Pliers (regular, needle nose, and wire cutters)
- A pocket knife
- Polyethylene rope (yellow)

- A magnetic retrieving tool
- A 12-inch wooden ruler
- A screwdriver (flat and Phillips head)
- Steel measuring tapes (12-foot and 100-foot)
- A video camera (optional)
- A voltage tester
- Adjustable wrenches (6-inch and 8-inch)
- A yellow lumber crayon

Investigating a mishap scene could expose you to health hazards such as soot, sharp metal, toxic chemicals, or asbestos fibers in torn lagging. In such cases, you need to wear at least the following protective equipment:

- Disposable coveralls
- Protective gloves
- Adequate respiratory protection
- Safety glasses and goggles
- Safety shoes

If a respirator is necessary, your respiratory protection officer or shore Respiratory Protection Program manager can help you get fit-tested and ensure you receive the required medical screening.

## INVESTIGATIVE PROCEDURES

A mishap has occurred! The worst that could happen has happened! What are your priorities? There is no question about the first priority at a mishap site—save lives and prevent more injury and property loss. Aboard ship, damage control takes priority over preserving the scene of the mishap for investigators.

Begin your investigation as soon as possible after the mishap. The sooner you begin, the better your investigation will be. Witnesses will be present. You can gather more accurate facts because the damage and materials involved will be in the same relative position as when the mishap occurred.

The mishap investigator is seldom the first to arrive at the scene of a mishap. An activity with a pre-mishap plan will have a supervisor on the scene who knows how to protect the site, detain witnesses, and provide observations. Protecting and preserving the mishap site is important. However, it may be necessary to disturb the scene for damage control purposes.

Your first overall observation and analysis on arrival at the scene is critical. Slow your approach to the scene so that you can observe the overall big picture.

Start your investigation the minute you arrive, but don't hinder damage control or first-aid efforts. Don't become part of the mishap! Once people have calmed down, victims have been removed, and the area is safe, your priorities are as follows:

- Preserve the evidence
- Protect the mishap site
- Secure the evidence

You will have little time to plan your investigation. Always be ready to begin collecting facts and evaluating the situation with little prior notification.

## Preserving Evidence

Mishaps gather crowds! People forget their work and begin running in all directions as they rush in for a look. Too often, many more people arrive on the scene than need to be there. Preserving evidence and controlling activities under these conditions is almost hopeless. Evidence gets washed away, trampled on, thrown over the side, picked up as a souvenir, or scooped up in initial clean-up efforts.

When a mishap occurs, especially aboard ship, everyone's first thought is to get the site back to normal. That must be discouraged if it doesn't impact on operational readiness. Anything that can be left in place should not be touched.

As a safety supervisor, you may be a key player in preserving evidence until a mishap investigation board arrives. Take the following steps (which should be included in your pre-mishap plan) to preserve evidence:

- Cord off or secure the mishap scene. Post a guard if you must!
- Get a photographer on the scene as soon as possible to take photographs—takes lots of photos of everything. Use a video camera, if available, as well.
- Cover the scene with a tarp if the scene is outdoors or if the scene may be disturbing to passersby.
- Prevent witnesses from leaving the area. Keep them from conversing with each other, if possible. Get their names and a phone number

where you can reach them, If time allows, have them start writing down what they saw.

- Ensure the medical department representative or emergency medical technician preserves any transitory evidence, such as blood samples, for drug and alcohol tests (if warranted and authorized).
- Minimize moving or disturbing any physical evidence. Other investigators may be using this same evidence, so protect it as a courtesy to all who may need that evidence.
- Before any evidence is moved, photograph it from several angles. If you don't have a camera, make a quick sketch or diagram.

### Collecting Evidence

You may have seen investigators on television in surgical gloves placing little bits of debris in plastic bags. They handle such evidence gingerly to prevent damage to it.

You may want to collect parts, pieces, debris, and other items from the site to prevent their loss and to examine later. Carefully wrap them in protective material or place them in plastic bags, envelopes, or small glass or plastic containers. Accurately label each item with the following types of information:

- Who gathered the item (You may want to question the person later about the position or location in which it was found.)
- The identification of the item, if known
- The time and date it was gathered
- The location of the item when removed

When labeling evidence, make sure you do not put any information on the label that might be privileged. In other words, do not indicate the source leading to your finding the item or any deliberative comments. You must share physical evidence with other investigators, since it, in itself, is not privileged.

You may also collect records such as logs, operating procedures, or time cards as evidence. Even though you review the original record, make a copy of it to retain as evidence. Mark on the back who made the copy and when. A copy of a log made a week after the mishap may have given someone the chance to rewrite or "correct" it. Check for erasures and added lines.

**PHOTOGRAPHING.**—Photographs are perhaps the most valuable piece of evidence you will have besides an eye witness. You can't just go in to a mishap scene and start shooting photographs at random! You or your photographer needs to plan your shots to make the best use of limited time and still not miss critical information.

Some safety officers and safety managers keep a disposable 35-mm camera or self-developing camera readily available. If they arrive early at the scene, having a camera on hand may be vital. If you intend to use the base or ship's photographer, arrange ahead of time for a review of investigation and photographic techniques with the photographer.

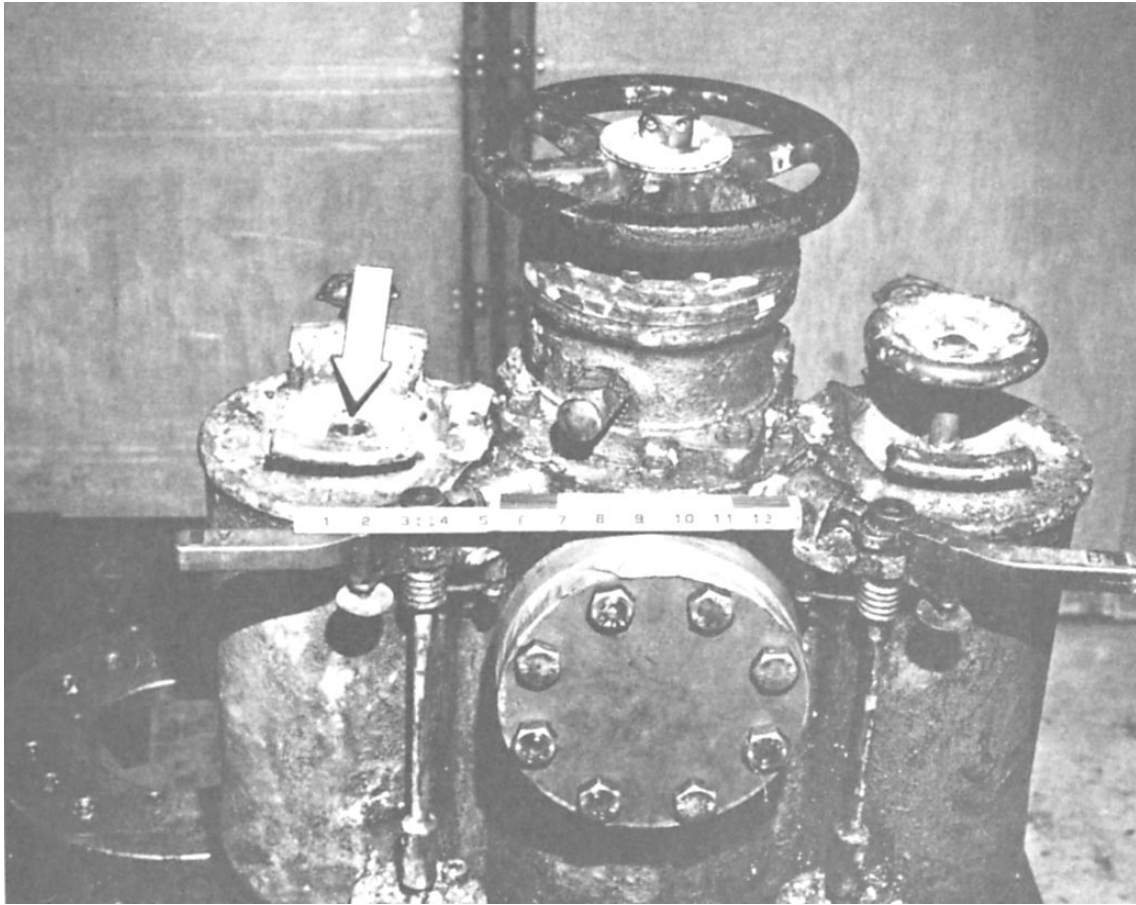
Self-developing photographs are acceptable but lack fine detail and are difficult to enlarge. Black and white photographs are not as helpful as color photos, but some ships and laboratories can only develop black and white film. Using color film may delay developing services. If you are using base or commercial photo laboratory services, color developing may be available and faster. Color, 35-mm, 400-speed film used with a high-speed flash will do a good job. Otherwise, make do with what is available.

Color photography is especially helpful in fire investigations. The color of the smoke and flames can provide valuable information on what is burning and how hot the fire may be. A yellowish to white flame indicates a hot flame of about 1500 degrees Celsius, while a reddish color indicates a cooler flame of about 500 degrees Celsius. Red or running flames on water indicate the burning of petroleum products. Heavy black smoke usually means a burning petroleum product or burning rubber or paint. Light white smoke occurs from the burning of combustibles such as wood or paper. An aura of brilliance around the base of the smoke indicates burning metal.

Take care to avoid underexposure when taking photos of fire scenes after the fire is out. Charred and sooty material may absorb the light from your flash.

Be sensitive to photographs that show bodies or body parts, especially if the victim can be identified. If the mishap was controversial or has high public interest, be careful about using commercial photo developing services. We don't want to tempt a technician to send one of your photos to the local newspaper.

If you use Navy developing services, ask for the negatives, proof sheets, and all prints. Get proof sheets and decide which photos you want printed. You should overshoot but underprint—take duplicate photos with



**Figure 4-2.—Investigation photograph with ruler to show scale.**

different light, exposures, or angle; but only print the good shots.

Photographs are physical evidence. They can be shared among investigators. The only exception is if the mishap investigation board deliberately stages a photograph. Based on its deliberations, the board may want a photograph staged to prove or disprove a point. For example, the board may decide that a worker was electrocuted by touching a light switch over a metal sink. To prove that could have happened, the board may have a worker of the same height stand in the same spot to try to reenact touching the switch. Staging the photograph to show that the victim could reach the switch makes that photograph and its negative privileged information. Also, if a mishap board member writes or draws something on a photograph based on board deliberations, the photograph then becomes privileged. The negative to that photograph, without the writing, is not privileged.

When taking photographs for your investigation, keep the following tips in mind:

- Take a few shots while approaching the mishap. Follow the path of travel of the victim.
- Photograph anything that may get moved or collected.
- If you get there while the mishap is in progress, take photos of the onlookers and emergency response personnel. That may provide identification of witnesses to the mishap and where they were standing.
- Get photos from all sides, if possible.
- Photograph the debris so that you can see details—get close but keep some background in the photo to show a relationship with other evidence.
- Show a scale of the item by photographing a person, a hand, a ruler, or a clipboard next to the item (fig. 4-2).

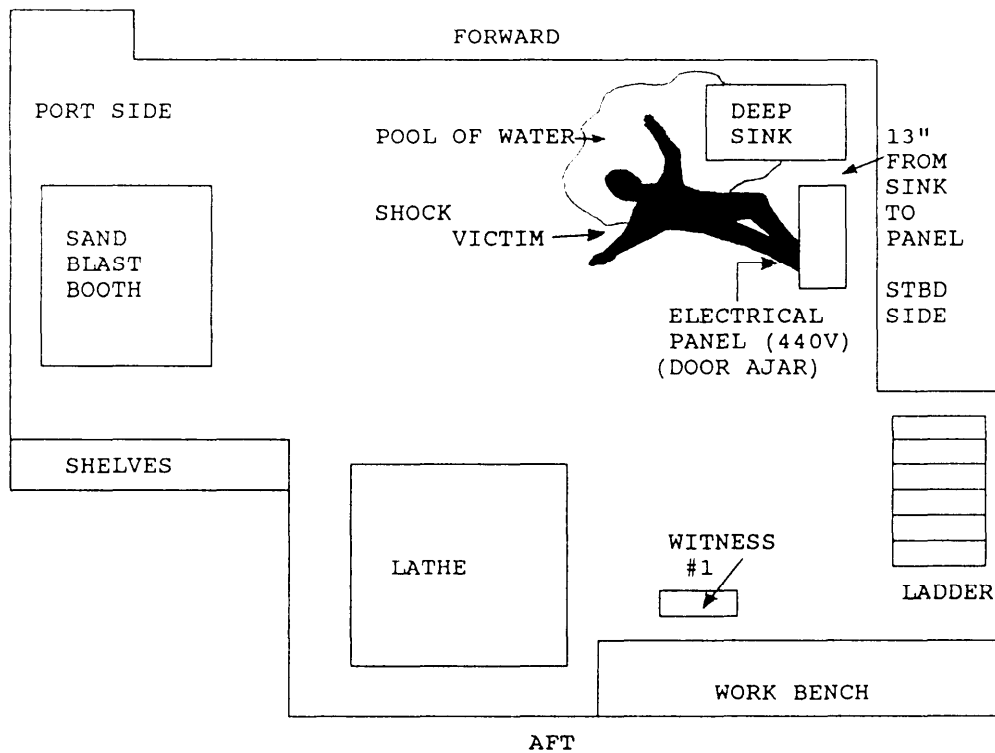


Figure 4-3.—Sketch of mishap scene.

- Use a pen or pencil to draw arrows to parts of the photograph you wish to draw attention to.
- Take wide-angle shots as well as close-ups.
- Identify your photo by including a photo log, slate, or card in the photo with a code or number or some other method of identification.

Label each photo according to your log or record, telling when it was taken, who took it, under what conditions it was taken, where it was taken from, and what it shows. Otherwise, you may end up with a photo of a jumble of wires and twisted metal with no clue as to what the photo is of. It is embarrassing to leaf through a stack of photographs and not even know which angle is up!

**VIDEOTAPING.**— Videotaping is a valuable method of recording a mishap scene, but it is not a substitute for still photography. A video tape shows responders in action and shows movement and color; but it cannot be studied as well as a photo.

Recording a reenactment of the chain of events leading to a mishap can serve as a valuable supplement to still photography. A videotape made by an afloat or aviation mishap investigation board to reenact a mishap is privileged, since the tape reflects the board's

deliberations. Other video tapes made by reporters, passersby, or a single investigator are not privileged since they are physical evidence.

**SKETCHING, DIAGRAMING, AND CHARTING.**— A sketch is a drawing made at a mishap site. It is usually a rough, stylized drawing that can be smoothed up later into a more accurate diagram. Charts are usually tables of information, measurements, or statistics used to clarify certain points. You may also have charts of speeds, instrument readings, and temperatures.

The same rules that apply to the labeling of photographs apply to the labeling of sketches and diagrams (fig. 4-3). Carefully label sketches and diagrams as you would a photograph. The advantage that a diagram has over a photograph is that it is less cluttered. A diagram can show movement with arrows, angles, positions of people and parts, and key distances. Drawn closely to scale, it can emphasize certain aspects of a photograph to clarify a point. Sketches may be the only evidence you have from a mishap scene if photographs were not available before evidence was moved.

With a sketch or diagram, you can add information like temperatures, air flow, plots of noise, and lighting.



Use grid or graph paper, if available, to help draw to scale. Mark sketches or diagrams aboard ships showing forward and aft, port and starboard, compartment number, or frame number. Ashore, mark magnetic north or place north in the upper left corner. Use key landmarks or features to orient your drawing. Mark key points, distances, and movement on a spare navigation chart or map. Remember to be as accurate as possible. Some items to record and measure include the following:

- Location of injured and dead personnel
- Machines and equipment affected by the mishap
- Parts broken off or detached from the equipment
- Objects damaged, marked, or struck against
- Gouges, scratches, dents, or paint smears
- Tracks or similar indications of movement
- Defects or irregularities
- Accumulations of stains or fluids
- Spilled or contaminated substances
- Areas of debris
- Sources of possible distractions or adverse environmental conditions
- Safety devices and equipment
- Positions of people and witnesses
- Possible movement of people, before, during, or after a mishap

Look for things that are obviously missing. A key part of a machine may not have been replaced during maintenance.

### Using Various Types of Witnesses

We usually think of witnesses as being people who were at or near the mishap scene who can provide helpful information. But witnesses need not be human. A witness can be anything or anyone who provides insight into a mishap. A witness may not have even been near the mishap but can provide information about events leading up to the mishap. Some mishap investigation courses identify four types of witnesses, known as the four “P’s”: people, parts, position, and paper.

- **People.** People can include others besides eyewitnesses, participants, and victims. They can be your friends, supervisors, or anyone who can provide information about the mishap. They can also be technical representatives for equipment or aircraft involved in the mishap.
- **Parts.** Parts include debris, wreckage, charred wood, failed machinery, support equipment, or stressed metals found at the mishap site.
- **Position.** Position includes the mishap location, patterns of movement, where victims were found, and where the wreckage was found or was resting after the mishap.
- **Paper.** Paper, such as logs, records, reports, drawings, and recordings, provides witnessing information. Although we may not think of them as paper-type products, floppy disks also fall into this category.

All of these items “testify” about the mishap. But by far the most valuable information about “how” the mishap occurred comes from the human witness.

In a JAG Manual investigation or any other legal investigation, the investigator is interested in the truth. Witnesses must swear under oath that their testimony is true. The written testimony of witnesses, which can be used against them, must stand up in court.

Witnesses are sometimes reluctant to fully cooperate in legal investigations because they fear retribution. That inhibits investigators from getting all the pertinent information.

A safety investigation cannot risk the withholding of information! Therefore, witness testimony in a safety investigation is NEVER TAKEN UNDER OATH! The safety investigator and witness must share a free and open flow of truthful information. Witnesses must be confident that what they say will not be used against them in any disciplinary or administrative proceeding. Witnesses must feel free to share rumors; their opinions, thoughts, or recommendations; or any other information about the mishap. They must understand that the only purpose for the information is SAFETY and that investigators need to know everything about the mishap to prevent recurrence.

Safety officers, safety petty officers, or safety supervisors who conduct an informal investigation may take oral testimony. Although you may take notes, be careful to avoid documenting any information that may be used to harm witnesses or their command. For a

command or local investigation, *assure* witnesses that you will not use the information against them, but let them know the report is releasable under the Freedom of Information Act (FOIA).

In a command or local investigation, information and evidence are not privileged. That is because junior supervisors may lack the ability to properly protect that information from release or misuse. Information becomes privileged only when gathered through an afloat or aviation mishap investigation board. To avoid problems, avoid taking written statements for locally conducted investigations.

A mishap investigation board that writes a limited-use mishap report can promise that the information witnesses provide will not be used against them. The board provides that promise in writing. An Advice to Witness form (fig. 4-1) is provided to all witnesses in an afloat mishap so that they understand just how their testimony will be used by the board. Similar forms are used in both aviation and afloat mishap investigations. These witness statements are privileged. Shore mishap investigation boards use a different form giving the witness testimonial immunity.

Remember, all testimony is VOLUNTARY in a safety investigation. Witnesses can refuse to cooperate. You must explain your purpose and request their assistance. You cannot force a person to provide information.

### Interviewing Witnesses

Witnesses should be interviewed as soon as practical after the mishap to ensure the integrity of the information. Witnesses provide better information when the mishap is fresh in their minds. Waiting days, or even hours, to conduct an interview can be detrimental.

- Witnesses are strongly influenced by each other and the news media. Given time to talk among themselves and compare stories, witnesses may add to or change their story. Seeing the mishap on the news can influence their own account.
- Witnesses can forget. They forget minor details. If the witnesses didn't understand what they saw, they may use their imagination to fill in the blanks; therefore, their story may change.
- Some witnesses are hostile, and, given time, may develop a grudge. They may find out information

that influences them to protect a friend or to try to hurt their supervisor.

- Witnesses may go out and tell all their friends about the exciting mishap. Each time they tell the story, it gets better. Without knowing it, the witnesses are embellishing the information.

Try to keep witnesses apart by giving them separate tasks at different locations. Put them to work drawing a sketch of the scene, listing participants, or writing down what they saw. Having a dozen sailors waiting together on the mess deck will ensure homogenized testimony.

An investigator must also consider the personality of the witness:

- Extrovert or braggart
- Timid or self-conscious
- Suspicious
- Excitable
- Intentionally misleading
- Traumatized
- Untruthful

SIGNS OF UNTRUTHFULNESS
Hang-dog appearance
Repeats the questions asked
Inaudible speech
Defensive smile
Nervous laugh
Unnatural emphasis on details
Excessive detail

The interviewer determines witness reliability. Witnesses may not be intentionally misleading, but you must compare their information to that of other witnesses. For example, six sailors responded to a fire aboard ship. Three said they heard the word passed and then heard the general quarters alarm. The fourth did not hear the word passed at all. The other two heard the word passed after the alarm. The interviewer must determine the credibility of each witness, compare testimony, and then decide which account was more accurate. The first

three may have compared stories. The fourth may have been too far from a 1MC speaker.

Interviewers who have the following types of personalities can also influence a witness:

- Commanding-type-overbearing
- Proud, overconfident (“COLUMBO complex”)
- Overly eager
- Timid, insecure, insincere
- Prejudiced
- Manipulative

The interviewer’s body language can intimidate witnesses or set them at ease. When interviewing, sit on the same level as the witness, not above. Offer the witness a soft drink or cup of coffee. Use a quiet place, such as an office or stateroom, to conduct the interview, not a crowded lunchroom. If a male is interviewing a female (or vice versa), the interviewer should ensure the door remains open and the place is not secluded. Make sure you are not interrupted during the interview. Interview one-on-one—avoid ganging up on a witness with two or three investigators.

INTERVIEW-DO NOT INTERROGATE!

Be sincere and friendly to your witnesses. Provide a phone number where you can be reached if they wish to add something they forgot to their testimony. Explain the purpose of your investigation. Do not argue with your witnesses.

Before your interviews, you should preplan a few common questions. Asking each witness a few similar questions can help determine if the witness’s account is believable. Write down pertinent questions about which a particular witness may have information. Have a basic understanding of the equipment, material, and procedures surrounding the mishap. If you are not familiar with how a band saw works, you may not be able to ask pertinent questions about how the victim used the saw.

Ask neutral questions. Ask questions that require explanations, not just a yes or no answer. Listen, and permit silent periods. Do not rush your witness. Keep the interview on track. Solicit a witness’s assistance and

recommendations to prevent recurrence of the mishap. Always start with the same question: **WHAT FIRST ATTRACTED YOUR ATTENTION TO THE MIHSHAP?**

You may want to use a visual orientation to jog the witness’s memory. If not too traumatic, take the witness to the mishap scene. Let the witness explain what happened, who was standing where, and what his or her actions were. First refresh the witness’s memory at the scene; then conduct the interview. Be sensitive to your witness. A witness who saw a friend injured or killed may be too upset to provide much testimony.

If you want to interview a victim in the hospital, check with the physician first to see if an interview would harm the victim. Go to the hospital sometime other than regular visiting hours. Relatives of the victim may be hostile, press for information, or upset the victim. Relatives may try to blame you or your command for hurting their loved one.

In an informal interview you listen to the witness and take notes. Although a witness may draw a scene or write down a sequence of events, a local or command mishap investigation does not use Advice to Witnesses forms or take written statements.

A mishap investigation board does use the Advice to Witnesses form and can ask for a written statement. A witness who is reluctant to write a statement may record or dictate the statement. Review dictated statements with the witness. Have a recorded statement transcribed; then review it with the witness.

Let witnesses know that you may call them in later to reinterview them or ask them more questions. Encourage witnesses to add to their testimony later, as well.

An interview has four phases:

- First phase—Free narrative
- Second phase—Repeat the story
- Third phase—Review the information
- Fourth phase—Clear up inconsistencies

Once you have interviewed and reinterviewed your witnesses, then you must analyze their information.

Table 4-1.—Witness Information Chart

WITNESS	LOCATION	ACTIVITY	OBSERVATION
MMC on watch as EOW	Engine Room mid-level	Reviewing readings	Called by MM3 about hearing someone call for help. Went to switchboard after a moment and saw MM2 doing CPR on FN; called OOD.
MM3 on watch as throttleman	Control board	Talking with MMFN	Heard someone yell, so called EOW. Told MMFN (throttleman under instruction) to investigate noise.
MMFN on watch as throttleman (under instruction)	Control board	Observing MM3 on watch	Heard nothing, but was told by MM3 to look near switchboard. Saw FN rigid against panel door; ran to phone and called OOD.
MM2 at SSTG doing repair work	SSTG #2A	Repairing lube oil strainer	Saw MMFN run by saying someone was being shocked; went to see. Knocked FN away with mop handle; started CPR.
WITNESS	HEARD FN YELL	SAW VICTIM	NOTIFIED OOD
MMC	no	yes	yes
MM3	maybe	no	no
MMFN	no	yes	yes
MM2	no	yes	no

Sometimes developing a chart of your witness information (table 4-1) is helpful.

**Determining the Sequence of Events**

Now that you have your sketches, evidence, photographs, video tapes, and witness statements, you can determine your sequence of events. That is the most difficult part of investigating a mishap, especially a complex mishap. You must take all the events surrounding the mishap and put the jigsaw puzzle together.

In some mishaps you have logs and records that aid you in pinning down times and people. Start with the times you do have; then fill in the blanks with testimony

and your “best guess.” Some investigators write the sequence of events on small pieces of paper and arrange them into different sequences until a possible chain of events appears.

Your chain of events can start days or weeks before the mishap even occurred. Look as far back as needed to find a cause that could prevent recurrence. Maintenance done on an aircraft 6 weeks ago could be a contributing cause to an aircraft crash. Disconnecting a backup warning bell on a forklift last year may have contributed to a worker’s being run over last week. All of these may be part of your sequence of events.

Your sequence of events may also be extremely short. A welding spark touching off a pyrotechnic device that detonates other ammunition that blows out

the wall of a building may happen in a matter of seconds. The sequence of events is the investigator's best estimate of what could have happened.

### **Reconstructing the Mishap**

Sometimes you will find that reconstructing the mishap will help you get a clear picture of how the mishap occurred. Using your best guess of the sequence of events, walk through the mishap.

Have those who take part in recreating the mishap proceed up to the point of the mishap. Use original players if they are not too upset to revisit the scene. Go through the events slowly; then stop and discuss the events.

Be careful not to repeat the unsafe act. You don't need to have another mishap on your hands! Beyond the point of the mishap, talk about the action taken and walk through it again. Try other possibilities to see if they could have been contributing causes. Videotape the reconstruction and view the tape. Many times you will discover the cause of the mishap through the reconstruction.

### **Checking Precedence**

During your investigations you should also check to see if this same type of mishap has happened before. Based on the precept that there are "no new causes," a previous mishap could provide clues to this mishap. The Naval Safety Center, systems commands, and type commanders have information on previous mishaps, near-mishaps, and systems/equipment problems that may provide insight. Reviewing this type of information also aids in formulating corrective actions.

### **Determining Criminal Evidence**

A mishap is an unplanned event. A criminal act is an intentional or planned event. A deliberate act is not a mishap. The criminal act may not be readily obvious until the mishap investigation is started. Arson, for example, may not be determined until most of the mishap investigation is completed.

When doing an investigation, if you find criminal evidence, stop the investigation and inform your chain of command. A mishap investigation board that finds a possible criminal act will stop its investigation, and the senior member will inform the chain of command. Nonprivileged physical evidence can be turned over to

criminal investigators. The sources of the evidence and privileged information are never revealed or turned over. If directed, a mishap investigation may continue, depending on the mishap. For example, if an arson fire occurred, but investigators found several hydrants out of commission and several hoses missing, a mishap investigation might look into those problems.

### **Analyzing Mishaps**

A variety of analytical techniques are used in mishap investigations. Some are simple, while others derived from civilian investigators are quite sophisticated. In this section we will define and discuss a few of the more common analytical techniques used by DOD personnel.

An analysis of a mishap involves many methods and techniques of arranging facts. The facts can be used for the following purposes:

- To help determine what additional information is needed
- To establish consistency, validity, and logic
- To establish sufficient and necessary causes
- To help guide and support judgments and opinions

Some methods of analysis are used both to prevent mishaps and investigate them. Systems safety and failure mode analysis are detailed methods used when investigating systems involving complex, interrelated components. The Navy may use these methods for aircraft and weapons systems investigations. Some of the results of these analyses can also be used to predict mishaps or the possibilities that certain mishaps will occur.

The following techniques are used by some Navy mishap investigators, depending on their training and the extent of the investigation. Training is available in the techniques through the Naval Safety School and local colleges and universities.

**FAULT TREE ANALYSIS.**— The Navy uses fault tree analysis to determine if a particular system, component, or equipment requires planned maintenance. It asks questions such as, If maintenance is not done, will the system fail? If the system fails, what is the result? Will personnel get injured? Will operational readiness be damaged? The fault tree is a

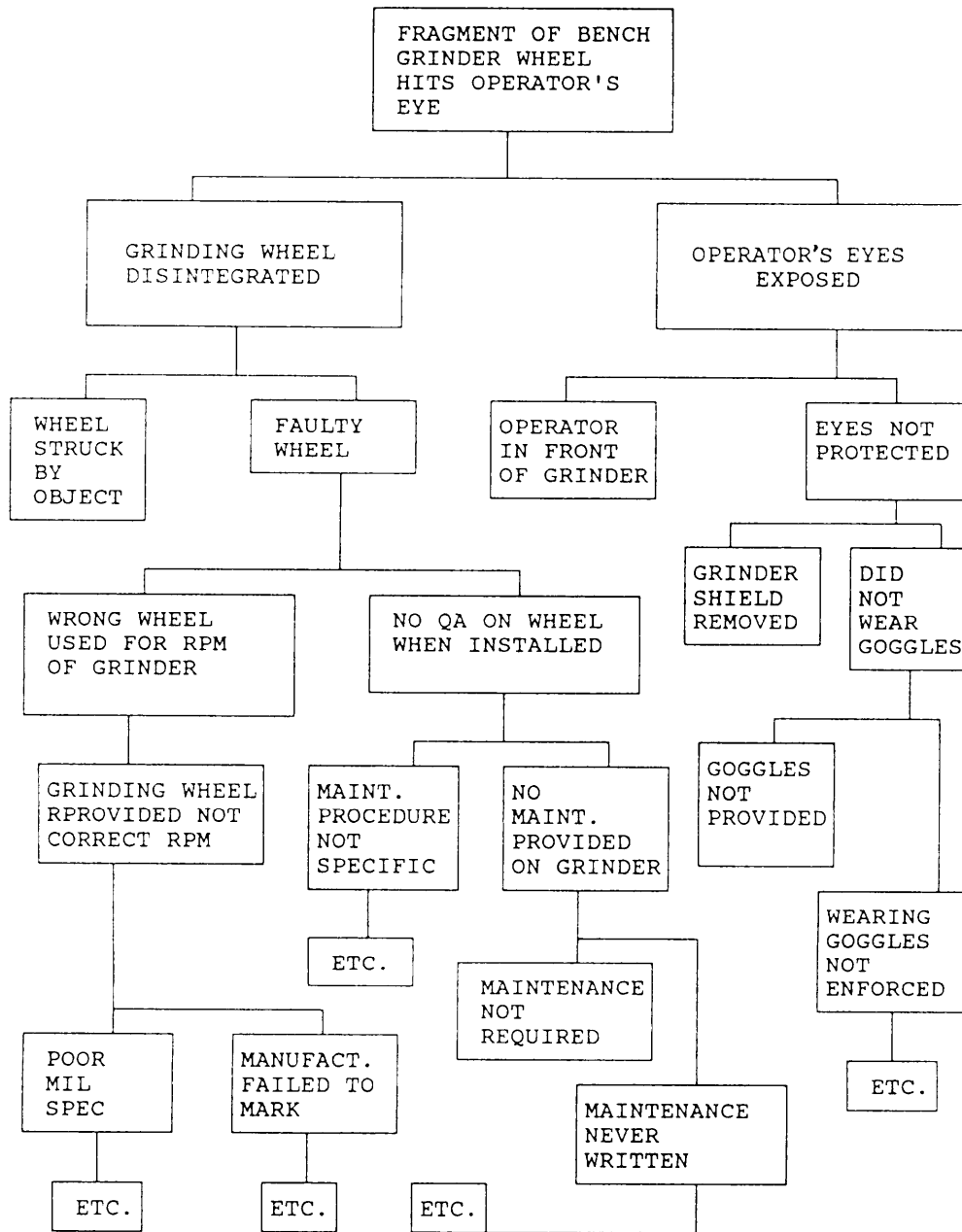


Figure 4-4.—Sample fault tree diagram.

symbolic diagram on paper showing “what if” problems (fig. 4-4). It also branches off into other components affected by the failure. Analyzing mishap investigation information works backwards from the final failure to the original component. It shows the cause-and-effect relationship of systems.

**CHANGE ANALYSIS.**— Change signals trouble. A change in the steering of the ship or a change in the sound of an engine may signal trouble. Departures from the norm may be an element in the chain of events leading to a mishap. Changes interact with subsequent

changes. A change in a Maintenance Requirement Card (MRC) could cause a change in frequency of the maintenance. The change in frequency could change the adequacy of the maintenance. The change in adequacy of maintenance could change the reliability of the equipment. The change in reliability could lead to a mishap. Analyzing the changes that affected a system or procedure may provide mishap causes. In a change analysis, we compare a mishap situation with a similar but mishap-free situation. We determine the differences

and analyze them. These differences may be the cause factors.

**MANAGEMENT OVERSIGHT AND RISK TREE.—** The management oversight and risk tree (MORT) technique uses a logic tree format as a guide to seeking facts in mishap investigations. It involves a long series of interrelated questions and the use of diagrams, symbols, and charts. It is similar to a fault tree but adds in more supervisory and human factors. Once completed, it provides a visible trail of facts and investigative steps.

MORT is based on the concept that all accidental losses arise from two sources: (1) specific job oversights and omissions, and (2) the management system factors that control the job. Within the MORT system, a mishap means an unwanted transfer of energy that produces injury, damage, and loss.

Mishaps are prevented by using energy barriers or controls. For example, the energy of a piece of broken grinding wheel causes the loss of an eye. The appropriate energy barrier would have been a guard on the grinder or eye protection on the worker.

#### **TECHNIQUE OF OPERATIONS REVIEW.—**

The technique of operations review (TOR) method is used in mishap prevention and as an investigative tool. It is directed more at management than at hardware. TOR is a step-by-step process whose goal is the efficient operation of a system. Analyzing the operation using TOR after a mishap defines weaknesses in the operation. TOR usually uses a group discussion method of defining all possible and probable causes and then tracing the events. As causes are accepted or rejected, the primary cause eventually becomes clear. TOR does not propose solutions but does expose problems.

#### **SUMMARY**

In this chapter you have been given some mishap investigation fundamentals concerning investigative techniques, collection of evidence, interviewing witnesses, and analyzing information. These procedures can be applied to any type of investigation, whether ashore, afloat, or involving aviation. The results of these investigations provide you with the information to complete mishap reports. Chapters 6, 7, and 8 deal with their respective areas of mishap reporting.





## CHAPTER 5

# NAVY OCCUPATIONAL SAFETY AND HEALTH PROGRAM FUNDAMENTALS

In chapter 1, we gave you background information on the Navy Occupational Safety and Health (NAVOSH) Program. In this chapter, we will discuss the following areas of the NAVOSH Program:

- NAVOSH Program background
- NAVOSH Program elements
- Scope of NAVOSH Program
- Industrial hygiene surveys
- Industrial hygiene terminology
- Heat Stress Control and Prevention Program
- Hearing Conservation Program
- Hazardous Material/Hazardous Waste Program
- Sight Conservation Program
- Asbestos Control Program
- Lead Control Program
- Radiation Protection Program
- Respiratory Protection Program
- Personal Protective Equipment (PPE) and Clothing Program
- Electrical Safety Program
- Tag-Out/Lock-Out Program
- Gas Free Engineering Program
- Medical Surveillance Program
- General safety precautions

The off-duty safety program elements, such as home, traffic, athletic, and recreation safety, are also part of the NAVOSH Program. Chapters 10 and 11 discuss those elements.

### NAVOSH PROGRAM BACKGROUND

Federal law requires the Department of Defense (DOD) and Secretary of the Navy (SECNAV) (as

discussed in chapter 1) to establish occupational safety and health programs. The Chief of Naval Operations (CNO) has established the NAVOSH Program in response to this requirement.

In 1983, the first *NAVOSH Program Manual*, OPNAVINST 5100.23C, was written, defining the Navy's occupational safety and health standards. Since program requirements differed significantly for military equipment, a separate NAVOSH manual was drafted for forces afloat. OPNAVINST 5100.19B, a revision of the *Safety Precautions for Forces Afloat*, was issued in 1989. Numerous changes have been made to these manuals to make them comply with revisions to Occupational Safety and Health Administration (OSHA) standards.

### NAVOSH PROGRAM ELEMENTS

The NAVOSH Program addresses the maintenance of safe and healthful conditions in the workplace or the occupational environment. It applies to all Navy civilian and military personnel and operations, ashore or afloat. The principle elements of the NAVOSH Program, in no particular order of importance, are as follows:

- Training
- Program evaluation
- Safety standards and regulations
- Mishap investigation and reporting
- Hazard control and deficiency abatement
- Inspections, surveys, and medical surveillance

A successful NAVOSH Program is one that reduces work-related injuries and illnesses. That results when every level of the organization emphasizes the program. SECNAV has overall responsibility for the NAVOSH Program. CNO administers the program through the chain of command.

These six program elements are applied through two basic components of the NAVOSH Program: the Occupational Health Program and the Occupational Safety Program.

## OCCUPATIONAL HEALTH PROGRAMS

Occupational health deals with preserving the health of workers on the job. Unlike safety, in which the results of a mishap are quickly clear (such as a fall down a ladder), many occupational illnesses and diseases aren't instantly apparent. They may not show up until years after workers have been exposed to a hazard. Since the effects may be slow to appear, the hazards may not be readily obvious. One good example is hearing loss. Hearing loss normally takes place gradually as a result of years of noise exposure.

The Navy is concerned with occupational health issues as well as safety. They both can affect our sailors' quality of life. They can cause lost work time and cost millions of dollars in worker compensation.

Occupational health programs include the following:

- Heat stress control
- Lead safety
- Sight conservation
- Hearing conservation
- Respiratory protection
- Asbestos control
- Nonionizing radiation and laser safety
- Personal protective equipment (PPE)
- Hazardous material control and management

We will provide in-depth coverage of the preceding programs in this and the following chapters. For additional information, consult the *Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, or the *NAVOSH Program Manual for Forces Afloat*, OPNAVINST 5100.19B.

## OCCUPATIONAL SAFETY PROGRAMS

Occupational safety concerns the prevention of mishaps and injuries that may occur on the job. Most safety mishaps result in immediate injuries and material damage that affect mission readiness. Anytime a sailor loses a day of work because of a mishap, the command loses a valuable resource and part of the team.

The occupational safety components of the NAVOSH Program include the following:

- Deck safety

- Tag-out
- Electrical safety
- Gas free engineering
- Machinery and workshop safety
- Weapons safety (general safety precautions)
- Diving operations (general safety precautions)
- Shipboard aircraft safety (general safety precautions)
- Hazardous material handling, storage, and disposal
- Marine sanitation devices (MSD) and collection, holding, and transfer (CHT) safety

Often, these occupational safety and occupational health programs overlap. Only by taking **all** NAVOSH Program aspects, including on-duty and off-duty safety, into account can we cover the entire spectrum of today's Navy.

## SCOPE OF THE NAVOSH PROGRAM

The NAVOSH Program applies to both civilian and military workers. OPNAVINST 5100.23C, the *NAVOSH Program Manual*, does not address all safety and health standards for civilian and military workers assigned ashore. In those cases, shore personnel must follow OSHA standards or other applicable criteria. For example, since the *NAVOSH Program Manual* does not contain electrical safety standards, it refers readers to 29 CFR 1910, *General Industry Standards*.

OPNAVINST 5100.19B, *Navy Occupational Safety and Health Program Manual for Forces Afloat*, applies to all DOD civilian and military personnel assigned to or embarked on naval vessels. This publication defines safety standards for ships, submarines, and small craft. Volumes II and III of OPNAVINST 5100.19B provide surface ship and submarine safety standards.

## INDUSTRIAL HYGIENE

The shore and afloat NAVOSH manuals refer personnel to industrial hygiene officers or industrial hygienists for assistance. Industrial hygiene is the science of protecting workers' health through the control of the work environment.

Historically, the health of workers was of little concern before 1900, even though diseases were

attributed to certain occupations since the fourth century B.C. The occupational health effects of mining toxic metals, such as lead and mercury, were studied and well documented in 1473. Then in the early 20th century, the U.S. Public Health Service and U.S. Bureau of Mines conducted the first detailed federal studies on worker health. This concern for worker health and safety progressed slowly until 1970, when Congress passed the Occupational Safety and Health Act (OSHA). Industrial hygiene, as a profession, has been around for several hundred years, but didn't become a specialty within the Navy until the 1940s.

Industrial hygiene is both a science and an art; it concerns the total realm of control of the work environment. This realm of control includes recognition and detailed evaluation of workplace environmental factors that may cause illness, lack of well being, or discomfort among workers. Using this information, the industrial hygienist formulates recommendations to alleviate safety and health problems.

When speaking of the work environment, we include the following factors:

- Lighting
- Ventilation
- Air contaminants
- Facility design
- Physical stressors (heat, humidity, vibration, noise, radiation)
- Safety hazards (flying chips, turning shafts, saw blades)

## INDUSTRIAL HYGIENE SURVEYS

An industrial hygiene survey involves inspecting every workplace at the facility or ship, from the overhead to the deck. Inspectors observe work processes and document all potential hazards. To quantify these hazards, inspectors take readings with meters and other types of equipment. They also collect air samples for laboratory analysis (fig. 5-1). They measure noise with a sound level meter. They use small air pumps to collect dust, vapors, or gases to determine exact exposure levels. These exposure levels help determine the hazard to workers and what controls are required. Controls are then tailored to the facility or workplace to eliminate or lessen the hazard. These controls generally fall into three categories:

- Engineering controls (design) and substitution

- Administrative controls (e.g., stay times)
- Use of personal protective equipment (PPE)

An industrial hygiene officer, civilian industrial hygienist, or industrial hygiene technician conducts the survey. Medical clinics, environmental and preventive medicine units, destroyer tenders, and submarine tenders provide industrial hygiene support.

