CHAPTER 6

PERSONNEL SAFETY AND DAMAGE CONTROL

LEARNING OBJECTIVES

Upon completion of this chapter, you should be able to do the following:

1. Identify the duties of the electrical safety petty officer.
2. Describe the responsibilities and the elements of an electrical safety program.
3. Describe the electrical safety precautions associated with hand tools and portable electrical power tools.
4. Explain how to effectively supervise personnel in work center and job site safety.
5. Explain the work center supervisor's role in occupational safety and health awareness.
6. Identify the various methods used on the job to enforce safety.
7. Explain how to apply the Navy Occupational Safety and Health Program within the work center.
8. Explain how to instruct personnel on the use and maintenance of personal protective equipment and clothing.
9. Describe the different parts of the ND Mk V and MCU-2/P chemical, biological, and radiological (CBR) protective masks.
10. Explain how to fit, test, and don the ND Mk V protective mask.
11. Explain how to replace mask canisters on the ND Mk V protective mask.
12. Describe how to care for and maintain the ND Mk V protective mask.
13. Explain how to check for leaks on the MCU-2/P protective mask.
14. Explain how to fit and don the MCU-2/P protective mask.
15. Explain how to select the correct size of MCU-2/P protective mask.
16. Describe the different types of CBR protective clothing.
17. Describe how the M258A1 skin decontamination kit should be used during a CBR attack.

It is the policy of the Navy to enhance operational readiness and mission accomplishments by establishing an aggressive occupational safety and health program which will reduce injuries, illnesses or death, material loss or damage, and maintain safe and healthy working conditions for personnel.

—OPNAVINST 5100.19B

This chapter provides information about safety in the work center, the duties of the electrical safety petty officer, and chemical biological and radiological (CBR) protection equipment. Hopefully, reading about these topics will cause them to remain fresh in your mind as you go about your daily routine.

SAFETY IN THE WORK CENTER

The goals of the Navy safety programs are to create and maintain safe and healthful working

conditions for military and civilian personnel and to reduce mishaps. A mishap is an event or a series of events that lead to injuries, occupational illnesses, death, or material damage or loss. Safety and occupational health concepts and procedures should be made part of every person's professional approach to a job—from top management through the first-line supervisor to the worker. You, as a petty officer second class, may be that first-line supervisor.

ROLE OF THE SUPERVISOR

The safety-minded supervisor is the key to a successful mishap prevention program. First-line supervisors should know the most about their areas of responsibility. Supervisors normally have daily contact and are familiar with the personnel, equipment, and materials involved. They should know the standard practices and circumstances in the work area as well as the hazards involved. They have a personal and professional interest in identifying factors that cause mishaps. Supervisors should take immediate action to prevent a mishap from occurring or recurring. They can usually communicate effectively with their people because they speak their language and understand them better than anyone else.

Supervisors should make mishap prevention a part of the job. They should motivate their people to develop and use safe work habits and to believe in mishap prevention. Supervisors should insist on safe practices at all times, recognize hazardous methods and procedures, and take corrective (mishap preventive) measures immediately. Experience has shown that a lack of knowledge or skill is the single biggest cause of mishaps. Teaching a person the RIGHT way to do a job includes teaching the person the SAFE way. That is why on-the-job training and supervision are important parts of safety programs.

TRAINING AND EDUCATION

A comprehensive training and education program is essential to mishap prevention. Safety training develops people's skills in using mishap prevention methods and in applying safe practices in all activities. Safety education develops people's awareness of the importance of mishap prevention and their ability to recognize and correct potential mishap conditions and practices. Thorough, high-quality training and education is needed to achieve the Navy's safety program objectives.

One of the most effective methods of safety training is to have trainees do a job repeatedly, following set procedures. When trainees repeatedly follow correct and safe procedures to do a job, safe practices become a part of their daily routine. Such practices develop and reenforce good safety habits and allow the instructor to correct unsafe habits on the spot. Testing and periodic retesting of the operator and the maintainer should be conducted to ensure they remember set procedures. This provides feedback and validation of instruction and allows detection and correction of unsafe habits.

As a result of changing technology, new developments and equipment are constantly being introduced into the work environment. In spite of conscientious mishap prevention, new developments and equipment present new hazards. Our environment, the mistakes of others, and our own carelessness also present hazards. Because the potential for hazards is so great, hazard awareness training is necessary.

Supervisors and managers should use formal and on-the-job training to teach hazard awareness. They should also share personal experiences to develop hazard awareness in their personnel. Safety-related magazines, pamphlets, posters, films, closed-circuit television (CCTV), and other training aids should be used as an integral part of the training program.

Magazines and periodicals relating to safety and mishap prevention are available from the Naval Safety Center. These publications should be ordered by each naval activity and routed to all hands. Published articles are excellent training aids for mishap prevention presentations and training sessions.

Posters are designed to promote awareness of a specific hazardous action or event and, through this awareness, reduce the possibility of a particular mishap. They are effective in increasing mishap prevention awareness on a short-term basis. However, if left displayed too long, they can quickly become a part of the background and fail to generate the desired interest. Posters should be located where the greatest number of personnel will see them. Also when possible, they should be located in the vicinity of the potential hazard or action denoted by the poster. Pages taken from publications such as *Fathom* make good safety posters.