## INDUSTRIAL HYGIENE TERMINOLOGY

The following are some of the units and terms you will see on workplace monitoring and industrial hygiene survey reports:

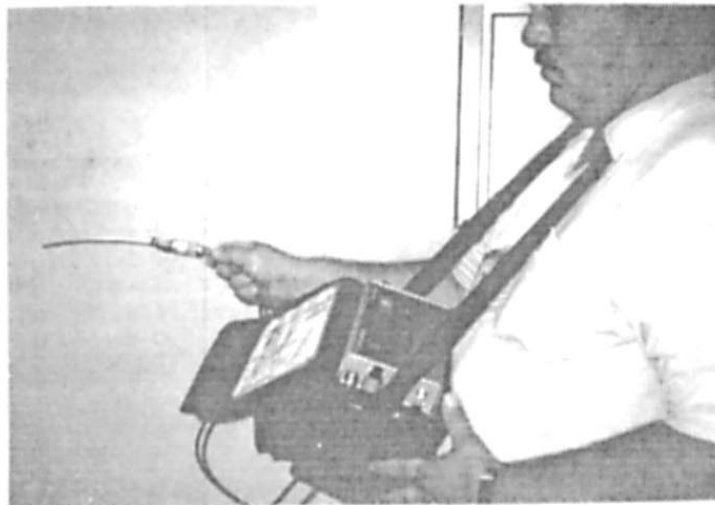
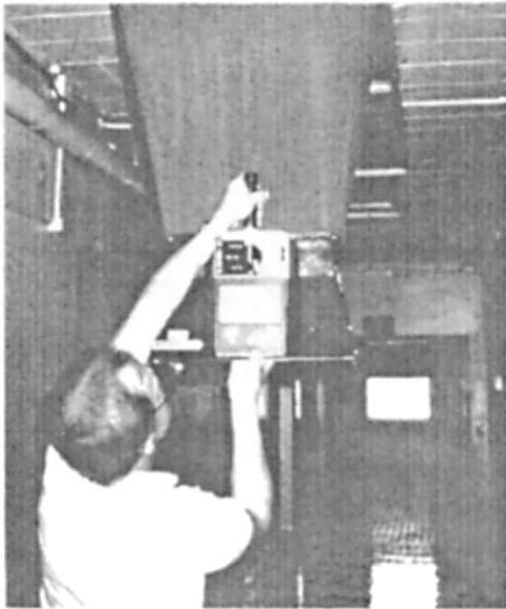
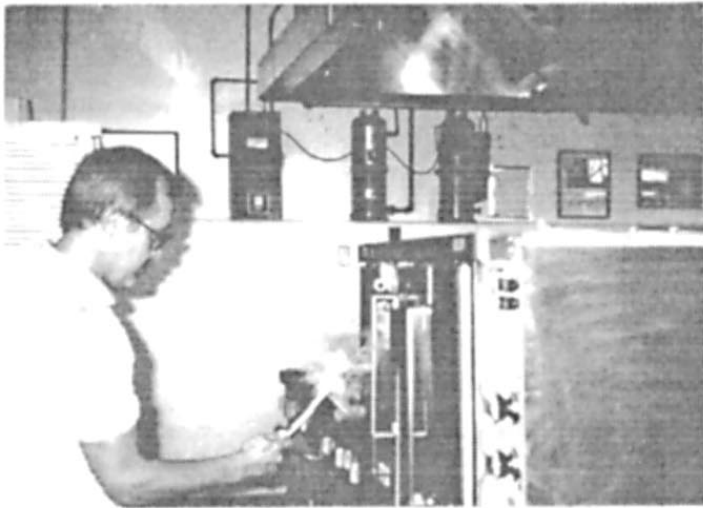
- Action level—Unless otherwise specified in a NAVOSH standard, one-half the relevant permissible exposure level (PEL) or threshold limit value (TLV).
- Ceiling limit (C)—The maximum hazard exposure concentration level, expressed as TLV(C), at which a person may work.
- Concentration—The quantity of a substance per unit volume (in appropriate units). The following are examples of concentration units:

mg/m<sup>3</sup>—milligrams per cubic meter for vapors, gases, fumes, or dusts.

ppm—parts per million for vapors or gases.

fibers/cc—fibers per cubic centimeter for asbestos.

- Decibel (dB)—A unit used to express sound pressure levels; specifically, 20 times the logarithm of the ratio of the measured sound pressure to a reference quantity of 20 micropascals (0.0002 microbars). In hearing testing, the unit used to express hearing threshold levels as referred to audiometric zero.
- Permissible exposure limit (PEL)—The legally established time-weighted average (TWA) concentration or ceiling concentration of a contaminant or the exposure level of a harmful physical agent that must not be exceeded.
- Short-term exposure level (STEL)—The concentration to which workers can be exposed continuously for a short time without suffering from (1) irritation, (2) chronic or irreversible tissue damage, or (3) narcosis.



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**Figure 5-1.—Industrial hygiene officer conducting a survey.**

- Time-weighted average (TWA)—The average concentration of a contaminant in air during a specific period, usually an 8-hour workday or a 40-hour workweek.
- Threshold limit value (TLV)—An atmospheric exposure level under which nearly all workers can work without harmful effects. TLVs are established by the American Conference of Governmental Industrial Hygienists (ACGIH).

### NAVOSH PROGRAMS THAT ADDRESS SPECIFIC HAZARDS

We will now discuss the administration of various NAVOSH programs that address specific hazards. These hazards include hearing conservation, sight conservation, respiratory protection, heat stress, electrical safety (tag-out program), and personal protective equipment. In addition, we will cover hazardous material control and management, asbestos control, gas free engineering, and lead control. OPNAVINST 5100.23C, chapters 7 through 27, and OPNAVINST 5100.19B, volume I, part B, chapters B1 through B12, discuss these subjects in detail. The basic criteria are similar, whether applied ashore or afloat. Refer to the appropriate NAVOSH manual for program details.

### HEAT STRESS CONTROL AND PREVENTION PROGRAM

We define heat stress as any combination of work, air flow, humidity, air temperature, thermal radiation, or internal body condition that strains the body. Heat stress becomes excessive when the strain to regulate its temperature exceeds the body's capability to adjust.

Personnel affected by heat stress can suffer fatigue, nausea, severe headache, and poor physical and mental performance. As body temperature continues to rise (because of prolonged exposure), heat rash and heat injuries (such as heat cramps, heat exhaustion, and heat stroke) occur. Heat stroke severely impairs the body's temperature-regulating ability and can be fatal. Recognizing heat stress symptoms and getting prompt medical attention for affected persons are all-hands responsibilities.

From 1989 to 1992, 68 people received injuries from heat exhaustion or heat stress at shore activities. All of these injuries involved lost time away from work. Thirteen people lost 5 or more workdays. Of the 41 incidents involving military people, 29 (71 percent) people were drilling, playing, or taking part in physical fitness training. The rest were working.

Aboard ship, nearly 50 heat stress reports were filed in 1991, most involving personnel wearing the fire-fighting ensemble (FFE). During Operation Desert Storm, the control of heat stress among engineering plant watch standers was critical. In the hot climate around Saudi Arabia, ships were unable to maintain air conditioning and ice machines that broke down from overuse. Heat stress caused by air and water temperatures above 90°F threatened operational readiness.

### Symptoms of Heat Stress

The following are the symptoms of heat stress and the steps you should take to help the victim:

**Heat Exhaustion:** Victims have pale and clammy skin and experience profuse sweating. Their pulse is fast but weak, and their breathing is fast and shallow. They may experience weakness, nausea, dizziness, and mild cramps. Move victims to a cool location and seek medical attention for them as soon as possible.

**Heat Stroke:** Victims have hot, flushed, dry skin. Their pulse is fast and strong, and their breathing is fast and deep. They may twitch or vomit. Shock will follow. Heat stroke is a life-threatening medical emergency. Call a medical emergency immediately.

### Controlling Heat Stress

You can encounter heat stress aboard U.S. Navy ships in workshops, laundries, sculleries, engineering spaces, food preparation spaces, and steam catapult spaces. Detailed surveys of ship spaces have confirmed that these heat stress conditions often have been so severe that a limit was placed on personnel exposures to avoid serious harm. The primary correctable causes of heat stress in these spaces were as follows:

- Excessive steam and water leaks
- Boiler air casing leaks
- Missing, damaged, improperly installed or deteriorated thermal insulation on steam piping, valves, and machinery
- Ventilation system deficiencies, including design deficiencies, missing or damaged duct work, misdirected terminals, improper or clogged screens, closed or partially closed CIRCLE WILLIAM dampers, dirty ventilation ducting, and inoperative fan motors and controllers

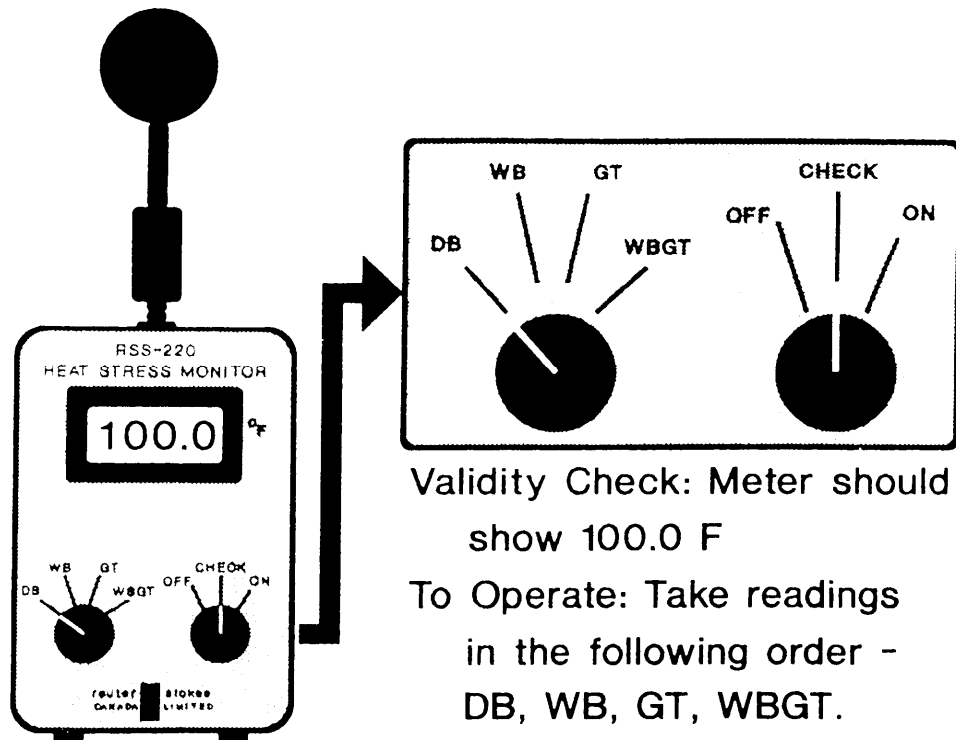


Figure 5-2.—Heat stress monitor.

Heat stress can occur when personnel are wearing layered, impermeable, or impervious clothing such as fire-fighting; chemical, biological, and radiological (CBR); or hazardous material protective clothing. The presence of atmospheric contaminants such as combustion gases or fuel vapors may also contribute to heat stress. Heavy exertion, such as that involved in athletics, in hot, humid weather also leads to heat stress. Other conditions that lead to heat stress include reduced physical stamina because of illness; lack of sleep; or the use of medication, drugs, or alcohol.

Heat stress ashore is of concern when personnel are required to work or drill in hot weather. Many bases raise colored flags to indicate the level of caution required because of the heat.

### Preventing Heat Stress

You can prevent heat stress injury as follows:

1. By detecting, correcting, and controlling the conditions that cause heat stress

2. By using dry bulb thermometers to monitor locations in which heat stress conditions maybe present
3. By restricting personnel exposure to heat stress conditions as the result of heat stress surveys conducted to determine safe stay times
4. By recognizing heat stress symptoms in yourself or in shipmates and acting to prevent or minimize the effects of heat injury

Since dry bulb temperature, humidity, and radiant heat all affect the body and may cause heat stress, you must take all three into account. Conducting a heat stress survey with a wet bulb globe temperature (WBGT) meter (fig. 5-2) provides a calculated WBGT index. You can use this index with a graph of physiological heat exposure limits (PHEL) curves to determine stay times in that environment. Since we cannot reduce the heat, we must reduce the exposure time of the personnel working in that heat. Stay times also take into account the work load of the individual.

You can find further information and guidance on the Navy Heat Stress Control and Prevention Program in OPNAVINST 5100.20C, *Shipboard Heat Stress Control and Personnel Protection*; OPNAVINST

5100.19B, *Navy Occupational Safety and Health Program Manual for Forces Afloat*; and NAVMED P-5010-3, *Manual of Naval Preventive Medicine*, chapter 3, "Ventilation and Thermal Stress Ashore and Afloat."

## **HEARING CONSERVATION PROGRAM**

The Navy recognizes hearing loss as an occupational hazard related to certain trades. For example, gunfire and rocket fire produce high-intensity impulse or blast noises that can cause hearing loss. Hearing loss can result from the continuous or intermittent noises of aircraft and marine engines, as well as industrial activities. The noise of saws, lathes, grinders, forging hammers, or internal combustion engines also creates a hazard to your hearing.

Hearing loss is a serious concern within the Navy. Action must be taken to reduce hearing loss attributed to occupational exposure. Work-related hearing losses result in costly compensation claims. Hearing loss may also cause lower productivity and efficiency and may contribute to mishaps. To prevent occupational, noise-related hearing loss, the Navy has developed the Hearing Conservation Program.

### **Goals of the Hearing Conservation Program**

One goal of the Hearing Conservation Program is to prevent occupational hearing loss among military and civilian workers. Another is to ensure personnel can hear well enough to perform their duties. The program elements used to achieve these goals are as follows:

- Surveying all work environments to identify potentially hazardous noise levels and personnel at risk
- Using engineering controls (design methods) to limit noise exposure
- Requiring periodic hearing tests
- Training personnel to protect their hearing when working in hazardous noise environments
- Ensuring personnel use personal protective equipment

Education is vital to the overall success of a hearing conservation program. Make sure your personnel receive instruction in and understand the rationale for the following elements of the Hearing Conservation Program:

- Proper wearing and maintenance of hearing-protective devices and conditions requiring their use
- Command program and personnel responsibilities for off-duty practices to help protect hearing

Encourage your personnel to use hearing-protective devices during off-duty activities that expose them to hazardous noise sources, such as lawn mowers, chain saws, and firearms. All personnel exposed to gunfire during training or to artillery or missile firing under any circumstances must wear hearing-protective devices.

### **Noise Measurements**

To control hazardous noise exposure, we must accurately determine the actual noise level using standard procedures and compare these levels with accepted criteria. Noise measurements are taken as part of the industrial hygiene survey or the workplace monitoring program for the commands with periodic sampling requirements.

How do you know if you need hearing protection? Use the base-line thumb rule. Hearing protection is required when you must raise your voice to talk to a person who is one arm length away.

Taking noise measurements is part of the base-line or 18-month Industrial Hygiene Survey aboard ship. You need not take actual measurements during the follow-up survey unless you suspect changes in noise levels in the work environment. Keep records of noise measurements until superseded by a later survey. Larger afloat commands may establish a workplace monitoring plan to conduct periodic sampling throughout the 18-month cycle.

Ashore, noise measurements are taken according to the workplace monitoring plan, and records are maintained for 40 years. Resurveys are conducted within 30 days of any significant modifications or changes in work routine.

### **Analyzing Noise Measurements**

Analyzing noise measurements to assess the hazard potential is a complex task. An industrial hygienist or some other qualified person under the industrial hygienist's direction performs the analysis. The analysis determines hazardous noise areas, equipment, and processes.

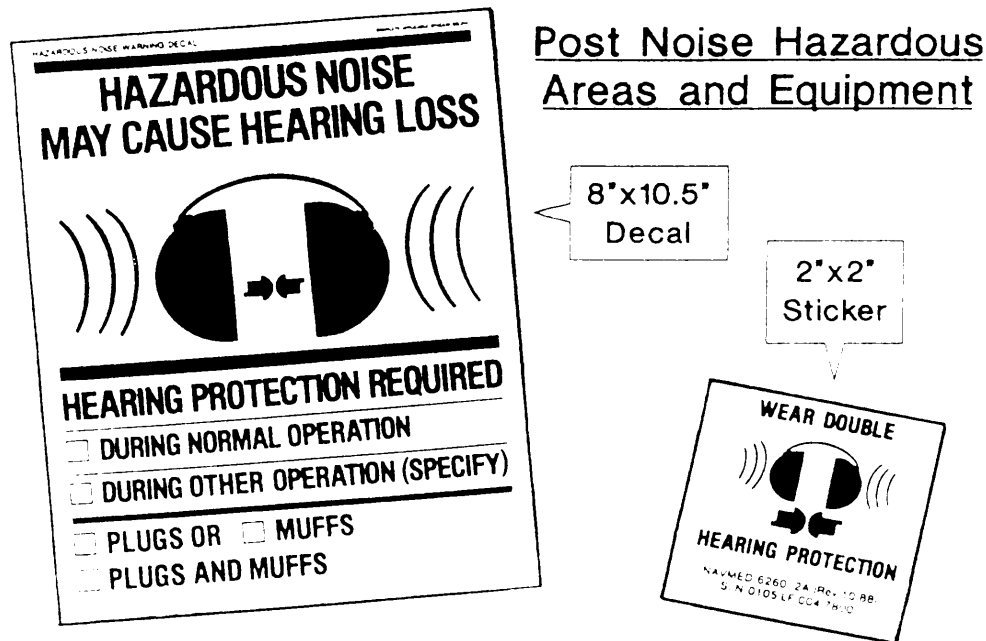


Figure 5-3.—Hazardous noise labels.

The person qualified to take the noise measurements uses a sound level meter to identify all potentially hazardous noise areas. The work areas where the sound level, continuous or intermittent, is routinely greater than 84 dB(A) or where the peak sound pressure level, caused by impulse or impact noise, routinely exceeds 140 dB are considered hazardous noise areas. These areas and equipment are then labeled to warn of the noise hazard.

### Hearing Tests/Audiograms

Hearing tests, or audiograms, are required to monitor the hearing of workers routinely exposed to hazardous noise. Periodic monitoring will allow us to catch a hearing loss before it becomes severe or to correct potential problems with hearing-protective devices. Audiograms test a person's hearing at a variety of frequencies in the human speech range. Audiograms can be conducted at most Navy clinics, aboard tenders, and aboard air capable surface ships.

Personnel working in hazardous noise areas must be entered in the Hearing Conservation Program. Military personnel should have received a reference hearing test upon entry into naval service. Civilian personnel being considered for employment in an occupational specialty or area that involves routine exposure to hazardous noise should receive a reference audiogram. Navy employees presently in service who do not have a reference

audiogram filed in their health record will not be assigned to duty in designated hazardous noise areas until they receive a reference hearing test. All personnel should receive a hearing test periodically and before ending their naval service or civilian service.

### Labelling of Hazardous Noise Areas and Equipment

Make sure you label designated noise-hazardous areas with the approved 8-inch by 10.5-inch decal (fig. 5-3). Normally, you should apply the proper decals to the outside of all doors or hatches leading into the noise-hazardous area. That ensures personnel know what protection they must wear in that area. Label equipment, such as hand tools, with the approved 2- by 2-inch hazardous noise sticker, NAVMED 6260/2A (fig. 5-3). This sticker ensures personnel know whether to wear single or double protection when using that equipment.

### Personal Hearing-Protective Devices

When a hazardous noise area or operation is identified, we try to control or eliminate that noise hazard using engineering controls. These controls include the use of acoustic material, the isolation of noisy equipment, or the substitution of a less noisy process. If we cannot reduce the noise to a safe level, then our only choice is the use of personal protective



equipment, such as earplugs or earmuffs. The equipment is also used as an interim measure until the noise hazard is under control or eliminated.

Personnel working in designated hazardous noise areas or operating noise-hazardous equipment must wear hearing protection devices. They must wear single-type hearing-protective devices when noise levels are greater than 84 dB(A). They must wear a combination of both the insert type and circumaural muff type of hearing-protective devices in all areas where noise levels exceed 104 dB(A).

Each hearing-protective device is tested and assigned a noise reduction rating (NRR). This NRR tells how many decibels the earplug or muff will reduce the external noise. For example, suppose the noise hazard area is measured at 90 dB(A). If you wear an earplug with an NRR of 20 dB, you will only be exposed to 70 dB. That is well below the hazard level of greater than 84 dB(A). These NRRs are listed on earplug and earmuff packaging.

Medical personnel dispense all earplugs requiring fitting. The medical representative measures the examinee's ear canals and instructs him or her on the proper type, size, and use of earplugs. In addition, the examinee learns how to clean and maintain the earplugs. Foam earplugs, earcaps, and earmuffs require no fitting; but personnel must be trained to use them properly.

## **HAZARDOUS MATERIAL/HAZARDOUS WASTE PROGRAM**

We use hazardous materials daily, afloat and ashore, in maintenance, repair, and cleaning. We could not maintain our operational effectiveness without using hazardous materials. In using hazardous materials, however, we may also produce hazardous waste.

We can use hazardous materials effectively and safely if we take care in their handling, storage, and disposal. To help ensure that, OSHA passed a regulation called the *Hazard Communication Standard*, 29 CFR 1910.1200. Since DOD and SECNAV have adopted that regulation, all civilian and military employees of the federal government must comply with it.

The hazardous materials you must use to do your job can be hazardous to your health and the environment if handled improperly. Therefore, you have the right to be trained in the use of hazardous materials and to know any information about those materials that could threaten your safety or health.

To protect your rights and to ensure personnel comply with OSHA and Environmental Protection Agency (EPA) regulations, the Navy has developed a hazardous material control and management program. *Hazardous Material Control and Management (HMC&M)*, OPNAVINST 4110.2, provides the details of this program. OPNAVINST 5100.23C, chapter 7, and OPNAVINST 5100.19B, chapter B3, also discuss hazardous material control and management.

The Naval Supply Systems Command manages the overall program for hazardous material control and management for the Navy. The program objectives are as follows:

- Minimize the amount of hazardous materials in use
- Use hazardous materials safely
- Decrease the amount of hazardous waste we produce

## **Definition of Hazardous Material**

What is hazardous material? We define hazardous material as any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment. Hazardous materials include the following categories:

- Aerosols
- Compressed gases
- Oxidizing materials
- Toxic or poisonous materials
- Flammable and combustible materials
- Corrosive materials, such as strong acids and alkalies

Separate directives cover some materials considered hazardous. They include mercury; asbestos; propellants; bulk fuels; ammunition; medical waste; and chemical, biological, and radiological materials.

## **Definition of Hazardous Waste**

We define hazardous waste as any discarded material (liquid, solid, or gas) that meets the definition of hazardous material. Only the Environmental Protection Agency or a state authority may designate material as hazardous waste.

## Categories of Used or Excess Hazardous Material

Afloat units turn in used or excess hazardous materials to Public Works Centers or other shore collection sites. The shore site then restores, recycles, or disposes of the used or excess hazardous materials.

## Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) are technical bulletins containing information about hazardous material (figs. 5-4A and 5-4 B). Manufacturers produce MSDSs based on their testing and research of their products. By law, they must provide the data to hazardous materials users. They tell users how to use, store, and dispose of hazardous material. OPNAVINST 5100.19B requires all hands to follow these guidelines. MSDSs must be in English and contain at least the following information about the material:

- Identity
- Hazardous ingredients
- Physical and chemical characteristics
- Physical hazards
- Reactivity
- Health hazards
- Precautions for safe handling and use
- Control measures
- Routes of entry into the body
- Emergency and first-aid procedures for exposure
- Date of preparation of the MSDS or last change
- Name, address, and phone number of a responsible party who can provide additional information on the hazardous material and appropriate emergency procedures

Manufacturers may use any format or arrangement of this information, but every MSDS must include all the items. Some MSDSs contain ingredient information that the manufacturer considers proprietary (a trade secret). Proprietary information is provided on the compact disk-read only memory (CD-ROM) labeled "LR" version. The "L" version does not contain proprietary information. Only safety and health professionals should have access to the "LR" version of the CD-ROM.

Every hazardous material user must be trained on the precautions associated with that material. MSDSs must be available upon request to any user. If you have a question, check with your command's hazardous material/hazardous waste coordinator.

## Hazardous Materials Information System

The Hazardous Materials Information System (HMIS) is a computerized data base of Material Safety Data Sheets (MSDSs). It provides information for people working in hazardous materials management. The system provides basic technical information required at all levels to aid in the proper handling, storage, transportation, and disposal of hazardous materials. In addition, it provides information about safety, health, and environmental functions.

The HMIS data base provides useful information on more than 70,000 hazardous materials used by DOD. The Naval Supply Systems Command distributes the data base quarterly on Compact Disk-Read Only Memory (CD-ROM) as part of the *Hazardous Material Control Management (HMC&M)* CD-ROM, which contains the following materials:

- HMIS data base with MSDSs and labels
- *Hazardous Material Afloat Program (HMAP) Management Guide*
- *Hazardous Material User's Guide (HMUG)*
- *Ships Hazardous Material List (SHML)*
- *Safety Equipment Shopping Guide*
- Naval Safety Center roster
- Various hazardous material and environmental compliance instructions
- Tutorial for hardware and software

Each ship and most shore stations have been issued computer compact disk (CD) players, which are on distribution for *HMC&M* updates. Navy Environmental and Preventive Medicine Units (NePMUs) also offer a 1-day course that covers the retrieval of data, including the type of data available, from the HMIS system.

## Labeling of Hazardous Materials

Labeling provides the handler, shipper, and user of a hazardous material with critical information. You must ensure every container of hazardous material has

DOD Hazardous Materials Information System

DOD 6050.5 5-LR

AS OF MAY 1992

For U. S. Government Use Only

FSC: 6505  
 NIIN: 001538480  
 Manufacturer's CAGE: 1BF21  
 Part No. Indicator: A  
 Part Number/Trade Name: HYDROGEN PEROXIDE SOLUTION 3%

General Information

Item Name: HYDROGEN PEROXIDE TOPICAL SOLUTION, USP  
 Manufacturer's Name: MALLINCRODT INC  
 Manufacturer's Street:  
 Manufacturer's P.O. Box: M  
 Manufacturer's City: PARIS  
 Manufacturer's State: KY  
 Manufacturer's Country: US  
 Manufacturer's Zip Code: 40361-0315  
 Manufacturer's Emerg Ph #: 314-982-5000  
 Manufacturer's Info Ph #: 314-982-5000  
 Distributor/Vender # 1: RUGER CHEMICAL CO. INC.  
 Distributor/Vender # 1 Cage: 64220  
 Distributor/Vender # 2:  
 Distributor/Vender # 2 Cage:  
 Distributor/Vender # 3:  
 Distributor/Vender # 3 Cage:  
 Distributor/Vender # 4:  
 Distributor/Vender # 4 Cage:  
 Safety Data Action Code:  
 Safety Focal Point: D  
 Record No. For Safety Entry: 001  
 Tot Safety Entries This Stk#: 006  
 Status: SE  
 Date MSDS Prepared: 21JAN86  
 Safety Data Review Date: 05DEC90  
 Supply Item Manager: KX  
 MSDS Preparer's Name:  
 Preparer's Company:  
 Preparer's St Or P.O. Box:  
 Preparer's City:  
 Preparer's State:  
 Preparer's Zip Code:  
 Other MSDS Number:  
 MSDS Serial Number: BJFCN  
 Specification Number:  
 Spec Type, Grade, Class:  
 Hazard Characteristic Code: P2  
 Unit Of Issue: BT  
 Unit Of Issue Container Qty: 1 PT  
 Type Of Container: BOTTLE  
 Net Unit Weight: 1.16 LBS  
 NRC/State License Number:  
 Net Explosive Weight:  
 Net Propellant Weight-Ammo:  
 Coast Guard Ammunition Code:

Ingredients/Identity Information

Proprietary: NO  
 Ingredient: HYDROGEN PEROXIDE, SOLUTION 3%  
 Ingredient: Sequence Number: 01  
 Percent: UNKNOWN  
 Ingredient Action Code:  
 Ingredient Focal Point: D  
 NIOSH (RTECS) Number: 1005359HP  
 CAS Number: UNKNOWN  
 OSHA PEL: UNKNOWN  
 ACGIH TLV: UNKNOWN  
 Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance and Odor: CLEAR, COLORLESS SOLUTION, ODORLESS.  
 Boiling Point: 212F,100C  
 Melting Point: 32.0F,0.0C  
 Vapor Pressure (MM Hg/70 F): N/K  
 Vapor Density (Air=1): N/K  
 Specific Gravity: N/K  
 Decomposition Temperature: UNKNOWN  
 Evaporation Rate and Ref: N/K  
 Solubility In Water: INFINITELY  
 Percent Volatiles By Volume: N/R  
 Viscosity:  
 pH: N/R  
 Radioactivity:  
 Form (Radioactive Matl):  
 Magnetism (Milligauss):  
 Corrosion Rate (IPY): UNKNOWN  
 Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: N/K  
 Flash Point Method: N/K  
 Lower Explosive Limit: N/K  
 Upper Explosive Limit: N/K  
 Extinguishing Media: MAY USE WATER SPRAY TO PUT OUT SURROUNDING FIRE & COOL EXPOSED CONTAINERS. WATER SPRAY WILL REDUCE FUME & IRRITANT GAS.  
 Special Fire Fighting Proc: USE NIOSH APPROVED SCBA WITH FULL POSITIVE PRESSURE FACE PIECE & CLOTHING. NOT COMBUSTIBLE, BUT LIQUID IS OXIDIZER & MAY IGNITE/W REDUCING AGENTS/COMBUSTIBLES.  
 Unusual Fire and Expl Hazards: EXTREMELY VIOLENT COMBUSTION IF CONTACT WITH OXIDIZING SUBSTANCES. DRIED CONCENTRATED HYDROGEN PEROXIDE/COMBUST. MATERIAL ON CLOTHES MAY CAUSE FIRE OR EXPLOSION.





Reactivity Data

Stability: NO  
 Cond To Avoid (Stability): HEAT. SPONTANEOUS COMBUSTION MAY OCCUR ON STANDING IN CONTACT WITH READILY FLAMMABLE MATERIALS.  
 Materials to Avoid: REDUCING AGENTS, ORGANIC MATERIALS, DIRT, ALKALIES, RUST & MAY METALS.

Figure 5-4A.—Material Safety Data Sheet (front).

<p>Hazardous Decomp Products: DECOMPOSES TO WATER &amp; OXYGEN WITH RAPID HEAT RELEASE. USE VENTED CONTAINERS. SOLUTION CAN DECOMPOSE RAPIDLY UPON HEATING  Hazardous Poly Occur: NO  Conditions To Avoid (Poly): NOT APPLICABLE</p>	<p style="text-align: center;">Transportation Data</p> <p>Transportation Action Code:  Transportation Focal Point: D  Trans Data Review Date: 90339  DOT PSN Code: ZZZ  DOT Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION  DOT Class: N/R  DOT Label: N/R  Limited Quantity: NO  DOT Mode Indicator:  Identification Number: N/R  Reportable Qty.-Trans File: NO  DOT/DoD Exemption Number:  IMO PSN Code: ZZZ  IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION  IMO Regulations Page Number: N/R  IMO UN Number: N/R  IMO UN Class: N/R  IMO Subsidiary Risk Label: N/R  IATA PSN Code: ZZZ  IATA UN ID Number: N/R  IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION  IATA UN Class: N/R  IATA Subsidiary Risk Class: N/R  IATA Label: N/R  AFR 71-4 PSN Code: ZZZ  AFR 71-4 Prop. Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION  AFR 71-4 Class: N/R  AFR 71-4 Label: N/R  AFR 71-4 ID Number: N/R  AF MMAC Code:  Tech Entry NOS Shipping Name:  Additional Trans Data:</p>
<p style="text-align: center;">Health Hazard Data</p> <p>LD50-LC50 Mixture: LD50 UNKNOWN  Route Of Entry-Inhalation: YES  Route of Entry-Skin: YES  Route of Entry-Ingestion: YES  Health Haz Acute and Chronic: ACUTE-EYES: IRRITATION. SKIN: INTACT SKIN, NONE. CONTACT ON BURN/OPEN SKIN MAY CAUSE IRRITATION. INHALE: UPON HEATING, MAY CAUSE IRRITATION TO MUCOUS MEMBRANES OF NOSE &amp; THROAT. INGEST: IRRITATION TO MOUTH, THROAT &amp; ABDOMEN. CHRONIC-NONE.  Carcinogenicity-NTP: NO  Carcinogenicity-IARC: NO  Carcinogenicity-OSHA: NO  Explanation Carcinogenicity: THIS PRODUCT IS NOT LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.  Signs/Symptoms Of Overexp: EYE: REDNESS &amp; PAIN. SKIN: STINGING PAIN. INHALE: IRRITATION TO MUCOUS MEMBRANES OF NOSE &amp; THROAT. INGEST: BLISTERING TO MOUTH, THROAT &amp; ABDOMEN. ABDOMINAL PAIN, VOMITING &amp; DIARRHEA.  Med Cond Aggravated By Exp: NONE  Emergency/First Aid Proc: FIRST AID-INHALATION: REMOVE TO FRESH AIR. SEE DOCTOR IF NEEDED. EYES: WASH WITH PLENTY OF WATER FOR 15 MINUTES. SEE DOCTOR. SKIN: WASH WITH SOAP &amp; WATER. IF IRRITATION PERSISTS, GET MEDICAL ADVICE. INGEST: GIVE SEVERAL GLASSES OF WATER TO DRINK TO DILUTE. GET MEDICAL ADVICE.</p>	<p style="text-align: center;">Disposal Data</p>
<p style="text-align: center;">Precautions for Safe Handling and Use</p> <p>Steps If Matl Released/Spill: VENT SPILL AREA. MAY REQUIRE PROTECTIVE CLOTHING. ABSORB SPILL WITH DRY ABSORBENT OR DILUTE WITH LARGE AMOUNTS OF WATER AND HANDLE AS NONHAZARDOUS WASTE. CONTAINERIZE UNSTABLE MATERIAL FOR DISPOSAL IN AN APPROVED WASTE FACILITY.  Neutralizing Agent: NOT APPLICABLE.  Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL LAWS.  Precautions-Handling/Storing: STORAGE-STORE IN A COOL, WELL-VENTILATED DARK AREA. ISOLATE FROM INCOMPATIBLE SUBSTANCES. PROTECT FROM PHYSICAL DAMAGE.  Other Precautions: NONE</p>	<p>Disposal Data Action Code:  Disposal Data Focal Point:  Disposal Data Review Date:  Rec # For This Disp Entry:  Tot Disp Entries This Stock#:  Landfill Ban Item:  Disposal Supplemental Data:  1st EPA Haz Wst Code UnUsed:  1st EPA Haz Wst Name UnUsed:  1st EPA Haz Wst Char UnUsed:  1st EPA Acute Hazard UnUsed:  2nd EPA Haz Wst Code UnUsed:  2nd EPA Haz Wst Name UnUsed:  2nd EPA Haz Wst Char UnUsed:  2nd EPA Acute Hazard UnUsed:  3rd EPA Haz Wst Code UnUsed:  3rd EPA Haz Wst Name UnUsed:  3rd EPA Haz Wst Char UnUsed:</p>
<p style="text-align: center;">Control Measures</p> <p>Respiratory Protection: NONE  Ventilation: DILUTION VENTILATION IS SATISFACTORY. HOWEVER IF WORKER FEELS DISCOMFORT, LOCAL EXHAUST SYSTEM SHOULD BE USED.  Protect Gloves: RUBBER  Eye Protection: CHEMICAL SAFETY GOGGLES/FULL FACE SHIELD  Other Protective Equipment: EYEWASH STATION &amp; QUICK-DRENCH FACILITY.  Work Hygienic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES.  Suppl. Safety &amp; Health Data: NONE</p>	

Figure 5-4B.—Material Safety Data Sheet (back).

HAZARDOUS CHEMICAL WARNING LABEL					
1. CHEMICAL / COMMON NAME					
2. HAZARD CODE			3. NSN / LSN		
4. PART NUMBER					
5. ITEM NAME					
6. HAZARDS (X all that apply)	(1) Acute (Immediate)				(2) Chronic (Delayed)
	NONE	SLIGHT	MODERATE	SEVERE	
a. HEALTH 					
b. CONTACT 					
c. FIRE 					
d. REACTIVITY 					
7. SPECIFIC HAZARDS AND PRECAUTIONS (Including Target Organ Effects)					
(See MSDS for further information)					
8. PROTECT (X all that apply)		a. EYES		b. SKIN	c. RESPIRATORY
9. CONTACT: a. COMPANY NAME					
b. ADDRESS (Street, P.O. Box, City, State, Zip Code and Country)					
c. EMERGENCY TELEPHONE NUMBER (include Area Code)					
10. PROCUREMENT YEAR FOR HAZARDOUS CHEMICAL					

DD Form 2522 (1C), DEC 88

S/N 0102-LF-012-1100  
 ☆ GPO: 1991-507-027

C347.3

Figure 5-5.—Hazardous Chemical Warning Label.

a label. Tank trucks and railroad tank cards must be placarded with Department of Transportation (DOT) symbols.

Although the format of the label may differ from company to company, the OSHA Hazard Communication Standard mandates that certain information appear on the label. That information includes the following:

- Identity of the material or chemical

- Name and address of the manufacturer or responsible party
- The appropriate hazard warning

DOD has a hazardous Chemical Warning Label (fig 5-5). DOD personnel must use this label on DOD manufactured hazardous materials, repackaged containers, tanks of hazardous chemicals, and unlabeled materials already in the DOD system. The labels are

printed directly from the Hazardous Material Information System (HMIS) data base CD-ROM on self-adhesive forms or plain paper.

Several types of multicolored signs, placards, and decals are used to provide visual hazard warnings. They may contain words, shapes, symbols, pictures, or any combination of these. Sometimes they picture the international symbols for gloves, aprons, goggles, and respirators. These international symbols appear as small pictures (called *icons*) on the label showing the required protective equipment.

Manufacturers use various symbols and DOT shipping labels with the required OSHA labeling. Used alone, these DOT symbols or labels **do not** meet the OSHA labeling requirements. Navy personnel should not place any labels on containers that already have proper labels. If you buy or receive a hazardous material with the minimum required labeling, do not add any additional labeling. If you have an unlabeled container **or** one with a damaged label, you can print a label from the HMIS CD-ROM onto plain paper or the DD Form 2522.

## SIGHT CONSERVATION PROGRAM

The Navy must provide eye protection, at government expense, for personnel working in eye-hazardous areas. Workers must wear appropriate eye protection when performing eye-hazardous operations such as pouring or handling molten metals or corrosive liquids and solids. Personnel must also wear eye protection when cutting and welding, drilling, grinding, milling, chipping, sand blasting, or performing other dust- and particle-producing operations. Anyone near such operations, including visitors, also must wear eye-protective equipment. OPNAVINST 5100.23C, chapter 19, and OPNAVINST 5100.19B, chapter B5, provide more information on the Navy's Sight Conservation Program.

### Basic Sight Program Requirements

All Navy activities that perform eye-hazardous operations must have a sight conservation program. The program should include, but is not restricted to, the following:

- Determination and evaluation of eye-hazardous areas, processes, and occupations
- Operation of a vision and medical screening program

- Operation of an effective equipment maintenance program
- Compliance with procedures for the use of temporary eye wear
- Operation of a comprehensive training/education program
- Operation of an effective enforcement program

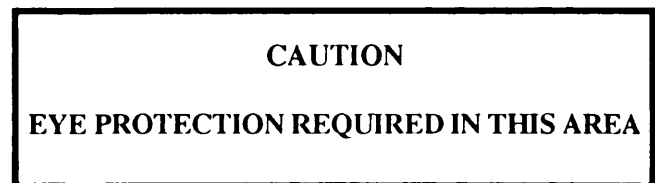
The Navy considers any person found to have vision in one eye of 20/200 or worse to be visually impaired. You cannot assign people who have a visual impairment to duties that present a hazard to their remaining eye. Make certain these personnel always wear protective eye wear, regardless of their occupation or work station.

To setup an effective sight conservation program, activity safety officers must identify eye-hazardous areas and ensure they are posted with warning signs. Commands must equip these areas with emergency eyewash facilities. Safety officers must also identify eye-hazardous occupations and processes that require personal protective equipment and determine the safeguards needed.

Safety officers maintain a listing of areas, processes, and operations that require eye protection. In addition, they keep a listing of areas requiring eyewash or deluge shower facilities. Safety officers maintain eye injury records and ensure the program is evaluated for compliance and effectiveness.

### Labelling of Sight Hazard Areas

A warning sign and 3-inch yellow and black striping or checkerboard markings on the deck identify eye-hazardous areas. The black and yellow striping or checkerboard pattern outlines the eye hazardous area. The sign warning of an eye hazard area is mounted directly on the hazard, part, machinery, boundary bulkhead or door in a conspicuous location. Caution signs should read as follows:



The words should be in black letters on a yellow background. The signs and tape are available in the supply system.

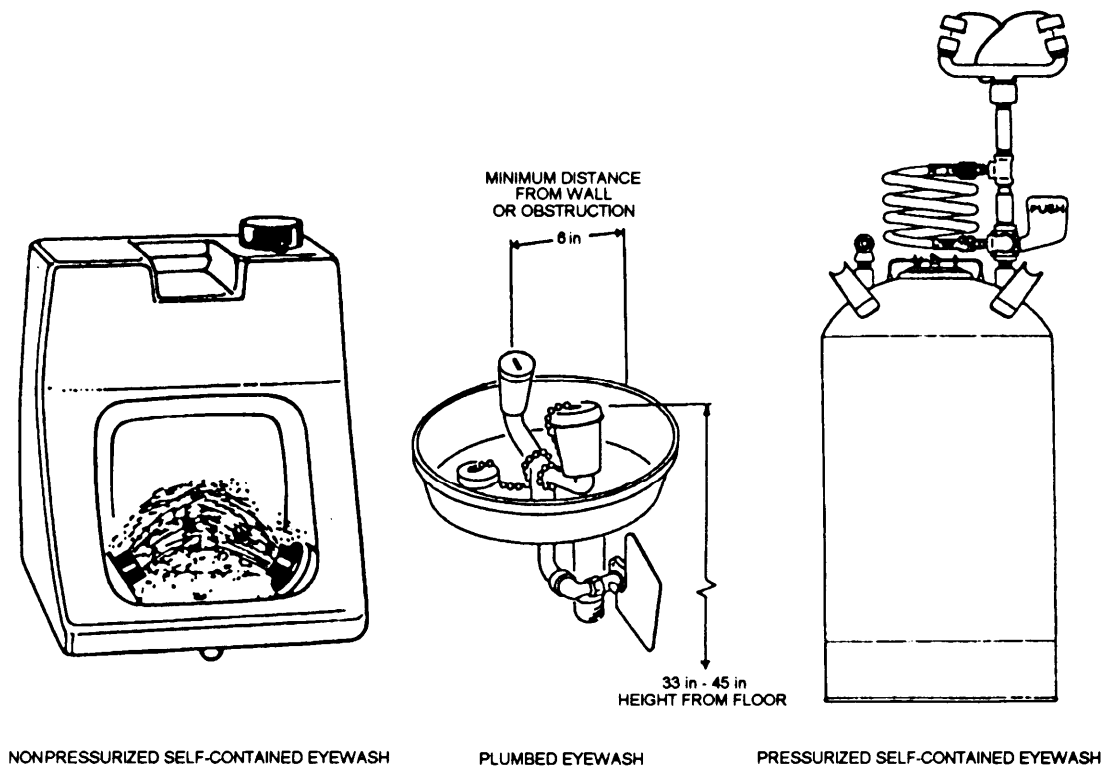


Figure 5-6.—Emergency eyewash stations.

### Emergency Eyewash Stations

Emergency eyewash facilities are designed to provide first aid to personnel who splash corrosive materials into their eyes. Corrosive materials are especially hazardous to the eyes because the longer the materials contact the eyes, the more damage they cause. If you get a chip of metal in your eye, as long as you don't rub your eye, the metal doesn't cause further damage. You have time to get to sick bay to have the eye treated. Chemicals continue to cause damage as long as they remain in the eyes. Taking the time to go to sick bay for treatment could result in serious damage to the eyes. For that reason we need on the spot first aid to wash the eye to dilute the chemical.

Areas in which corrosive materials are used must have emergency eyewash facilities. Make sure all such emergency facilities are easily accessible to personnel in need of them. Make sure the locations of all units are unobstructed and are located as close to the hazard as possible. In no instance should a person have to travel more than 100 feet or take more than 10 seconds to get to the eyewash unit. People who work in areas that use great quantities of corrosives face the risk of splashing the materials on their body. Those areas must be equipped with a combination deluge shower and eyewash station.

Plumbed and self-contained emergency eyewash equipment (fig. 5-6) flush the eyes using potable water. The minimum flow rate must be 0.4 gallons per minute for 15 continuous minutes. Ensure the velocity of the water will not hurt the user's eyes.

You must clearly mark each eyewash station with a safety instruction sign. Post signs in a visible location close to the eyewash unit. The sign must identify the unit as an emergency eyewash station.

### ASBESTOS CONTROL PROGRAM

For many years, the Navy used asbestos as the primary insulation (lagging) material in high-temperature machinery, shipboard boilers, and the piping of boiler plants at shore facilities. The material was used as floor tile, as gasket materials, and for other uses that required fire resistance. We now recognize airborne asbestos fibers as a major health hazard.

The Navy developed an asbestos exposure control program to protect and monitor personnel who have been exposed to asbestos. Aboard ship, many pipes and boilers still have asbestos insulation. However, the Navy started a program in the mid- 1970s to use less harmful materials, such as fibrous glass, for pipe and boiler insulation.

Asbestos removals are limited to intermediate maintenance activities, shipyards, or contractors. Aboard ship you cannot remove asbestos insulation except in an operational emergency approved by the commanding officer.

The Navy Asbestos Control Program, which is part of the NAVOSH Program, ensures compliance with OSHA regulations. It also prevents the exposure of any Navy personnel to asbestos. The program covers the following areas:

- Identifying asbestos hazards
- Controlling asbestos in the work environment
- Following strict work practices
- Properly disposing of asbestos waste
- Establishing an asbestos medical surveillance program
- Protecting the environment
- Training people to recognize asbestos hazards and observe necessary precautions

The program's purpose is to protect personnel who, through their job or in emergency situations, come into contact with asbestos. If personnel must handle asbestos, we must ensure they have the proper protection and training.

The Navy follows upon the health of personnel who may have been exposed to asbestos in their current work or in the past through the Asbestos Medical Surveillance Program. This program monitors the health of personnel exposed to asbestos before regulations were set. It also screens personnel currently assigned to emergency asbestos removal teams.

### **Asbestos Health Hazards**

The danger of asbestos results from the asbestos fibers that break off into small particles. These fibers are small enough that, when airborne, you can inhale them. Once deep in the lungs, the fibers cause scar tissue or tumors. We now link asbestos fiber exposure with diseases such as asbestosis, lung cancer, and mesothelioma. These asbestos diseases may not show up for 15 or more years after exposure. Most cases of lung cancer in workers exposed to asbestos occur among workers who smoke. Workers who smoke and are exposed to asbestos have chances 90 times greater of developing cancer.

### **Identifying Asbestos**

Can you identify asbestos? Can you tell by looking at lagging whether or not it is asbestos? The only way to determine if material contains asbestos is to analyze the materials under a microscope. Every tender and repair ship and most shore medical facilities have the microscopes needed to test materials for asbestos and to analyze suspected material. If in doubt about insulation, consider it to be dangerous.

Aboard ship, anyone seeing a potential asbestos hazard (open or torn lagging) should report the hazard to the chief engineer or safety officer immediately.

### **Controlling Exposure to Asbestos**

You should never try to handle, remove, or repair suspected asbestos material without proper authorization and special protective equipment. Each ship having asbestos on board must have a trained, 3-person asbestos rip-out team for emergencies. This team receives training, is medically monitored, and has special protective clothing and equipment available for use when needed.

For detailed information on asbestos protective measures, refer to *Naval Ships' Technical Manual (NSTM)*, chapter 635; *Thermal, Fire, and Acoustic Installation*, OPNAVINST 5100.19B, chapter B1; and OPNAVINST 5100.23C, chapter 17.

### **LEAD CONTROL PROGRAM**

We also recognize lead as a serious health hazard. If you ingest lead, it can damage your nervous system, blood-forming organs, kidneys, and reproductive system. Although we normally associate lead in the Navy with lead-based paints, we also come into contact with other sources of lead. To prevent lead poisoning and related injuries during the use, handling, removal, and melting of materials containing lead, the Navy developed the Lead Control Program. OPNAVINST 5100.23C, chapter 21, and OPNAVINST 5100.19B, chapter B10, explain the Lead Control Program.

The following items aboard ship contain lead:

- Batteries
- Pipe joints
- Lead-based paint
- Small arms ammunition
- Weights and cable sockets



- High-voltage cable shielding
- Ballast and radiation shielding

Lead exposure occurs during grinding, sanding, spraying, burning, melting, and soldering. Lead exposure can also occur during machining, disassembling engines with leaded gasoline, and handling contaminated protective clothing.

The greatest hazard comes from lead dust, since we can easily inhale or ingest the fine particles. Most ingestion exposures occur when personnel eat or smoke without washing the lead dust off their hands.

### **Elements of the Lead Control Program**

The Navy's Lead Control Program includes the following elements:

- Medical surveillance
- Worker and supervisor training
- Control of lead in the workplace
- Environmental protection and waste disposal procedures
- Periodic industrial hygiene surveys to identify potential hazards from lead sources

Whenever possible, the Navy substitutes lower lead content or lead-free paints and coating for paints containing lead. However, many lead-based paints are still in use in the Navy today. Existing coatings of paint may contain lead, especially if they are 5 years old or older.

### **Medical Surveillance for Lead Workers**

Medical surveillance for lead workers consists of a preplacement medical evaluation, blood-lead level monitoring, and follow-up evaluations. In addition, medical surveillance includes removing personnel from exposure to lead, when necessary, based on blood-lead levels. Personnel must take part in the program under the following conditions:

- When a work site is found to have an airborne level of 30 micrograms of lead per cubic meter of air for over 8 hours
- When the workers handle lead at least 30 days per year

We must teach and warn occasional lead workers and handlers (those who handle lead less than 30 days per year) about the hazards of lead.

## **RADIATION PROTECTION PROGRAM**

Radiation is energy transmitted through space in the form of electromagnetic waves (rays) or nuclear particles. Radiofrequency radiation, including microwaves; x-rays; and gamma, infrared, visible light, and ultraviolet rays are electromagnetic waves. Alpha particles, beta particles, and neutrons are nuclear particles.

### **CATEGORIES OF RADIATION**

Radiation is commonly divided into two categories, which are indicative of the energy of the wave or particle: ionizing and nonionizing radiation. Radiation with enough energy to strip electrons from atoms in the media through which it passes is known as ionizing radiation. Examples include alpha particles, beta particles, x-rays, and gamma rays. Less energetic radiation that is not capable of such electron stripping is known as nonionizing radiation. Radio waves, microwaves, visible light, and ultraviolet radiation belong to this category.

Potentially hazardous sources of ionizing and nonionizing radiation exist aboard Navy ships. Ionizing radiation sources include radioactive material and equipment that generate x-rays. Lasers, radar, and communications equipment emit nonionizing radiation.

### **RADIATION PROTECTION PROGRAM ELEMENTS**

The Radiation Protection Program consists of the following elements:

- Training
- Medical surveillance
- Identification and evaluation of radiation sources
- Investigation and reporting of radiation incidents
- Use of dosimetry to monitor exposure to ionizing radiation

OPNAVINST 5100.23C, chapter 22, and OPNAVINST 5100.19B, chapter B9, outline the Radiation Protection Program. This program is designed to minimize personnel exposure to radiation from sources other than nuclear weapons and nuclear power systems.

Nuclear weapons and nuclear power systems have their own radiation protection and control programs. The program excludes those individuals, who as patients, are exposed to radiation while undergoing diagnostic or therapeutic procedures.

## **RESPIRATORY PROTECTION PROGRAM**

Many repair and maintenance operations generate air contaminants that are dangerous if inhaled. Engineering controls, such as local exhaust ventilation, are the most effective methods of protecting personnel against such contaminants. When engineering controls are not possible, personnel must wear respiratory protection. OPNAVINST 5100.23C, chapter 15, and OPNAVINST 5100.19B, chapter B6, cover the Respiratory Protection Program.

The Respiratory Protection Program requires training, fit-testing, recordkeeping, medical screening, and procurement and tracking of equipment. It also requires the purchase of respirators, spare parts, and cartridges.

Respirators have been used by workers for centuries. Discomfort from dust and smells drove some workers to invent their own respirators using cloth and animal bladders. The coal mining industry took the lead in developing and certifying respirators for miners suffering from black lung disease. In the late 1960s and early 1970s, the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) were designated as the certifying agencies for respirators.

Respirators and respirator parts are designed and manufactured according to strict NIOSH and MSHA guidelines. Respirators that NIOSH and MSHA have tested and certified are labeled with a NIOSH/MSHA certification number. Parts are not interchangeable between manufacturers.

### **Elements of the Respiratory Protection Program**

The Respiratory Protection Program must include the following elements:

- Written standard operating procedures
- Proper, hazard-specific selection of respirators
- User training in the proper operation and limitations of respirators
- Regular cleaning and disinfection of respirators

- Convenient, clean, and sanitary storage of respirators
- Inspection, repair, and maintenance of respirators
- Industrial hygiene surveys to identify operations requiring respirators and to recommend specific types of respirators
- Periodic monitoring and evaluation of program effectiveness
- Medical qualification
- Use of only NIOSH and MSHA approved respirators
- Fit-testing

Ashore, the commanding officer or officer in charge starts the program by appointing, in writing, a certified respiratory protection program manager (RPPM). Afloat, the commanding officer appoints, in writing, a trained respiratory protection officer (RPO). Although the duties of the RPPM and the RPO are similar, the duties of each depend on the size of the command and the extent to which command personnel use respirators.

### **Selecting the Proper Respirators**

You must wear the correct respirator for the right job! A respirator is not going to do you any good if it is the wrong type. Some people believe they can wear the surgical masks worn by medical personnel during various evolutions, such as deck grinding and small welding jobs. Those blue surgical masks serve only one purpose—to keep the doctor from passing saliva to the patient. Surgical masks will not protect personnel from any type of air contaminant. Selecting and wearing the correct, properly fitted respirator is the only way workers can ensure they are protected.

### **Identifying Various Types of Air Contaminants**

When selecting a respirator, we must first understand the six types of air contamination we may be exposed to:

- Dust—Small solid particles created by the breaking up of larger particles by processes such as crushing, grinding, sanding, or chipping. Some dusts are very toxic, such as the sanding dust from lead-based paints.

- **Fumes**—Very small particles (1 micrometer or less) formed by the condensation of volatilized solids, usually metals. Fumes are produced from the welding, brazing, and cutting of metals.

- **Gas**—A material that under normal conditions of temperature and pressure tends to occupy the entire space uniformly. Such material includes hydrogen sulfide gas from the collection, holding, and transfer system; acid gas from battery charging; and ammonia gas from deck stripping. Gases are usually invisible and sometimes odorless.

- **Mist and Fog**—Finely divided liquid droplets suspended in air and generated by condensation or atomization. A fog is a mist of enough concentration to obscure vision. Mists are produced when you spray solutions such as paint and spray cleaners.

- **Smoke**—Carbon or soot particles less than 0.1 micrometer in size resulting from the incomplete combustion of carbonaceous materials such as coal or oil.

- **Vapor (inorganic or organic)**—The gaseous state of a substance that is normally a liquid or solid at room temperature. Vapors are produced by fuels, paints and thinners, solvent degreasers, hydraulic fluids, and dry-cleaning fluids.

Knowing what types of air contaminants these terms refer to is critical to the proper selection of respirators. For example, many people believe that paint gives off fumes. *Fumes* is a common term used to describe any smells in the air. However, fumes are actually a condensed particle of vaporized metal given off during welding or cutting. If you select a respirator labeled **Dust, Mist and Fumes** to protect you from paint vapors, you will not be protected. Respirator cartridges are labeled as to the type of protection they provide.

The workplace monitoring plan or the industrial hygiene survey will pinpoint those areas and processes that require respirators. Since most ships carry few exotic chemicals and have limited heavy industrial work, they don't need a great variety of respirators or cartridges. Ashore, extensive industrial work may require an activity to have a greater selection and variety of respirators.

### Identify Various Types of Respirators

You should be familiar with the three basic types of respirators: air-purifying, supplied-air, and self-contained. An **air-purifying** respirator removes air contaminants by filtering, absorbing, adsorbing, or

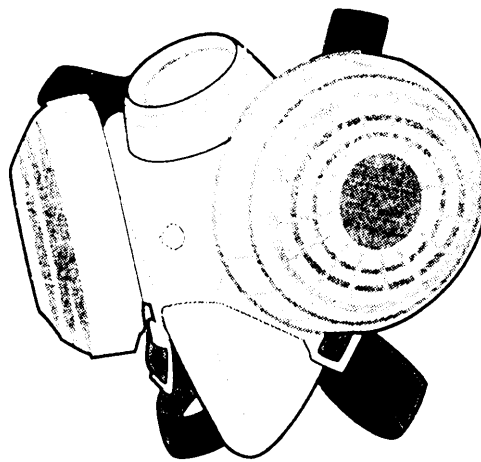


Figure 5-7.—Cartridge-type respirator.

chemical reaction. This respirator may be disposable or have a disposable prefilter on a cartridge (fig. 5-7).

You can only use the air-purifying respirator when the adequate oxygen (19.5 to 23.5 percent by volume) is available and the contaminant level is not immediately dangerous to life or health (IDLH). We classify air-purifying respirators as follows:

- **Particulate-removing**—These respirators have filters that remove dusts, mists, fumes, and smokes by physically trapping the material on the filter surface.
- **Gas- and vapor-removing**—These respirators have cartridges that absorb or chemically bind vapor or gas within the cartridge.
- **Combination particulate and gas- and vapor-removing**—These respirators are a combination of the preceding two types of respirators. They are required when you have a combination of materials such as a particle (mist) and a vapor.

Since these air-purifying respirators are negative-pressure respirators, they can only be used with air contaminants that have good warning properties, such as odor or taste. Warning properties indicate when the mask is leaking or the cartridge is used up.

The **supplied-air** respirator provides breathing air independent of the environment. You must wear this type of respirator when the following conditions exist:

1. Contaminant does not have enough odor, taste, or irritating warning properties

2. The contaminant is of such high concentration of toxicity that an air-purifying respirator is inadequate

We classify supplied-air respirators, also called air-line respirators, as demand, pressure-demand, and continuous-flow respirators. This respirator can be used in IDLH situation areas if operated in the pressure demand mode. It must also be equipped with an auxiliary, self-contained air supply of at least 15 minutes.

The breathing air source for air-line respirators must meet at least the minimum requirements for grade D breathing air. A ship's LP air is NOT suitable for use as breathing air unless it is specifically tested and certified to meet purity standards.

A self-contained breathing apparatus (SCBA) allows you complete independence from a fixed source of air. It allows the greatest degree of protection but is also the most complex. The SCBA provides protection in oxygen-deficient environments or other environments dangerous to life or health. The SCBA is equipped with a bottle of compressed air and is used in hazardous material spill kits.

### **Medical Screening and Fit-Testing Procedures Required Before Using a Respirator**

Before personnel can use a respirator, they must be medically screened and fit-tested. The ship's Hospital Corpsman, medical officer, or shore medical support clinic conducts the medical screening. Ashore, the clinic Occupational Health Division conducts medical screening for civilian workers. The purpose of the screening is to ensure that respirator users have no medical condition that inhibits their wearing a respirator. The screening also reviews the user's health record and potential for ill effects from working in a health-hazardous atmosphere.

A respirator mask must properly seal around the user's face to keep contaminated air from leaking into the mask. There are different brands, models, and sizes of respirators, all of which fit differently. Trained personnel from shore medical commands, environmental and preventive medicine units, or occupational safety and health offices fit-test respirator masks on potential users. First they have potential respirator users don a mask; then they test for leakage around the facepiece to ensure it seals properly. Afloat, larger ships and tenders, with primary duty safety officers, have trained fit-test personnel. Shore support

is provided to smaller ships. OPNAVINST 5100.23C, chapter 15, and OPNAVINST 5100.19B, chapter B6, give medical screening and fit-testing procedures.

### **PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT**

Personal protective equipment (PPE) protects the user in a hazardous environment. Any PPE breakdown, failure, or misuse immediately exposes the wearer to the hazard. Many protective devices, through misuse or improper maintenance, can become ineffective without the wearer knowing it. OPNAVINST 5100.23C, chapter 20, and OPNAVINST 5100.19B, chapter B12, provide information on PPE and PPE issue.

Personal protective devices do not reduce or eliminate the hazard itself. They merely set up a "last line of defense." Any equipment breakdown, failure, or misuse immediately exposes the worker to the hazard. PPE is used as an interim measure or when engineering controls cannot be applied.

### **Design and Construction of Personal Protective Clothing and Equipment**

All personal protective clothing and equipment should be designed and constructed to allow work to be performed safely. Therefore, extensive research and testing have been conducted to develop standards and specifications for the design and construction of personal protective clothing and equipment.

The federal government requires that personal protective clothing and equipment meet these standards and specifications. Therefore, the government only recognizes the certification and approval of certain agencies. Those agencies include the following:

- National Fire Protection Association (NFPA)
- American National Standards Institute (ANSI)
- Mine Safety and Health Administration (MSHA)
- Occupational Safety and Health Administration (OSHA)
- National Institute for Occupational Safety and Health (NIOSH)

All crewmembers must wear the required personal protective clothing and equipment. Workers should notify their supervisor immediately if the required clothing or equipment is not available to do the assigned work. Workers should also notify their supervisor if they need instruction on how to wear or use the clothing or



shoes from the supply system or a local purchasing agent or are reimbursed for their own purchase.

**HAND PROTECTION.**— Personnel should not wear gloves when operating rotating or moving machinery. However, they should wear gloves for protection against other types of hazards. Handling sharp materials requires the use of leather gloves. Performing hot work or handling hot items requires the use of heat-insulated, nonasbestos gloves. The use of portable electric tools in damp locations or during work on live electrical circuits or equipment requires the use of electrical-grade, insulating rubber gloves. Handling caustic or toxic chemicals requires specific gloves, depending on the type of substance being used. Thin rubber gloves or foodhandler-type gloves tear and leak easily and are not resistant to chemical absorption. Therefore, personnel must not use these gloves for any activity involving the use of a chemical substance. All types of gloves are available in the supply system.

**SAFETY CLOTHING.**— Safety clothing consists of flameproof coveralls, disposable coveralls, impervious chemical spill coveralls, welding leathers, and chemical aprons. When standing watch or working in a ship's fireroom, in main machinery spaces, and in hot work areas, personnel must wear fire-retardant coveralls. They should not wear synthetic clothing, such as certified Navy twill (CNT), in those areas. Aboard ship, fire retardant coveralls are provided as organizational clothing. Ashore, special protective clothing is provided at government expense.

**FALL PROTECTION EQUIPMENT.**— Personnel must wear parachute-type safety harnesses with Dyna-brake safety lanyards when climbing, working aloft, or working over the side. They should substitute wire rope for nylon working lanyards when performing hot work.

**FLOTATION DEVICES.**— Whenever personnel other than aircrew members and flight deck personnel are required to wear life jackets in open sea operations, the life jackets must be inherently buoyant. In exposed battle stations and when working over the side, personnel must wear jacket-type life preservers. They must also wear them topside in heavy weather, during replenishment at sea, and in small boats.

## **ELECTRICAL SAFETY PROGRAM**

Electrical shock is a serious hazard. If you combine high humidity, metal structures, high-voltage electricity, and perspiration, you have an electrical hazard. You must always observe safety precautions

when working around electric circuits and equipment to avoid injury from electric shock and short circuits. Records show most fatalities caused by electric shock result from people working on energized circuits and equipment. Post-mishap investigations show that they could have prevented these mishaps by following established safety precautions and procedures. A technician must view safety with a full appreciation of the various hazards involved in maintaining complex and sophisticated Navy equipment.

### **Elements of the Electrical Safety Program**

The Electrical Safety Program consists of the following elements:

- Following electrical safety standards
- Properly using equipment tag-out procedures
- Performing routine and periodic testing to detect and correct unsafe equipment
- Properly installing, maintaining, and repairing electrical and electronic equipment
- Performing control and safety testing of personal electrical and electronic equipment

### **Portable Electrical Tool Issue**

Ships must have a centralized portable electrical tool issue room for the daily issue of portable electrical tools. The electrical safety officer supervises operation of the portable electrical tool issue room. Personnel assigned to the portable electrical tool issue room perform daily inspections and safety testing of equipment before issuing it and upon its return.

Before issuing portable electrical tools, personnel assigned to the tool issue room brief tool users on routine tool safety precautions. In addition, they issue any required personal protective clothing and equipment. The tool custodian documents this briefing on the issue record. The custodian can issue tools only to personnel who have received ship's electrical safety training within the year.

Certain divisions or work centers maybe authorized permanent custody of selected electrical tools or equipment. These divisions perform required safety checks on their equipment. Personnel performing these checks must be members of an electrical or electronic rating. They must not issue these tools to other divisions.

Ashore, tools must meet Underwriters Laboratories (UL) approval or have a grounded metal case. Tools are

usually held by the user's shop or division and do not require electrical safety check for use ashore. *General Industry Standards*, 29 CFR 1910, and *Safety and Health Standards for Shipyard Employment*, 29 CFR 1915.132, address the shore Electrical Safety Program.

### **Basic Electrical Safety Training**

All personnel, when reporting aboard and annually thereafter, receive indoctrination on basic electrical safety. This indoctrination covers the requirements of using personal protective equipment, cardiopulmonary resuscitation (CPR), and first aid for electrical shock. Training for all personnel is documented and kept on file.

### **TAG-OUT/LOCK-OUT PROGRAM**

The Tag-Out/Lock-Out Program is a two-fold program. It ensures that personnel correctly tag out equipment before conducting maintenance and that personnel are notified when systems are not in a normal configuration. A Tag-Out/Lock-Out Program is necessary to prevent injury to personnel and damage to equipment.

Ships have a tag-out program, which requires the use of paper tags or labels to indicate systems are deenergized or under special configuration. Personnel must follow this program in the maintenance of all shipboard equipment, components, and systems. OPNAVINST 5100.19B, chapter B11, and OPNAVINST 3120.32C, section 630.17, cover this program.

Shore activities pattern their Tag-Out/Lock-Out Program after OSHA regulations. OPNAVINST 5100.23C, chapter 24, covers this program. The tags used ashore are very different from those used aboard ship, and in some instances locks are used to lock out a system.

Tag-out/lock-out procedures consist of a series of tags, adhesive labels, or locks. Personnel apply them to instruments, gauges, or meters to show that they are inoperative, restricted in use, or out of calibration. Each tag contains information personnel must know to avoid a mishap. All corrective maintenance should include standard tag-out/lock-out procedures, including work done by an intermediate maintenance or depot level activity. Coordination is required between shipyard and contract workers and afloat units when tagging-out shipboard systems.

Training ashore and afloat is needed to ensure personnel understand the Tag-Out/Lock-Out Program.

Detailed training is required for personnel authorized to administer the program.

### **GAS FREE ENGINEERING PROGRAM**

Why do we have gas free engineering? Entry into, work in, or work on confined or enclosed spaces may cause injury, illness, fires, or death. Hazards may result from flammable or explosive materials or atmospheres, toxic materials, or an oxygen-depleted atmosphere.

Personnel normally do not inhabit confined or enclosed spaces. We consider them unsafe for entry or work until an authorized person, usually the gas free engineer, tests the air. Then that person issues a gas free certificate stating the hazard or special precautions to follow. Only by carefully retesting the air in confined and enclosed spaces can we ensure the safety and health of personnel working in these areas.

### **Health and Fire Hazards**

A lack of oxygen in a confined space will not support life and may asphyxiate workers. The presence of toxic gases or vapors from paint or tank contamination may cause asphyxiation or intoxication. Flammable vapor or gas build-up could lead to a serious explosion or fire. Any combination of the above could lead to fatalities or serious injury or material damage if workers try to enter or work in the unknown atmosphere.

### **Gas Free Certificates**

The ship's gas free engineer (GFE) or the shore marine chemist is assigned to test the applicable space. Each person must obey the requirements and limitations outlined on a gas free certificate. The certificate is posted at the entrance to the space. It shows the conditions that existed at the time the tests were conducted. The following are examples of conditions documented on gas free certificates:

- SAFE FOR PERSONNEL—SAFE FOR HOT WORK
- SAFE FOR PERSONNEL—NOT SAFE FOR HOT WORK
- NOT SAFE FOR PERSONNEL—NOT SAFE FOR HOT WORK
- NOT SAFE FOR PERSONNEL WITHOUT PROTECTION—NOT SAFE FOR HOT WORK
- NOT SAFE FOR PERSONNEL INSIDE—SAFE FOR HOT WORK OUTSIDE

Aboard ship, a gas free certificate is good for a maximum of 8 hours. After 8 hours, the testing must be repeated. While testing, the GFE or the marine chemist must wear the protective equipment required by the certificate and his or her supervisor. Ashore, the gas free certificate issued by the marine chemist will indicate retest periodicity.

### **Requesting Gas Free Services**

Now that we know why we have gas free testing, we need to know who performs the service. Anytime you have a need to enter a confined or enclosed space aboard ship, you must make a request to have the space tested to ensure it is gas free. Contact the damage control assistant (DCA) or fire marshal to arrange for these services. For more information on the Gas Free Engineering Program afloat, consult OPNAVINST 5100.19B, chapter B8, and *Naval Ships' Technical Manual (NSTM)*, chapter 074, volume 3.

Ashore, the marine chemist performs gas free services as outlined in OPNAVINST 5100.23C, chapter 27.

### **MEDICAL SURVEILLANCE PROGRAM**

The Medical Surveillance Program monitors the continuing health of certain personnel. The results of the industrial hygiene surveys, as interpreted by qualified occupational health professionals, determine the selection of personnel for medical surveillance examinations. The medical department representative (MDR) and the division officer identify personnel who require medical surveillance. The MDR follows the guidance of the *Medical Surveillance Procedures Manual*; *Navy Occupational Health Information Management System (NOHIMS) Medical Matrix*; and *Navy Environmental Health Center (NAVENVHLTH-CEN) Technical Manual*, NEHC-TM91.5.

Navy facilities ashore and afloat establish military and civilian employee medical treatment and surveillance programs. Medical facilities ashore provide direct support to ships that are not equipped or staffed to provide appropriate medical surveillance and documentation. In general, these programs monitor the following areas:

- Job certification or recertification to determine a person's fitness to begin or continue to perform a job safely and effectively

- The effectiveness of major hazard-specific programs based on a continuing check on the health status of exposed personnel
- As a secondary prevention, the detection of early indicators of excessive exposure caused by the work environment before actual illness, disease, or injury occurs and to allow for the timely start of corrective actions to prevent any long-term adverse effects
- Compliance with the requirements of certain NAVOSH standards

### **Medical Examinations**

The types of examinations scheduled are preplacement or base-line, special-purpose or periodic, and termination. Medical examinations assess the health status of people as it relates to their work. These examinations produce specific information that determines the adequacy of protection for personnel from potential workplace hazards. The medical examination may include a physical examination, clinical laboratory tests, radiologic exams and physiologic testing, or an inquiry about the person's occupational history. OPNAV Form 5100/15, Medical Surveillance Questionnaire (figs. 5-9A and 5-9B), shows an individual's previous and current employment. This information helps identify work or other activities that may pose a potential health hazard for the person. Occupational medical examinations are scheduled based on a person's birth month or as operational requirements permit. For hazard-specific medical surveillance, a medical examination will be provided when the action level of the contaminant is exceeded. An examination is also provided when the exposure exceeds 30 days per year.

### **Medical Records**

Existing directives dictate procedures on the maintenance, retention, and disposal of medical records. The cognizant medical command, branch clinic, or Military Sealift Command medical offices maintain records consisting of forms, correspondence, and other files that relate to an employee's medical and occupational history. Other information includes occupational injuries or illnesses, physical examinations, and all other treatment received in a health unit. Included, too, are audiograms; pulmonary function tests; industrial hygiene computations; laboratory and x-ray findings; and records of personal exposure to physical, biological, and chemical hazards. A problem summary



MEDICAL SURVEILLANCE QUESTIONNAIRE							
<small>PRIVACY ACT STATEMENT</small> <small>*The authority to collect this information is Section 19 of the Occupational Safety and Health Act and the Code of Federal regulations (29 CFR 1950). The information will be used by the Occupational Health Physician, and/or such clinical staff as he may designate to help identify the causes of adverse health effects and for future epidemiology studies. Providing the information is voluntary; however, failure to provide the information could unnecessarily hamper the identification of potential health problems and preclude any redress of problems identified in the future.*</small>							
PART 1 - OCCUPATIONAL HISTORY							
Instructions: Please complete the following work history in chronological order from your first job to the present and list all part-time and full-time jobs you have held. Be as specific as possible. If you held more than one job with the same employer, list each title and activity. Use additional sheets, as needed.							
TODAY'S DATE	DATES		NO HRS WK	JOB TITLE AND WORK ACTIVITIES (include employer if not Navy)	POTENTIAL HAZARDS (be as specific as possible)	PROTECTIVE EQUIPMENT (Respirator, ear plugs, protective clothing, etc)	
	FROM MO/YR	TO MO/YR					
PATIENT'S IDENTIFICATION <small>(Use this space for mechanical imprint)</small>			PATIENT'S NAME (Last, first, Middle initial)			Sex	
			YEAR OF BIRTH	RELATIONSHIP TO SPONSOR	COMPONENT STATUS	DEPART SERVICE	
			SPONSOR'S NAME				
			SSN OR IDENTIFICATION NO				ORGANIZATION

Figure 5-9A.—Medical Surveillance Questionnaire (front), OPNAV 5100/15.

list and copies of preemployment, disability retirement, and fitness for duty examinations are also included.

### GENERAL SAFETY PRECAUTIONS

Volume II (surface ship) and volume III (submarine) of OPNAVINST 5100.19B provide general safety precautions for forces afloat. OPNAVINST 5100.23C and *General Industry Standards*, 29 CFR 1910, provide shore safety precautions.

The afloat safety precautions specifically cover shipboard operations, such as heavy weather, underway

replenishment, cargo handling, and small boat operations. Consult these precautions to plan for training before specific evolutions. Afloat safety precautions only cover general precautions. Naval warfare publications (NWP) and technical manuals provide more detailed precautions.

In general, safety precautions ashore do not apply aboard ship. In other words, a civilian contractor bringing electrical equipment on board is not required to comply with the ship's electrical safety check program. The civilian employee follows OSHA safety precautions. OSHA is not authorized to inspect military



electrical safety, and personal protective clothing. In addition, we discussed hazardous material/hazardous waste, asbestos control, gas free engineering, lead control, and medical surveillance.

You have a duty to yourself and the people you work with to know and enforce all safety regulations. Before assigning personnel to a task that can harm them in any way, ensure they are familiar with and know the correct safety procedures. Make sure they are wearing the proper protective clothing and using the correct respirator. Provide them with adequate eye and hearing protection. Take no short cuts and do all jobs safely. Get

copies of OPNAVINST 5100.23C, *Naval Occupational Safety and Health (NAVOSH) Program Manual*, and OPNAVINST 5100.19B, *Navy Occupational Health and Safety Program Manual for Forces Afloat*. Become familiar with them. Remember the adage, “The life you save may be your own.”

Complacency, haste to complete a job, and the “it can’t happen to me” attitude can hinder an effective self-policing safety program. A safe environment requires us to stay alert, be patient, and think safety at all times.



## CHAPTER 6

# SHORE SAFETY

In this chapter we will discuss general safety programs and the Navy Occupational Safety and Health (NAVOSH) Program as they apply to shore activities. Shore activities, with both Department of Defense (DOD) civilian and military workers, have a greater diversity of industrial operations than ships. Like their non-DOD civilian counterparts, shore activities derive safety standards almost exclusively from Occupational Safety and Health Administration (OSHA) regulations.

OPNAVINST 5100.23C, the *Navy Occupational Safety and Health (NAVOSH) Program Manual*, provides the administrative requirements for shore NAVOSH programs. OPNAVINST 5100.23C applies to all shore Navy civilian and military personnel worldwide, except those under the NAVOSH Program responsibility of the Commandant of the Marine Corps (CMC). Since afloat units have many unique requirements, the standards for afloat units found in OPNAVINST 5100.23C have been included in OPNAVINST 5100.19B, *Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*.

In this chapter we will address the following topics:

- Shore activity organization and staffing
- Shore safety training
- Occupational health standards
- NAVOSH Inspection Program
- Inspections and investigations by OSHA officials
- Mishap reporting for shore activities

### SHORE SAFETY ELEMENTS

In chapter 1 we discussed the shore safety organization with regard to echelon 2 commands and the local Occupational Safety and Health (OSH) Office. At shore activities and commands, commanders, commanding officers, and officers in charge must conduct an aggressive, continuing OSH program and issue an OSH policy statement. This OSH policy statement adopts and enhances or expands on the NAVOSH policy in OPNAVINST 5100.23C. Chapter 2

of OPNAVINST 5100.23C lists the OSH responsibilities.

Individual civilian and military personnel must comply with NAVOSH standards and regulations. Violators of NAVOSH regulations or instructions are subject to disciplinary action prescribed in *Civilian Personnel Instruction (CPI) 752* or the *Uniform Code of Military Justice*. Individuals must also report observed workplace hazards and mishaps. The report is shown in figure 6-1.

Everyone must be familiar with the OSH program. Based on chapter 10 of OPNAVINST 5100.23C, commands must post the procedures personnel must follow to report unsafe or unhealthful working conditions. Personnel must know where they can review command OSH Program documentation, such as NAVOSH standards, OSH committee records, and the activity hazard communication plan.

Shore commands must also post 1146-DOL-XX (5102)—the annual summary report of occupational injuries and illnesses for the preceding year. They also must place the Department of Defense Occupational Safety and Health Program poster (fig. 6-2) in a prominent location. This poster provides personnel with their OSH points of contact within the activity.

### SHORE SAFETY ORGANIZATION AND STAFFING

Major naval shore activities have an OSH office. Organizationally, the OSH office reports directly to the commander, commanding officer, or officer in charge. As was discussed in chapter 1, the OSH office plans, directs, and administers the activity OSH program. OSH offices have many specific as well as administrative functions, depending on individual activity operations. Chapter 3 of OPNAVINST 5100.23C lists all of these functions.

Staffing of the OSH office depends on its workload and location, the population it serves, and the tenant commands it supports. Activities with 400 or more personnel are to have full-time OSH managers and a clerical staff. Both the managers and the clerical staff are trained, fully qualified OSH professionals. They

<b>NAVY EMPLOYEE REPORT OF UNSAFE OR UNHEALTHFUL WORKING CONDITION</b>	
<i>THIS FORM IS PROVIDED FOR THE ASSISTANCE OF AN EMPLOYEE AND IS NOT INTENDED TO CONSTITUTE THE ONLY METHOD BY WHICH A REPORT MAY BE SUBMITTED</i>	
1 THE UNDERSIGNED (check one) <input type="checkbox"/> EMPLOYEE <input type="checkbox"/> REPRESENTATIVE OF EMPLOYEES	
BELIEVES THAT A VIOLATION OF AN OCCUPATIONAL SAFETY OR HEALTH STANDARD WHICH IS JOB SAFETY OR HEALTH HAZARD HAS OCCURRED AT	
a Navy installation/activity and mailing address	
b Building or worksite where alleged violation is located, including address	
2 NAME AND PHONE NUMBER OF GOVERNMENT SUPERVISOR AT SITE OF VIOLATION	
3 DOES THIS HAZARD IMMEDIATELY THREATEN DEATH OR SERIOUS PHYSICAL HARM? <input type="checkbox"/> NO <input type="checkbox"/> YES	
4 BRIEFLY DESCRIBE THE HAZARD WHICH EXISTS INCLUDING THE APPROXIMATE NUMBER OF EMPLOYEES EXPOSED TO OR THREATENED BY SUCH HAZARD	
5 IF KNOWN, LIST BY NUMBER AND/OR NAME THE PARTICULAR STANDARD (OR STANDARDS) ISSUED BY THE AGENCY WHICH YOU CLAIM HAS BEEN VIOLATED	
6 TO YOUR KNOWLEDGE HAS THIS VIOLATION BEEN THE SUBJECT OF ANY UNION/MANAGEMENT GRIEVANCE OR HAVE YOU (OR ANYONE YOU KNOW) OTHERWISE CALLED IT TO THE ATTENTION OF, OR DISCUSSED IT WITH, THE GOVERNMENT SUPERVISOR <input type="checkbox"/> NO <input type="checkbox"/> YES (List results, including any efforts by management to correct violation)	
7 EMPLOYEE TYPED OR PRINTED NAME	8 EMPLOYEE SIGNATURE
9 EMPLOYEE ADDRESS	10 EMPLOYEE PHONE NUMBER
11 MAY YOUR NAME BE REVEALED? <input type="checkbox"/> NO <input type="checkbox"/> YES	12 ARE YOU A REPRESENTATIVE OF EMPLOYEE <input type="checkbox"/> NO <input type="checkbox"/> YES (List organization name)

OPNAV 5100/11

Figure 6-1.—Navy Employee Report of Unsafe or Unhealthful Working Condition (OPNAV 5100/11).

may be safety engineers, occupational safety and health specialists, industrial hygienists, or industrial hygiene technicians. In areas where it is more effective, a consolidated OSH office may serve several activities. Written agreements define the services of consolidated OSH offices.

### Medical and Industrial Hygiene Support

Hospitals and clinics provide occupational health support. Depending on the area they serve, most hospitals and clinics have industrial hygiene and

preventive medicine divisions or departments. The hospitals and clinics usually provide occupational medicine services with full-time occupational health nurses and physicians. The size, type, and location of activities supported determine the assignment of nurses and physicians. Chapter 3 of OPNAVINST 5100.23C provides the equations used to calculate staffing requirements.

### Industrial Hygiene Laboratories

Industrial hygiene laboratories provide analytical services in support of workplace monitoring and

# DEPARTMENT OF DEFENSE SAFETY AND OCCUPATIONAL HEALTH PROTECTION PROGRAM



THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, EXECUTIVE ORDER 12196 AND 29 CFR 1960 REQUIRE THE HEADS OF FEDERAL AGENCIES TO ESTABLISH PROGRAMS TO PROTECT THEIR PERSONNEL FROM JOB SAFETY AND OCCUPATIONAL HEALTH HAZARDS.

1. THE DEPARTMENT OF DEFENSE (DOD) DESIGNATED AGENCY SAFETY AND OCCUPATIONAL HEALTH OFFICIAL IS THE ASSISTANT SECRETARY OF DEFENSE (FORCE MANAGEMENT AND PERSONNEL)

2. THE \_\_\_\_\_  
DOD COMPONENT  
DESIGNATED SAFETY AND OCCUPATIONAL HEALTH OFFICIAL IS

\_\_\_\_\_  
TITLE ADDRESS

3. THE \_\_\_\_\_  
NAME OF INSTALLATION/FACILITY

SAFETY AND OCCUPATIONAL HEALTH DESIGNEE IS

\_\_\_\_\_  
NAME/TITLE

4. THE \_\_\_\_\_  
NAME OF INSTALLATION/FACILITY

SAFETY POINT OF CONTACT IS

\_\_\_\_\_  
NAME TELEPHONE NUMBER

5. THE \_\_\_\_\_  
NAME OF INSTALLATION/FACILITY

OCCUPATIONAL HEALTH POINT OF CONTACT IS

\_\_\_\_\_  
NAME TELEPHONE NUMBER

\_\_\_\_\_  
NAME OF INSTALLATION/FACILITY

HAS THE RESPONSIBILITY TO:

1. COMPLY WITH THE APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)/DOD/DOD COMPONENT SAFETY AND OCCUPATIONAL HEALTH STANDARDS.
2. SET UP PROCEDURES FOR SUBMITTING AND RESPONDING TO EMPLOYEE REPORTS of unsafe and unhealthful working conditions.
3. ACQUIRE, MAINTAIN, AND REQUIRE the use of approved personal protective equipment and safety equipment.
4. INSPECT ALL WORKPLACES with participation by civilian employee representatives to identify potential hazards.
5. ESTABLISH PROCEDURES TO ASSURE that no worker is subject to restraint, interference, coercion, discrimination, or reprisal for exercising his/her rights under the DOD safety and occupational health program.
6. POST NOTICES of unsafe or unhealthful working conditions found during inspections.
7. ASSURE PROMPT ABATEMENT of hazardous conditions. Workers exposed to the conditions shall be informed of the abatement plan. Imminent danger corrections must be made immediately.
8. SET UP A MANAGEMENT INFORMATION SYSTEM to keep records of occupational accidents, injuries, illnesses and their causes; and to post annual summaries of injuries and illnesses for a minimum of 30 days at each installation/facility.

9. CONDUCT SAFETY AND OCCUPATIONAL HEALTH TRAINING for management, supervisors, workers and worker representatives.

**DOD PERSONNEL HAVE THE RESPONSIBILITY TO:**

1. COMPLY with all applicable OSHA/DOD/DOD component safety and occupational health standards.
2. COMPLY with \_\_\_\_\_  
NAME OF INSTALLATION/FACILITY  
policies and directives relative to the safety and occupational health program.
3. USE personal protective equipment and safety equipment provided by your installation/ facility.
4. REPORT hazardous conditions, injuries, illnesses, or other mishaps promptly to your supervisor or to the safety or occupational health point of contact for your installation/ facility.

**DOD PERSONNEL AND CIVILIAN EMPLOYEE REPRESENTATIVES HAVE THE RIGHT TO:**

1. HAVE ACCESS to applicable OSHA/DOD/DOD component standards, installation/facility injury and illness statistics, and safety and occupational health program procedures.
2. COMMENT on alternate standards proposed by DOD/DOD component.
3. REPORT AND REQUEST INSPECTIONS OF UNSAFE AND UNHEALTHFUL WORKING CONDITIONS to appropriate officials who include, in order of preference: the immediate supervisor, the safety or occupational health point of contact, the safety and occupational designee for your installation/facility, the installation/facility commander, the safety and occupational health designee for your DOD component, the safety and occupational designee for DOD, and the Secretary of Labor. However, the Secretary of Labor encourages personnel to use DOD procedures for reporting hazardous conditions as the most expeditious means to achieve abatement. The hazard report form provided by your installation/facility should be used for this purpose. Anonymity, when requested, is assured.
4. PARTICIPATE in the installation/facility safety and occupational health program. Civilian workers shall be authorized official time to participate in the activities provided by the DOD safety and occupational health program.

**OTHER INFORMATION:**

1. When the safety or occupational health point of contact for your installation/facility is notified by a worker of a hazardous worksite condition, he/she will insure an inspection of the worksite and he/she will report the results of the inspection in writing to the worker making the report.
2. Inspector General channels may be used to investigate complaints from either DOD civilian or military personnel concerning alleged acts of discrimination or reprisal due to participation in safety and occupational health activities. For DOD civilian personnel, allegations of reprisal may also be initiated by them in accordance with applicable appeal procedures, or administrative or negotiated grievance procedures.
3. For further information about the installation/facility safety and occupational health program, procedures, standards, committees, Federal laws, or other related matters, contact the safety or occupational health point of contact for your installation/facility as noted on this poster.
4. How well you carry out your safety and occupational health responsibilities will be an important factor in the success of the program.

Figure 6-2.—Department of Defense Safety and Occupational Health Protection Program poster.

Category of Activity Personnel	HAZCOM Training Required
Top Management	0.5 hr. initial
Supervisors and Employee Reps*	3 hr. initial; annual refresher plus spill response & emergencies for supervisors
Nonsupervisory Personnel* **	3 hr. initial, plus on-the-job training (OJT) and refresher by supervisor, as required
Collateral Duty Safety & Occupational Health Personnel	3 hr. initial and refresher training as required
Full-Time Safety & Occupational Health Personnel	24 hr. initial and 3 hrs. annual
Emergency Response, Hazardous Waste Spill, Handlers, & Cleanup Personnel	See 29 CFR 1910.120 and OPNAVINST 4110.2
<p>* For personnel occupationally involved with the use of or exposure to hazardous material.</p> <p>** OJT must include appropriate review of chemicals used, such as review of Material Safety Data Sheets (MSDSs). Stand-up safety meetings can be used for this purpose.</p>	

Figure 6-3.-Hazard communication training requirements.

occupational medicine examinations. The Navy has four consolidated industrial hygiene laboratories (CIHLs). They are located at the Environmental and Preventive Medicine Units in Norfolk, Virginia; San Diego, California; Pearl Harbor, Hawaii; and at the Mare Island Naval Shipyard, Vallejo, California. Each CIHL is accredited by the American Industrial Hygiene Association (AIHA). Additionally, most industrial hygiene offices can perform limited industrial hygiene analyses, such as asbestos identification and airborne fiber concentration determination.

### SHORE SAFETY TRAINING PROGRAMS

A well-developed and coordinated training effort, keyed to all levels and types of personnel, is required to maximize safe operating practices and procedures. OSH training can change behavior and lead to mishap prevention and improved performance.

The NAVOSH Training Group oversees the Navywide management of OSH training. This training group consists of a steering committee and four working groups. The working groups represent the surface ship, submarine, aviation, and shore communities and their special training needs. The steering committee consists of a SYSCOM member and representatives from

OPNAV, CNET, CINCPACFLT, CINCLANTFLT, COMNAVSAFECEN, CHBUMED, NAVINSGEN, and PRESINSURV. Working together, this steering committee reviews, updates, and revises the NAVOSH/Hazardous Material Control and Management (HMC&M) Navy Training Plan (NTP). This NTP provides for the manning, funding, and planning of NAVOSH training to support all communities and echelons.

### Activity OSH Training

Activity OSH training programs are designed to instruct individual employees to work in a safe and healthful manner. The training is tailored to each person's level of responsibility.

OSHA regulations require employers to conduct hazard communication (HAZCOM) training. This training covers the specific hazards and safe work practices involved in the handling of hazardous materials/chemicals. Figure 6-3 shows the HAZCOM training requirements.

All top management personnel, employee representatives, supervisory and nonsupervisory personnel, and collateral duty OSH personnel are required to have initial OSH orientation training. Initial and annual



training is required, when applicable, for workers exposed to specific hazards, such as asbestos and lead. Professional development courses are required for full-time OSH personnel. Appendix 6-A of OPNAVINST 5100.23C provides a complete listing of shore OSH training requirements.

Formal safety courses are available through the Naval Safety School located at the Naval Air Station, Norfolk, Virginia. The school currently provides shore-oriented safety courses available to military and civilian personnel. For a list of courses, quotas, and convening dates, contact Quota Control at (804) 445-8778 or Defense Switched Network (DSN) 565-8778.

Courses are also available through the OSHA Training Institute, 1555 Times Drive, Des Plaines, IL 60018. For a list of courses, quotas, and convening dates, call (708) 297-4913.

Shore safety supervisors receive specific training as well as orientation, monthly, and annual refresher training on the activity's OSH Program. Supervisory personnel also receive training on how to manage the activity's OSH Program at the work unit level. In this training, they learn how to train and motivate subordinates to develop safe and healthful work practices. They also learn how to integrate occupational safety with job training. Other OSH training for supervisory personnel involves the following areas:

- OSH performance measurement
- Job hazard analysis
- Enforcement of NAVOSH standards
- Mishap investigation
- The use and maintenance of personal protective equipment
- Hazardous material control and management (HMC&M)

### **Safety and Health Reference Library**

The safety supervisor uses educational and promotional materials such as posters, films, technical publications, pamphlets, and related materials. These materials help promote the reduction and prevention of workplace-related accidents and injuries.

Each shore activity is required to maintain a suitable safety and health reference library. The local OSH office usually maintains this library.

Although the local office normally supplies the activity with educational and promotional materials, it can simply provide the activity with information on how to procure the materials. Some materials are purchased through the National Safety Council or similar organizations. Films and video tapes are available through the Naval Education and Training Support Centers on a temporary or permanent custody basis. These centers are located on each coast. They may be contacted at the following addresses or phone numbers:

Naval Education and Training Support Center,  
Atlantic  
Code N5, Bldg. W313  
Naval Station, Norfolk, VA 23511-6197  
Phone (804) 444-4011/1468, DSN 564-4011/1468

Naval Education and Training Support Center,  
Pacific  
921 West Broadway  
San Diego, CA 92132-1360  
Phone (619) 532-1360, DSN 522-1360

OPNAV P-09B1-01-88, *Catalog of Navy/Marine Corps Audiovisual Productions*, provides a listing of all available films and video tapes.

Various periodicals also provide valuable OSH information. They include applicable portions of the *Federal Register*, Defense Logistics Agency hazardous material newsletters, and the following magazines:

- *Safetyline*— This magazine is published six times per year by the Naval Safety Center (NAVSAFECEN). Included in this magazine are articles on occupational health, weapons safety, off-duty safety, occupational safety, high-risk training, fire prevention, motor vehicles, and hazardous materials.

- *Occupational Hazards*— You can receive this magazine at no cost by writing to Occupational Hazards Magazine, 111 Chester Avenue, Cleveland, OH 44114.

- *Occupational Health and Safety*— This magazine is available from Medical Publications, Inc., 225 New Road, Waco, TX 76810.

Material Safety Data Sheets (MSDSs) for DOD materials are available on the *Hazardous Material Control and Management (HMC&M)* data base, distributed on compact disk-read only memory (CD-ROM). The *HMC&M* CD-ROM contains a variety of publications, including MSDSs on the Hazardous Material Information System (HMIS). Most shore commands are already on quarterly distribution for the *HMC&M* CD-ROM.

## Safety and Health Training Records

The OSH office is responsible for maintaining OSH training records. These records must be maintained for 5 years. As required by the *Federal Personnel Manual*, civilian employee training must be documented in personnel records. Military personnel training is documented in the General Military Training Record.

OSH offices also maintain copies of lesson plans used for local training classes. OSH training records are reviewed during inspections.

## OCCUPATIONAL HEALTH STANDARDS

The primary objective of the NAVOSH Program is to provide a safe and healthy work environment. Shore activity occupational safety standards are derived from OSHA regulations such as 29 CFR 1910 —*General Industry Standards*. Occupational health standards are also derived from these regulations.

Most safety deficiencies are recognized during workplace evaluations and inspections. Deficiencies such as a broken guard on a grinder or paints stored near a heat source are obvious hazards. Occupational exposures to gases, dusts, radiation, and vapors are less obvious. Identifying and monitoring these health hazards require a more elaborate program. Most hospitals and clinics have occupational health programs to support the activity OSH office in recognizing and controlling these hazards.

Occupational health programs are divided into the following two major specialties:

- Industrial hygiene—Involves surveillance of the workplace and evaluation of identified health hazards
- Occupational medicine—Focuses on job qualification examinations and the medical surveillance of employees potentially exposed to workplace hazards

Together, these specialties try to identify, treat, and prevent acute and chronic occupational illnesses.

## Industrial Hygiene Survey

OPNAVINST 5100.23C and DODINST 6055.5, *Industrial Hygiene and Occupational Health*, require the thorough evaluation of each Navy workplace to accurately identify and quantify all potential health hazards. An initial, or base-line, industrial hygiene survey is required for this evaluation. However,

potential hazards that need to be monitored must be identified before the industrial hygiene survey can begin.

The base-line survey is followed by periodic surveys at intervals dependent upon the presence and degree of hazards found. Periodic surveys must be conducted at least annually when hazards are found. Surveys may be scheduled at longer intervals if no hazards are present.

Changes in the workplace require a new base-line industrial hygiene survey, either for the entire workplace or just for those hazards specifically altered by the change. Limited or special-purpose evaluations can also be conducted when problems arise or when new information is available about the hazards of an operation.

The first step in the industrial hygiene survey is a workplace assessment (walk-through survey). The responsible industrial hygienist or a qualified technician conducts this walk-through survey to obtain the following information:

- A description of each work site
- A description of operations and work practices
- A list of hazardous materials or biological agents used and their rate of use
- A list of physical hazards and their sources
- A description of existing controls (ventilation, personal protective devices, etc.) with an evaluation of their use and effectiveness

Following the walk-through survey, the industrial hygienist prepares a written assessment of each workplace.

## Workplace Monitoring Plan

Next, a workplace monitoring plan is developed for areas in which an employee might be exposed to toxic chemicals or harmful physical agents. The industrial hygienist, assisted by the OSH office, develops this plan based on a sampling strategy designed to obtain samples representative of actual exposures. NAVOSH standards or the professional judgment of the industrial hygienist determines the sampling parameters needed to quantify employee exposures.

In quantifying an exposure, the industrial hygienist determines the measured exposure level as compared to safe levels. That allows the hygienist to assess the

effectiveness of, or the need for, control measures directed at reducing or eliminating health hazards. The hygienist makes this assessment based on the results of the sampling programs carried out within the work environment.

If the exposure assessment shows that an employee might be exposed to toxic chemicals or harmful physical agents, a workplace monitoring plan is prepared and carried out. Activity OSH personnel and the responsible medical command or clinic industrial hygienists jointly develop the Workplace Monitoring Plan, OPNAV 5100/14. They base the plan on a sampling of actual exposures. Specific NAVOSH standards or, when such standards do not exist, the professional judgment of the industrial hygienist prescribes the frequency of monitoring.

The results of the analysis and interpretation of the data gained through this sampling strategy serve several purposes. They provide a timely assessment of hazards and provide recommendations for required changes to existing conditions. They also determine requirements for medical surveillance of exposed personnel. These results also help the OSH office and the command prioritize and fund corrective actions and determine manning and support services.

Data pertinent to personnel exposures are incorporated into each person's medical record. Survey, evaluation, and monitoring records are retained for a minimum of 40 years (except asbestos monitoring records, which are retained indefinitely). Employees have access to records that pertain to their individual exposures as provided and defined in 29 CFR 1910.20, *Access to Employee Exposure and Medical Records*.

In chapter 5, we discussed industrial hygiene and medical surveillance. Additional information is available in chapter 8 of OPNAVINST 5100.23C.

## **NAVOSH INSPECTION PROGRAM**

Once the NAVOSH Program is in place, we need a way of evaluating program compliance and effectiveness. The NAVOSH Inspection Program has three levels of inspection:

- Local OSH office
- Echelon 2 or 3 commanders
- Naval Inspector General

The Inspection Program is designed to identify deficiencies that must be corrected to protect personnel and to meet the requirements established by federal

agencies. All NAVOSH inspections must be conducted by inspectors trained and qualified in the subject they inspect.

## **Workplace Safety Inspections**

At the activity level, workplace inspections are targeted at identifying hazardous conditions, unsafe work practices, and violations of standards. These inspections are also used to follow up on accident reports and abatement programs. Workplace monitoring programs and medical surveillance requirements are also determined at the local level.

All Navy workplaces with recognized potential health hazards must be evaluated at least annually. More frequent inspections are required for areas with a high potential for hazards.

Deficiencies identified during local inspections are documented on an OPNAV 5100/12, NAVOSH Deficiency Notice, as the written report of that workplace inspection. This report must be forwarded to the official in charge of the area inspected within 15 working days of the inspection. We reviewed this process and hazard abatement in chapter 3.

## **OSH Management Evaluations**

Echelon 2 and 3 commanders conduct evaluations of subordinate commands and field activities. They ensure that their activities have an effective NAVOSH Program and that the program is properly carried out. Written reports of these management evaluations are forwarded for action to the activity commander, commanding officer, or officer in charge.

## **NAVOSH Oversight Inspections**

NAVOSH oversight inspections are conducted by the Naval Inspector General (NAVINGEN) for shore activities and by the President, Board of Inspection and Survey (PRESINSURV), for afloat units. Both of these extensive inspections evaluate compliance with all aspects of the NAVOSH Program.

At shore activities, the NAVOSH Oversight Inspection Unit (NOIU), located in Norfolk, Virginia, conducts oversight inspections. This is an extensive inspection involving the use of a point system to quantify compliance. The Inspection Unit inspects those sites with the most severe safety and health problems. It usually conducts the inspections on short notice.

NAVINGEN provides Chief of Naval Operations (CNO) with a semiannual summary of inspection results, including a summary evaluation of program effectiveness.

You can get help in preparing for a management evaluation or NAVINGEN inspection from the following sources:

- *NAVOSH Program Evaluation Guide for Shore Activities*, NAVSAFECEN PUB 5100/1
- NAVSAFECEN, Code 41, commercial phone number (804) 444-6043 or DSN 564-6043

## **INSPECTIONS AND INVESTIGATIONS BY OSHA OFFICIALS**

Certain ships, Navy Facilities, and private sector contractor sites at Navy facilities are subject to Department of Labor (DOL) inspections. The DOL carries out the Occupational Safety and Health Act (OSHACT). The OSHACT provides for the development, issuance, and enforcement of standards. Civilian employees, Navy or contractor, are protected by OSHA.

### **Contractor Inspections**

The OSHACT defines DOD contractors, operating from DOD or privately owned facilities located on or off Navy shore installations, as employers. They are subject to enforcement authority by federal and certain state OSHA officials.

Normally, federal and state OSHA officials are authorized to enter contractor workspaces without delay and at reasonable times to conduct inspections. However, officials must arrange to provide the proper credentials authorizing the inspection before their visit. They will be accompanied by representatives of the shore activity.

A state may exercise jurisdiction over OSH matters involving a contractor workplace at a Navy shore installation provided the state has an OSH plan approved by the Secretary of Labor.

Only federal OSHA officials may perform inspections in DOD contractor workplaces situated in areas where the United States holds exclusive federal jurisdiction, such as aboard naval vessels. Chapter 11 of OPNAVINST 5100.23C covers various federal jurisdiction exceptions and exemptions.

## **Navy Civilian Inspections**

Federal OSHA officials, acting as representatives of the Secretary of Labor, are authorized to conduct unannounced inspections of all Navy civilian workplaces. Exclusions are workplaces in foreign countries and military workplaces staffed exclusively with military personnel. Workplaces excluded from these inspections may be scheduled as part of DOL's targeted inspection program. This scheduling may occur as a result of an annual evaluation of the DOD OSH Program or in response to a complaint from a Navy civilian employee or employee representative. OSHA may also conduct an inspection solely at the discretion of the Secretary of Labor.

Navy activities employing civilians will have a designated coordinator with whom federal OSHA officials interface for inspection purposes. Before an inspection, OSHA officials must present their credentials and inform the chain of command of their visit. During the inspection, they must abide by certain restrictions in taking photographs and accessing records.

Federal OSHA officials are authorized to interview civilian employees or to be accompanied by employee representatives during the inspection. Reports and deficiency notices generated by federal OSHA officials are sent up the chain of command to the CNO. Special requirements exist concerning access to areas requiring security clearances.

As a safety supervisor, you should know that OSHA may inspect the work site of Navy civilians or contractors. Federal OSHA officials may inspect Navy civilian work sites. Federal and state OSHA officials may inspect contractor work sites. Aboard ship, only federal OSHA officials may inspect Navy civilian or contractor work sites (fig. 6-4).

If your work center or area is staffed exclusively with military personnel, OSHA officials have no jurisdiction and are not authorized to conduct work-site inspections. NAVOSH regulations cover inspections of work centers or areas staffed strictly with military personnel. Chapter 11 of OPNAVINST 5100.23C provides details on these inspections.

## **MISHAP REPORTING FOR SHORE ACTIVITIES**

In chapter 4, we discussed mishap investigation techniques and procedures. Mishap reporting differs for

	SHORE			AFLOAT		
	Contractor Workplaces	Civilian Employees' Workplaces	Exclusively Military Workplaces	Contractor Workplaces	Civilian Workplaces	Exclusively Military Workplaces
FEDERAL OSH REPRESENTATIVES	YES 4,5	YES 4,5	NO	YES 3,4,5	YES 3,4,5	NO
STATE OSH REPRESENTATIVES	YES 1,2,4,5	NO	NO	NO	NO	NO

**NOTE:**

1. State OSH plan must be approved by the Department of Labor. If state plan is not approved, access may be denied. However, states without approved OSH plan may inspect contractor work sites only if there is no relevant federal OSH standard applicable to the contractor workplace.
2. If the Navy facility is in an area of exclusive federal jurisdiction, state OSH representatives have no legal authority on the station and may be denied access to the facility.
3. Ships or service craft must be in port; Navy Department will not transport federal OSHA representatives to ships or service craft that are under way.
4. Federal and state OSH representatives have no jurisdiction over military operations or equipment. In addition, these officials are not authorized to inspect workplaces or operations for compliance with any standard implementing 10 U.S.C. 172 (explosive safety) or 42 U.S.C. Section 2012, 2021, or 2022 (nuclear safety).
5. Inspections may be announced or unannounced.

Figure 6-4.—Inspection of Navy workplaces by federal and state OSH representatives.

shore, afloat, and aviation activities. OPNAVINST 5100.23C and OPNAVINST 5102.1C, *Mishap Investigation and Reporting*, govern shore activity mishap reporting.

To track shore activity occupational injuries and illnesses, the OSH office uses the following logs and reports:

- Log of Navy Injuries and Occupational Illnesses (civilian and military), Local Form 5102/7
- OPNAV Safety Report (SR), OPNAV 5102/9 (used for personnel injury and material property damage)
- Annual Report of Navy Civilian Occupational Injuries and Illnesses, 1146-DOL-XX(5102)
- Annual Summary of Navy Civilian Occupational Injuries and Occupational Illnesses

These reports may bring certain mishaps to the attention of the OSH office. The OSH office then conducts an investigation of that mishap. If the mishap meets the criteria of a reportable mishap, the OSH office

ensures a mishap report is prepared. Mishap reports are sent to the Naval Safety Center, which maintains mishap statistics for military and civilian mishaps.

#### Reportable Shore Mishaps

Any injury, fatality, or occupational illness occurring ashore that results in one or more of the following events will be investigated and reported:

- A fatality or hospitalization of five or more people.
- A lost workday case that prevents a military person from performing regularly established duty or work for a period of 1 day or more before 2400 on the day of injury or onset of illness; or a lost workday case that causes a civilian employee to miss work for a full shift on any day before the day of injury or onset of illness. Only lost workday cases resulting in 5 or more days away from work are reportable to the Naval Safety Center.
- Electric shock resulting from an equipment design deficiency.

- Chemical or toxic exposure or an oxygen deficiency requiring medical examination or attention.

- A student mishap at a training command that results in any interruption or cessation of formal training in which at least 1 day of instruction is lost or the student is rolled back or disenrolled from the course.

- A contractor mishap caused by contractor operations that results in reportable injury or occupational illness to military or on-duty civilian personnel.

- Fires, injuries, and fatalities associated with fires.

- Material (property) damage occurring ashore involving a repair or replacement cost of \$10,000 or more as a result of a mishap. Cost of repair or replacement includes cost of labor; all DOD man-hours will be computed at \$16 per hour for that purpose. Examples of reportable mishaps are those involving the improper operation or maintenance of equipment, improper ashore cargo handling, and equipment casualties caused by electrical faults. Damage to small craft and service craft assigned to a shore activity is also reportable.

- Explosive and conventional ordnance mishaps.

- DOD motor vehicle mishaps involving collisions with other vehicles; pedestrians or bicyclists struck by a motor vehicle or other objects; personal injury or property damage caused by cargo shifting in a moving vehicle; personal injury in moving vehicles or from falls from moving vehicles; towing or pushing mishaps; and other injury or property damage when on or more of the following conditions result:

1. At least \$2,000 property damage
2. A fatality or lost-time injury (5 or more lost workdays)
3. A fatality or injury requiring treatment greater than first aid to non-DOD personnel

- A traffic mishap that does not involve a government motor vehicle but results in a fatality or lost-time injury (5 or more lost workdays) to military personnel or to on-duty DOD civilian personnel or results in \$2,000 damage to DOD property. Collisions involving pedestrians or bicyclists struck by a motor vehicle and other objects are to be included if reporting requirements are met.

- Off-duty, recreation, athletic, and home mishaps. (Chapter 11 of this manual covers the Recreation, Athletics, and Home Safety Program.)

- Diving mishaps if they result in a fatality—regardless of the time between the diving incident and death or whether hyperbaric treatment-recompression therapy was conducted as a result of aviation bends or a diving mishap—or any diving injury that results in 5 or more lost workdays.

An exception to these shore mishap reporting requirements is made for aircraft and aviation accidents. Chapter 8 of this training manual covers naval aviation safety.

### **Special Investigations for Shore Mishaps**

If an occupational on-duty shore mishap results in a fatality or hospitalization of five or more persons, the responsible echelon 2 command initiates an investigation within 48 hours of notification of the mishap. The echelon 2 command establishes an investigative team to examine the cause of the mishap and recommend corrective action. The leader of this team may be either from headquarters or from a subordinate command other than the mishap activity. This team leader must be a senior line officer (O-5 or above) or an OSH professional. The Naval Safety Center may also provide a team member. An investigation is not required for motor vehicle mishaps or for mishaps exclusively involving contractor personnel.

The mishap investigation team reports its findings to the Naval Safety Center, Chief of Naval Operations (N9), and the chain of command in a detailed For Official Use Only mishap report.

### **Formats for Reporting Shore Mishaps**

The five formats for reporting shore mishaps, as provided in OPNAVINST 5102.1C, are as follows.

- Diving Mishap/Hyperbaric Treatment/Death Report, OPNAV 5102-5
- Explosive Mishap Report (EMR)/Conventional Ordnance Deficiency Report (CODR), DD-FM&P(AR) 1020(5102)
- Motor Vehicle Mishap Report, OPNAV 5102-4
- OPNAV Safety Report (SR), OPNAV 5102/9 (for personnel injury and material damage)

These reports must be submitted to the Naval Safety Center within 30 days of the mishap, except as directed in special cases in OPNAVINST 5102.1C and OPNAVINST 5100.23C.

### **SUMMARY**

In this chapter you learned the NAVOSH Program requirements specific to shore activities. You learned about organization and staffing, OSH training

programs, and occupational health program fundamentals. You reviewed workplace monitoring and NAVOSH inspections as well as inspections by OSHA officials.

You learned the different mishap reporting requirements for Navy civilian, military, and contractor personnel at shore activities. You also learned the importance of carefully coordinating NAVOSH and OSHA regulations to ensure worker protection.





## CHAPTER 7

# AFLOAT SAFETY

Ships and submarines present unique hazards not found at shore industrial activities. As discussed in chapter 1, Department of Defense (DOD) safety directives allow for the adjustment of Occupational Safety and Health Administration (OSHA) safety standards for military systems and equipment. We must attain the highest possible safety standards within these limitations. As we have a separate safety program for shore activities and aviation, we address afloat safety standards in its own directive, OPNAVINST 5100.19B, *Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*. Another instruction (OPNAVINST 5100.21B, *Afloat Mishap Investigation and Reporting*) includes additional requirements for shipboard safety.

The Afloat Safety Program applies to all DOD military and on-duty civilian personnel assigned to or embarked in a U.S. Navy vessel. The program also covers U.S. Naval Reserve and Military Sealift Command (MSC) vessels manned by military personnel and civil service employees. Because of the manning complexities of MSC ships, a command may tailor some administrative procedures for MSC ship application. However, the procedures must provide protection equal to, or better than, those contained in OPNAVINST 5100.19B.

In this chapter, we will address the following topics:

- Afloat Safety Program background and goals
- Afloat Safety Program elements
- Afloat Safety Program organization
- Shipboard safety organization
- Afloat safety training
- Afloat Safety Program evaluation
- Surface ship safety standards
- Afloat mishap reporting

### AFLOAT SAFETY PROGRAM GOALS

Attaining the highest degree of operational readiness and mission accomplishment is the primary goal of the Afloat Safety Program. We achieve this goal

by eliminating or controlling hazards. By achieving this goal, we reduce injuries, deaths, and material damage.

Another goal of the program is to setup and maintain a fleetwide atmosphere of safety consciousness. This awareness must be foremost in every evolution of the program. To achieve the Afloat Safety Program goals, we must strive for constant improvement through positive leadership. We need personnel at all levels to take part in the Afloat Safety Program. We also need the support of those who oversee the program in helping to ensure compliance. You can easily see how your role as a supervisor fits into this program.

The critical, first step in achieving the Afloat Safety Program goals is hazard identification. Hazard identification requires all levels of the chain of command to practice safety awareness by continuously watching for hazards. Preventing mishaps depends on the elimination, control, and correction of hazards. We discussed hazard abatement in chapter 3.

Remember, you cannot eliminate some hazards. In such cases, you can reduce the risk through engineering controls, administrative controls, and personal protective devices. OPNAVINST 5100.19B, *Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, introduces specific requirements on hazard awareness, identification, reporting, and correction. All commands should take the following actions:

- Report unsafe or unhealthful conditions, without fear of reprisal
- Take positive action on all reports of unsafe conditions
- Correct unsafe conditions based on the severity of the hazard
- Investigate and report mishaps and near mishaps and rapidly issue lessons learned to prevent recurrence

### AFLOAT SAFETY PROGRAM ELEMENTS

The Afloat Safety Program encompasses a variety of operational safety, general safety, and health program

elements. Various directives contain safety guidance and standards. Commanding officers will use them to set up their shipboard safety program. For a list of references providing detailed safety program guidance, refer to enclosure (11) of OPNAVINST 5100.21B, *Afloat Mishap Investigation and Reporting*. This enclosure refers you to other directives for safety standards to prevent you from studying duplicate and conflicting information.

You can find most of the shipboard safety standards in the NAVOSH *Program Manual for Forces Afloat*, OPNAVINST 5100.19B. Volume I contains detailed program administration requirements. Volume II provides safety standards for surface ships, and volume III provides submarine safety standards. Volumes II and III replace the superseded instruction, *Safety Precautions for Forces Afloat*.

The following publications also contain safety precautions:

- *Naval Ships' Technical Manuals (NSTMs)*
- *General Specifications for Ships of the United States Navy (GENSPECS)*
- *General Specifications for Overhaul of Surface Ships (GSO)*
- Naval Sea Systems Command instructions
- Bureau of Medicine and Surgery instructions
- Ordnance publications (OPs)
- Fleet and type commander directives

### **AFLOAT SAFETY PROGRAM ORGANIZATION**

Primary responsibility for directing the Afloat Safety Program rests with the chain of command. The chain of command includes commanding officers, executive officers, department heads, division officers, division leading petty officers, and work center supervisors. It also includes the individual sailor or MSC civilian worker. Chapter 1 discussed a typical ship safety organization. The safety organization provides a means to introduce the program and set it in motion.

All levels in the chain of command have some specific safety duties and responsibilities. You should consult the following instructions for further information on specific duties and responsibilities:

- *Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B
- *Standard Organization and Regulations of the U.S. Navy*, OPNAVINST 3120.32C
- *Afloat Mishap Investigation and Reporting*, OPNAVINST 5100.21B
- *U.S. Navy Regulations, 1990*

### **CHIEF OF NAVAL OPERATIONS**

The Chief of Naval Operations (CNO) is responsible for executing and managing the Afloat Safety Program. The CNO ensures safety training is provided to all U. S. Navy afloat commanding officers, executive officers, department heads, and primary and collateral duty ship's safety officers. In addition, the primary duty safety officers assigned to readiness group and squadron staffs also receive safety training.

### **SYSTEMS COMMANDERS**

Systems commanders (COMNAVSEASYSKOM, COMNAVAIRSYSKOM, COMSPAWARSYSKOM, and COMNAVSUPSYSKOM) provide technical focus for comprehensive development, assessment, and administration of surface ship, air, and submarine safety programs. When requested, they help mishap investigation boards in the investigative process. Systems commanders respond to the recommendations and corrective actions developed by the type commanders. They also issue proper documentation to correct hazardous conditions. Finally, COMNAVSEASYSKOM maintains membership in the Safe Engineering and Operations Program (SEAOPS) for the landing craft, air cushion (LCAC) review committee.

### **CHIEF OF NAVAL EDUCATION AND TRAINING (CNET)**

Chief of Naval Education and Training (CNET) is responsible for ensuring that subordinate commands provide effective safety training at all levels in the chain of command. CNET also ensures that safety awareness is an extensive and integral part of every U.S. Navy training course.

### **COMMANDER, NAVAL SAFETY CENTER**

Commander, Naval Safety Center (COMNAVSAFECEN), supports the Assistant/Deputy Chief of

Naval Operations (N4, N87, N86, and N88) and the systems commanders in effecting, maintaining, and improving the Afloat Safety Program. COMNAVSAFECEN recommends revisions to OPNAVINST 5100.19B about safety standards for forces afloat and periodically reviews and revises OPNAVINST 5100.21B. Naval Safety Center personnel, also act as technical consultants for all afloat safety training. At least annually, COMNAVSAFECEN reports on the Afloat Safety Program compliance to the assistant Chiefs of Naval Operations. These reports are based on the analysis of data collected during safety surveys.

COMNAVSAFECEN provides an advisor to mishap investigation boards for Class A mishaps. The commander coordinates, with the type commander (TYCOM), recommendations for investigation of other than Class A mishaps that may warrant a mishap investigation board. When agreed upon with the type commander, COMNAVSAFECEN also provides an advisor for mishap investigation boards for other than Class A mishaps.

COMNAVSAFECEN determines, when appropriate and if requested, the privileged or nonprivileged status of all mishap investigation board evidence. COMNAVSAFECEN conducts the final review and analysis of mishap investigation reports (MIRs). He or she endorses MIRs and provides a copy to all endorsers. The Naval Safety Center retains, as the custodian, MIRs and the endorsements for at least 5 years. COMNAVSAFECEN checks the completion of corrective action resulting from an MIR.

Sanitizing MIRs and endorsements for use in safety training upon request is another COMNAVSAFECEN responsibility. Sanitizing includes removing all identifiable data that could connect the report to an individual, organization, or particular mishap. COMNAVSAFECEN promptly distributes essential information, such as lessons learned, to cognizant commands. The Naval Safety Center also maintains a centralized historical safety data repository.

## **TYPE COMMANDERS**

Submarine, surface, air, Naval Reserve, and MSC TYCOMs ensure subordinate afloat commands set in motion and maintain the Afloat Safety Program. Through group and squadron commanders, TYCOMs foster a positive atmosphere that encourages and demands continuous attention to hazard identification, mishap prevention, and proper reporting.

TYCOMs ensure the correction of documented hazards receives priority during availability planning. Additionally, they make sure subordinate units conduct timely and complete shipboard safety mishap investigations. A TYCOM directs the formal investigation of any Class B mishap. Additionally, a TYCOM directs a mishap investigation board in the investigation of other mishaps if the investigation may reveal vital safety information.

TYCOMs will provide and maintain the overall Quality Assurance (QA) Program as an integral part of mishap prevention. In maintaining the QA Program, they must strive to eliminate the hazards in dangerous shipboard systems. TYCOMs coordinate with the COMNAVSAFECEN, COMNAVSEASYSKOM, and other technical agencies in providing aid to the mishap board, when requested.

## **GROUP AND SQUADRON COMMANDERS**

Group and squadron commanders ensure subordinate commands execute and maintain the Afloat Safety Program according to the policy and philosophy of OPNAVINST 5100.19B. They must include elements of this program in command inspections, including evaluation of the QA process in maintaining shipboard systems. They also help units identify hazards beyond their capability to correct in the availability work package. The units should then schedule the correction of these hazards.

Additionally, group and squadron commanders ensure subordinate commands include mishap prevention, investigation, and reporting in their group and squadron training requirements. The TYCOM directs this training. Finally, group and squadron commanders make sure commanding officers are informed of hazardous conditions and of specific hazards identified by a mishap investigation.

## **GROUP OR SQUADRON SAFETY OFFICER**

The group or squadron safety officer acts as the principal advisor to the commander for the Afloat Safety Program. Group and squadron safety officers were first assigned as a primary duty in 1991. These full-time safety officers provide continuity in the chain of command for safety matters from the ships to the TYCOM.

The group or squadron safety officer maintains appropriate safety records and mishap statistics. He or she then makes this information available to a mishap board upon request. The group or squadron safety

officer aids subordinate commands in conducting safety mishap investigations for all other reportable and special case mishaps. Assuring distribution of safety information and lessons learned resulting from mishap investigations is an additional responsibility of the group or squadron safety officer.

The group or squadron safety officer schedules and coordinates mishap prevention and hazard awareness training with the group or squadron training officer. The safety officer helps subordinate commands in rating their compliance with suitable instructions and in rating the effectiveness of their safety and QA programs. The group or squadron safety officer also coordinates with the staff material officer to ensure that the Current Ship's Maintenance Projects (CSMPs) identify hazards beyond ships' force capability to correct.

### **SHIPBOARD SAFETY ORGANIZATION**

Chapter 1 discusses the shipboard safety organization in detail. OPNAVINST 5100.21B outlines some of the specific duties of the shipboard safety organization dealing primarily with mishap investigation and reporting.

### **COMMANDING OFFICERS, MASTERS, AND CRAFTMASTERS**

Commanding officers, masters, and craftmasters must conduct an aggressive, positive Afloat Safety Program based on OPNAVINSTs 5100.19B and 5100.21B. They ensure all mishaps are investigated and assist mishap investigation boards in their investigations. The safety officer acts as the principal advisor to the commanding officer for the Afloat Safety Program.

### **AFLOAT SAFETY OFFICERS**

The afloat safety officer reports directly to the commanding officer in matters about hazardous or unsafe conditions or operations. The safety officer reports through the executive officer for matters on program administration, program deficiencies, and corrective action status. The safety officer helps the commanding officer conduct mishap investigations for all reportable mishaps not investigated by mishap investigation boards.

In case of a mishap, the safety officer aids the commanding officer in the following responsibilities:

- Making an accurate plot of the scene

- Taking photographs or making videotapes of the wreckage, its distribution, and the surrounding area
- Diagraming any underwater damage
- Submitting the appropriate report (fig. 7-1)

### **DEPARTMENT HEADS, DIVISION OFFICERS, AND WORK CENTER SUPERVISORS**

Department heads, division officers, and work center supervisors include information on mishap prevention and investigations in general military training (GMT). They must emphasize the positive, all-hands approach to safety awareness and hazard identification. They must report hazards as outlined by OPNAVINST 5100.19B. They also must inspect all work and make sure all repair actions under their responsibility conform with QA procedures.

### **ALL HANDS**

All hands must know and obey all safety precautions and standards. They must report suspected unsafe or unhealthful work procedures or conditions to their immediate supervisor. In addition, personnel must report any injuries, occupational illnesses, or property damage resulting from a mishap to their supervisors. Finally, they should help all safety investigators by voluntarily providing mishap information.

### **AFLOAT SAFETY TRAINING**

The key to a successful safety program is quality training. CNET provides safety training at all levels in the chain of command. The *Navy Occupational Safety and Health (NAVOSH)/Hazardous Material Control and Management (HMC&M) Navy Training Plan*, NTP S-40-8603, requires that all U.S. Navy courses, from recruit through commanding officer training, include safety topics. The plan also requires the periodic review and revision of safety courses to ensure they reflect current safety standards.

### **SHIPBOARD SAFETY TRAINING**

Building and expanding upon NAVOSH formal training requires an effective, onboard training effort. The safety officer and the organization of division safety petty officers provide a cadre to execute onboard training. All shipboard personnel will receive Afloat

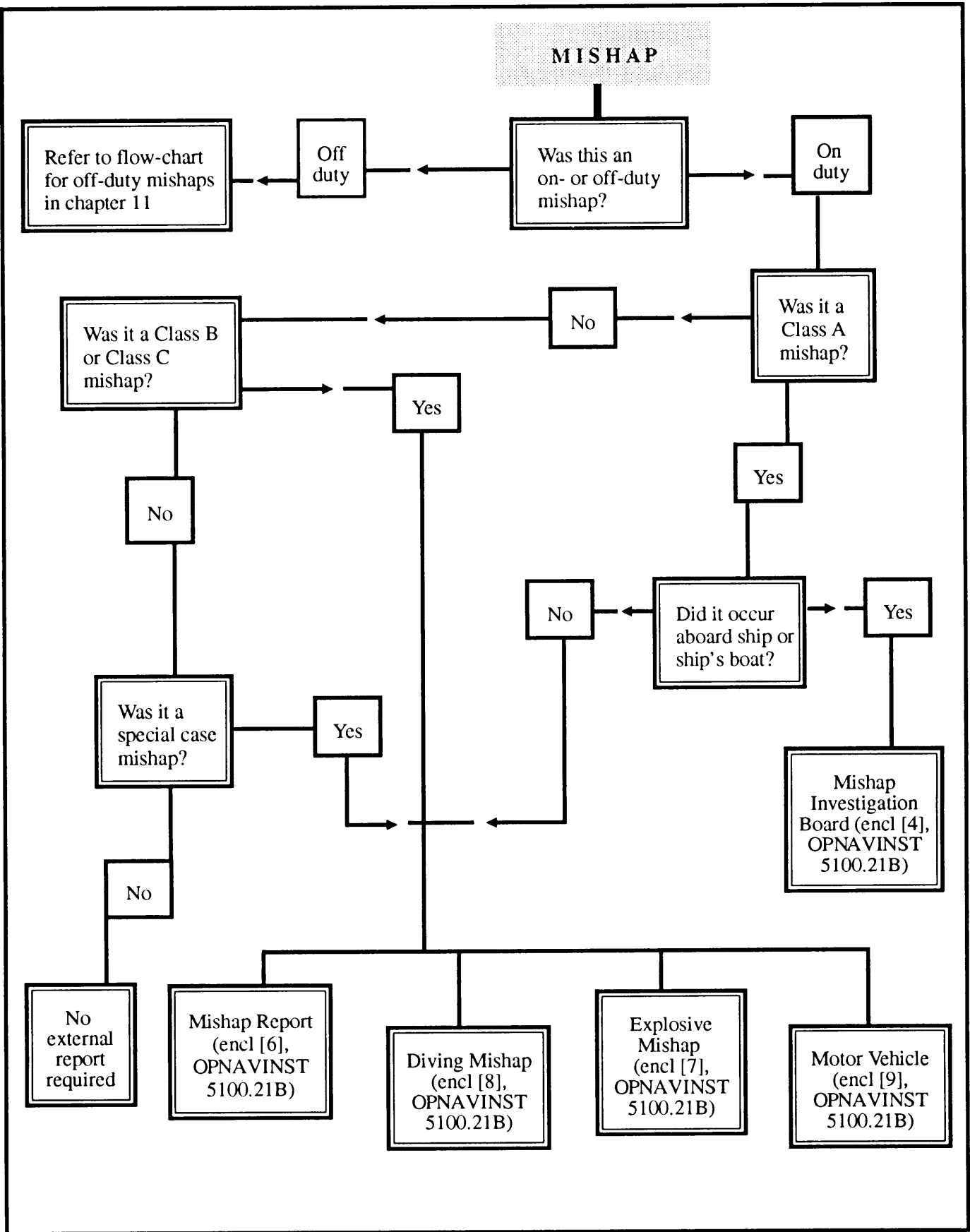


Figure 7-1.—Afloat mishap pathfinder.

Safety Program indoctrination and annual refresher training that includes the following topics:

- An introduction to the Afloat Safety program, the identity of key safety personnel, and the identity of safety chain of command personnel
- Detailed information on mishap prevention, investigation, and reporting with emphasis on privileged information
- Safety precautions and safety standards
- Hazard identification and reporting procedures

You may wish to use the *NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, in conducting the shipboard training required by OPNAVINST 5100.19B. The training guide combines occupational health and safety subject matter into 20 generic lesson guides, complete with quizzes and handouts. It also provides lists of available training aids, video tapes, and formal course information. It supplies a sample long-range training plan, references, and a technical assistance guide.

Instructors for the afloat training guides should be E-5 or above, preferably safety petty officers or medical department representatives. The instructor does not have to be a subject matter expert. Make afloat safety and occupational health training apart of your command training plan. Include it as GMT in the long-range training plan for your ship.

## **FORMAL TRAINING FOR SHIPBOARD SAFETY AND HEALTH PROGRAMS**

In addition to shipboard training, several shore courses are offered for shipboard personnel. Fleet training centers, the Naval Safety Center, the Naval Safety School, and Navy Environmental and Preventive Medicine Units (NEPMUs) conduct the training. The NAVOSH training incorporated into these courses reinforces basic and specialty training. This training provides direct support toward the management of hazard-specific programs associated with the NAVOSH Program. Formal NAVOSH training provides personnel with information on how to detect hazards, perform surveillance, report deficiencies, report mishaps, conduct training, and achieve program elements. The *NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, lists these courses.

Formal safety training was upgraded in 1991 in response to a tasking from the Chief of Naval Operations for an improved Afloat Safety Program. The Naval

Safety Center developed two new safety officer courses and helped to revise the safety supervisor course. The following formal training is provided for the surface ship and submarine safety organization:

### **AFLOAT SAFETY OFFICER COURSE**

(A-4J-0020)—This 10-day course trains commissioned officers, warrant officers, and Military Sealift Command first officers who have been or will be assigned as a command's safety officer. The course concentrates on preparing primary and collateral duty safety officers to manage the program aboard their commands. The Surface Warfare Officer School staff in Newport, Rhode Island, presents the course, which they export to major fleet home ports.

The course uses OPNAVINST 5100.19B to provide instruction on hazard identification (inspections and industrial hygiene surveys), medical surveillance, and hazard abatement. It also covers program evaluation, training, safety standards and regulations, and the Safety Council and Enlisted Safety Committee. It also addresses the major hazard-specific and support programs and the detailed instruction on mishap investigation and reporting. This course is required for staff and shipboard primary and collateral duty safety officers.

### **SUBMARINE SAFETY OFFICER COURSE**

(F-4J-0020)—This 4-day course is a condensed version of the 10-day Afloat Safety Officer course. It is tailored exclusively for submarine, collateral-duty safety officers. The submarine training facilities at Norfolk, Virginia, and Pearl Harbor, Hawaii, present the course. This course provides the same topics as the afloat course but drops the surface-ship-unique topics. All collateral duty submarine safety officers should complete either this course or the Afloat Safety Officer course.

### **SAFETY PROGRAMS AFLOAT COURSE**

(J-493-2099)—This 5-day course, presented at fleet training centers, provides specialized NAVOSH training to senior enlisted personnel. Anyone who takes the course must be an E-5 or above who has been, or will be, assigned to duty as a division safety petty officer or safety supervisor. One-half of the division safety petty officers from each ship will attend this course before, or within 6 months of, their assignment. Training covers information on workplace monitoring, hazard identification, hazard abatement, and deficiency correction. In addition, personnel receive training on rating the division safety program, safety standards and regulations, mishap or near-mishap investigations, and division safety training.

Division safety petty officers also receive training on the enlisted safety committee, using and caring for personal protective equipment, and advising the division officer on safety matters. This course helps the student develop and maintain an effective division safety program.

### **AFLOAT SAFETY PROGRAM EVALUATION**

The principle way commands discover hazards is through workplace inspections. The command's supervisors direct the workplace inspections. They arrange for appropriate safety and health personnel to evaluate ship's spaces and equipment. They also routinely observe operations at the jobsite. Onsite observations enable supervisors to detect and correct hazards resulting from noncompliance with the safety standards contained in OPNAVINST 5100.19B, volumes II and III.

Commands use industrial hygiene surveys as another method of identifying and evaluating workplace hazards. Professional industrial hygienists conduct these surveys to evaluate each workplace for occupational hazards and physical stressors. This survey identifies medical surveillance requirements. The examinations detect adverse health effects resulting from health hazardous exposure associated with duties.

### **ANNUAL WORKPLACE SAFETY INSPECTIONS**

Every workspace on board ship should be inspected for safety hazards at least once a year. The safety officer will ensure this inspection is conducted. An experienced officer, accompanied by a division safety petty officer (or aboard submarines, a submarine-qualified senior petty officer from the division), is assigned to accomplish the safety inspection of a workplace.

Appendix A3-A of OPNAVINST 5100.19B provides inspection guidance in the form of checklists. Safety inspections of all workspaces/equipment need not be conducted at one time. During regularly scheduled zone inspections, you can designate certain spaces to receive "safety" zone inspections. These zone inspections will make up the safety inspection. The completed Workplace Inspection Form with an accompanying deficiency list, such as a Zone Inspection Deficiency List (ZIDL), is returned to the safety officer upon completion of the inspection. That allows the hazards to be documented and followed for corrective action.

### **INDUSTRIAL HYGIENE SURVEYS**

This survey quantifies hazardous exposures associated with health-hazardous operations based on actual measurements. We discussed industrial hygiene services in chapter 5. The industrial hygiene survey provides the following information:

- Summary of NAVOSH Program compliance
- List of asbestos hazards
- List of eye hazardous areas
- Respiratory protection requirements
- Lead hazard areas or processes
- Medical surveillance requirements
- Other data from measurements and air sampling

Industrial hygiene surveys are conducted between the completion of each yard period and before deployment. These surveys will normally be accomplished by a Navy Environmental and Preventive Medicine Unit (NEPMU) or a tender or aircraft carrier industrial hygiene officer. The safety officer should keep a copy of the survey report and follow up on corrective actions.

### **JOBSITE OBSERVATION**

It is amazing how many people can walk right by a hazard and not notice it! Every supervisor, of every rank, has an obligation to be on the lookout for hazards. Most hazards are identified through jobsite observation.

The commanding officer, executive officer, safety officer, department heads, division officers, and work center supervisors should routinely walk through workspaces during the workday or during evolutions to observe jobsite performance. They should make these observations to detect and correct hazards resulting from worker noncompliance with safety standards.

Supervisors should correct those hazards that can be corrected—on the spot—and document all others. They may need to take temporary measures to prevent a mishap until a permanent correction is made.

### **MASTER-AT-ARMS FORCE INSPECTIONS**

Members of the master-at-arms (MAA) force act as roving safety inspectors during their normal tours of the command. They must be alert to any deficiencies or hazards that could result in injury to personnel or

damage to equipment. They assist the safety officer in keeping the NAVOSH Program visible to all hands. They attempt to have any observed deficiency or hazard corrected “on the spot.” If that is not possible, they will report the deficiency to the safety officer or their supervisor. Although submarines do not have an MAA force, roving watch standers can still be on the lookout for hazards.

## NAVSAFECEN SAFETY SURVEYS

Ships should request a Shipboard Safety Survey from the Naval Safety Center once every 3 years (2 years for submarines). The NAVSAFECEN conducts the Shipboard Safety Survey, which takes 1 or 2 days. During the survey, NAVSAFECEN looks at representative operations throughout the ship. It identifies safety hazards, trains safety officers and safety petty officers, and provides the commanding officer with an evaluation of the safety status of the command. Since the intent of the survey is to promote hazard awareness, the survey report is made only to the ship. No grade or relative standing is assigned, and follow-up reports are not required.

## FORMAL SAFETY INSPECTIONS

Many formal inspections conducted afloat and ashore review safety procedures and conditions. The Board of Inspection and Survey (INSURV), under the administration of the CNO, conducts a material inspection of ships. This inspection, taking 3 to 5 days (part of which is under way), takes place 4 to 6 months before a regular overhaul, or about every 3 years. INSURV also inspects ships before their de-commissioning and inspects (through sea trials, acceptance trials, or final contract trials) newly constructed ships. One area the Board inspects is NAVOSH. This area of the inspection includes a thorough examination of the ship’s programs, training, administration, and material condition. The following are examples of other formal inspections conducted aboard ships, which cover elements of the NAVOSH Program:

- Operational propulsion plant examination (OPPE)
- Light-off examination (LOE)
- Logistics management assessment (LMA)
- Medical readiness inspection (MRI)

- Command inspection by the immediate superior in command (ISIC) or type commander (TYCOM)
- Various weapons and radiological controls inspections
- Intermediate maintenance activity (IMA) audit/maintenance material inspection (MMI) (tenders only)

Preparation for any of these formal inspections is extensive and time consuming, especially if you don’t keep the programs up to date. A routine self-inspection and survey program can help you stay ahead of hazard correction and keep your command ready for inspection. Volume I of OPNAVINST 5100.19B provides checklists at the end of every chapter. These checklists help you evaluate your program and determine your course of action for inspection preparations.

## SURFACE SHIP SAFETY STANDARDS

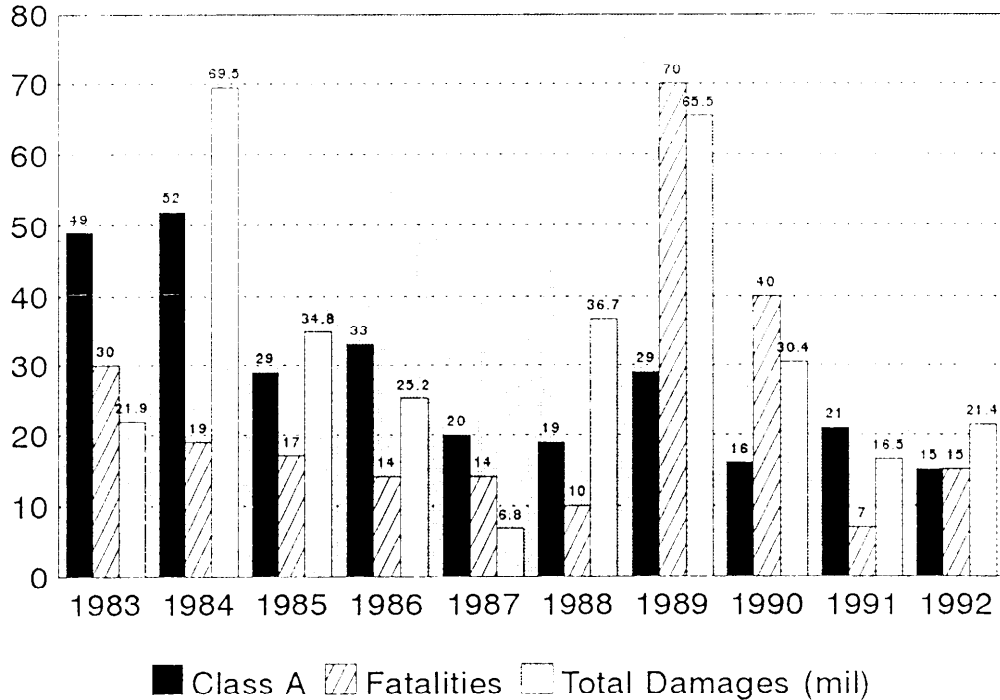
As stated earlier, shipboard life is one of the most hazardous working and living environments in existence. The existence of hazardous materials and equipment contributes to the creation of a mishap-prone environment. A ship is a constantly moving platform subject to conditions such as weather, collision, and grounding. These conditions help to create a mishap-prone environment. Therefore, you can see how dangerous a ship’s environment can be. Any chain of events could lead to a major catastrophe. Because of that, personnel must follow both **PRACTICAL SAFETY** and prescribed **SAFETY REGULATIONS** to prevent personal injury and illness.

Every time a mishap occurs involving a violation of an afloat safety standard, you should once again bring the standard to the attention of all personnel. You can do that by using Plan of the Day (POD) notes or division training at quarters. Most sailors receive instruction on safety standards at recruit training and at advanced training schools. However, don’t forget the new crewmember reporting on board! Give him or her a copy of the afloat safety standards found in chapter C1 (for surface ships) and chapter D1 (for submarines) of OPNAVINST 5100.19B. Briefing the new crewmember on the intent and importance of the standards is important.



We will now examine general safety standards that apply to all shipboard operations and spaces. **The following 40 standards may save your life!**

1. Locate and remember all exits from working and living spaces that you frequent.
2. Know the storage location of life jackets in or near working and living spaces.
3. Make sure you secure or lash down all movable objects in your spaces.
4. Always wear clothing that snugly fits your body.
5. Carry a load in a reamer that allows one hand to be free when practical.
6. Always move up or down a ladder with one hand on the railing.
7. Know the emergency shutdown procedures for all equipment you use.
8. Make sure you do not block exits with equipment or boxes.
9. Ensure ventilation ducts are free of blockage.
10. Prohibit horseplay aboard ship.
11. Prevent personnel from wearing rings, watches, key rings, and other items that might become entangled or caught on projections.
12. Always wear approved safety shoes when the job requires it.
13. Carry as little in your pockets as possible.
14. Walk, don't run in passageways.
15. Be cautious when nearing a "blind" corner.
16. Know the location of all lifeboat and liferaft stations. Know how to proceed to them from your living and working spaces.
17. Identify the location of all fire stations and other fire-fighting equipment in or near your living or workspaces.
18. Keep constantly familiar with the whereabouts of crewmembers in the space where you are working. That is especially important if the work is in tanks, voids, or other restricted-movement areas.
19. Smoke only in designated areas.
20. Use equipment in an authorized manner, and make sure it is used only by authorized personnel.
21. Wear sunglasses topside only.
22. Close and dog watertight doors if so designated during normal operations.
23. Know the location of life rings, watermarkers, and flares.
24. Know the areas where you should wear protective equipment.
25. Inform senior personnel responsible for a given space or equipment if you discover unsafe conditions.
26. Do not lean against lifelines.
27. Keep decks free of obstacles and materials causing slippery conditions. Post slippery areas with a warning sign. Make sure you install nonskid around machinery work areas.
28. Provide temporary protection by guardrails or chains, suitably supported by stanchions or pads, when opening accesses in bulkheads or decks normally closed.
29. Never straddle or step over lines, wire, and chains under tension.
30. Wear a life jacket topside where the potential exists of falling, slipping, or being thrown or carried into the water.
31. Never lock escape scuttles so personnel cannot open them from the inside.
32. Never dismantle or remove any lifeline or hang or secure any weight or line to any lifeline except as authorized by the commanding officer.
33. Never dismantle or remove any inclined or vertical ladder without permission from the commanding officer. Secure such areas with temporary lifelines and post with a warning sign.
34. Never operate machinery or equipment with defective safety devices without permission of the commanding officer.
35. Never tamper with or render ineffective any safety device, interlock, ground strap, or similar device intended to protect operators or equipment without the approval of the commanding officer.



89-Iowa (47), 90-Saratoga (21) deaths

Figure 7-2.—Afloat mishaps from 1983 through 1992.

36. Never open or close electrical switches and pipe valves unless authorized to do so.
37. Make sure you pad low overheads above inclined ladders (72 inches) and passageways (75 inches).
38. Color-code hazardous areas around machinery and elevators to warn people of danger areas.
39. Rig heavy weather lifelines before expected inclement weather.
40. Attach a safety line to workers when working in a tank or void.

#### AFLOAT MISHAP REPORTING

In late 1989, in response to a rash of shipboard mishaps, the Chief of Naval Operations (CNO) called a Navywide safety standdown (fig. 7-2). After the standdown, CNO tasked Commander, Naval Safety Center (COMNAVSAFECEN) with providing

recommendations to improve our safety programs among ships and submarines. These recommendations were as follows:

- Establish better afloat mishap investigation and reporting procedures.
- Add primary duty safety officers to group and squadron staffs and large ships (crew greater than 500).
- Upgrade safety training.

Safety officials found that although the aviation community was thorough in its investigation of serious mishaps, ships were ineffective in reporting mishaps. Without detailed investigations, we were unable to provide lessons learned in a timely manner. CNO directed COMNAVSAFECEN to create an afloat safety program patterned after the Aviation Safety Program in OPNAVINST 3750.6Q.

OPNAVINST 5100.21B provides detailed procedures and report formats for afloat mishap investigation and reporting.

Although safety professionals were assigned to type commander staffs, no primary duty safety officers served within the chain of command between the safety professionals and the ships. Beginning in 1991, primary duty safety officers were assigned to readiness squadrons and group staffs. Primary duty safety officer billets were also added to fast combat support ships (AOEs). Other large ships already had primary duty safety officers. Ships with a crew of less than 500 personnel were to assign a collateral duty safety officer. All of these assignments provided continuity and assistance throughout the chain of command for safety issues.

During the period following 1991, safety training needed to be upgraded. New directives and emphasis on safety required a safety officer to have more in-depth knowledge and capabilities. Therefore, the CNO tasked NAVSAFECEN to develop a 10-day afloat safety officer course, now presented by Surface Warfare Officer School in Newport, Rhode Island.

In 1992, NAVSAFECEN developed a 4-day submarine safety officer course, now presented by the submarine training facility in Norfolk, Virginia, and the Naval Submarine Training Center in Pearl Harbor, Hawaii. The course for safety petty officers offered at fleet training centers was upgraded from 4 to 5 days and expanded to include additional safety skills. Afloat safety training was also added to many surface warfare officer courses, enlisted “A” and “C” schools, and recruit training.

When afloat mishaps occur, accurate mishap investigation and reporting serves to prevent mishap recurrence. We derive our general safety mishap investigation and reporting procedures from DOD Instruction 6055.7, *Mishap Investigation, Reporting, and Recordkeeping*. We discussed mishap investigation procedures in chapter 4. Investigative procedures are similar no matter where the mishap occurs. What mishaps are reportable and the procedures used to report mishaps are different for afloat, ashore, and aviation mishaps. OPNAVINST 5100.21B, *Afloat Mishap Investigation and Reporting*, provides **specific** reporting procedures for those mishaps occurring aboard surface ships and submarines.

DODINST 6055.7 provides for the various mishap categories and types of reports. The “class” of mishap is determined by the cost of damage and extent of injury

or fatality. The reports are classified as either a **General Use Mishap Report** or **Limited Use Mishap Report**.

We define an afloat mishap as any mishap caused by DOD operations resulting in injury, work-related illness, or death to embarked DOD military or civilian personnel. An afloat mishap also includes material loss or damage occurring on board all afloat U.S. Navy units and their embarked craft. Shipboard mishap investigation and reporting procedures apply to mishaps occurring on board all U.S. Navy vessels and their embarked or leased craft.

## AFLOAT REPORTABLE MISHAPS

The categories of reportable afloat mishaps are as follows:

- **Class A Mishap.** Reportable damage of a total cost of \$1,000,000 or more or any injury or work-related illness resulting in death or permanent total disability. All Class A mishaps require investigation by a mishap investigation board and the submission of a Mishap Investigation Report (MIR). OPNAVINST 5100.21B provides the MR format.

- **Class B Mishap.** Reportable property damage of a total cost of \$200,000 or more, but less than \$1,000,000; an injury or work-related illness resulting in permanent, partial disability; or a mishap resulting in the hospitalization of five or more people. A Class B mishap requires the submission of a Mishap Report (MR) to the Naval Safety Center. OPNAVINST 5100.21B provides the MR format.

- **Class C Mishap.** Reportable property damage of a total cost \$10,000 or more, but less than \$200,000; or an injury preventing an individual from performing regularly scheduled duty or work beyond the day or shift on which the mishap occurred; or a nonfatal illness or disability causing loss of time from work or disability at any time (lost time case). A Class C is only reportable in an MR under the following conditions:

- The total cost of reportable property damage is \$10,000 or more, but less than \$200,000.
- It results in an injury preventing an individual from performing regularly scheduled duty or work 5 days beyond the day or shift on which the mishap occurred.

- **Special Case Mishaps.** For data collection and analysis purposes, the following special case mishaps are reportable to the NAVSAFECEN in an MR:

- All cases of electric shock.
- All cases of toxic, hazardous chemical, or hazardous material exposure requiring medical attention.
- All cases of oxygen deficiency requiring medical attention.
- All cases of back injury requiring medical attention.
- All mishaps involving explosives, oxidizers, incendiaries, explosive systems, or chemical warfare agents. They include mishaps resulting from the detonation, accidental launch, malfunction, dangerous defect, or improper handling of a weapon; damage to a launching device; a weapon impact off-range; or any other unusual or unexpected weapons-related occurrence. They are reported using the information and format provided in OPNAVINST 5100.21B. An explosive mishap that meets the criteria for an afloat Class A mishap requires a formal mishap investigation and the submission of an MIR.

## **OFF-SHIP REPORTABLE MISHAPS**

Mishaps that occur off ship (on or off duty) are normally reported using OPNAVINST 5100.21B. However, mishap investigation boards are not required for off-ship fatalities. Off-ship mishaps include home, athletics, recreation, motor vehicle, and diving mishaps. They are reportable as follows, based on OPNAVINST 5100.21B:

- Report off-duty mishaps resulting in a fatality, 5 or more lost workday injuries, or greater than \$10,000 government property damage to the NAVSAFECEN using a Recreation, Athletics, and Home Safety (RAHS) Report. Enclosure (10) of OPNAVINST 5100.21B gives the format for this report.
- Bicycle, pedestrian, motorcycle, and motor vehicle mishaps involving a fatality, 5 or more lost workday injuries, or greater than \$2,000 government property damage are reportable to the NAVSAFECEN. Enclosure (8) of OPNAVINST 5100.21B contains the format for this report.
- Off-duty diving mishaps are reportable if they involve a fatality, 5 or more lost workdays because of injury, or the need for hyperbaric treatment. Submit a

diving mishap report for recreational diving mishaps that do not require hyperbaric treatment. Enclosure (7) of OPNAVINST 5100.21B gives the format for the diving mishap report.

Other than Class A mishaps, reportable and special-case mishaps are the responsibility of shipboard personnel to investigate. The safety officer conducts an informal mishap investigation, as discussed in chapter 4. The safety officer has 30 days from the time of the mishap to submit the appropriate report. Shipboard mishaps involving other civilian or foreign personnel are not reportable under OPNAVINST 5100.21B. You may request guidance from COMNAVSAFECEN on mishap investigation and reporting requirements.

## **PRIVILEGED INFORMATION**

Since a thorough safety mishap investigation cannot be conducted if the witnesses are afraid or reluctant to provide information, they are assured that the board will keep their testimony in confidence. Since the MIR is a limited-use report that is not releasable under the Freedom of Information Act (FOIA), we can protect witness testimony and other mishap board deliberations from being used for other than safety purposes. We call this protected information “privileged” information. We discussed privileged information in more detail in chapter 4.

## **MISHAP INVESTIGATION BOARDS**

Superiors in the chain of command appoint a formal mishap investigation board to investigate all afloat Class A mishaps on surface ships. The board consists of at least three members. The immediate superior in command (ISIC) of the ship or craft involved in the mishap appoints the senior member of the board. These board members are appointed in writing and will include a medical member if the mishap involved a fatality or injury.

COMNAVSAFECEN sends a mishap investigation advisor to help each board. This advisor is not a member of the board, but assists the board in conducting the investigation. The board may also request technical assistance, such as technical representatives and forensic experts. Technical assistants are not members of the board.

The mishap investigation boards submit findings and recommendations in an MIR. An MIR is a **limited**-use report written by a mishap investigation

board as a result of a Class A mishap. MIRs contain privileged information.

The chain of command receives and endorses the MIR. All MIR endorsements are also privileged, The NAVSAFECEN endorses all MIRs.

The chain of command then takes corrective action to prevent recurrence of the mishap. These actions may include sending out a message with lessons learned, changing procedures or designs, or alerting all units with similar systems to review their equipment. Lessons learned can be generated by the TYCOM or the NAVSAFECEN.

## **SUMMARY**

In this chapter, we introduced you to the Afloat Safety Program. We discussed its goals and its scope, as well as the responsibilities of the personnel involved in the program. We examined the program's organization. We reviewed the training, both ashore and afloat, available to shipboard personnel. We briefly discussed shipboard mishap reporting procedures. Finally, we examined basic submarine and surface-ship safety precautions.

For detailed information on the Afloat Safety Program, you should consult the references listed at the end of this training manual.



## CHAPTER 8

# NAVAL AVIATION SAFETY

Aircraft mishaps are unforgiving. The loss of one aircraft can cost millions of dollars. Therefore, aviation safety has been of concern since man began to fly. As a result, both civilian aerospace industries and the military have developed aircraft mishap prevention programs.

Aviation personnel are exposed to many dangerous situations. In fact, many insurance companies rate flight line operations, and in particular the flight deck environment, among the most dangerous jobs in the world. Naval aviation safety programs have existed since before World War II to reduce the danger of those jobs. These programs are incorporated into the training of all Navy pilots and aviation support personnel.

In this chapter, we discuss the following elements of the Naval Aviation Safety Program:

- Purpose of the program
- Objective of the program
- Scope of the program
- Hazard reports
- Aircraft mishaps
- Pre-mishap plans
- Mishap reports
- Mishap investigations
- Mishap investigation reports
- Mishap investigation report endorsements
- Mishap and Hazard Recommendation Tracking Program

We also discuss the command aviation safety program and shipboard aircraft safety.

### THE NAVAL AVIATION SAFETY PROGRAM

We will now discuss the purpose, objective, and scope of the Naval Aviation Safety Program. Remember, the goal of the safety program is to enhance operational readiness by reducing the number of deaths

and injuries. In addition, the aim is to reduce the losses and damage to material from accidental causes.

### PURPOSE OF THE NAVAL AVIATION SAFETY PROGRAM

The purpose of the Naval Aviation Safety Program is to preserve human and material resources. The program enhances operational readiness by preserving the resources used in accomplishing naval aviation missions.

The human resources include professional pride, high morale, physical well-being, and life itself. These resources are susceptible to damage and destruction by mishaps.

The material resources include various kinds of property, such as naval aircraft, ships, weapons, and facilities, that a naval aircraft mishap might damage. The Naval Aviation Safety Program directly supports all aspects of naval aviation.

### OBJECTIVE OF THE NAVAL AVIATION SAFETY PROGRAM

Preventing damage and injury accomplishes the purpose of the Naval Aviation Safety Program. *Hazards* are the potential causes of damage and injury. The elimination of hazards is the objective of the Naval Aviation Safety Program. Setting up an effective, aggressive, and continuous mishap prevention program helps us achieve this objective.

### SCOPE OF THE NAVAL AVIATION SAFETY PROGRAM

The Naval Aviation Safety Program encompasses all activities concerned with detecting, containing, and eliminating hazards in naval aviation. For example, these include, but are not limited to, activities involving the following areas:

- Aircraft design, research, development, testing, evaluation, procurement, modification, maintenance, servicing, and operations
- Aircraft support equipment, facilities, supplies, and weapons

- Personnel selection, training, and education
- Protective clothing and equipment
- Policies, procedures, instructions, directives, and publications

## **AVIATION SAFETY PROGRAM RESPONSIBILITIES**

We will now discuss the various responsibilities for the Naval Aviation Safety Program.

### **Assistant Chief of Naval Operations (Air Warfare)**

The Director, Air Warfare (N88), directs and supervises the Naval Aviation Safety Program. He or she conducts the program within the office of the Chief of Naval Operations (CNO).

### **Commander, Naval Safety Center**

The Commander, Naval Safety Center (COMNAVSAFECEN), advises and aids the CNO in formulating, administering, and monitoring the Naval Aviation Safety Program. In addition, COMNAVSAFECEN has the following responsibilities:

- Under exceptional circumstances, waives or changes the investigation or reporting requirements of OPNAVINST 3750.6Q.
- Reviews, evaluates, and classifies all naval aviation mishap investigation reports (MIRs).
- Ensures the adequate distribution of essential safety information received in reports required by OPNAVINST 3750.6Q.
- Maintains a repository for all reports and related data submitted according to OPNAVINST 3750.6Q.
- Directs a system for accountability of naval aircraft mishaps and mishap exposure data.
- Releases mishap data as directed by higher authorities.
- Develops and publishes procedures and standards for aircraft mishap investigation.
- In special cases, begins and conducts naval aircraft mishap investigations under the authority of CNO.

- Executes the Mishap and Hazard Recommendation Tracking (MISTRAC) Program.
- Maintains liaison with safety activities in the other armed services and with the Department of Defense.
- Advises and aids CNO in administering the Naval Aviation Safety Awards Program.
- Conducts naval aviation statistical research, studies, analyses, special projects, and compilations.
- Sponsors and provides representation for conferences, symposia, and seminars in the furtherance of safety.
- At the invitation of aviation organizations, conducts aviation safety surveys.
- Publishes naval aviation posters, brochures, literature, and safety periodicals, in support of the Naval Aviation Safety Program.
- Helps in reviewing aviation system safety engineering requirements on new systems and major changes. He or she accomplishes this by selectively serving on boards, attending conferences, and taking part in studies for design review.
- Selectively takes part in engineering proposal evaluations and maintenance feasibility inspections of new aviation production systems and equipment.
- Supports appropriate offices, commands, and agencies in preparing general or specific operating instructions.
- Acts as technical advisor on aviation safety for the development of all naval education and training courses, films, training aids, and devices.
- In selected cases, requests support for a pathological investigation from the Armed Forces Institute of Pathology.

### **Commanders of Organizations Requiring an Aviation Safety Officer**

Activities requiring an aviation safety officer (ASO) include functional wings, marine aircraft wings, marine air groups, and training wings. Also included are all activities that are reporting custodians. Commanders



of organizations with ASO billets must take the following actions:

- Assign only designated naval aviators or designated naval flight officers to the ASO billet
- Assign a graduate of the Aviation Safety School to the ASO billet
- Place the ASO billet in the organizational structure so that the ASO reports to the commander/commanding officer directly or via the safety department/section head about aviation safety matters
- Assign aviation safety as the primary duty of the person serving in the ASO billet
- Set up and maintain a command aviation safety program according to OPNAVINST 3750.6Q

### **Aircraft Controlling Custodians**

Aircraft controlling custodians must set up and maintain a command aviation safety program. The ASO manages the program. He or she also provides advice and help to subordinate commands in the conduct of their command aviation safety programs.

### **Commanders of Naval and Marine Corps Airfields**

Commanders of naval and Marine Corps airfields must perform the following functions:

- Organize and maintain a command aviation safety program
- Coordinate a command pre-mishap plan with pre-mishap plans of nearby commands
- Submit reports of aircraft mishaps occurring within their areas of responsibility
- Provide security for aircraft wreckage within their area of responsibility
- Provide requested support to aircraft mishap boards (AMBs), including wreckage recovery, transportation, and salvage
- Manage relations with local authorities, the public, and the media
- Investigate and process claims arising from aircraft mishaps

### **All Naval Aviation Personnel**

All naval aviation personnel must acquaint themselves with safety regulations and directions that apply to them and their assigned duties. They must follow established safety standards. In addition, they must report hazards and mishaps according to their command aviation safety program and OPNAVINST 3750.6Q.

### **HAZARD REPORTS**

We discussed the detection and elimination of hazards earlier in the chapter. We will now address the purpose of hazard reports (HRs) and the procedures for reporting a hazard.

#### **Purpose of Hazard Reports**

The three purposes of hazard reports (HRs) are as follows:

1. To report a hazard and the remedial action taken so that others can take similar action to eliminate the hazard
2. To report a hazard and recommend that another organization take corrective action to eliminate the hazard
3. To report a hazard so that some other organization may determine the proper corrective action to eliminate the hazard

#### **Submission of Hazard Reports**

You have an obligation to others in naval aviation to report hazards. What is a hazard? As stated earlier, a **hazard** is a potential cause of damage or injury. You must submit an HR whenever you detect a hazard. Command safety programs must encourage personnel to report hazards. If the command expects a hazard to have an effect outside the organization, it must report the hazard to higher authority.

You can send an HR by mail or message with the Naval Safety Center as the sole addressee. Activities or individuals reluctant to identify hazards derived from unique situations or circumstances may use this reporting method. COMNAVSAFECEN will protect the source of the report and distribute a sanitized report, as it believes necessary.

Reports may include recommendations for corrective action within the command. In that case, the command should communicate the mishap prevention

information to other commands who need to take the same or similar corrective action. In the case of some hazards, the reporting command may lack the expertise to formulate recommended corrective action.

Four hazards require a special HR format: bird (and bat) strikes; near mid-air collisions; physiological episodes; and embarked landing hazards. When these types of hazards occur but they do not meet the criteria of a defined aircraft mishap, you **must** submit an HR.

The quality of an HR obviously depends on the quality of the investigation into the circumstances causing the hazard. Commands can, and are encouraged to, use aircraft mishap boards (AMBs) to investigate and report hazards. Boards that investigate physiological episodes must, as a minimum, include a flight surgeon.

OPNAVINST 3750.6Q recommends that the AMBs conduct both the investigation of the hazard and the preparation of the HRs. The reporting custodian of the naval aircraft, equipment, or facility involved normally submits the report, but any naval activity that identifies the hazard can submit a report. Activities or individuals reluctant to identify hazards involving unique situations or circumstances may submit an anonymous hazard report. Send anonymous HRs by mail directly to the Navy Safety Center.

No formal deadlines are required for submitting HRs. However, in the interest of safety, you should submit all HRs with a severe risk assessment code within 24 hours following detection of the hazard. Submit all other HRs within 14 days following detection of the hazard.

Success of the Naval Aviation Safety Program depends on the submission of complete, open, and forthright information and opinions concerning safety matters. The exercise of command influence to edit, change, or in any way censor the content of reports is contrary to the spirit of the program.

### Nonprivileged Status

Do not consider HRs as privileged. HRs and mishap investigation reports (MIRs), which are privileged, are distinctly different. The investigation and reporting of mishaps, **not hazards**, strictly limits the authority for granting an assurance of confidentiality. You must take extreme care to avoid giving any impression that HRs are for safety purposes **only**. The only restriction on their use is that they are used For Official Use Only. HRs should not include personal identifiers, such as names and social security numbers, except as points of contact. Do not ask for such information if you can investigate the hazard without using such personal information.

## NAVAL AIRCRAFT MISHAPS

In chapter 3, we examined the causes and prevention of mishaps as well as reporting procedures. We will now discuss the procedures for reporting naval aircraft mishaps and identify the various injury classifications.

### Naval Aircraft Mishap Defined

What is a naval aircraft mishap? A naval aircraft mishap is an unplanned event or a series of events that comes under one or both of the following two categories:

1. Cumulative damage of \$10,000 or greater to naval aircraft, other aircraft, and property. Property damage costs include those required to repair or replace facilities, equipment, or material.
2. An injury involving naval aircraft that results in traumatic bodily harm and causes one of the following occurrences:
  - a. Death
  - b. Permanent total disability
  - c. Permanent partial disability
  - d. One or more lost workdays

Traumatic bodily harm includes a cut, burns, a fracture, or poisoning resulting from a single or 5-day exposure to an external force, toxic substance, or physical agent resulting in one of the four occurrences just listed.

### Naval Aircraft Mishap Categories

The three naval aircraft mishap categories are defined as follows:

1. **Flight Mishap (FM):** FMs are mishaps in which intent for flight existed at the time of the mishap and in which \$10,000 or greater damage to DOD aircraft occurred.
2. **Flight Related Mishap (FRM):** An FRM is a mishap in which intent for flight existed at the time of the mishap and in which less than \$10,000 damage to DOD aircraft occurred and \$10,000 or more total damage or a defined injury or death occurred.
3. **Aircraft Ground Mishap (AGM):** An AGM is a mishap in which **no intent** for flight existed at the time of the mishap and DOD aircraft loss, or \$10,000 or more aircraft damage and/or property damage, or a defined injury occurred.

MISHAP CATEGORY	SEVERITY CLASS		
	A	B	C
FLIGHT MISHAP (FM) ----- INTENT FOR FLIGHT EXISTED, AND \$10,000 OR MORE DOD AIRCRAFT DAMAGE OCCURRED	TOTAL COST OF DAMAGE IS \$1,000,000 OR MORE AND/OR INVOLVES DESTROYED AIRCRAFT AND/OR FATAL INJURY AND/OR PERMANENT TOTAL DISABILITY	TOTAL COST OF DAMAGE IS \$200,000 BUT LESS THAN \$1,000,000 AND/OR INVOLVES PERMANENT PARTIAL DISABILITY AND/OR HOSPITALIZATION OF FIVE OR MORE PERSONNEL	TOTAL COST OF DAMAGE IS \$10,000 BUT LESS THAN \$200,000 AND/OR INVOLVES AN INJURY OF 5 LOST WORKDAYS
FLIGHT-RELATED MISHAP (FRM) ----- INTENT FOR FLIGHT EXISTED WITH LESS THAN \$10,000 DOD AIRCRAFT DAMAGE	TOTAL COST OF DAMAGE IS \$1,000,000 OR MORE AND/OR INVOLVES FATAL INJURY AND/OR PERMANENT TOTAL DISABILITY	TOTAL COST OF DAMAGE IS \$200,000 BUT LESS THAN \$1,000,000 AND/OR INVOLVES PERMANENT PARTIAL DISABILITY AND/OR HOSPITALIZATION OF FIVE OR MORE PERSONNEL	TOTAL COST OF DAMAGE IS \$10,000 BUT LESS THAN \$200,000 AND/OR INVOLVES AN INJURY OF 5 LOST WORKDAYS
AIRCRAFT GROUND MISHAP (AGM) ----- NO INTENT FOR FLIGHT EXISTED	TOTAL COST OF DAMAGE IS \$1,000,000 OR MORE AND/OR INVOLVES DESTROYED AIRCRAFT AND/OR FATAL INJURY AND/OR PERMANENT TOTAL DISABILITY	TOTAL COST OF DAMAGE IS \$200,000 BUT LESS THAN \$1,000,000 AND/OR INVOLVES PERMANENT PARTIAL DISABILITY AND/OR HOSPITALIZATION OF FIVE OR MORE PERSONNEL	TOTAL COST OF DAMAGE IS \$10,000 BUT LESS THAN \$200,000 AND/OR INVOLVES AN INJURY OF 5 LOST WORKDAYS

Figure 8-1.-Severity class data.

### Naval Aircraft Mishap Severity Classes

The following mishap severity classes, based on personnel injury and property damage, apply to all three categories of mishaps in the preceding paragraphs.

**CLASS A SEVERITY**— A Class A mishap is one in which the total cost of property damage (including aircraft damage) is \$1,000,000 or greater or in which an aircraft is destroyed or missing. A mishap in which any fatality or permanent total disability occurs with direct involvement of naval aircraft also falls into this category.

**CLASS B SEVERITY**— A Class B mishap is one in which the total cost of property damage (including all

aircraft damage) is \$200,000 or more, but less than \$1,000,000. In addition, permanent partial disability and/or the hospitalization of five or more personnel occurs.

**CLASS C SEVERITY**— A Class C mishap is one in which the total cost of property damage (including all aircraft damage) is \$10,000 or more, but less than \$200,000. In addition, injury results in 5 or more lost workdays. Figure 8-1 lists the data for each severity class.

An occurrence resulting in a total property damage cost (including all aircraft damage) of less than \$10,000 and no defined injuries is not reportable as a naval aircraft mishap. However, it may be reported as an aviation hazard.

## Injury Classifications

There are eight injury classifications:

1. Fatal injury. This is an injury resulting in death from a mishap or from complications arising from the mishap. The length of time between the mishap and a later death has no effect on the assignment of a fatal injury classification.
  2. Permanent total disability. These are nonfatal injuries that, in the opinion of competent medical authority, permanently and totally incapacitate a person so that he or she cannot follow any gainful occupation. Additionally, the loss of, or the loss of use of, both hands, or both feet, or both eyes, or a combination of any of these body parts as a result of a single mishap will be considered as a permanent total disability.
  3. Permanent partial disability. Injuries that do not result in death or permanent total disability, but, in the opinion of competent medical authority, do result in permanent impairment or loss of any part of the body, loss of the great toe or the thumb, or an unreparable inguinal hernia, with the following exceptions:
    - a. Teeth
    - b. The four smaller toes
    - c. Distal phalanx of any finger
    - d. Distal two phalanges of the little finger
    - e. Repairable hernia
    - f. Hair, skin, nails, or any subcutaneous tissue
  4. Lost workday. An injury that does not result in death, permanent total disability, or permanent partial disability, but results in 5 or more lost workdays (not including the day of the injury). Lost workday level injuries are further divided into major and minor categories.
    - a. Major Injury—A nonfatal injury that does not result in permanent total disability or permanent partial disability, but results in 5 or more lost workdays and requires admission to a hospital or quarters, or a combination of both, for 5 or more days. It also includes any of the following regardless of hospital status:
      - (1) Unconsciousness for more than 5 minutes because of head trauma.
      - (2) Fracture of any bone, except simple fracture of the nose or phalanges.
      - (3) Traumatic dislocation of major joints or internal derangement of the knee.
      - (4) Moderate to severe laceration resulting in severe hemorrhage or requiring extensive surgical repair.
      - (5) Injury to any internal organ.
      - (6) Any third degree burns, or any first or second degree burns (including sun-burn) over 5 percent of the body surface.
    - b. Minor Injury—An injury less than major that results in 1 to 4 lost workdays.
  5. First-aid injury. This injury involves bodily harm requiring only first aid or no treatment.
  6. No injury.
  7. Lost at sea.
  8. Missing or unknown.
- Note that both lost at sea and missing/unknown injuries are considered as fatalities in assigning mishap severity level classification.

## PRE-MISHAP PLANS

Simply put, pre-mishap plans are descriptions of who is responsible for doing what, both before and after an aircraft mishap. A command must expect, take measures for, and formulate plans for all reasonable eventualities. The command conducts periodic drills to identify any deficiencies and to evaluate coordinated execution of the plan.

You can expect pre-mishap plans to vary widely, depending on the mission, resources, environment, and personnel of the individual command. If possible, you should write pre-mishap plans that will remain valid during deployments. Include an abbreviated pre-mishap plan in a letter of instruction (LOI) or in executing instructions for detachment. You may require other changes when the command relocates. For more information on both pre-mishap plans and post-mishap plans, consult appendix 2B of OPNAVINST 3750.6Q.

## MISHAP REPORTS

We use mishap reports (MRs) to provide interested commands with information about significant naval aircraft mishaps. The MR includes preliminary information on the mishap and information on the

progress of the investigation. When appropriate, reporting custodians may use MRs to request investigative help, relief from investigative responsibilities, or extension of MIR deadlines. An MR is not used for the submission of hazard elimination information.

All classes of mishaps require the submission of an MR by telephone or by message. You must submit an initial MR by message within 4 hours for all Class A and Class B aviation mishaps. On all Class A aviation mishaps, an initial telephone report to the NAVSAFECEN is required to provide the NAVSAFECEN with timely information on the mishap and allow a mishap investigator to respond. The first amended mishap message reports for all Class A and Class B mishaps, if necessary, and Class C initial MRs are due within 24 hours.

Any naval command may submit MRs. The reporting custodian of the naval aircraft involved in a mishap normally submits the MR. However, if it is apparent that a reporting custodian will be unable to submit the required MR within the deadline, the first command that becomes aware of the mishap will submit the report.

## AIRCRAFT MISHAP INVESTIGATIONS

A naval aircraft mishap is a signal of a failure of the Naval Aviation Safety Program. It shows that hazard detection and elimination actions were not taken in time to prevent the mishap-level damage or injury. Actions must then be taken to prevent a recurrence of the mishap. We accomplish hazard detection after a mishap through mishap investigation.

### Purpose of Aircraft Mishap Investigations

The purpose of aircraft mishap investigations is to identify the cause factors of the mishap and the damage or of any injuries resulting from the mishap. Cause factors of mishaps and cause factors of injury and damage resulting from a mishap can be two different matters. However, both are the subject of aircraft mishap investigations.

Less important reasons for conducting aircraft mishap investigations include determining the extent of damage and injury resulting from the mishap. Another reason is proving the safety commitment of the organization conducting the investigation. We conduct all naval aircraft mishap investigations **solely** for safety purposes.

## Types of Aircraft Investigations

As a result of aircraft mishaps, different authorities conduct various types of investigations for different purposes. Some of the investigations conducted are as follows:

- Aircraft mishap investigations
- Interagency investigations
- Special weapons investigations
- *Judge Advocate General Manual (JAGMAN)* investigations
- North Atlantic Treaty Organization (NATO) investigations
- Naval Safety Center investigations
- Intercomponent investigations
- Naval aircraft mishaps involving fire, explosion, or damage to a ship or shore facility
- Aircraft fire on board ship

For detailed information on the types of investigations conducted, consult chapter 6 of OPNAVINST 3750.6Q.

## Mishap Investigation Responsibilities

The reporting custodian of a naval aircraft involved in a mishap is responsible for investigating and reporting the mishap. An aircraft mishap board (AMB) investigates and reports each naval FM, FRM, and AGM according to OPNAVINST 3750.6Q.

### Aircraft Mishap Boards

Each aircraft reporting custodian maintains at least one standing AMB. The appointing authority appoints the AMB members by name and in writing. Commissioned officers on active duty compose each AMB. Minimum AMB membership consists of the following four officers:

1. An aviation safety officer (ASO)
2. A flight surgeon
3. An officer well qualified in aircraft maintenance
4. An officer well qualified in aircraft operations

The senior member must be a designated naval aviator or designated naval flight officer. Additionally, one member of the AMB must be qualified in the Naval Air Training and Operating Procedures Standards (NATOPS) if the aircraft involved in the mishap is manned by an aircrew.

## **MISHAP INVESTIGATION REPORTS**

We report hazards after mishaps by submitting a mishap investigation report (MIR). These reports are important in preventing the recurrence of aircraft mishaps. Success of the Naval Aviation Safety Program depends on the submission of brief, open, and forthright information, opinions, and recommendations. The exercise of command influence to edit, change, or in any way censor the content of MIRs is prohibited since that would be contrary to the spirit of the program. Should any senior commander have a comment to make on the content of an MIR, that officer should make that comment in an endorsement of the report.

### **Purpose of an MIR**

The purpose of an MIR is to provide information needed to fix mishap cause factors. Each cause factor has three elements associated with it that precisely describe the personnel, equipment, actions/events, and reasons for the mishap. Determining the elements determines the cause factors, which identifies the starting point for remedial action. We use MIRs to report those hazards that caused the reported mishap and the damage or injury resulting from the mishap. The report also provides a means for submitting recommended corrective action that would prevent recurrence of the mishap and resulting damage or injury.

### **Contents of an MIR**

An MIR has two parts. The first part, Part A, consists of the list of nonprivileged information extracted from paragraph 10 of the MIR, the final MR message, and enclosures specified in chapter 7 of OPNAVINST 3750.6Q. Enclosures to MIRs serve two purposes. One is to provide additional data on the mishap that can be coded and entered in the NAVSAFECEN data bank or used as research material. The second purpose is to clarify points of evidence that cannot be made in the body of the MIR message. Part B is privileged. It includes a copy of the complete MIR message, Part B enclosures, and all endorsements. For further information, consult chapter 7 of OPNAVINST 3750.6Q.

## **Submitting an MIR**

Submit MIRs within 30 calendar days following the mishap. In the case of missing aircraft, submit the MIR within 30 calendar days after completion of the organized search. The originator of the MIR is usually the appointing authority of the Aircraft Mishap Board (AMB). Usually, the appointing authority is also the reporting custodian of the aircraft involved in the mishap.

You must submit MIR messages through military radio/electronic communications facilities. Send enclosures with one copy of the MIR message by mail to the Naval Safety Center.

Figure 8-2 depicts the reporting requirements for HRs, MRs, and MIRs.

## **HAZARD REPORT AND MISHAP INVESTIGATION REPORT ENDORSEMENTS**

The endorsement of both HRs and MIRs is an important step in eliminating many major hazards. Endorsements provide an opportunity for seniors in the chain of command to add their broader perspective and authority to the process of recommending corrective actions.

### **Purpose of Endorsements**

The ultimate purpose of endorsements is to eliminate the hazards described in the reports. Endorsements convey the position of the endorsers on the matters contained in the endorsed report.

### **Review of Reports and Enclosures**

The endorsement of MIRs and HRs requires careful review of submitted reports and previous endorsements. Any endorser in the chain of command who believes an investigation is incomplete or an MIR or HR is inadequate should take corrective measures. Those measures should ensure an adequate investigation of the mishap or resubmission of the report. Any endorser may get copies of specific enclosures to the MIR by requesting them from the appointing authority of the AMB.

TYPE REPORT	SEVERITY	15 MINUTES	4 HOURS	24 HOURS	30 DAYS
HAZARD REPORT (HR)	SEVERE			PRIORITY MESSAGES	
	ROUTINE				ROUTINE MESSAGE
MISHAP REPORT (MR)	A	TELEPHONE	PRIORITY MESSAGE	AMENDED AND CLASS C MISHAP REPORT PRIORITY MESSAGE	
	B				
	C				
MISHAP INVESTIGATION REPORT (MIR)	A				ROUTINE MESSAGE  (MAIL ENCLOSURES)
	B				
	C				

Figure 8-2.-General reporting requirements for HRs, MRs, and MIRs.

### Requirements for an Endorsement

Mishap and hazard report endorsements are required under certain conditions. For all Class A mishaps, endorsements go through the Naval Safety Center. For all other classifications, the mishap or hazard report is not closed until appropriate endorsements have addressed all recommendations requiring action. If the corrective action agency is in the endorsing chain, the endorsement goes through the corrective action agency. The endorsement goes through the controlling custodian when the corrective action agency is out of the endorsing chain.

Additionally, endorsements are required when directed by higher authority. Recommendations that require or request corrective action by higher authority directly imply the requirement for an endorsement or official reply from that command. The action agency for the recommended corrective action will respond by message or letter within 30 days of the controlling custodian's endorsement.

### MISHAP AND HAZARD RECOMMENDATION TRACKING PROGRAM

We described earlier in the chapter methods you use to identify and report hazards. We will now address the Mishap and Hazard Recommendation Tracking (MISTRAC) Program. We use this program to monitor corrective actions. Monitoring corrective actions ensures the completion of those actions so that a hazard cannot cause future damage or injury. Usually the detection, reporting, and correction of hazards take place within a single command, such as the controlling custodian. However, some corrective actions require reports by a subordinate, endorsement by seniors, or remedial action by an external command. The monitoring of internal corrective actions by subordinates is a prerogative of command. COMNAVSAFECEN monitors recommendations resulting from mishaps and hazards under the MISTRAC program.

All command aviation safety programs must include methods for checking the elimination of hazards. Squadron, group, wing, ship, or other command levels can identify recommended corrective actions. COMNAVSAFECEN uses MISTRAC to track completion of these actions.

COMNAVSAFECEN directs a MISTRAC program designed to track recommendations. MISTRAC files contain a record of recommendations submitted to eliminate hazards. Individual MISTRAC files include a summary of the related mishap or hazard, recommended corrective actions, endorsement(s), and summary of action taken. The responsible aircraft operations analyst maintains the aircraft model files. He or she uses those files to track recommendations to closure. Hazards excluded from MISTRAC are as follows:

- Near mid-air collisions (NMACs)
- Bird strikes
- Physiological episodes
- Embarked landings
- Mishaps and hazards not requiring endorsement beyond the unit commanding officer

When corrective action is incomplete, a recommendation becomes a mishap and hazard recommendation (MISREC) if

1. it is assigned a risk assessment code (RAC) of I or II and is favorably endorsed by a controlling custodian or
2. it is designated a MISREC by COMNAVSAFECEN.

Since a MISREC is considered to have a special status, it is given a separate tracking file. NAVSAFE-CEN tracks each recommendation, regardless of the RAC assigned. Closing out the referenced mishap or hazard requires the action agency assigned to submit a recommendation or MISREC. We consider recommendations and MISRECs involving incomplete action as privileged information.

Semiannually on 1 March and 1 September, COMNAVSAFECEN provides action agencies with a listing of all MISRECs under their responsibility. This listing provides information those agencies can use to update the MISREC files. This information includes the MISREC that generated the mishap or hazard summary, all endorsements, and all transactions that have taken place to the date of the report.

COMNAVSAFECEN provides a listing of all MISRECs to the controlling custodians semiannually (1 June and 1 December) to help in the overall monitoring of MISRECs. COMNAVSAFECEN also updates MISREC files based on information received from action agencies, controlling custodians, pertinent mishap data, and other DOD agencies.

## **COMMAND AVIATION SAFETY PROGRAM**

The command aviation safety program promotes aviation safety through the command's attitudes and practices as well as through written policies, procedures, and plans. The aim of a command aviation safety program is to end hazards within the command and within naval aviation. In addition, the program must enhance the safety awareness of all personnel.

Safety is an inherent responsibility of command. Thus, the chain of command carries out the program. The command must generate and carry out safety policies and directives based on instructions covering the many different types of safety programs and processes. The goal of the safety program is to enhance operational readiness by reducing personnel deaths and injuries and material loss and damage.

## **COMMAND AVIATION SAFETY RESPONSIBILITIES**

Although all aviation personnel are responsible for carrying out the command aviation safety program, certain command personnel have the primary responsibility for the program.

### **Commanding Officer**

The commanding officer of an activity appoints an aviation safety officer (ASO) as specified in the *Standard Organization and Regulations of the U.S. Navy*, OPNAVINST 3120.32C. This instruction lists the command ASO's responsibilities and how the ASO should establish the program within the command.

### **Aviation Safety Officer**

The aviation safety officer (ASO) acts as principal adviser to the commanding officer on all aviation safety matters. He or she advises and aids the commanding officer in setting up and managing a command aviation safety program. Providing safety education throughout the command is a responsibility of the ASO. He or she also ensures the incorporation of safety standards and



procedures into all activity functions. The ASO coordinates safety matters among the organization staff. He or she maintains appropriate aviation safety records and mishap statistics. The ASO must be a primary billet assignment.

The aviation safety officer and Quality Assurance/Analysis (QA/A) Division personnel, working together, develop a local maintenance instruction (MI) or command type of instruction. This instruction identifies the command policies and responsibilities of all concerned. You should consult the following publications during the instruction development process:

- *The Naval Aviation Safety Program*, OPNAVINST 3750.6Q
- *Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B
- *Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C
- *NAVAIROSH Requirements for the Shore Establishment*, NAVAIR A1-NAOSH-SAF-000/P-5100-1

The ASO and QA/A Division personnel investigate most mishaps/incidents and hazards in their activity. OPNAVINST 3750.6Q identifies report requirements and specifies the conditions under which you report mishaps and injuries to the Commander, Naval Safety Center. To prevent mishaps and their causes, local activities should check the effectiveness of their safety program and mishap investigation and reporting procedures.

The key to having an effective safety program is effective communication at all levels of command. A variety of publications are available to the safety officer and key members in the safety program to help in the communication process. The Naval Safety Center helps to promote safety in aviation through various safety-oriented publications. They are described in chapter 1. Some of the publications available that contain current, accurate information you can use to help prevent aviation mishaps include:

- *Approach* magazine
- *Aviation Safety Bi-weekly Summary*
- *MECH* magazine

## **FUNCTIONS OF THE COMMAND AVIATION SAFETY PROGRAM**

Sound, positive leadership combined with able and proper management of the command aviation safety program ensures the reinforcement of the following three program functions:

1. Hazard detection
2. Hazard elimination
3. Safety education and awareness

### **Hazard Detection**

We accomplish hazard detection most often at the squadron level. However, the Aviation Safety Program requires that command aviation safety programs at all levels include methods for hazard detection.

Hazards exist as a result of poor design, improper or unprofessional work or operational practices, and inadequate training or preparation for a task or mission. Other causes of hazards include inadequate instructions or publications or a demanding and unforgiving environment. Each member of the command must support a program of reduced risks by reporting hazards.

### **Hazard Elimination**

The keys to effective hazard elimination are knowledge, required procedures and reporting instructions, proper use of materials and equipment, and safety awareness. As hazard detection is an all-hands effort, so too is hazard elimination. You can readily identify some hazards and correct them on the spot. Others, however, are more difficult to identify. We accomplish hazard elimination through remedial action to correct hazards. This action is divided into the following three parts:

1. Reporting of hazards
2. Remedial action to correct hazards
3. Monitoring of corrective actions

### **Safety Education and Awareness**

Each command aviation safety program must include a safety education and awareness program to provide safety training and to enhance safety awareness. Safety education provides routine safety training covering all safety subjects, including aeromedical, as well as formal U.S. Navy aviation and related safety courses. Safety education provides training on how to

properly identify, report, and correct hazards. It also provides training on properly managing safety information, which involves its collection, circulation, and control.

## **ELEMENTS OF THE COMMAND AVIATION SAFETY PROGRAM**

Setting up a proper aviation safety climate is required for a successful aviation safety effort. The commanding officer creates a set of command safety goals and standards and sets up a means of enforcing those standards. In addition, he or she creates an environment that will enhance safety hazard detection and elimination and promote safety education, training, and awareness programs. The following elements of the command aviation safety program are vital to a successful safety effort:

- **Command climate**—The commanding officer must foster a climate that promotes the goal of the command aviation safety program. He or she establishes the goal, monitors achievements of the program, and sets the standards.

- **Command safety goals**—The commanding officer establishes a clear set of aviation safety goals and an aviation safety policy. The policy defines what the commander expects of command personnel to attain these goals.

- **Command safety organization**—The commanding officer must issue a description of the command safety organization and the tasks or functions of each member of the command safety organization. The flight surgeon or wing flight surgeon serving the command is responsible for the aeromedical aspects of the command safety program.

- **Aviation Safety Council**—If the command is a squadron, an air station, or a larger activity, the command must form an Aviation Safety Council. The council sets goals, manages assets, and reviews safety-related recommendations. The council keeps records of the meetings it holds. Members of the council review command plans, policies, procedures, conditions, and instructions to make sure they are current and correct. The council also responds to corrective recommendations. Standing members of the council include aviation, ground, and aeromedical (flight surgeon) safety officers.

- **Enlisted Aviation Safety Committee**—Representatives from each work center and other designated activities, such as the Medical Department and Aircraft

Intermediate Maintenance Department (AIMD), form the Enlisted Aviation Safety Committee. The committee meets once a month to discuss safety deficiencies and provide recommendations for improved safety practices and promotion of safety awareness. The committee keeps a record of attendance and subjects discussed at the meetings. The commanding officer responds to all recommendations of the committee in writing and in a timely manner.

Each activity safety petty officer/noncommissioned officer should complete the personnel qualification standards (PQS) for *Aviation Safety PO/NCO*, NAV-EDTRA 43218.

### **Safety Standdown**

The command may conduct periodic safety standdowns devoted to providing dedicated time for safety training and awareness. In addition, safety stand-downs enhance the command safety climate.

### **Safety Surveys**

To measure the command's safety posture, the command should conduct periodic safety surveys. They may consist of in-house safety surveys conducted by unit personnel. The surveys also may consist of external services provided by a sister aviation activity, a wing, or a higher staff. The survey might be a formal survey by the NAVSAFECEN survey team. The recommended frequency of formal NAVSAFECEN surveys is every 2 years.

### **Safety Training**

The command must conduct and document periodic safety training within the command. The command makes sure personnel attend required formal safety training courses. Those who are unable to attend must request a waiver from higher authority.

### **Investigation of Suspected Hazards and Reporting Requirements**

The command must investigate and determine recommended corrective action on all hazards discovered or reported. The command must report hazards as required by OPNAVINST 3750.6Q, OPNAVINST 4790.2E, and other applicable directives. Reporting of hazards contributes to safety and hazard awareness. Reporting of hazards also helps in obtaining corrective action and improves procedures, processes, and materials.

## General Safety

The command should make sure it effectively covers programs in general safety, such as hearing conservation, flight deck/flight line safety, traffic safety, home safety, and hazardous materials.

### SHIPBOARD AIRCRAFT SAFETY

Flight decks are hazardous, and their danger to personnel goes beyond the chance of crashes. Exhausts on jet engines can propel personnel into other objects or over the side of the ship. Propellers and rotor blades can maim or kill. Aircraft carry ordnance and fuel that can cause fires and explosions. Moving aircraft can hit personnel. The ship pitches and rolls. For those reasons, all personnel whose job requires them to work on the flight deck must be constantly alert and aware of all dangers to avoid injury or death.

Flight line safety precautions, discussed later, apply to flight deck operations. The primary difference is the limited space and tempo of operations experienced on the flight deck. The flight deck is increasingly more dangerous.

All personnel assigned flight quarters on or above the hangar deck must wear appropriate jerseys and helmets. Personnel on the flight deck during flight quarters must wear the following equipment:

- A cranial impact helmet or its equivalent
- Goggles
- Sound attenuators
- Flight deck shoes
- Flotation gear
- An adequately secured whistle
- A survival light

### FOREIGN OBJECT DAMAGE

Engines can suck up loose objects from the deck or area around the intake. That can cause costly foreign object damage (FOD) or complete loss of the engine. Personnel must inspect the deck and other areas for FOD by conducting FOD walkdowns before beginning air operations or when starting engines for maintenance. Flight deck personnel must not put loose objects in shirt pockets and must keep their shirt pockets buttoned while they are in a flight operations area. FOD prevention is one of the reasons we prohibit the dumping of trash and garbage during launch and recovery operations.

## LINE AND FLIGHT DECK SAFETY PRECAUTIONS

You must observe several miscellaneous safety precautions when working on the aircraft flight line and the carrier flight deck. The following precautions are of special importance to ensure your safety as well as the safety of your co-workers.

### Propellers and Rotors





The first general precaution you must observe when working on the line around propeller-driven aircraft or helicopter rotors is to **BEWARE OF PROPELLERS**. When you see a propeller, let it be a constant reminder to **STAY CLEAR!** In general, do not cross in front of moving propellers, as whirling propellers are not easily seen. A good habit is to always walk around propellers. Keep the area around the aircraft clear of loose gear and debris.

### Intake Ducts

Maintenance of jet engines presents several major hazards. The air intake duct of operating jet engines represents an ever-present hazard. It is a hazard both to personnel working near the inlet duct of the aircraft and to the engine itself if the turn-up area around the front of the aircraft is not kept clear of debris. Jet engines will “eat” anything, and they have no respect for life or limb. This hazard is, of course, greatest during maximum power settings (high-power turn-up).

The air inlet duct may develop enough suction to pull hats, eyeglasses, loose clothing, and rags from pockets. Personnel should properly secure or remove all loose articles before working around operating jet engines. In some engines, the suction is strong enough to pull a person up to or, in some cases, into the inlet and pull the person’s eyeballs out. Needless to say, personnel must take every precaution to keep clear of the intakes.

Protective screens are supplied as part of the ground-handling equipment for most jet aircraft. These screens should be installed before maintenance turn-ups. The use of turn-up screens protects both personnel and engines. It does **NOT** eliminate the need for caution; a person can receive serious injury as a result of being pulled against the screen. Small items can be pulled through the screen, resulting in thousands of dollars of damage to the engine.

			
UNIVERSAL-FIT EARPLUG	EARPLUG V-51-R TYPE OR SIMILAR TYPES	TYPICAL EARMUFF	FLIGHT DECK SOUND-ATTENUATING HELMET (INCLUDES EARMUFFS)

### WARNING

- EARPLUGS AND EARMUFFS SHALL BE WORN TOGETHER WHEN PERFORMING ENGINE RUN-UP.
- IF ENGINES ARE RUN UP IN FRONT OF BLAST DEFLECTOR, EXHAUST JET WAKE AND SOUND SHALL BE DIRECTED UP AND TO THE SIDES, RESULTING IN DISTORTION TO CONTOUR PATTERNS SHOWN.
- AT MAXIMUM POWER, TF30-P-412A AFTERBURNERS ARE AT MAXIMUM NOZZLE OPENING (ZONE 5). AT MILITARY POWER, THE NOZZLES ARE FULLY CLOSED (MINIMUM OPENING).

Figure 8-3.—Ear-protective devices.

### Exhaust Area Hazards

Jet engine exhaust creates several hazards. Tests show that while the carbon monoxide content of jet exhaust is low, other gases are present that are imitating to the eyes. Less noticeable, but as important, is the respiratory irritation exhaust fumes may cause.

The two most important hazards of jet engine exhaust are the high temperature and high velocity of the exhaust gases from the tail pipe. You can find high temperatures up to several hundred feet from the tail pipe, depending on wind conditions. Closer to the aircraft, temperatures are high enough to damage asphalt pavement.

When a jet engine is started, excess fuel accumulates in the tail pipe. When the fuel ignites, long flames can be blown out the tail pipe. Flight line personnel should know the possibility of this hazard. They should keep all flammable materials clear of the danger area.

During maximum power settings, the high velocity of the exhaust gases may pick up and blow loose dirt, sizable rocks, sand, and debris several hundred feet. that creates an eye and FOD hazard. Therefore, you should use caution when parking an aircraft for run-up. The general information section of the applicable maintenance instruction manual (MIM) contains

information about exhaust area hazards. These instructions should be strictly adhered to. **NO ONE SHOULD FOOLISHLY EXPERIMENT WITH THE SPECIFIED SAFETY MARGINS.**

After engine operation, no work should be done to the exhaust section for at **LEAST ONE-HALF HOUR** (preferably longer). If work is required immediately, personnel must wear heat-resistant gloves.

### Engine Noise

Jet engines produce noise capable of causing temporary as well as permanent loss of high-frequency hearing. On the flight line, noise levels can exceed 150 decibels (dB). When working around jet engines, you should take the following precautions to protect your hearing:

- Report on time for your annual or periodic audiograms.
- Do not exceed the directed time limits on exposure to the various sound intensities.
- Wear the proper ear protection, such as earplugs or sound attenuators (fig. 8-3). If double hearing protection is specified, wear earplugs under your cranial earmuffs.

Damage to hearing occurs when you expose your ears to high sound intensities for excessive periods. The higher the sound intensity, the shorter the period of exposure that will produce damage. As stated in an earlier chapter, exposures above an 84-dB(A) sound intensity, without hearing protection, can cause hearing damage.

The wearing of approved earplugs or sound attenuators will protect you from hearing loss. In extremely high noise level areas, such as the flight line, even double protection may not be enough protection. In such cases, time limits are set for allowable exposures to noise. Wearing hearing protection can raise the limits of time exposure. All personnel working within danger areas should be familiar with calculated decibel levels (as specified in the applicable maintenance instruction manual) and should wear the required protective equipment.

### **Movable Surface Hazards**

Movable surfaces such as flight control surfaces, speed brakes, power-operated canopies, and landing gear doors are a major hazard to flight line personnel.

These units are normally operated during ground operations and maintenance. Therefore, you should ensure that all personnel and equipment are clear of the area before operating any movable surface.

### **SUMMARY**

In this chapter, we addressed the scope and goal of the Naval Aviation Safety Program. We covered the concepts and individual responsibilities associated with the safety program. We discussed the command aviation safety program functions and its elements. We examined hazard reports, naval aircraft mishap reports, and mishap investigation reports. We considered the endorsements required on both hazard reports and mishap investigation reports. We examined general shipboard aircraft safety. Finally, we discussed the importance of monitoring mishap corrective actions.

We did not intend for this chapter to make you an expert in naval aviation safety. The chapter was developed to provide you with a basic introduction to aviation safety as well as the references you should consult for additional information.



## CHAPTER 9

# EXPLOSIVES SAFETY

This chapter will acquaint you with basic explosives safety precautions. All activities involved with ordnance have experts trained in the areas of ordnance usage, stowage, handling, disposal, and transportation. As a safety supervisor, you must know about ordnance safety. It will be up to you to reduce hazards and to help prevent mishaps. In this chapter we briefly discuss the following topics:

- Purpose and elements of the Naval Explosives Safety Program
- Organization and general responsibilities of the Naval Explosives Safety Program
- The safety supervisor's ordnance safety requirements and responsibilities
- General safety precautions for freight/weapons elevators and ammunition hoists
- Personal protective equipment
- Protective clothing worn during ordnance handling
- Prohibited articles in hazardous areas
- Ordnance hazards associated with fire and heat
- Qualification/certification criteria and procedures
- Definitions and terms associated with explosives mishap reports
- Reportable mishaps or deficiencies
- Investigation and reporting responsibilities

### THE NAVAL EXPLOSIVES SAFETY PROGRAM

Preventing the premature, unintentional, or unauthorized discharge of explosives and devices containing explosives is what explosives safety is all about. It involves a decrease in the effects of explosions, combustion, and toxicity. It includes all mechanical, chemical, biological, and electrical hazards associated with explosives and hazards of electromagnetic radiation to explosive ordnance. In addition, explosives

safety includes equipment or systems in which malfunction would hazard the safe handling, maintenance, storage, transfer, release, delivery, or firing of explosives.

The Weapons Systems Explosives Safety Review Board (WSESRB) reviews the explosives safety of weapons or explosives systems. It makes safety recommendations to the proper naval systems commander or project manager responsible for the system or material under review. This board, headed by a representative of the Commander, Naval Sea Systems Command (COMNAVSEASYS COM), consists of representatives from appropriate systems commands and other commands as necessary.

The Department of Defense Explosives Safety Board (DDESB) sets up explosives safety standards for Department of Defense (DOD) personnel. It advises the Secretary of Defense and each DOD component on hazardous conditions associated with the handling, transportation, and storage of explosives and ammunition. This board consists of one colonel or captain (O-6, or senior) from each military department. An officer or a person of equivalent seniority chairs the board. That position rotates among the departments. Liaison officers and a permanent secretariat of senior civilian explosives safety engineers from each of the military departments provide technical support to the board.

### PURPOSE AND ELEMENTS OF THE NAVAL EXPLOSIVES SAFETY PROGRAM

The purpose of the Naval Explosives Safety Program is to ensure safety and enhance operational readiness. The program uses several elements to reduce, to a minimum, the chance of injury, loss of life, and property damage.

#### Explosives Safety Standards

Explosives safety standards are an essential element of the Naval Explosives Safety Program. The DDESB sets explosives safety standards and periodically coordinates their revision. These standards guide DOD components in avoiding the hazardous conditions connected with explosives. Appropriate Naval Sea

Systems Command (NAVSEASYSKOM) publications publish the standards for naval use and observance.

### **Explosives Safety Studies**

Explosives safety studies, surveys, and reviews are conducted as part of the Naval Explosives Safety Improvement Program (NESIP). The Chief of Naval Operations (CNO) established this element of the safety program. The WSESRB conducts some of the reviews, while the Navy Ammunition and Hazardous (AMHAZ) Materials-Handling Review Boards conduct others. The Naval Sea Support Center detachments conduct detailed inspections.

### **Explosives Safety Training**

Training is another key element of the Naval Explosives Safety Program. You must make sure your personnel follow safe operating practices and procedures. To do that, they must maintain a clear and practical understanding of mishap prevention. Make sure the personnel involved in handling or transporting explosives know how to perform their work safely and quickly. Experienced commissioned officers or petty officers train shipboard personnel until they are competent to perform their work under less direct supervision. We address training in more depth later in this chapter.

### **Explosives Safety Inspections**

One element required of all levels of command is the establishment and continuation of a positive explosives safety inspection program. This program, too, must be present at all levels of command.

### **Explosives Mishap Investigations and Reporting Procedures**

The final element of the Naval Explosives Safety program is the use of explosives mishap investigation and reporting procedures. The gathering of information concerning mishaps, incidents, and material safety is basic to any safety program. Such information helps you to develop organized steps needed to prevent further mishaps. We discuss investigation and reporting procedures later in this chapter.

## **ORGANIZATION AND GENERAL RESPONSIBILITIES OF THE NAVAL EXPLOSIVES SAFETY PROGRAM**

The Naval Explosives Safety Program is an important part of the primary program areas (shore, surface, aviation, and submarine and diving). It extends into several support areas of the Naval Occupational Safety and Health (NAVOSH) Program. It applies to all personnel, civilian and military, in any Department of the Navy duty assignment in which explosives are, or may be, present.

The CNO exercises general supervision and command authority for the application of technical guidance. Within the Office of the CNO, the Deputy Chief of Naval Operations (DCNO) (Logistics, N4) supervises U.S. Navy explosives safety matters. The DCNO exercises the authority of the Secretary of the Navy for waiver of explosives safety requirements. The DCNO coordinates with the Commandant of the Marine Corps the explosives safety policies, programs, and guidance that mutually affect Navy and Marine forces.

NAVSEASYSKOM sets up and issues technical standards and criteria and provides technical help to the Department of the Navy. NAVSEASYSKOM also furnishes technical advice and evaluations to the CNO when operational requirements conflict with technical requirements. NAVSEASYSKOM directs and coordinates all technical offices concerning explosives safety and prepares data as needed to analyze program effectiveness. This command also provides the necessary technical advice and guidance for development of training programs. These programs set up a level of competence within the Department of the Navy that ensures the success of the Naval Explosives Safety Program.

The following is a list of commanders who have assigned responsibilities under the supervision of the CNO (N4):

- Commander, Naval Air Systems Command
- Commander, Naval Electronic Systems Command
- Commander, Naval Supply Systems Command
- Commander, Naval Facilities Engineering Command

The Commander, Naval Safety Center (COMNAV-SAFECEN), provides support to the CNO (N4) in the



supervision and management of the Naval Explosives Safety Program.

All commands having custody of explosive materials must make sure only qualified personnel handle those materials. Commands must submit reports of explosives mishaps. We discuss both the certification program and explosives mishap reporting later in the chapter.

## **ORDNANCE MISHAP PREVENTION**

Improper processing, handling, loading, and testing of explosive devices have, in the past, caused mishaps. These mishaps resulted in injury, loss of life, or damage to property. They also reduced the working effectiveness of both fleet and shore activities.

Personnel error is the major cause of mishaps with explosive devices. Analysis of mishaps caused by personnel error shows that the most common reasons for their occurrence are as follows:

- Lack of training
- Improper procedures
- Improper handling
- Lack of proper supervision
- Inattention
- Complacency

## **THE SAFETY SUPERVISOR'S ORDNANCE SAFETY REQUIREMENTS AND RESPONSIBILITIES**

As an ordnance safety supervisor, you must be familiar with current directives in ordnance safety, such as *Ammunition and Explosives Ashore*, NAVSEA OP 5, and *Ammunition Afloat*, NAVSEA OP 4. You also should know the type and classification of ordnance within your command or activity. In addition, you should know the specific hazards the various types of ordnance pose. Personnel supervising the use, care, inspection, handling, preparation, or routine disposal (excluding explosive ordnance disposal operations) of ammunition and explosives must adhere to the following guidelines:

1. Be qualified and certified as required by OPNAVINST 8023.2C and supplemental regulations.

2. Make sure personnel obey all regulations and instructions; remain vigilant throughout the operation; and strictly prohibit horseplay.
3. Carefully instruct and frequently warn personnel under them of the need for care and constant vigilance.
4. Brief working parties on related safety instructions before they begin an operation. Know the hazards of fire, explosion, and other catastrophes that the safety regulations should prevent.
5. Be alert to detect any hazardous procedures or practices. Know the symptoms of a deteriorating mental attitude of certified personnel, and take immediate corrective action upon detecting such symptoms.
6. Make sure subordinates are qualified and certified to perform the job assigned to them. Make sure their certification is current. Report those personnel who are not qualified for their assigned work to their immediate superior.
7. Enforce orders about the maximum number of personnel permitted in the hazard area.
8. Permit the use of only authorized tools and handling equipment for the operations. Make sure personnel use them in the manner specified by standard operating procedures,
9. Keep the area clean; prevent the blocking of safety exits, aisles, and accesses to fire-fighting equipment.
10. Enforce compliance with safety regulations that concern protective clothing and equipment. That includes inspecting; maintaining; or replacing, if necessary, goggles, gloves, respirators, aprons, and other personal protective equipment. Instruct personnel on the purpose and use of protective equipment before they engage in an operation requiring its use.
11. Before leaving at the end of a work day, make sure all conditions in the work area are safe.
12. Inform the immediate supervisor of any area needing lights, guards, safety appliances, or repairs.
13. Report in writing to the commanding officer any requests, suggestions, or comments about safety standards.

14. Assign personnel to guide ordnance through scuttles or hatches. Install 1-inch pads on edges of openings.
15. Refrain from competing with other ordnance-handling parties. Prohibit any other cargo-handling operations during ordnance-handling operations.
16. Post warning signs during ordnance-handling operations, and hoist the "BRAVO" flag.
17. Keep ordnance-handling parties small.
18. Alert your immediate supervisor of the need for explosive ordnance disposal (EOD) personnel to remove defective or suspected ammunition from the work area.
5. Warn others if an unforeseen hazard occurs by giving an audible warning; exercise reasonable caution in such appropriate situations
6. Immediately report to their supervisor the presence of unauthorized personnel in the area
7. Thoroughly wash hands after handling ordnance
8. Refrain from moving cracked, dented, deformed, corroded, or otherwise damaged ordnance
9. Avoid handling ordnance that is "armed" or on which the safety device is off, unless directed otherwise

As a supervisor, you have no authority to waive or alter NAVSEASYSKOM and other commands' safety regulations. You cannot permit anyone to deviate from or violate these regulations.

### Ordnance Handling Training of Subordinates

You now know what your duties as a supervisor are. What are the duties of those personnel you train and supervise? Operating personnel must read, understand, and strictly follow all safety standards, requirements, and precautions that apply to their work or duty.

Personnel working with hazardous munitions must know that such substances are designed to explode and are **always** dangerous. Make sure they are trained to instantly respond to, or initiate, any warning signal. The signal can be oral, visual, audible, or any combination of these. Conduct training on a regular basis to ensure all personnel are aware of the meaning and intent of all warning signs, safety precautions, and instructions.

In addition, train your subordinates to take the following actions:

1. Immediately report to their supervisor any condition, actions, or equipment or material they consider unsafe
2. Immediately **warn** other **personnel** when they are in **danger** because of known hazards or by their failure to obey safety precautions
3. Wear or use approved protective clothing or equipment, as required
4. Immediately report to their supervisor any injury or evidence of impaired health to themselves or others occurring during work or duty

### General Ordnance Precautions

The greatest danger from ordnance is explosion. Because of built-in safety devices, ordnance requires outside intervention to set it off unintentionally. Fire, excessive heat, improper handling, or simple misjudgment or mistakes can cause a weapon to detonate. The major safety factor in preventing an ordnance catastrophe is having a well-experienced and knowledgeable person in charge. He or she must identify and correct potential safety hazards. A crew who knows and understands the basics of ordnance safety and has a real respect for ordnance hazards helps its supervisor. The following is a list of general ordnance precautions that you and your subordinates must follow:

1. Do not smoke or allow open flames near ordnance.
2. Stop operations immediately if ordnance leaks any material. Notify supervisors who will take corrective action.
3. Use ordnance only for its designed purpose.
4. Make sure fire-fighting equipment is available near ordnance operations.
5. Do not eat or drink near ordnance.
6. Know and understand decontamination methods if handling chemical ordnance.
7. Get immediate first aid if fuels or oxidizers splash on you.
8. Never enter a space where you suspect liquid fuel leaks without having a gas free survey conducted.
9. Report all mishaps immediately.

10. Do not try to alter or change ordnance in any way.
11. Use only authorized equipment to perform any operation on ordnance.
12. Electrically ground weapons during assembly, disassembly, and check-out.
13. Use approved standard operating procedures (SOPs) for all hazardous operations.
14. Suspend operations involving ordnance during thunderstorms or high winds as directed by local regulations.

### **GENERAL SAFETY PRECAUTIONS FOR FREIGHT/WEAPONS ELEVATORS AND AMMUNITION HOISTS**

When working around freight/weapons elevators and ammunition hoists, observe the following safety precautions:

- Always emphasize safety as well as following safety procedures when using freight/weapons elevators and ammunition hoists. Allow only trained personnel to operate this equipment. Ensure they know how to operate emergency devices.
- Inspect the elevators and hoists at least once each week or after use. Look for loosened or damaged parts. Tag the equipment **OUT OF SERVICE** before beginning repairs, adjustments, or inspections. Until repairs are complete, make sure elevator doors remain locked or barricades remain erected if they must remain open.
- Place a placard or card in each elevator showing its safe working load. You must never exceed the safe working load.
- Authorize personnel to use only those elevators specified for passenger use. Elevators not authorized for passenger use must carry a **KEEP OFF THIS ELEVATOR WHEN NOT IN OPERATION** sign.
- Close and secure all elevator doors or gates before starting the elevator and when in use.
- Keep hands away from motor-operated doors if you are the operator. When you can manually operate doors or gates, grasp only the handles provided. Operators must never leave the elevator-operating mechanism unprotected.

- Remove the load from an elevator or hoist that does not start. If the elevator or hoist still fails to work, call maintenance personnel for help. Do not jump off the elevator if it refuses to stop. Safety devices and automatic terminal stops should take care of an emergency.
- Perform maintenance and testing of elevators according to *Naval Ships' Technical Manual (NSTM)*, chapter 700.
- Use more than one person to move the elevator when performing maintenance.
- Use only elevators and hoists designated for ammunition.
- Secure covers on ammunition hoists when not in use.
- Make sure personnel do not ride in or on top of ammunition hoists to perform maintenance of any type.
- Load heavy loads in the center of the platform. Make sure the operator exercises extreme care in handling such loads. While unloading or offloading heavy loads, make sure the operator checks to see that locking devices and safe hoisting attachments are in place.

### **PERSONAL PROTECTIVE EQUIPMENT**

Personnel who handle ordnance must wear proper personal protective equipment (PPE). his equipment consists of garments and devices needed to protect people from hazards inherent to the performance of specific jobs. Do not mistake PPE with safe work attire, such as short sleeves, cuffless trousers, or safety shoes. PPE does nothing to reduce or eliminate a hazard, and its failure means immediate exposure to the hazard. PPE may become ineffective or misused without the wearer knowing so, which is particularly serious.

You must provide personal protective clothing and equipment and make sure personnel use them in the following situations:

- When enclosing or isolating a process, or when equipment is impractical
- When making process-material substitutions
- When providing ventilation
- When using other control measures

- When short exposures to hazardous airborne concentrations may occur
- When certain or accidental spills may occur

Always make sure personnel observe the following safety precautions:

- Wear ear protection when handling ordnance during firing exercises
- Wear nonskid, steel-toed safety shoes when working with ordnance
- Clean their protective clothing after each use to remove all traces of contamination before stowing it
- Inspect clothing for damage, deterioration, or other defects before using it
- Reject any items that are not completely satisfactory

When working with ordnance containing white phosphorus, make sure enough emergency equipment is available for personnel to use.

## **PROHIBITED ARTICLES IN HAZARDOUS AREAS**

Personnel working with explosives or in areas where explosives are present must not wear certain clothing articles. They also must not wear or carry certain prohibited articles. Some of the prohibited articles are listed in the following paragraphs.

### **Articles of Adornment**

Personnel may not wear articles of adornment, such as watches, rings, necklaces, chains, bracelets, earrings, neckties, and scarves, in the following situations:

- When working with exposed explosives or in areas where exposed explosives are present
- When operating moving or rotating equipment
- When physically handling material, such as that involved in lifting or moving
- When working with equipment that could cause electric shock
- When handling weapons with electric leads

There are several exceptions to the above list. Personnel may wear articles of religious adornment if the local safety office approves. Operators of

materials-handling equipment engaged in receipt, storage, and issue of material may be exempted at the discretion of the local safety office. Another exemption, if approved by the local safety office, concerns personnel operating or testing electrical equipment that is properly grounded.

### **Tools**

Personnel must use authorized tools when working on explosives or in an explosives area. You, as supervisor, should make periodic inspections to ensure compliance.

### **Firearms**

Do not permit anyone carrying a firearm to enter any explosives area or building. The exceptions are couriers, assigned security personnel, or personnel responding to an emergency.

### **Matches and Lighters**

Unless the commanding officer gives written authorization, do not permit matches, cigarette lighters, and other spark-producing devices in explosives areas.

### **Food**

Personnel must not bring food to any area or eat, drink, or store food in any area in which the handling or storing of explosives or chemical agents occurs.

## **ORDNANCE HAZARDS ASSOCIATED WITH FIRE AND HEAT**

Fire is a hazard to life and property, especially when ammunition and explosives are involved. Many of these materials are extremely sensitive to heat. They react at temperatures much lower than those required to ignite ordinary wood, paper, or fabrics. Even indirect heat generated by a fire could start a reaction that could result in an explosion. The **first and most important rule** in operations involving ammunition and explosives is to **keep them away from excessive heat!**

All personnel concerned with ammunition and explosives must investigate the cause of fires. They must also recognize and follow good practices to prevent fires. Personnel concerned with ammunition must thoroughly understand procedures for fighting and controlling fires involving explosive materials. Having a well-trained and efficient organization responsible for fire safety is especially important. Personnel concerned

with ammunition must have a full awareness of their responsibility.

Immediately report all fires starting near ammunition or explosives. Begin fighting the fire with all available means and without awaiting specific instructions. If the fire involves explosive material or if it is supplying heat to explosives, evacuate personnel in the area and seek safety. Also evacuate personnel if a fire is so large that you cannot extinguish it with the equipment available.

Personnel engaged in fighting fires involving explosives and ammunition should seek available cover. Do not expose yourself unnecessarily to intense heat, flying fragments, or possible explosions.

### **Fire Hazard and Fire-Fighting Indoctrination**

Make sure all personnel, supervisory or otherwise, receive indoctrination about, and become thoroughly familiar with, fire hazards and fire-fighting equipment. They must be familiar with the safety practices of the operations for which they are responsible. They must be familiar with the fire bill provisions, both general and local, that apply to their operation. They must know the actions to take if a fire emergency develops.

### **Fire Watch Responsibilities**

You must make sure that a qualified fire watch, adequately prepared and equipped, is standing by during the following evolutions:

- Maintenance and repair work involving open flames or heat-producing devices near or within an area where personnel store, process, or handle explosives
- Disposal operations

### **Fire Hazard Inspections**

Fire hazard inspections conducted periodically are an important part of fire prevention. You should regularly inspect, preferably monthly, all areas and buildings of an ammunition activity. Common causes of fire and fire violations include, but are not limited to the following:

- Excessive amounts of combustible, explosive, or otherwise dangerous materials
- Hazardous conditions arising from defective or improperly installed equipment and machinery

used for processing or handling ammunition or explosives

- Dangerous accumulations of rubbish, waste paper, boxes, and shavings
- Improper storage of materials
- Obstructions interfering with the use of fire exits, fire doors, or fire-fighting equipment
- Insufficient, inoperative, or poorly maintained fire-fighting equipment
- Uncontrolled vegetation growing around buildings and magazines
- Evidence of violations of smoking regulations or the use or possession of matches, cigarette lighters, or other prohibited articles
- Missing or improperly posted fire bills
- Unauthorized use of heat- or flame-producing devices or equipment in restricted areas

### **Smoking Regulations**

Personnel must not smoke in areas containing ammunition, explosives, or any other hazardous materials. You should conspicuously display NO SMOKING signs where smoking is prohibited. The commanding officer may appoint certain smoking areas within restricted areas.

### **Housekeeping**

An essential element of any fire prevention effort is good housekeeping. Accumulations of explosive dust, combustible scrap, and flammable residue are primary sources of destructive fires. Keep areas clean and orderly to reduce fire hazards. Do not allow rubbish and trash to gather. Stack combustible material in an orderly manner to prevent toppling or collapsing of stacks.

## **EXPLOSIVES HANDLING PERSONNEL QUALIFICATION AND CERTIFICATION PROGRAM**

The intent of the Explosives Handling Personnel Qualification and Certification Program is to make sure you qualify and certify personnel before they perform any task involving explosive devices. This program concerns everyone involved in the handling, preparation, inspection, or adjustment of live ammunition.

You should permit only reliable, mentally sound, and physically fit persons to work with or use explosives and ammunition. Make sure their qualification and certification are current.

## QUALIFICATION PROCEDURES

Personnel qualify at various levels, such as team member, quality assurance, and safety observer. We discuss the different qualification levels in later paragraphs.

Explosive devices are segregated into representative “family types.” That prevents the need for personnel to qualify on every type of ordnance or ammunition. Personnel qualify by demonstrating their skills before a certified member of the certification board. They show each evolution they will perform (for example, assembly and testing) on the specific explosive device, represented by a family type of device, if appropriate. The person qualifying must know the documentation, such as a technical manual, that applies to each device and how to use it.

## QUALIFICATION LEVELS

As with any qualification process in the Navy, there are different levels and minimum standards for certification. The qualification levels and corresponding basic qualification standards are as follows:

**1. Team Member (TM):** Members must have an awareness of basic safety precautions about the work task and explosive devices concerned. They must have received formal or on-the-job training and must have been recommended by their immediate supervisor. **NOTE:** TM qualified personnel will perform in team concept only under supervision of a Team Leader.

**2. Individual/Team Leader (I/TL):** Team Leaders must have the same basic qualifications as a TM. They must have sufficient knowledge and must have demonstrated the skill required to be entrusted with performing the work task alone or to direct the performance of others in safe and reliable operations. They must be capable of interpreting the requirements of applicable checklists and assembly/operating manuals.

**3. Quality Assurance (QA):** QA personnel must have the same basic qualifications as an I/TL. They must have a detailed knowledge of applicable inspection criteria for the explosive/device system. They must be able to determine whether an explosive device/system is functioning properly while in use. They must be able

to determine whether the individual followed necessary assembly or installation procedures according to applicable directives.

**4. Instructor (IN):** Instructors must have the same basic qualification as an I/TE. They must have the required skills to instruct others and provide formal training using an approved course of instruction.

**5. Safety Observer (SO):** Safety observers must know enough about safety procedures and the functioning of safety devices to decide on actions needed to counter improperly used procedures or safety devices. **NOTE:** This level of qualification does not build on any other level of qualification.

## CERTIFICATION PROCEDURE

The commanding officer or officer in charge (OIC) of each unit or naval activity involved with explosives appoints a certification board. This board includes, as a minimum, the responsible department head (or comparable supervisory representative if not a department). The board also includes at least one person, E-6 or above, certified to perform the task, function, or evolution. In large units, such as aircraft carriers or weapons stations/ammunition depots, the department head may delegate the responsibility for certification. Additional personnel from within or outside the command may increase the board as appointed by the commanding officer or OIC.

Once qualified and recommended, personnel receive their final certification. The commanding officer, OIC, or the appointed head of the certification board issues the final certification. You must make sure this information gets entered into your people’s training or personnel record. In addition, you must keep a certification sheet (fig. 9-1) in the operating area for each person performing operations covered by an operating procedure. Activities may vary the certification sheet formats to satisfy specific requirements.

### Duration of Certification

Certification, unless revoked, is valid for a maximum of 12 months. The certification board confirms a renewal of the certification, whether issued at the time of expiration or later. The certification covers an individual or a team qualification. If possible, you should completely requalify personnel before renewing their certification.



- Show incompetence or unreliability by any other behavior

You should recognize that ordnance incidents and mishaps can and do happen through accidental acts, carelessness, and minor rule infractions. They also happen through deliberate acts, negligence, and major rule infractions. With the commanding officer's approval, personnel with a revoked certification must be retrained until you consider them requalified and recertified. However, their behavior may show that retraining may not be effective. You should then assign them to other tasks not involving explosive devices. Revoking the certification of military personnel requires an entry in the proper portion of their individual service record. The entry must state the specific reason for the revocation.

For information on qualification and certification procedures, you should consult type commander directives, enclosure 5 of OPNAVINST 8023.2C, and NAVSEAINST 8020.9A for naval shore activities.

### **EXPLOSIVES MISHAP OR CONVENTIONAL ORDNANCE DEFICIENCY REPORTING PROCEDURES**

A significant potential for damage or injury exists in mishaps involving explosives. Therefore, the requirements for reporting explosives mishaps are more extensive than those for reporting other types of mishaps. To report those mishaps properly, you first need to understand the meaning of the following terms:

- Explosives Mishap. An incident or accident involving conventional ordnance, ammunition, explosives, or explosive systems and devices resulting in an unintentional detonation, firing, deflagration, burning, launching of ordnance material (including all ordnance impacting off range), leaking or spilling of propellant fuels and oxidizers, or release of a chemical agent. Even if an ordnance system works as designed, if human error contributed to an incident or accident resulting in damage, death, or injury, the event is an explosives mishap.

- Explosive Material. A chemical, or a mixture of chemicals, that undergoes a rapid chemical change (with or without an outside supply of oxygen) freeing large quantities of energy in the form of blast, light, and hot gases. Incendiary materials and certain fuels and oxidizers that can be made to undergo a similar chemical change are also considered explosive materials.

- Conventional Ordnance Deficiency. A malfunction, observed defect, or induced defect involving conventional ordnance, explosives, ammunition, explosive systems, devices, or support and handling equipment used to handle, load, store, or transport ordnance.

- Chemical Agent. A chemical compound intended for use in military operations to kill, seriously injure, or incapacitate people through its chemical properties. Excluded are riot control agents, chemical herbicides, smoke and flames, pesticides, and industrial chemicals unrelated to chemical warfare.

### **REPORTABLE MISHAPS AND DEFICIENCIES**

When you report explosives mishaps and conventional ordnance deficiencies, use the format described in chapter 5 of OPNAVINST 5102.1C, *Mishap Investigation and Reporting*; enclosure (7) of OPNAVINST 5100.21 B, *Afloat Safety Program*; and chapter 10 of OPNAVINST 8600.2A, *Naval Airborne Weapons Maintenance Program (NAWMP)*. Reportable mishaps and deficiencies include incidents and malfunctions involving non-nuclear explosives, explosive ordnance, chemical agents, and explosive systems.

#### **Explosives Mishaps**

The following describes events you should report as explosives mishaps. When reporting these events, use the format described in the applicable instruction listed in the preceding paragraph:

- Detonation, Deflagration, Burning, or Firing. An unintentional initiation, or explosion, or reaction of an explosive material, component, or system. Accidental discharge of all guns, including small arms.
- Inadvertent Launch. An unintentional launching of a weapon.
- Chemical Agent Release. Any intentional launching of a weapon resulting in the following:
  - Damage to property from contamination, or costs incurred for decontamination
  - Physiological symptoms of agent exposure exhibited by individuals



- A serious potential for exposure created by the quantity of the agent released into the atmosphere
- Propellant Fuels and Oxidizers. Leaking or spilled propellant fuels and oxidizers.
- All ordnance impacting off range.

### Conventional Ordnance Deficiencies

The following describes events you should report as conventional ordnance deficiencies. When preparing a report of these events, follow the guidelines of OPNAVINST 5102.1C, appendix B; use the words *Conventional Ordnance Deficiency Report* for the subject line. If the report will include a request for an engineering investigation, use the words *Conventional Ordnance Deficiency Report/Engineering Investigation Request* for the subject line.

- Malfunctions. The failure of an explosive component, weapon, or weapons system to function as designed; for example, failure to launch and dud weapons.
- Improper Handling. Ordnance handling incidents attributed to human error. Examples include misuse of equipment, failure to follow established procedures, and violation of safety precautions, resulting in dropped or damaged ordnance. Other examples include human errors during processing, assembling, testing, loading, storing and transporting ordnance.
- Inadvertent Arming. The unintentional arming of an explosive component or weapon.
- Defective Weapons Support Equipment. Deficiencies involving any equipment or device used in the manufacture, test, assembly, handling, and transportation (skids, trailers or similar equipment) of any explosive system.
- Observed Defect. A discovered defective weapon or weapons system. Examples include protruding primers, damaged components, cracked grains, and advanced corrosion.
- Other
  - An event that, except for chance, would have been an explosives mishap.
  - Any failure or malfunction of, or damage to, a launch device or associated hardware and software resulting in a hazardous condition

when handling or otherwise manipulating dummy, exercise, or explosive material.

- Unusual or unexpected occurrences, unnatural phenomena, unfavorable environments, or instances of equipment failure that may damage or affect the safety of an explosive material or system. That includes hazards of electromagnetic radiation to ordnance (HERO) sensitive explosive systems exposed to radiation hazard (RADHAZ) environments.
- The failure of a missile or explosive system to test, calibrate, or otherwise meet preloading or prelaunch requirements.
- Use of explosive ordnance disposal (EOD) services involving military explosives for other than routine disposal of explosives.

### EXCEPTIONS

Report the following events as explosives mishaps or conventional ordnance deficiencies; use the guidelines of the publication listed for each event:

- Explosives mishaps or conventional ordnance deficiencies occurring aboard a U.S. Navy, U.S. Naval Reserve, or Military Sealift Command vessel; follow OPNAVINST 5100.21 B.
- Mishaps or deficiencies occurring during airborne weapons systems and equipment operations, including armament supporting equipment (any equipment used in the loading or unloading of an explosive system or launch device on an aircraft); follow OPNAVINST 8600.2A, *Naval Airborne Weapons Maintenance Program (NOTAL)*.
- Nuclear weapons mishaps and incidents; follow OPNAVINST 3100.6E, *Special Incident Reporting (OPREP-3, Navy Blue and SITREP) Procedures* (NOTAL) and JCS Publication 1-03.7 (NOTAL).
- Explosives mishaps and conventional ordnance deficiencies that occur off station while an explosive material or system is in the custody of a common (commercial) carrier; follow NAVSEA OP 8020.13B and volume I of NAVSEA OP 2165.
- Explosives mishaps and conventional ordnance deficiencies involving transportation by

commercial carriers (including railroads) that occur on board a naval installation; follow OPNAVINST 5102.1C and volume 1 of NAVSEA OP 2165.

OPNAVINST 5102.1C exempts U.S. Marine Corps activities from reporting mishaps if Report Symbol DN 8025-02 is submitted as prescribed by Marine Corps Order 8025.1C (Class V Malfunctions and Deficiencies) (NOTAL).

## **POST-MISHAP AND DEFICIENCY ACTION**

The activity experiencing the mishap or deficiency will take the following action:

- Stop using the item, lot, or batch involved pending guidance from higher authority.
- Start the reporting procedures.
- Accurately and quickly respond to requests for additional information.

Depending on the severity of the explosives mishap or deficiency, other U.S. Navy commands and activities may help in identifying the actual cause. They would then take steps to ensure that similar mishaps or deficiencies do not occur; the following is an example of how those steps may be taken:

1. NAVSAFECEN together with other activities may conduct a mishap investigation.
2. Commander, Naval Sea Systems Command (NAVSEASYSKOM); Commander, Naval Air Systems Command (NAVAIRSYSKOM); or Commandant, U.S. Marine Corps, may designate all related explosive systems unserviceable, direct follow-up tests and evaluation of various lots to identify defective hardware, or initiate procedural changes in the use of the weapons system.
3. Commander, Ships Parts Control Center (SPCC), Mechanicsburg, Pennsylvania, may

support the above command decisions regarding disposition and use of defective or questionable parts by issuing a Notice of Ammunition Reclassification (NAR).

4. NAVSAFECEN would then enter all relevant information into a data repository.

## **INVESTIGATION AND REPORTING RESPONSIBILITIES**

The commanding officer, officer in charge (OIC), or ship's master requires the investigation and reporting of all reportable explosives mishaps occurring within the command. Included are those mishaps involving personnel attached to their command.

Unless you must include classified material, consider the reports as unclassified (FOR OFFICIAL USE ONLY). For further information on a message report, consult appendix B of OPNAVINST 5102.1C, and enclosure (7) of OPNAVINST 5100.21B, or OPNAVINST 8600.2A.

## **SUMMARY**

We discussed the Naval Explosives Safety Program and the Explosives-Handling Personnel Qualification and Certification Program in this chapter. We also discussed the duties of a safety supervisor in ordnance safety. We covered the precautions you should take when handling ordnance. We listed the safety precautions you should follow during maneuvers involving freight/weapons elevators and ammunition hoists. We examined the personal protective equipment you must use when handling ordnance. We listed the articles prohibited in hazardous areas as well as the fire prevention, protection, and control techniques each supervisor should know. Finally, we discussed the procedures you should use to report an explosives mishap.

## CHAPTER 10

# TRAFFIC SAFETY

For many years, motor vehicle mishaps have accounted for a majority of the accidental deaths of Navy personnel. From 1982 through 1992, 2, 266 sailors died in motor vehicle mishaps. Many others suffered injuries that prevented them from returning to the work force.

The Navy's operational readiness depends upon its people. Motor vehicle mishaps are degrading this readiness through needless deaths and injuries. To combat this problem, the Navy established the Navy Traffic Safety Program. This program defines the safety precautions, regulations, and laws governing the use of all vehicles by Navy people, both on and off duty.

In this chapter, we address the following areas of the Navy Traffic Safety Program:

- Program applicability
- Program enforcement
- Safety belts
- Child safety seats
- Driver education
- Alcohol
- Pedestrians
- Portable headphones
- Motorcycles

### NAVY TRAFFIC SAFETY PROGRAM

The Navy Traffic Safety Program defines motor vehicles as wheeled vehicles designed for travel on public roads under motor power or assisted by motor power. Vehicles include automobiles, trucks, motorcycles, mopeds, and all-terrain vehicles. Navy personnel may operate motor vehicles that they or the government own, lease, rent, or control. The Navy Traffic Safety Program applies to all naval bases, stations, facilities, installations, detachments, and all other property under the jurisdiction of the U.S. Navy. Every command, including forces afloat, must designate, in writing, a traffic safety program manager.

Department of Defense (DOD) and Navy motor vehicles must conform to Federal Motor Vehicle Safety

Standards. Tactical and combat vehicles must closely conform to federal motor carrier safety regulations. Each naval installation must strive to meet the highway safety program standards (HSPS) outlined in *Issuance of Navy Traffic Safety Program*, OPNAVINST 5100.12F. These standards include marking hazards, setting safe speed limits, adopting laws, and ensuring that drivers are licensed.

### PROGRAM APPLICABILITY

The Navy Traffic Safety Program applies to the following motor vehicle operators, passengers, and pedestrians:

- All Navy military personnel (on or off base and on or off duty)
- All Navy civilian personnel in a duty status, on or off base
- All people in, or on any Navy motor vehicle, on or off base
- All people on a naval base, anytime

Even when driving an off-road motorcycle while off duty, personnel must obey applicable requirements of the Navy Traffic Safety Program.

### PROGRAM ENFORCEMENT

Noncompliance with certain parts of the Navy Traffic Safety Program can result in a court martial under the *Uniform Code of Military Justice (UCMJ)*. It can also result in nonjudicial punishment (NJP) for military people involved in minor violations. Noncompliance by civilian employees may result in disciplinary action.

If you receive an injury because you violate a Navy Traffic Safety Program regulation, the violation may be considered in determining the compensation to which you may be entitled. For example, if you have an accident while driving a friend's motorcycle without wearing the required protective equipment (an approved helmet, proper shoes, etc.) or before attending the motorcycle safety course, the Navy may not pay your medical bills. If you die, your family may not receive all of your death benefits.

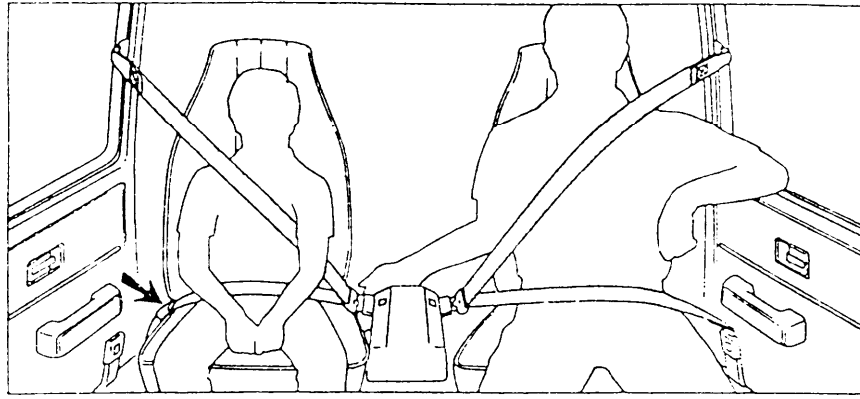


Figure 10-1.—Automatic safety belts with shoulder harnesses.

## HOW AIRBAGS WORK

0 SECONDS:  
Air bags in dash  
and steering wheel

2/100 SECOND:  
The air bags inflate,  
filling with nitrogen gas.

8/100 SECOND:  
Cushioning passengers  
and deflating to  
reduce rebound.

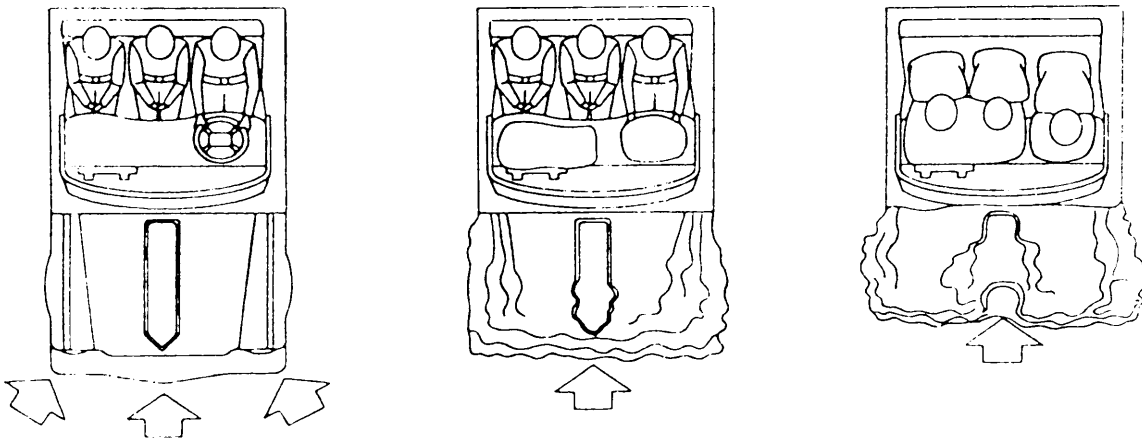


Figure 10-2.—Air bags save lives.

*Issuance of Navy Traffic Safety Program, OPNAVINST 5100.12F, authorizes disciplinary action for certain violations. For example, you may receive disciplinary action for failing to follow safety belt rules or for riding in the cargo areas of vehicles (in the back of a pickup truck).*

### SAFETY BELTS

Safety belts have been provided in most vehicles for the past 20 years. The original lap seat belt provided a measure of safety, but injuries still occurred when people snapped forward into the dashboard or steering wheel. Therefore, manufacturers began equipping vehicles with safety belts by adding shoulder harnesses

(fig. 10-1) to prevent the upper body from moving forward. In some cars, the safety belt moves into place automatically when the car is started.

Since 1990, some manufacturers have begun to equip vehicles with air bags (fig. 10-2) as well as safety belts. Air bags have grown in popularity as survivors have testified to their effectiveness.

National statistics have shown that using safety belts saves lives. Many states now have laws requiring the use of safety belts. The Navy requires personnel to use safety belts at all times.

All Navy motor vehicles must be equipped with safety belts for the driver and passengers. Each person riding in, or operating, a Navy motor vehicle must wear a safety belt. If the vehicle does not have a safety belt at

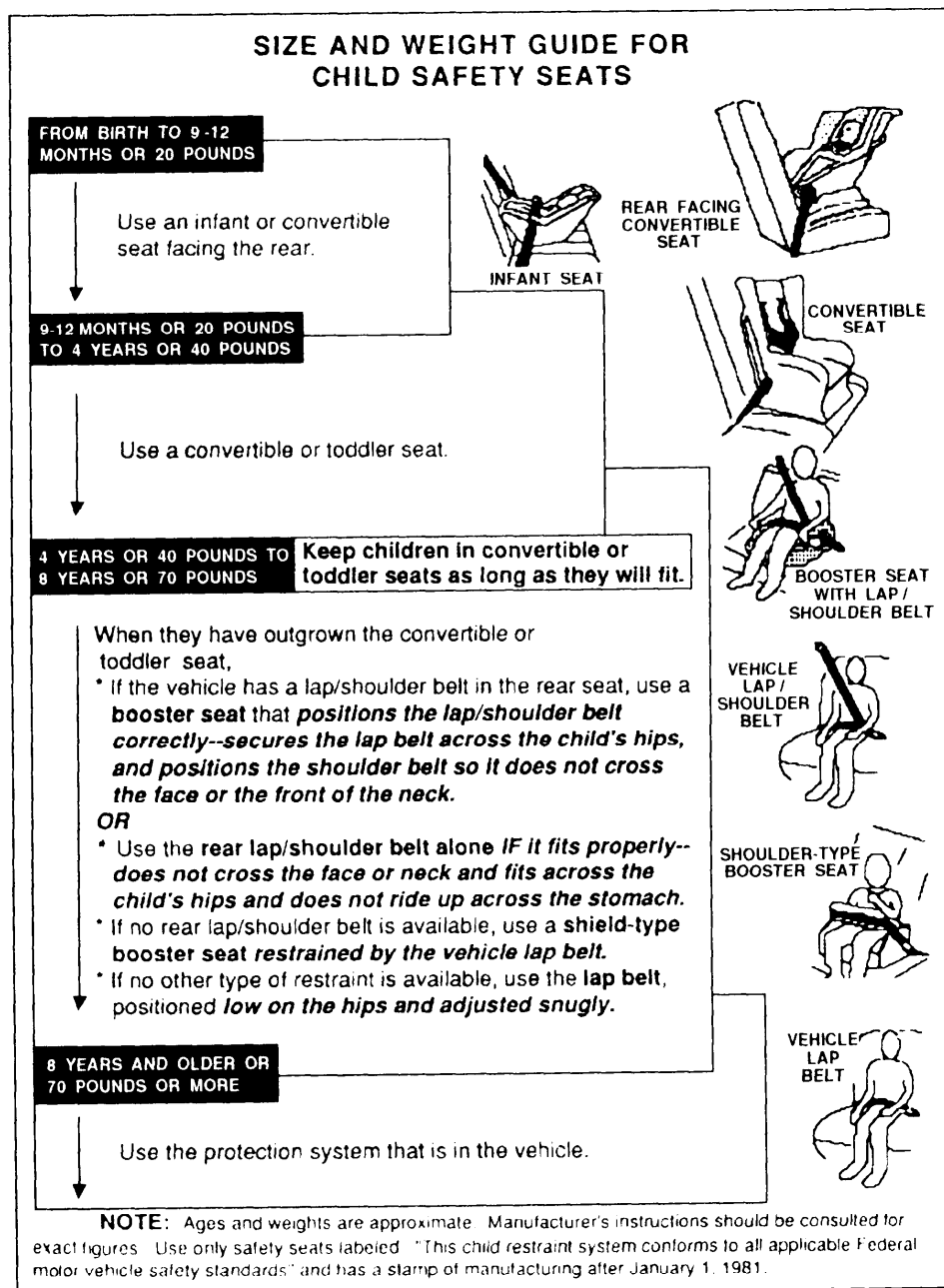


Figure 10-3.—Child safety seats.

a seating position, no one is permitted to ride in that seat. The only exception is buses not equipped with safety belts in passenger seating positions. If the cargo area of a vehicle does not have safety belts installed, no one is permitted to ride there. That means you may not catch a ride to the ship in the back of a Navy pickup or stake truck.

The rules are similar for private motor vehicles. All Navy personnel, on and off base, are required to wear a safety belt when riding in or operating a motor vehicle. If a vehicle does not have safety belts installed or if the

safety belts are damaged, military personnel are not permitted to ride in that vehicle. Public transportation, buses, and taxis are exceptions. You are not permitted to ride in the cargo area of motor vehicles without using safety belts.

#### CHILD SAFETY SEATS

All children under the age of 4 or weighing less than 40 pounds must be restrained in a child safety seat (fig. 10-3) while riding in a Navy motor vehicle or while

riding in a private motor vehicle on any naval base. This restriction applies even when a state has child safety seat laws that differ from the Navy's requirements.

### WARNING

The operator of the vehicle is responsible for informing all passengers of the safety belt, child safety seat, and protective equipment requirements of the Navy Traffic Safety Program. That means, as an operator of a motor vehicle, you must make sure your passengers BUCKLE UP!

### DRIVER EDUCATION

The Chief of Naval Education and Training (CNET) is required to provide all military personnel under the age of 26 who have a driver's license or who are required to operate a government motor vehicle with a minimum of 8 hours of classroom instruction in traffic safety. This training may be provided during recruit training or at their first duty station.

You may be required to attend such a course if you are found at fault in a traffic mishap while operating a government motor vehicle. You may also be required to attend such a course if you have been convicted of serious moving traffic violations in a government or private vehicle on base.

The Commander, Naval Safety Center (COMNAV-SAFECEN) certifies instructors who conduct the American Automobile Association's Driver Improvement Program at commands throughout the Navy.

Individuals **must not be assigned** as drivers of Navy police vehicles, ambulances, fire trucks, and crash and rescue vehicles until they have successfully completed the National Highway Traffic Safety Administration's Emergency Vehicle Operator Course (EVOC). This course is conducted by a COMNAV-SAFECEN approved instructor. This training is to be repeated every 3 years thereafter to ensure competency in the safe operation of such vehicles.

### ALCOHOL

Alcohol seriously affects a person's ability to operate a motor vehicle. Alcohol is the leading

contributing factor in motor-vehicle-related deaths and injuries. Small amounts of alcohol (one beer or a mixed drink) can affect a person's judgment and motor skills. The best defense is **don't drive after drinking** (fig. 10-4). Make arrangements for alternate forms of transportation (for example, call a taxi or a friend, or designate someone to drive who is not going to drink). You are not permitted to have open containers of alcohol in your possession while operating or as a passenger in a motor vehicle on any naval installation.

### PEDESTRIANS

The Navy Traffic Safety Program also pertains to pedestrians. Personnel **are not authorized** to jog on main roads and streets on naval installations with high traffic density and during peak traffic periods. Local commanders are required to define and publish the peak traffic periods of the locale and the roads and streets with high-density traffic.

If possible, avoid jogging on roads and streets on naval installations; use defined jogging facilities or routes when available. When jogging on roads and streets, jog in patrolled areas and wear light-colored clothing. During periods of reduced visibility (for example, at night or during fog or rain), wear reflective clothing. Jog facing traffic and obey traffic rules and regulations.

Appropriate fluorescent or reflective personal protective equipment **must be provided to and used by all personnel** who are exposed to traffic hazards in their assigned duties. This requirement involves traffic control personnel, roadway maintenance and construction crews, and electricians and telephone repair personnel working on overhead lines.

### PORTABLE HEADPHONES

Portable entertainment devices, such as miniature headset radios, cassette players, or other devices with headphones, can be dangerous. Not only do they produce hazardous noise if turned up to full volume, but they can cause mishaps. People have been killed while walking on train tracks or along roadways because they could not hear horns or warnings.

The use of portable headphones, earphones, or other listening devices is prohibited on roadways, sidewalks, and shoulders along roadways on all naval facilities while operating a motor vehicle, jogging, walking, bicycling, or skating. That does not include the use of hearing aids or hearing-protective equipment, nor does it negate the requirement for wearing hearing-protective

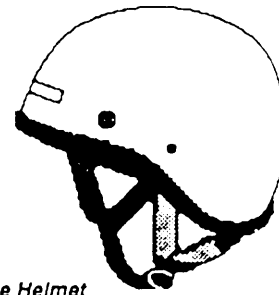
BLOOD ALCOHOL CONCENTRATION (BAC) CHART																
	1 Drink				2 Drinks				3 Drinks				4 Drinks			
After hours	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1
Weight pounds																
80	—	—	—	.02	—	—	.05	.08	.07	.10	.10	.10	.12	.12	.15	.15
100	—	—	—	.02	—	—	.04	.06	.05	.07	.08	.09	.09	.10	.12	.13
120	—	—	—	.02	—	—	.03	.04	.03	.04	.06	.08	.06	.08	.09	.11
140	—	—	—	.01	—	—	.02	.04	.02	.03	.05	.06	.04	.06	.08	.09
160	—	—	—	.01	—	—	.02	.03	.01	.02	.04	.05	.03	.04	.06	.08
180	—	—	—	.01	—	—	.01	.03	—	.02	.03	.04	.02	.04	.05	.07
200	—	—	—	—	—	—	.01	.02	—	.01	.03	.04	.01	.03	.04	.06
	5 Drinks				6 Drinks				7 Drinks				8 Drinks			
After hours	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1
Weight pounds																
80	.17	.17	.19	.20	.19	.22	.22	.25	.25	.27	.27	.30	.29	.30	.32	.33
100	.13	.14	.16	.17	.16	.18	.19	.21	.20	.22	.23	.25	.24	.25	.27	.28
120	.09	.11	.13	.14	.13	.14	.16	.17	.15	.17	.19	.20	.19	.20	.22	.23
140	.07	.09	.10	.12	.10	.12	.13	.15	.13	.14	.16	.17	.15	.17	.18	.20
160	.06	.07	.09	.10	.08	.09	.11	.13	.10	.12	.13	.15	.13	.14	.16	.17
180	.04	.06	.07	.09	.06	.08	.09	.11	.09	.10	.12	.13	.11	.12	.14	.15
200	.03	.04	.06	.08	.05	.07	.08	.09	.07	.09	.10	.12	.09	.10	.12	.13
Numbers (.01 through .33) equal the percentage of alcohol in the blood. Dash (—) = a trace of alcohol.																
GUIDE																
BAC	BEHAVIOR															
.01%-.04%	<i>Affected</i> —Judgment begins to lessen; person is less critical of actions; reaction time is slowed; indications of mental relaxation may appear.															
.05%-.09%	<i>Impaired</i> —Judgment is not sound; thinking and reasoning powers are not clear; the ability to do complex jobs is lessened.															
.10%	<i>Intoxicated</i> —Judgment and reasoning powers are severely hampered; cannot do common simple acts without error.															

Figure 10-4.—Alcohol and driving don't mix.

### HELMET FIT

Helmet fit is very important. A helmet that is too small will be uncomfortable, while one that is too large will be more likely to come off in a crash, even with the chin strap fastened. A helmet should fit snugly; it should not turn freely on your head.

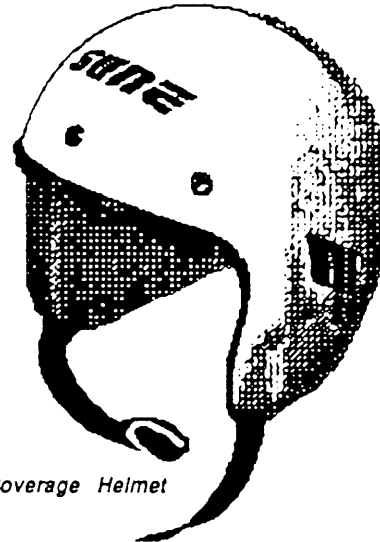
Always try a helmet on for size before you buy it. Your motorcycle dealer should be able to help you select one that fits properly.



*Partial Coverage Helmet*

### CHIN STRAP

Helmets are effective only if they stay on in a crash. If the chin strap is not fastened, the helmet can come off. Partial coverage helmets are more likely to come off than are the other types. The chin strap should be tightened until it is snug, without cutting into your neck. Some newer helmets don't use chin straps, but have another type of retention system. They should be used according to the manufacturer's instructions.



*Full Coverage Helmet*

### EYE PROTECTION

Windshields alone do not provide adequate protection against eye injuries when riding a motorcycle. Bugs and airborne debris can cause eye injuries and distract your attention enough to cause a crash. Traveling at highway speed without eye protection can also cause squinting and excessive tearing, both of which will impair your ability to see. Always use a helmet face shield or goggles. Most helmets are sold with a face shield or with the snap fasteners so one can be attached.



*Complete Facial Coverage Helmet*

Figure 10-5.—Motorcycle helmets.



equipment where conditions dictate. Also exempted is communication equipment being used for official business.

## MOTORCYCLES

The Navy uses the term *motorcycle* to refer to motorcycles, motorscooters, motorized bicycles, mopeds, and all-terrain vehicles (ATVs). If you are in the Navy and operate a motorcycle, on or off base, **you are required** to successfully complete a motorcycle safety program approved by NAVSAFECEN. You must be licensed by a state to operate a motorcycle before you can enroll in the course. You must also complete this course before you can obtain a base sticker that allows you to operate a motorcycle on base. Although you cannot license an ATV for operation on public roadways, all ATV operators must successfully complete the All Terrain Vehicle Safety Institute (ASI) ATV Rider Course.

Motorcycle safety courses are available throughout the Navy. You are not required to pay for those courses. Once you have successfully completed an approved course, it is important you continue to practice your riding skills. The skills you learn in the course are only effective if they are used. **About half of all motorcycle accidents involve personnel with less than 5 months' riding experience on the motorcycle involved.**

Navy motorcycle operators must wear the following protective equipment when operating/riding a motorcycle:

- A properly fastened helmet that meets U.S. Department of Transportation (DOT) standards.
- Properly worn eye-protective devices, which are defined as impact- or shatter-resistant eye-glasses, goggles, or a face shield attached to a helmet. A motorcycle-mounted windshield is not considered to be proper eye protection.

- A long-sleeved shirt or jacket, long-legged trousers, and full-finger leather or equivalent gloves.
- Properly worn hard-soled shoes with heels. Riders are encouraged to wear over-the-ankle shoes or boots.
- A commercially available, brightly colored, mesh or fabric safety vest with reflective vertical, horizontal, or diagonal stripes front and back with a minimum of 130 square inches of reflective area; 65 square inches on the front and 65 square inches on the back.

The proper personal protective equipment (PPE) for motorcycle riders does much more than protect them during a mishap. It also protects them from exposure to the environment. A helmet and eye/face protection (fig. 10-5) protect from wind blast, sand, gravel, bugs, and so forth. Clothing protects the riders from weather, flying objects, and hot parts of the motorcycle. Since motorcyclists are exposed to these conditions each time they ride, they should protect themselves as much as possible by wearing PPE.

## SUMMARY

We discussed the most important points of the traffic safety program covered in OPNAVINST 5100.12F, *Issuance of Navy Traffic Safety Program*. We discussed to whom the program applies; possible penalties for failure to comply; safety belt regulations; driver education; pedestrians; and the use of alcohol, portable headphones, and motorcycles.

Read this chapter carefully and follow its directions. We want you to live and enjoy operating your motor vehicles for a long time.



## CHAPTER 11

# RECREATION, ATHLETICS, AND HOME SAFETY

Off-duty mishaps outnumber shipboard and industrial mishaps. The Navy is concerned with personnel both on and off duty. In addition to traffic safety, discussed in chapter 10, the Navy has developed the Navy Recreation, Athletics, and Home Safety Program.

Sports and recreation are in the Navy to stay. In addition to raising morale, these activities contribute to the development of leadership. The service member meets many conditions in sports activities that are similar to conditions in combat. In athletic competition, an individual can develop various qualities to levels unattainable by other means. These qualities include personal courage, confidence, aggressiveness, and determination. These same qualities, which are essential in combat, can lead to mishaps and injuries in sports competition. Somehow we must find the “fine line” between courage and recklessness, between confidence and unrealistic appraisal of a situation, and between determination and inappropriate stubbornness. Finding the “fine line” reduces mishaps and injuries. We can achieve that fine line through proper supervision, effective instruction, and proper training of participants.

It is Navy policy to provide Navy personnel, and their families, programs that will effectively contribute to their morale and well being. All personnel should include some form of exercise in their daily routine to attain and maintain an acceptable state of physical fitness. The Navy recommends that personnel take part in vigorous sports activities to maintain desired levels of physical fitness.

An old adage says, “A man’s home is his castle.” Unfortunately, that very same castle can lead to a variety of mishaps. You can prevent many home mishaps, such as children’s poisoning, lawn mower mishaps, and fires. Whether a mishap affects the sailor or the sailor’s family, it still affects the Navy. A safe attitude on the job needs to extend to the home and off-duty hours.

In this chapter, we discuss the following areas of the Navy Recreation, Athletics, and Home Safety Program:

- Recreation, athletics, and home safety training
- Facilities evaluation and inspections
- Personal protective equipment

- Recreational safety controls
- Safety for recreational activities
- Safety for athletic activities
- Safety in the home
- Off-duty mishap investigation and reporting

### NAVY RECREATION, ATHLETICS, AND HOME SAFETY PROGRAM

The Navy issued a directive dealing with recreation, athletics, and home safety in 1987 and updated it in 1990. *Navy Recreation, Athletics, and Home Safety Program*, OPNAVINST 5100.25A, sets up policy and procedures for executing this program ashore and afloat. This program applies to the following personnel:

- All military personnel on or off base
- Military dependents while on government property and while taking part in command-sponsored events off base

That means you are covered during an off-base softball game as part of the command’s team or as a spectator. It applies to you while you swim in the base pool and to the members of your family as they watch you at the base bowling alley. It also covers you if you get hurt while repairing your car in your garage at home.

### NAVY RECREATION, ATHLETICS, AND HOME SAFETY TRAINING

The Recreation, Athletics, and Home Safety (RAHS) Program manager must make sure military personnel receive training on recreation, athletics, and home safety at least quarterly. The program recommends that civilian personnel also receive this training.

Work center supervisors and department/division safety petty officers should conduct this training. When you are responsible for this training, make sure it is seasonal and geographically appropriate. Conduct the training before or during those times of the year when personnel are at risk.

You can use Plan of the Day (POD) notes, posters, stand-up lectures, and video tapes to help you with this training. You can also use athletic team training as another way to train personnel in athletic safety.

The following are some of the recreation, athletics, and home safety topics that should be covered during training each year:

- Basketball (responsible for the most lost time of any sport)
- Physical fitness
- Water sports
- Racquetball
- Football
- Softball
- Hobby safety

### **Qualification Training**

Patrons using recreational watercraft and Navy automotive and woodworking hobby-shop equipment expose themselves to high-hazard activities. Morale, welfare, and recreation (MWR) staff members make sure only qualified patrons safely operate watercraft, power tools, hydraulic lifts, and spray paint booths. Staff members should keep a record of those who qualify.

Competent MWR staff members should conduct training in the use of this equipment. They should emphasize the use of safety precautions, safety equipment guards, and personal protective equipment (PPE).

The health hazards associated with spray painting require additional precautions. MWR employees must advise patrons in writing of the hazards spray painting poses. An MWR employee must observe patrons throughout the spray painting evolution.

Qualification training for watercraft includes basic rules of the road, knowledge of personal flotation devices (PFDs), applicable safety requirements, and emergency procedures. Successfully completing a small boat safety course, such as that offered by the U.S. Coast Guard Auxiliary, is evidence of qualification.

### **Recordkeeping of Training**

Commands must maintain all training records for 2 years. Documentation should include a log of scheduled training, dates of training, and names of personnel attending. Each department should maintain its own

training records. These records will be available for annual inspections.

## **FACILITIES EVALUATION AND INSPECTIONS**

Recreational and hobby facilities and equipment used by military patrons and dependents will be of safe design. The facility must provide a safe and healthful setting for patrons as well as workers.

Each command must inspect and evaluate its recreational facilities and equipment annually. These facilities and equipment include game rooms, hobby shops, shipboard gyms, and workout and weight-lifting areas. Ashore, they include all the facilities run by fleet recreation and special services. Ships with enough athletic equipment to checkout, such as volleyballs and basketballs, must also have written recreational safety measures. Naval Safety Center (NAVSAFECEN) policies require these measures to reduce the possibility of injury to participants and spectators.

The safety and health personnel and the designated RAHS Program manager should jointly conduct the inspection. The inspection identifies hazards and ensures the execution of abatement plans. NMPCINST 1710.6A, *Aquatic Programs and Facilities*, governs the inspection of swimming pools and waterfront areas. Applicable Navy standards govern the inspection of other recreational facilities. A summary of these standards and other requirements for program administration is available from the NAVSAFECEN.

Personnel checking out athletic equipment must ensure it is in good condition. Staff personnel should check gym equipment for sharp edges, loose or worn parts, and obstruction hazards. Poorly made athletic equipment, which may not stand up to heavy use, should not be used.

## **PERSONAL PROTECTIVE EQUIPMENT**

You have no choice about wearing several types of personal protective equipment (PPE). BUPERSINST 1710.20 states that personnel must wear approved eye protection when playing squash, handball, and racquetball. Eye protection is not the only PPE required during an athletic event. Certain athletic events and work at the hobby shop require the use of mouthpieces, hand protection, and other types of protective equipment. Did you know that mouthpieces are credited with preventing about 200,000 injuries in high school and college football alone?

Navy RAHS Program managers are responsible for educating people about off-duty hazards and stressing the importance of using PPE for sports. The game players are responsible for wearing the required eye-protective equipment while playing games. The facility manager has the responsibility and authority for ensuring all players wear the proper safety equipment. All commands are required to provide PPE for recreational and athletic activities. For example, if you check out a racquetball racket, the command should provide safety glasses.

The use of PPE should also be emphasized for hobby shop patrons or personnel working at home. For example, training should cover the wearing of safety glasses or goggles and hard-soled shoes while mowing the lawn.

## **RECREATIONAL SAFETY CONTROLS**

Most sports have inherent hazards we cannot eliminate without compromising the game. However, many preventable mishaps occur during recreational activities. We can prevent athletic injuries by providing better training and the proper PPE. Most athletic injuries result from people being out of condition or not warming up before an event. Practically all sports involve some type of hazard since they center around the principles of attack and retreat. But, if you take the proper safety control measures, you can reduce most of the injury-causing hazards.

### **Administrative Controls**

To ensure safe recreational activities for personnel, commands should provide protective control in the form of rules and procedures. They should also provide qualified physical training instructors, special services officers, and recreational leaders. Commands should select recreational personnel based on their experience. However, they should also consider their familiarity with, interest in, and ability to instruct or supervise activities.

Installations should set up effective programs to make certain the proper PPE is on hand when needed. In addition, commands must make sure that facilities are available and that leaders are present to supervise the events.

### **Leadership and Supervision**

When supervising or coaching an athletic event, you must be aware of several factors. One factor is

leadership. Good leadership promotes safety at recreational activities. You must consider the physical differences of the participants. As a leader, you also must understand the goal of the sport involved and demand complete observance of the rules.

If you are a recreational leader, give preliminary instructions to all players and thoroughly indoctrinate beginners in the basics of the sport. You can do that through a progressive training program. To avoid mishaps caused by confusion, make sure all players clearly understand your instructions.

As a recreational supervisor or coach, make sure all injured persons receive immediate medical attention. Make sure participants do not drink alcoholic beverages before or during play.

Before allowing players to engage in any vigorous sport, put them through a warm-up period. Without preliminary warm-ups, your players are more likely to be injured.

Qualified officials must manage all sports contests, whether intramural or extramural. They must make sure the participants carefully follow the standard rules of the game.

### **Personal Responsibility**

As a participant in an athletic event, you have several responsibilities. One is to protect yourself from injury. You should not continue to participate, practice, or play in events when you are excessively tired. Before play starts, warm up. Do not try a new game or practice a new athletic skill without direct supervision of a qualified monitor. Make sure your equipment fits properly and you know how to use it. Wear only clean clothing and equipment next to your skin. Do not take unnecessary chances. Pay strict attention to how to play the game.

## **SAFETY FOR RECREATIONAL ACTIVITIES**

Recreational safety includes many outdoor activities, such as water sports, hunting, bicycling, and ice and snow sports.

The most deadly recreational activities, by far, are conducted on or near the water. Watersports can be fun. The thrill of boating, waterskiing, scuba diving, or even just fishing have long been a part of our leisure time. However, we must respect water. Water can be deadly to both children and adults alike. Drowning is the leading killer of Navy people in recreational mishaps

and the third leading cause of accidental deaths in the United States. From 1987 to 1992, 42 percent of all Navy people killed in recreational mishaps died from drowning. You can prevent drowning by knowing some common water-safety tips.

## Swimming

About 45 percent of all drownings involve people falling in the water while walking on piers and bridges or fishing from boats. Many victims were poor swimmers who lacked basic water skills.

If you are going to spend time near the water, you should know how to swim. Swimming is your best defense against drowning. You should know how to swim even if you never expect to go in the water. You may someday have the opportunity to save a drowning person's life.

Always swim with a friend. The buddy system saves lives. Swim only in designated areas. Undesignated swimming areas may have hidden hazards that can kill you.

Teach your children how to swim. Drowning is the second leading cause of accidental deaths in children. NEVER leave a child alone near a swimming pool or swimming area. Many parents think they can hear their child fall into a pool. They are wrong. Drowning is a silent killer. There is usually no loud splash or cry for help because the first gasp for air fills a child's lungs with water, blocking all sound. Child-proof your pool. Install a double layer of protection around your pool. Build a fence at least five feet high around the pool with a self-closing, self-latching gate. Make sure the latch is out of children's reach. You also can buy an electronic sensor that floats in the pool and sounds an alarm if something disturbs the water.

Beware of cold water. Chances of survival in 50-degree water are only 50-50 if you are exposed for 50 minutes. If you are alone, use the heat escape lessening position (HELP). To do that, huddle to conserve heat by crossing your arms and feet and pulling your knees up (fig. 11-1). You can die from hypothermia, even if you fall into water as warm as 70 degrees, if you stay immersed long enough. If you have several people in the water, huddle together in a circle (fig. 11-2). For either of these techniques to be effective, you must be wearing an approved personal flotation device.

Do not jump or dive into water that may be so cold it will numb your body. Instead, ease into the water

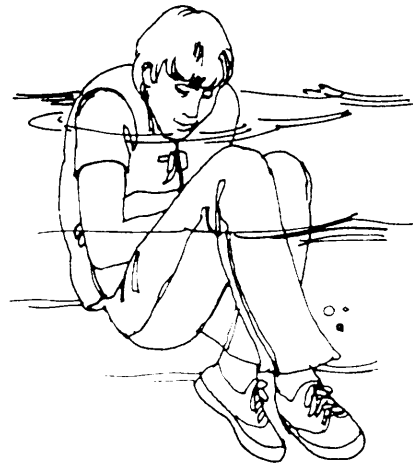


Figure 11-1.—Heat escape lessening position (HELP).

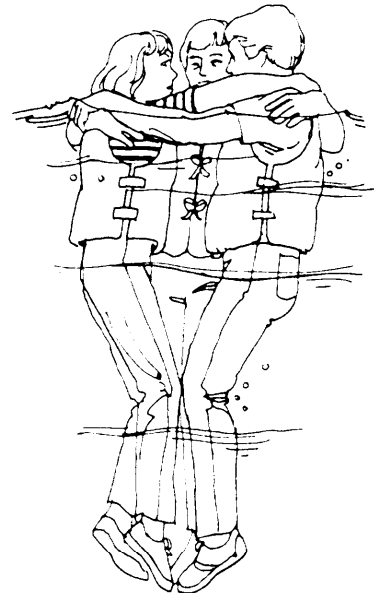


Figure 11-2.—Huddle position

gradually. Cold water exhausts a swimmer faster than warm water. Do not swim long distances in cold water. Cold or tired muscles are susceptible to cramps. To overcome a cramp, draw your knees toward your chest and massage your cramped foot or leg while moving it. You should be in a "face forward" float position while doing that.

Know and consider your swimming limitations. Do not swim when you are tired, overheated, or chilled. If you find yourself fatigued, you can find temporary relief by floating, treading water on your back, or varying the style of swimming. If you find yourself in trouble,

conserve strength as much as possible. You can do that by resting on your back in a floating position with a minimum amount of motion.

We have said this before, but we will say it again: NEVER drink and swim. Alcohol and water are a deadly combination. Alcohol dilates the blood vessels and your body loses heat faster. It also impairs your judgment and increases risk-taking.

Look before you dive! Shallow water dives could leave you paralyzed for life. It did for two Navy people in 1992. Know the depth of the water before your dive. Never dive in unknown waters.

If you have a history of ear trouble, check with your doctor before swimming. Try to avoid swimming underwater. You may use commercial plugs to keep water out of the ear canal. If you fear eye infections or irritations, wear a face mask or goggles.

Except in an emergency, avoid swimming in the dark. Finally, never jokingly call for help.

### Scuba, Skin, and Cave Diving

Skin diving, scuba diving, and cave diving are demanding swimming sports that require a person to be in good physical condition. These activities also require good swimming ability and a thorough knowledge of the sport. Two Navy service members drown almost every year during recreational diving. The main reason is lack of training and certification. Proper certification is essential to diving safely. Open water scuba diving certification does not qualify a person for cave or cavern diving.

All divers should get a physical examination by a doctor who is aware of the special hazards and demands of underwater diving. Heart problems, sinus or ear problems, lung trouble, and related health difficulties could make it risky for an affected individual to dive.

All divers should observe the following basic safety rules for diving:

- NEVER drink alcohol before diving.
- NEVER dive until you are a good swimmer.
- Stay in top physical condition.
- NEVER dive alone-use the buddy system.
- Use safe, reliable, time-proven equipment. Make sure your equipment is properly adjusted and maintained. Be familiar with your equipment.

- Be familiar with your diving area before diving, and plan each dive. If you are unfamiliar with the area, get instruction from a knowledgeable source.
- Always use a float with surface identification (diver's flag). This identification helps during rescue or for self-rescue.
- Heed all pains and strains as warning symptoms.
- Know basic first aid.
- Know and obey all local diving laws and regulations.
- Join a reputable diving club.
- Know the basic laws of diving physics and physiology.
- Practice skin diving frequently before scuba diving.
- NEVER wear goggles or earplugs when skin or scuba diving. They are **swimming** aids, not diving aids.
- Engage only in diving exercises that are consistent with your training and experience.

You should observe the following basic safety precautions for scuba diving:

- NEVER use pure oxygen in your tank; it is poison to a diver. Instead, use clean, filtered, certified, compressed air.
- Know your decompression rules and avoid planned decompression dives.
- Set up a system of communication with other divers; develop emergency procedures and procedures for reuniting in case of separation.
- NEVER hold your breath while scuba diving.
- NEVER dive when suffering from a cold, sore throat, or when feeling ill.
- NEVER ascend faster than 60 feet per minute. A usually safe rule of thumb is "NEVER ascend faster than the slowest bubbles."
- Wear a buoyancy compensation device and submersible pressure gauge.
- Adjust buoyancy to be slightly positive on full inhalation.

- Surface carefully to avoid coming up under a boat or some other object. If visibility is poor, extend one or both hands above your head to ward off any object.
- If you lose visual contact with your buddy, listen for the sound of escaping bubbles from the other scuba equipment. If unable to locate your buddy, pound on your cylinder to attract attention. If this fails, surface, locate your buddy, and then descend together.
- Check your cylinder pressure and equipment before a second dive.
- Know how to use an alternate air source and a low-pressure buoyancy compensation inflation system.

## Boating

The purchase of a nautical-type or sailor's hat does not suddenly cloak a person in boating experience. The overwhelming majority of boat operators involved in fatal accidents have never taken a safe boating course. Before you go boating, take a safe boating course. For more information on the boat course, call the Coast Guard Boating Course hot line at 1-800-336-BOAT.

About 50 percent of all boating mishaps resulting in serious injuries involve alcohol. Operating a boat while intoxicated, with a blood alcohol content (BAC) of 0.10 percent or more, carries a \$1,000 civil penalty. It carries a criminal penalty of up to \$5,000, 1 year in jail, or both.

Collisions or people falling overboard causes most boating injuries. If you fall or are accidentally thrown into the water, a personal flotation device (PFD) can save your life. U.S. Coast Guard studies show that up to 85 percent of all boating deaths could have been prevented if the victims had been wearing a PFD. Always wear a PFD when boating. Even though it isn't a Navy regulation, we strongly urge you to wear a PFD when you are in your own boat. However, in a watercraft owned by the Morale, Welfare, and Recreation (MWR) Department, the operator and any passengers must wear a PFD approved by the U.S. Coast Guard.

Match your motor to your boat. If you use a motor, have someone check it before your first boat trip of the season. Make sure you have a fire extinguisher aboard, along with tools and equipment to make minor motor adjustments or repairs. Make sure you have enough fuel before starting out. NEVER refuel with the motor running.

Do not go out in a small boat unless you are thoroughly familiar with the craft. Learn to handle your boat by practicing near shore in shallow, smooth water. Become familiar with the basic rules about right-of-ways, channel markings, anchorages, and use of lights.

Leave a float plan with a friend before you set out. Your plan should include the identification number of your boat, who is with you, where you are going, when you expect to return, and when to contact the Coast Guard. Inspect your boat each time before you use it, checking for leaks and other defects. Remove any water that may be present on the deck to reduce the possibility of slip hazards. Check weather conditions before you leave home and while on the water. Storms come up in a hurry. Learn to read cloud formations and other weather signs. Never leave the dock without all required safety equipment.

Make sure you do not overload or improperly load your boat. Counting the number of seats does not indicate capacity. Overloading is dangerous and reduces freeboard (the distance from the waterline to the edge of the boat). Improper loading makes a boat unstable or less maneuverable. Know the safe load capacity and recommended horsepower for your boat. The best place for the load is on the bottom and in the middle. Do not allow passengers to sit or stand on the bow, stern, or gunwales. In rough water, place the load, including passengers, low to keep the boat stable sideways; place the load away from the ends to give the bow and stern buoyancy.

Keep a small boat away from big boats, especially at night. Speedboats and paddle-wheelers are especially dangerous. Before large swells from a large boat reach your small boat, head into them. Slow down so they will slide under your boat from end to end.

**TIPS IN CASE OF BOAT OR WEATHER TROUBLE.**— What do you do in case of trouble? First of all, don't panic. The following are a few boating tips you should keep in mind:

- If you get trapped on the water by a sudden squall, point the bow into (toward) the wind. Reduce speed or shorten the sail at once.
- If you get caught in rough water, head the boat so that it receives the waves at a 45-degree angle either to the left or to right side of the bow. Do not get crosswise,
- Go slowly against a strong sea because speed can bury the bow, allowing more water to come aboard. Arrange your load to keep the bow up.



- Keep the boat well bailed; if necessary, throw out heavy items (not people) to lighten the craft.
- In swift current, do not grab for trees or bushes along the bank to slow up.
- If your boat capsizes or swamps, try to keep calm. Most small boats support several people even though filled with water. A swamped boat, right side up, will support about as many persons as it is designed to carry when afloat.
- If you can manage it, sit in the swamped boat. Do not try to swim for shore even if you think you can do it easily. Instead, paddle or row for shore or wait for help.
- In rough or cold water, maintain a firm hold on the boat with a belt or rope.

**TIPS IN CASE SOMEONE FALLS OVERBOARD.**— If someone falls overboard, grab the person quickly and hang on if possible. Get the person back into the boat as fast as you can. If the person tries to climb over the side in a panic, balance the boat until he or she gets in or quiets down. Throw a life preserver, cushion, or rope to a person who is some distance from the boat instead of going into the water after him or her.

Bring the person aboard over the stern if it is square; bring the person aboard near either the bow or stern if the stern is not square. Rescuers should keep low in the boat; that allows them to have one hand free, most of the time, to hang onto the boat.

### Water Skiing

Water skiing is one of the most thrilling of water sports. Spectacular as it appears, it is among the easiest to learn. Many people, particularly children, master the basics within an hour. Even though it seems easy, you still must take precautions and know various factors before you ski.

To water-ski safely requires three people: the skier, the boat operator, and an observer who knows all the proper hand signals. It is not surprising that showing off is the chief cause of water-skiing mishaps.

Before you even think about strapping on a pair of water skis, learn correct and safe water-skiing techniques from a qualified instructor. The instructor will teach you how to hold the towline, how to “get up” on skis while keeping your balance, and how to control your skis.

<u>SIGNAL</u>	<u>MEANING</u>
A thumbs-up gesture	Boat faster
A thumbs-down gesture	Boat slower
Thumb and forefinger in shape of an <i>O</i>	Speed OK
Circle finger overhead and point in direction of turn desired	Turns
Raise hand with fingers spread	Stop
Slap thigh with hand	Return to dock or shore
Draw hand or finger across throat	Cut motor
Point in direction you wish to go, then point to yourself	Go that way
Clasp hands overhead while treading water (after fall)	I'm OK

Figure 11-3.—Water-skiing signals.

Before you water-ski, check your equipment, making sure the personal flotation device (PFD) you wear fits properly and is secure. Some states require a rearview mirror for the boat driver. Pay close attention to the tightness of the ski binders or runners.

Know the different water-skiing signals you must use to communicate with the boat operator and the observer (fig. 11-3). You only need to know two audible signals. When you are in the starting position and want the boat operator to take up the slack in your towline, shout “In gear,” When the line becomes taut, your ski tips are up, and you are ready to begin skiing, shout “Hit it” for your boat operator to open the throttle.

Relax when you ski. Holding the towline too tight and becoming tense are bad habits. A relaxed skier learns fast and takes few spills while learning. Don't try stunts beyond your ability. Learn each stunt progressively. Leave the fancy skiing to the professionals.

NEVER wrap the towrope around any portion of your body or place your arms or legs through the bridle. Always ski in water that is deep enough. How do you know if the water is deep enough? Your skis should not touch bottom. Make sure the water is free of floating objects and other obstructions.

When you fall, and you *will fall*, fall backward and not forward whenever possible. At speeds above 25 mph, you should somersault or roll with the fall. Tuck your head beneath your arms and roll into a ball. Rolling not only controls the fall but blunts the impact. Don't tense up and stiffen. At lower speeds, lean to the side or back before you release the towline. When you release the towline, you will fall in the direction of the lean. You will hit with a thud, rather than a splash. Forget about your skis. You can retrieve them easily—they float, remember?

## Hunting

The misuse of small arms has resulted in many accidents causing serious and fatal injuries to Navy personnel. Between 1987 and 1992, eight Navy men and women died in hunting and fishing mishaps. Ninety-one were injured in small arms accidents alone, most with guns they thought were unloaded. Firearms accidents kill as many females as males. The highest rate is in the 15- to 24-year age group.

Between one-fourth and one-third of all fatal, accidental shootings occur in connection with hunting trips. Annual studies of hunting accidents, both fatal and nonfatal, made by the National Rifle Association have shown firearm hunting accidents both by “intentional discharge” and “accidental discharge.” The principal causes of accidents by intentional discharge have been as follows:

- Victim moved into line of fire without warning.
- Victim shot by excited hunter firing quickly at game.
- Victim unseen by shooter.
- Victim mistaken for game.

The principal causes of casualties occurring through the accidental discharge of the gun have included the following:

- Stumbling or falling while carrying gun
- Catching trigger of gun in brush
- Clubbing game or cover with gun
- Bumping or jolting the gun while removing it from vehicle or boat
- Unwittingly letting gun fall from an insecure rest
- Crossing a fence
- Horseplaying with a gun thought to be unloaded

- Loading and unloading gun

Before you go hunting, you should learn the safe use of firearms from a competent instructor. The instruction should take place on a well-protected range. Experienced adults should accompany young people learning to shoot and coach them in firearm safety. You should never try backyard target shooting. Practice basement or other indoor shooting only if you have constructed a satisfactory backstop. Avoid shooting at hard, horizontal surfaces because of the danger of a ricochet. If you find yourself shooting over water, exercise extreme caution to avoid ricochets.

As a hunter, you must concern yourself more about safety than about the possibility of your missing a chance at your game. Your attitude in these matters is the real difference between being a safe or unsafe hunter. Regardless of how much hunters know or how great their skill and experience, if they do not practice safety, they are unsafe hunters.

## BICYCLING

Millions of people have found that biking is economical, healthy, and a great way for the entire family to take part in wholesome recreation. However, most of the time you will be sharing the road with vehicles of all shapes and sizes. Since a bicyclist is the most vulnerable participant in the highway system, observing safety rules is in your own best interest. That enables you to protect yourself against the carelessness of others.

The impact of a rider's head against a sidewalk from a 10-speed bike going 25 mph is as great as that of a rider thrown from a motorcycle at the same speed. From 1989 to 1992, more than 500 sailors were seriously injured or killed in bicycle accidents. More than 150 of those sailors suffered head injuries, 10 while wearing helmets. Helmets won't prevent head injuries in every bike accident, but they do make a difference in the severity of those injuries. You can protect yourself from serious injury by wearing an American National Standards Institute (ANSI) or a Snell Memorial Foundation approved bicycle safety helmet. In addition, you can protect yourself by complying with OPNAVINST 5100.25A, which covers the Navy Recreation, Athletics, and Home Safety Program. This instruction requires all recreational bicyclists operating on government property to wear light-colored clothing and to wear reflective clothing during reduced visibility conditions.

## ICE AND SNOW SPORTS

Ice and snow sports can be fun but deadly. In addition to the stresses placed on the body, there is the added hazard of extreme cold. Winter sports include the following activities:

- Ice skating
- Sledding, tobogganing, and snow disk riding
- Snowmobiling
- Skiing

Of these winter sports, Navy personnel experience the most mishaps from snow skiing. Each year thousands of people suffer injuries in skiing accidents. From 1984 to 1992, more than 150 Navy people have been hurt in mishaps on ski slopes and trails. One of these mishaps resulted in a fatality when a skier lost control in icy conditions and crashed into a tree. Another person suffered a permanent disability when he fractured a vertebrae in his lower back. Fortunately, most injuries are less severe, with broken legs and knee injuries commonly reported. You can still get hurt while cross-country skiing even though it is slower than downhill skiing.

The most common cause of skiing accidents is inexperience. Beginners hurt themselves when they try to move from a beginner's slope to advanced or expert slopes too soon. Trying slopes that are too steep or icy can result in injuries to even the more experienced skiers. The buildup of too much speed can cause you to lose control.

## SAFETY FOR ATHLETIC ACTIVITIES

People take part in many sports and other athletic activities both as members of on- and off-base teams. Intramural sports are part of the total recreation program. Athletics provide a basic physical conditioning process through which the Navy can help build and maintain an effective fighting force.

Some athletic events have inherent risks for participants. Padding and protective equipment can help reduce injuries and are mandatory for some sponsored team events. A good athlete is familiar with the injury potential of the sport being played and knows how to avoid injuries. When you are injured, you are of little use to a team. Part of the skill of any sport is the ability of an athlete to avoid injury.

One factor repeatedly cited as a major contributor to a mishap involving physical fitness is overexertion.

Once people realize they are out of shape, they want to do something about it. Unfortunately, they usually try to get back into shape too fast. Age has nothing to do with deaths relating to overexertion while exercising. Anyone is subject to overexertion, regardless of age or physical conditioning. With today's emphasis on health and wellness, many people take up strenuous fitness activities before they condition their bodies.

Good physical fitness can pay off, if you do it carefully and consistently. However, strenuous exercise once a week can do more damage than good. Before you start any physical fitness program, check with your doctor. The doctor will determine what precautions you should take and if you need a complete physical exam. Checking with your doctor is especially important if you are more than 35 years old.

## Baseball and Softball

Since baseball and softball present similar hazards, you should take similar precautions to avoid injury. The most serious mishaps associated with baseball and softball are those resulting from sliding and collisions. Breakaway bases are much safer than stationary bases. Softball fields operated by MWR departments are being converted from stationary to breakaway bases. Until the MWR installs breakaway bases, your command should conduct a sliding clinic. Establish a no-sliding rule for command-sponsored picnic and pickup games to prevent personnel from breaking their ankles and legs.



**Establish a no-sliding rule.**

Teammates need to communicate with each other to avoid collisions. Before the game, appoint the center fielder to call off teammates for outfield fly balls. Appoint the shortstop to do the same thing for infield fly balls. Make sure they make calls in a clear, loud voice. These precautions will keep players from running into each other and possibly resulting in a tragedy such as the one involving a highly skilled Navy technician. While going for a fly ball, this technician collided with another player; he never recovered from the impact and eventually died.

## **Basketball**

Many basketball injuries result from people warming up improperly, wearing the wrong type of shoes, and playing too aggressively. Taping your ankles or using ankle supports with high-top shoes reduces the severity of ankle injuries. Don't wear running shoes for playing basketball. Your high top shoes should have 1/2 inch at the toe for clearance on the sudden stops and pivots common to basketball. They should have nonslip soles and provide adequate ventilation. In early season workouts, paint the soles of your feet with benzoin to lessen your chances of getting blisters. Wear an inner sock of light cotton underneath a wool or heavier-weight athletic sock.

Wear pads to protect your knees and elbows from bruises and floor burns. Wear a knee brace if you need knee support.

Setting up basketball courts on flight and hanger decks provides recreation at sea, but these courts can cause serious injuries. Twisting and pivoting on a nonskid deck, as well as Falling, can result in a variety of injuries. Be careful when playing on this type of surface.

## **Boxing**

All participants, including boxers, coaches, referees, and physicians in a Navy boxing competition must attend at least one precompetition meeting or clinic. The purpose is to review concepts contained in the *Safety Awareness Manual* and explain procedures for training and competition. Other required publications include: *Official Boxing Rules*, *Physician's Ringside Manual*, and the *Introduction to Olympic Boxing* pamphlet. You can order copies of these publications (at a nominal charge) from the following address:

USA Boxing, Inc.  
1750 East Bolder Street  
Colorado Springs, CO 80909-5776

Boxers must wear a mouthpiece, U.S.A. Amateur Boxing Federation approved protective headgear, gloves, and a groin protector during sparring and competition. All weight classes must wear 16-ounce gloves. The gloves will be either the thumbless type or thumb-attached type. Boxing gloves must be checked before use. They should be clean, be free of lumps, and have smooth surfaces. A boxer should be able to fasten them securely.

Mouthpieces must be custom-made and individually fitted. When sparring and during actual matches, boxers should wear protective headgear. Boxers should wrap their hands to protect them while sparring, while working out on the heavy bags, and for all matches.

Medical officers providing support must be familiar with and must meet the requirements of the *Physician's Ringside Manual*. The professional qualifications of these medical officers should include current competency in the emergency treatment of head trauma, management of traumatic injury, certification in basic and advanced cardiopulmonary resuscitation (CPR), and experience in transporting unstable patients.

For additional information on Navy boxing competition, refer to enclosure (7) of BUPERSINST 1710.20.

## **Football**

Football is one of the most hazardous of all team sports because of the continuous heavy body contact. Only trained, well-conditioned players should take part in competitive football games. Players need not get hurt if they apply various safeguards.

All players must wear full-weight football shoulder, hip, thigh, and knee pads as well as headgear when they expect body contact both in practice and in the actual game. This gear must be properly fitted.

We recommend that anyone engaging in active sports wear a mouthpiece. The mouthpiece is a relatively inexpensive piece of equipment that reduces oral damage considerably. It also provides the cushion necessary to help prevent concussion from the shock of blows sustained by the head and chin.

Helmets provide a method of holding the skull away from the shell on impact. A helmet should have at least a 1-inch clearance between the outer shell and the nylon or canvas webbing into which the head fits. The helmet should be lined with vinyl plastic, which is 15 times more shock absorbent than foam rubber. The player must be able to hear in a helmet. Discard old helmets.

## Flag/Touch Football

Some people think touch and flag football are safe sports because pads and helmets are not normally required. However, what usually starts as a friendly game often turns into a rough game of tackle. The shoulder block is the only block permitted in touch and flag football. It is done between the waist and shoulder with both feet contacting the ground at the moment of contact.

To prevent collisions, teams should leave a fumbled football lying on the ground. Neither team should be allowed to advance the football; it should belong to the team that last had possession.

When playing football, wear a mouthpiece to protect your teeth and your tongue. Don't wear chains, rings, and metal wrist bands. If you wear glasses, secure them and make sure the lenses are shatter-proof.

## Golf

When playing golf, you should wear socks and well-fitted shoes to prevent blisters caused by long periods of walking and turning. When other players are hitting, watch their shots to avoid being hit by a ball or club. You should not hit your ball until the players ahead of you are well out of range. To keep from damaging your skin from the sun's rays, you may want to wear a protective cap and sun screen.

Avoid the golf course during electrical storms and severe weather. Golf clubs make excellent electricity conductors. If you get caught on the course, keep away from isolated trees, wire fences, hilltops, small sheds, and shelters in exposed areas. Try to reach thick timber or a depression in the ground or get near a steep cliff.



If caught in an electrical storm, do not delay; seek shelter.

## Squash/Handball/Racquetball

Most injuries from racquet sports occur when players do not use the proper eye protection. These injuries include hemorrhaging of the eye area, cuts, and corneal abrasions. A racquetball travels about 80 miles per hour when hit. Goggles without lenses offer little protection. A small ball, like the one you use in racquetball or squash, compresses when you hit it and can penetrate open frames. How can you protect your eyes? Learning how to duck faster isn't the answer. Wearing the proper eye protection while playing racquetball is not only safe, it is mandatory. Wear impact-resistant eyewear with either molded polycarbonate wraparound protectors or lenses mounted in sturdy frames. This requirement applies to all participants (military, family members, civilians, and guests) at all times. The people that issue Navy recreational equipment should provide eye protection with racquetball rackets. In addition, wear a mouthpiece to protect your teeth and tongue.

## Skateboarding

Skateboarding is a sport rapidly growing in popularity. Unfortunately, as its popularity increases, so do mishaps and injuries. Mishaps frequently occur when skateboarders lack balance and body control or haven't had enough practice. Several conditions contribute to skateboard mishaps and injuries: lack of protective equipment, poor board maintenance, and uneven riding surfaces. Fractures are the most common type of injuries for skateboarders. Some deaths have been reported, mostly from people falling off boards or colliding with cars.

When skateboarding, wear protective equipment, such as slip-resistant shoes, helmets, and specially designed padding. This equipment may not fully protect skateboarders from fractures, but it can reduce the number and severity of cuts and scrapes. Wrist braces and special skateboarding gloves also help absorb the impact of a fall. With protective equipment, you must look for comfort, design, and function. The equipment should not interfere with your movement, vision, or hearing.

## Roller Skating and In-Line Skating

Roller skating is an old sport in which a renewed interest has developed. In-line skating is a relatively new and exciting sport. The same injuries and mishaps we talked about earlier on skateboarding apply here. The

same types of PPE that apply to skateboarding also apply to these two sports.

### **Soccer**

Americans have discovered what Europeans have enjoyed for a long time—the fast-paced game they call soccer. However, as the popularity of soccer grows, so do the mishaps and injuries associated with it. Soccer is a rough-and-tumble game. In addition to scrapes, bruises, and cuts, soccer players suffer sprains, muscle cramps, and broken bones.

When playing soccer, wear a knee brace if you need knee support. Wear a mouthpiece to protect your teeth and your tongue. Don't wear chains, rings, and metal wrist bands. If you wear glasses, secure them and make sure the lenses are shatter-proof.

### **Tennis**

Tennis is a comparatively safe sport, except for the possibility of sprains and overexertion. If you are a tennis player, avoid overexertion in the hot sun and drink plenty of fluids. Wear socks and well-fitted shoes to prevent blisters.

### **Track and Field**

Track and field events are relatively safe athletic activities. Being in good physical condition is extremely important if you are a runner because of the sustained physical exertion on your body. The memory of a well-trained Olympic marathoner barely making it across the finish line is a grim reminder of the rigors of track. Track officials must give immediate help to a runner in danger of collapsing at the end of a race. That prevents the runner from falling and getting injured.

### **Walking**

Walking is an increasingly popular way to exercise. As the core of an effective fitness program, walking may be just what the doctor ordered. Regular walking will normally help in lowering your blood pressure and cholesterol levels. Both may reduce the risk of heart attack. Walking may also reduce depression and anxiety.

### **Wrestling**

The very nature of wrestling—constant body contact, sudden falls and movements, and the injury potential of the various wrestling holds—makes it a

hazardous sport. Qualified leaders must supervise all wrestling activities to prevent injury to participants.

## **SAFETY IN THE HOME**

In 1992, home fatalities and serious injuries were significantly lower than in 1991. This improvement is partially because of increased command emphasis on preventing off-duty mishaps, greater safety awareness, and training.

You can prevent mishaps, such as children's poisoning, lawn mower mishaps, and home fires. Most of these mishaps occur because of human error, such as lack of knowledge, inattention or distraction, or intentional violation of safety practices. You and your family can prevent nearly ALL injuries and deaths that occur in the home. It is up to you to take home the safety measures you learn on the job and teach them to the rest of your family.

### **Slips and Falls**

Most home mishaps involve falls. Falls are the third leading cause of death for off-duty Navy personnel. Most people fall on level surfaces, not from higher places. The following are the most common causes of slips and falls:

- Slipping on small scatter rugs
- Walking on highly polished or wet floors
- Tripping on upturned or torn carpets
- Walking on dark stairways
- Standing on chairs to extend one's reach

Falls may happen because of spilled water or grease on kitchen floors. Slippery conditions can exist because of water on bathroom floors. Toys left on the floor of the living room and other parts of the house are also trip hazards.

The bathroom is the most common area in the average home where falling mishaps take place. However, bathtub and shower falls have decreased over the last 25 years because of anti-slip bath mats, stick-on applique slip-proofing, and manufacturer-applied slip-proofing.

### **Ladders**

Every home should have a ladder. If you don't have one, you should get one and learn to use it properly. Whether you use a ladder to paint a ceiling, to clean out

the gutters, or for any other purpose, take some extra precautions. Most ladders sold for household use are type III light-duty ladders, rated for a maximum load of 200 pounds (user plus materials). If the ladder must carry more weight than that, select a type II medium-duty ladder (up to 225 pounds) or a type I heavy-duty ladder (up to 250 pounds). Most manufacturers label ladders with their duty rating or type number. Remember, don't overload your ladder.

## **Hobby Shop Equipment**

If you have or use a hobby or craft shop, you should not allow bench, table, or work areas to become cluttered. Periodically remove excess trim and scrap to proper containers to prevent excessive accumulation. Return tools to their proper place when you no longer need them. Clean machines and floor areas after use. You must always wear the correct PPE.

Wear snug clothing when operating machinery and equipment. Do not operate equipment while wearing a necktie or scarf or anything that could become entangled in the revolving machinery. Do NOT wear gloves when working with drills, ripsaws, table saws, and so on. Make sure you know the location of the power switch. Remove all jewelry. Use a brush, not your hands, to remove chips or cuttings.

Check drill bits to make sure they are straight and sharp. Make sure you tighten all chucks and clamps securely. Stop all equipment when making adjustments. NEVER reach around revolving equipment. You must be careful of kickback or violent throwback of the material you are feeding. Inspect saw blades to make sure they are in good condition and are free of gum or adhered resins. Check all machine safety guards. They should be substantial, in place, and properly aligned. Never operate the equipment without the safety guards, spreader, and anti-kickback fingers in place and properly adjusted. Set a saw blade to the proper cutting height. Adjust the fence or gauge, and secure it firmly.

When using equipment having blades, shut off the power and let the blade stop rotating before cleaning away debris. Never reach over or under the blade while operating the saw. Hold the stock firmly against the table and fence, and feed with even pressure within the capacity of the saw to take the load. Do not stand directly in line with stock you are putting through.

Note any clicking sound of a band saw, which indicates a cracked blade. Do NOT operate the saw if you hear that sound. Inspect the saw for excessive "burning" and buildup of gum or resins on the blade of

wheel surfaces. Use the proper size blade for the work. Do not cut small radius work on a wide band. Conversely, be sure the blade is as wide as the work will permit.

Do not stop or slow a saw by braking with a piece of wood. Permit natural rundown of the saw. Inspect the condition of the material. Test for safe depth of cut on a piece of soft, straight stock before proceeding.

## **Electricity**

Electricity has made life in the home much more comfortable and housework much easier. However, electricity is not a blessing without blemishes. Electricity at home can be either a servant or a killer. It all depends on how you handle it. To keep electricity in your home your servant, NOT your killer, obey the safety rules for each part of your home.

Install ground fault circuit interrupters (GFCIs) near bathroom and kitchen sinks as well as outdoors. GFCIs are shock-protection devices that detect electrical faults to prevent people from being seriously injured or killed. They detect electrical faults by monitoring circuit leakage to ground. When leakage exceeds 5 milliamps, the GFCI breaks the circuit, thereby preventing an electric shock. You can easily install them in the place of existing outlets, and they are relatively inexpensive.

Electrical appliances or other electrical items do not normally present a shock hazard to you unless they are defective. How do you reduce shock hazard? You should inspect the item before and after use, follow all safety standards, and use only materials approved by testing laboratories. Even when an electrical item in your home becomes defective, you can reduce the chance of its becoming a shock hazard to you. You do that by keeping your body from becoming part of the electrical circuit. A 110-volt house current kills more people annually than any other voltage. It takes less electricity to kill a person than it does to light a 10-watt light bulb. If you do not maintain the electrical equipment and systems in your home, they can be a threat to you and your family's safety.

## **Fires**

In 1991, 3,500 Americans died and 21,275 were injured in home fires. That's roughly about 15 people a day. Most home fires result from unattended cooking, careless smoking habits, overloaded electrical circuits, and children playing with matches. You and your family should know in advance what to do in case of fire. Obviously, you should do everything possible to

prevent a fire in the first place. The three main precautions you should take to help prevent fires are as follows:

1. Install fire or smoke detectors.
2. Plan fire escapes.
3. Reduce fire hazards.

Most fatal home fires occur at night while people sleep. Smoke usually precedes measurable amounts of heat in most cases of fire. Fire produces toxic gases and smoke that actually numbs the senses. If you are asleep or become disoriented by toxic gases, you may not even realize there is a fire. You cannot rely on your own senses to detect a fire. So, it is extremely important for you to install fire or smoke-detectors to sound an alarm. In addition, you and your family should practice escape drills. Make sure everyone in the family knows the phone number of the fire department.

There are two types of detectors—smoke detectors and fire detectors. Smoke detectors sound an alarm at the first trace of smoke. Heat or fire detectors sound an alarm to warn of an abnormally high temperature in the immediate area of the detector. Detectors can either be battery operated or part of a home's central wiring system. Be sure to install a detector on a circuit that you cannot turn off at a wall switch.

The National Fire Prevention Association's (NFPA) Standard 74 for household fire-warning equipment recommends you install one smoke detector outside each sleeping area of your house. You should install additional detectors on each story of your house. Don't forget the basement and attic, too. Supplement these detectors with additional detectors around the home, such as in hallways, utility rooms, the dining room, and furnace room.

Smoke rises, filling the highest points in a house, before moving down to the floor. To detect the first traces of smoke, mount the detector high on a wall or on the ceiling. Mount ceiling-mounted fire or smoke detectors at least 4 inches away from any wall. If you mount a detector on a wall, allow 4 to 12 inches from the ceiling. In a room with a high-pitched ceiling, mount the detector on or near the highest point of the ceiling. DO NOT install fire or smoke detectors near windows, doors, or air registers where drafts could affect their sensitivity.

### **Children**

More children die each year from preventable injuries than from childhood diseases. Accidents are

killing our children at an alarming rate. Mishaps are the leading cause of death for children aged 1 to 14 years.

The Department of Defense (DOD) takes part in a national campaign to safeguard our children. The National Safe Kids Campaign began in 1988 to eliminate mishaps to children through parental education and improvement of national safety codes and standards. To provide a balanced program covering all facets of children's safety, the campaign focuses each year on a different high-risk area.

**BURNS AND SCALDS.**— The number of children burned and scalded is alarmingly high. Many children under age 14 are treated in emergency rooms after being scalded by food; tap water; and hot liquids, such as grease. Most of these scalds occur in the kitchen. Keep all pots and pans out of children's reach. Keep hot substances away from the edges of tables and counters.

Hot tap water can easily scald children, especially in the bathtub. Always supervise your children in and around water. To prevent tap water scalds, stay with your children while they are taking a bath. You should check the temperature of bath water before bathing your child. (Hot water heaters should not be set higher than 120 degrees.)

Keep dangling enticements, such as a coffee pot cord or the drape of a table cloth, away from children.

**POISONING AND CHOKING.**— Every 30 seconds a child is poisoned in this country. A bottle of kitchen cleanser is harmless when adults use it to clean areas of the house. However, put that same bottle of kitchen cleanser into the hands of a curious child and you have a deadly situation. Children cannot protect themselves from accidental poisoning. You can, however, prevent accidental poisonings in your home. Some causes of children's accidental poisonings are medicines, household chemicals, cleaning products, make up, and plants; medicines cause most of the poisonings. Keep such common household items out of sight and reach of children.

### **OFF-DUTY MISHAP INVESTIGATION AND REPORTING**

The commanding officer is responsible for seeking ways and means of controlling and preventing injuries. That includes both on- and off-duty activities. Whether personnel are injured on the job or at home, their injuries can have an impact on mission readiness. Mishap prevention also extends to off-duty activities.



Mishaps in the category of “home, sports, and recreation” rank second only to privately owned motor vehicle accidents as a major cause of accidental injury. Sports and recreational injuries cost the Navy millions of dollars each year and result in a loss of countless man-years of work. In addition, these injuries result in impaired combat effectiveness because of the loss of skilled personnel—some temporarily disabled and others permanently handicapped.

In sports mishaps involving the category of “supervisory deficiencies,” the major factor is inadequate instruction. That shows the need for sound coaching and officiating of athletic contests. Is the intent of athletic contests to develop the body and a competitive spirit or just to win? You can effectively reduce injuries in sports and recreation by following these principles:

- Use proven administrative controls
- Effectively lead and supervise
- Provide and maintain adequate equipment and facilities
- Properly condition participants

You can prevent mishaps at home and in sports and recreation by identifying, isolating, eliminating, or controlling hazards. You should guard against those hazards you cannot eliminate. Finally, avoid creating new hazards.

Refer to OPNAVINST 5102.1C, *Mishap Investigation and Reporting*, for a list of the requirements for investigation and reporting of mishaps ashore. You must report any fatality or injury that occurs on government property, whether it involves civilian personnel, military personnel, or military dependents. Additionally, report fatalities or injuries that occur in conjunction with command-sponsored events off government property. Afloat, mishaps are reported based on OPNAVINST 5100.21B, *Afloat Mishap Investigation and Reporting*. In general, an injury is reportable if the injured person loses at least 5 working days because of that injury. All fatalities are reportable. These reports are sent to the Naval Safety Center within 30 days of the mishap.

## SUMMARY

In this chapter, we addressed the Navy Recreation, Athletics, and Home Safety Program. We examined the various types of personal protective equipment (PPE) individuals must wear when taking part in various sporting, athletic, and home activities. We discussed the various training Navy personnel must receive. We addressed various recreational safety controls commands and supervisors must follow. We discussed safety precautions for various recreation and athletic activities, including water sports. We covered various home hazards and safety precautions. Finally, we examined the reporting and investigating requirements for recreation and sports mishaps.



## APPENDIX I

# REFERENCES USED TO DEVELOP THE TRAMAN

**NOTE:** Although the following references were current when this TRAMAN was published, their continued currency cannot be assured. Therefore, you need to ensure that you are studying the latest revision.

### Chapter 1

*Afloat Mishap Investigation and Reporting*, OPNAVINST 5100.21B, Chief of Naval Operations, Washington, D.C., 1993.

*Department of the Navy Policy for Safety, Mishap Prevention and Occupational Health Programs*, SECNAVINST 5100.10G, Secretary of the Navy, Washington, D.C., 1989.

*Environmental and Natural Resources Program Manual*, OPNAVINST 5090.1A, Chief of Naval Operations, Washington, D.C., 1990.

*Issuance of Navy Traffic Safety Program*, OPNAVINST 5100.12F, Chief of Naval Operations, Washington, D.C., 1990.

*Mishap Investigation and Reporting*, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, D.C., 1989.

*Naval Aviation Safety Program*, OPNAVINST 3750.6Q, Chief of Naval Operations, Washington, D.C., 1989.

*NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, Commander, Naval Safety Center, Norfolk, Va., 1991.

*Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, Chief of Naval Operations, Washington, D.C., 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Recreation, Athletics, and Home Safety Program*, OPNAVINST 5100.25A, Chief of Naval Operations, Washington, D.C., 1990.

*Navy Safety and Occupational Health Program*, OPNAVINST 5100.8G, Chief of Naval Operations, Washington, D.C., 1986.

*Standard Organization and Regulations of the U.S. Navy*, OPNAVINST 3120.32C, Chief of Naval Operations, Washington, D.C., 1993.

### Chapter 2

*NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, Commander, Naval Safety Center, Norfolk, Va., 1991.

*Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, Chief of Naval Operations, Washington, D. C., 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

*Standard Organization and Regulations of the U.S. Navy*, OPNAVINST 3120.32C, Chief of Naval Operations, Washington, D.C., 1993.

### **Chapter 3**

*Mishap Investigating and Reporting*, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Occupational Safety and Health (NAVOSH) Program*, OPNAVINST 5100.23C, Chief of Naval Operations, Washington, D.C., 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

### **Chapter 4**

*Afloat Mishap Investigation and Reporting*, OPNAVINST 5100.21B, Chief of Naval Operations, Washington, D.C., 1993.

*Afloat Mishap Investigation Handbook*, NAVSAFECEN 5102/30, Commander, Naval Safety Center, Norfolk, Va., 1992.

*Mishap Investigation and Reporting*, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, D.C., 1989.

*Naval Aviation Safety Program*, OPNAVINST 3750.6Q, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, Chief of Naval Operations, Washington, D.C., 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

### **Chapter 5**

*Hazardous Material Control and Management (HMC&M)*, OPNAVINST 4110.2, Chief of Naval Operations, Washington, D.C., 1989.

*Manual of Naval Preventive Medicine*, NAVMED P-5010-3, Chapter 3, "Ventilation and Thermal Stress Ashore and Afloat," Naval Medical Command, Washington, D.C., 1988.

*Naval Ships' Technical Manual (NSTM)*, Chapter 635, "Thermal, Fire, and Acoustic Installation," S9086-VH-STM-010, Commander Naval Sea Systems Command, Washington, D.C., 1986.

*Naval Ships' Technical Manual (NSTM)*, Chapter 670, "Stowage, Handling, and Disposal of Hazardous General Use Consumables," S9086-WK-STM-006, Commander, Naval Sea Systems Command, Washington, D.C., 1987.

*Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, Chief of Naval Operations, Washington, D.C., 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

*Shipboard Heat Stress Control and Personnel Protection*, OPNAVINST 5100.20C, Chief of Naval Operations, Washington, D.C., 1985.

## **Chapter 6**

*Afloat Mishap Investigation and Reporting*, OPNAVINST 5100.21B, Chief of Naval Operations, Washington, D.C., 1993.

*Department of the Navy Policy for Safety, Mishap Prevention and Occupational Health Programs*, SECNAVINST 5100.10G, Secretary of the Navy, Washington, D.C., 1989.

*Mishap Investigation and Reporting*, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, D.C., 1989.

*Naval Aviation Safety Program*, OPNAVINST 3750.6Q, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, Chief of Naval Operations, Washington, D.C., 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Safety and Occupational Health Program*, OPNAVINST 5100.8G, Chief of Naval Operations, Washington, D.C., 1986.

## **Chapter 7**

*Afloat Mishap Investigation and Reporting*, OPNAVINST 5100.21B, Chief of Naval Operations, Washington, D.C., 1993.

*Joint Fleet Quality Assurance (QA) Program*, CINCLANTFLTINST/CINCPACFLTINST 4355.1B, Commander, Naval Surface Force, Norfolk, Va./San Diego, Ca., 1990.

*Manual of the Judge Advocate General*, JAG Instruction 5800.7C, Office of the Judge Advocate General, Alexandria, Va., 1990.

*Mishap Investigation and Reporting*, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, D.C., 1989.

*Mishap Investigation, Reporting, and Recordkeeping*, DOD Instruction 6055.7, Department of Defense, Washington, D.C., 1990.

*NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, Commander, Naval Safety Center, Norfolk, Va., 1991.

*Navy Occupational Safety and Health (NAVOSH) Navy Training Plan (NTP)*, NTP S-40-8603B, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

*Standard Organization and Regulations of the U.S. Navy*, OPNAVINST 3120.32C, Chief of Naval Operations, Washington, D.C., 1993.

## **Chapter 8**

*Aviation Maintenance Ratings Fundamentals*, NAVEDTRA 12010, Naval Education and Training program Management Support Activity, Pensacola, Fla., 1990.

*Aviation Maintenance Ratings Supervisor*, NAVEDTRA 12011, Naval Education and Training Program Management Support Activity, Pensacola, Fla., 1991.

*NAVAIROSH Requirements for the Shore Establishment*, NAVAIR A1-NAOSH-SAF-000/P-5100-1, Commander, Naval Air Systems Command, Washington, D.C., 1986.

*Naval Air Systems Command Supplement to the Navy Occupational Safety and Health (NAVOSH) Program Manual*, NAVAIRINST 5103.1A, Commander, Naval Air Systems Command, Washington, D.C., 1986.

*Naval Aviation Safety Program*, OPNAVINST 3750.6Q, Chief of Naval Operations, Washington, D.C., 1989.

*The Naval Aviation Maintenance Program (NAMP)*, Volume 1, OPNAVINST 4790.2E, Chief of Naval Operations, Washington, D.C., 1989.

*Naval Safety Center Aviation Safety Review Checklist*, NAVSAFECEN 3750 P, Commander, Naval Safety Center, Norfolk, Va., 1981.

## **Chapter 9**

*Afloat Mishap Investigation and Reporting*, OPNAVINST 5100.21 B, Chief of Naval Operations, Washington, D.C., 1993.

*Ammunition Afloat*, NAVSEA OP 4, Commander, Naval Sea Systems Command, Washington, D.C., 1988.

*Ammunition and Explosives Ashore, Safety Regulations for Handling, Storing, Production, Renovation, and Shipping*, Volume 1, NAVSEA OP 5, Commander, Naval Sea Systems Command, Washington, D.C., 1990.

*Mishap Investigation and Reporting*, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, D.C., 1989.

*Naval Airborne Weapons Maintenance Program (NAWMP)*, OPNAVINST 8600.2A, Chief of Naval Operations, Washington, D.C., 1989.

*Non-Nuclear Ordnance and Explosives Handling Qualification and Certification Program*, NAVSEAINST 8020.9A, Commander, Naval Sea Systems Command, Washington, D.C., 1985.

*Transportation and Storage Data for Ammunition, Explosives and Related Hazardous Materials*, SW020-AC-SAF-010, Commander, Naval Sea Systems Command, Washington, D.C., 1992.

*United States Navy Ordnance Safety Precautions*, NAVSEA OP 3347, Commander, Naval Sea Systems Command, Washington, D.C., 1986.

*U.S. Navy Explosives Safety Policies, Requirements, and Procedures (Department of the Navy Explosives Safety Policy Manual)*, OPNAVINST 8023.2C, Chief of Naval Operations, Washington, D.C., 1986.

## **Chapter 10**

*Issuance of Navy Traffic Safety Program*, OPNAVINST 5100.12F, Chief of Naval Operations, Washington, D.C., 1990.

## **Chapter 11**

*Administration of Navy Sports Programs*, BUPERSINST 1710.20, Chief of Naval Personnel, Washington, D.C., 1992.

Cote, Arthur E., *Fire Protection Handbook*, National Fire Protection Association, Quincy, Mass., 1986.

Craighead, Frank C., Jr., and John J. Craighead, *How To Survive on Land and Sea*, 4th ed., Naval Institute Press, Annapolis, Md., 1984.

*NAVOSH Training Guide for Forces Afloat*, NAVEDTRA 10074, Commander, Naval Safety Center, Norfolk, Va., 1991.

*Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat*, OPNAVINST 5100.19B, Chief of Naval Operations, Washington, D.C., 1989.

*Navy Recreation, Athletics, and Home Safety Program*, OPNAVINST 5100.25A, Chief of Naval Operations, Washington, D.C., 1990.





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