Films and CCTV are highly effective training aids. They must be carefully selected to emphasize the particular phase of mishap prevention being promoted. Showing films at random, with little

or no thought in their selection, can have a negative effect on the viewer. Films selected with care can increase mishap prevention awareness. Viewers will remember what they have seen in the films in future situations.

Continual monitoring of the mishap prevention program at each level of responsibility will reveal problem areas. Once the problem areas have been recognized, further training that deals with these areas can be carried out. This training can be conducted at the work center or command level, as required.

SAFETY INSPECTIONS

Safety inspections must be organized on a regular, systematic basis because unsafe conditions are always being created. First, all things wear out with use. Pipes corrode, cable strands break, insulation rots away, and hand tools develop defects. In the process, unsafe conditions are born. Secondly, the actions of people create unsafe conditions. Materials are occasionally left in hazardous locations. Tools are occasionally abused and rendered unsafe for the next person to use. Guards are sometimes removed and not replaced. Safety devices are sometimes made inoperative. Wherever people work, unsafe conditions are created.

Unsafe conditions may be created through honest ignorance, gross neglect, or deliberate action. The result is a steady trickle of unsafe conditions into virtually every place of work. The situation is somewhat like a boat with a leaky bottom. Unless the water is bailed out regularly, the boat is soon flooded. Similarly, unless regular safety inspections are held, most workplaces are soon flooded with unsafe conditions. That is when mishaps begin to occur.

Inspections are one of your most important tools for maintaining mishap-free work conditions. Inspections also help you ensure proper work habits and follow job progress. Types of formal and informal inspections include the following:

Special. Those which focus on a specific problem

Periodic. A thorough and systematic inspection of an area on a regular basis

Continuous. A constant inspection as part of the daily routine

Intermittent. Unannounced or unscheduled inspections

Several points should be considered when making an inspection. Know what to look for by knowing the job and the worker's responsibilities. Practice observation. Think about what you see—or should see. Keep an open mind at all times. Do not be satisfied with general impressions. Guard against habit and familiarity. Prepare and use a checklist. Start corrective action immediately.

Inspections provide several important benefits. They are a means of checking on the adequacy of past training. They promote on-the-spot corrections and develop cooperative attitudes toward mishap prevention. They can reveal better job methods. They make personnel aware of unsafe acts and conditions. They can also be used to promote awareness of hidden hazards that have become part of the daily routine and are no longer recognized as hazards. Inspections by outsiders can also have many benefits. These inspectors will see habits and other things ignored or unrecognized by the personnel who live with the hazards on a day-to-day basis. These outside inspections may be conducted by personnel from another work area or from a higher level of command, such as a squadron staff. Informal safety surveys are also conducted by the Naval Safety Center.

Daily informal inspections should be conducted with the aim of discovering hazards and preventing damage or injury. First-line supervisors should conduct inspections during the course of the workday on a random basis to identify hazards. Inspections should be conducted by all levels of management, formally and informally. Inspections should always be made in the presence of personnel normally associated with the space. That will make them immediately aware of all unsafe practices or conditions.

SAFETY PROGRAMS

In 1974 the President of the United States adopted safety programs consistent with Occupational Safety and Health Administration (OSHA) standards for government employees. During recent years the Navy has set up specific programs using OSHA standards as guides. That has resulted in most Navy safety programs being even stricter than OSHA requirements. Remember that OSHA has the authority to inspect naval activities. Basic guidance for Navy Occupational Safety and Health (NAVOSH) is contained in OPNAVINST 5100.23B. In this section, we will discuss some of the safety programs developed to provide us with safe working conditions in sometimes not-so-safe environments.

Navy Hearing Conservation Program

Exposure to high-intensity noise is usually associated with the impulse blasts of gunfire or rocket firing or the continuous or intermittent sounds made by aircraft and marine engines. But other more common work-related sources, such as grinders, saws, and similar high-speed tools and machines, also present noise problems. The goal of the Navy Hearing Conservation Program is to prevent occupational noise-related hearing loss among Navy personnel. Accomplishing the objectives of this program requires several actions:

- Work environments should be surveyed to identify noise levels that are potentially hazardous to personnel. Equipment producing such noise should be modified to reduce the noise level to acceptable levels. Unfortunately that may not always be economically or technologically feasible. When it is not feasible, administrative control and/or hearing-protective devices should be used.

- Periodic hearing testing must be conducted to monitor the effectiveness of the program. Early detection of temporary changes in minimum hearing levels is important. That allows for further testing and for preventive measures to be taken before permanent hearing loss occurs.

- Since education is vital to the overall success of a hearing conservation program, an understanding of the permanent nature of noise-induced hearing loss is necessary. The command's hearing conservation program and the individual's responsibilities under the program are all essential for program effectiveness. Consequently, Navy personnel should be encouraged to use hearing-protective devices both on and off duty. Wearing of such devices should include activities such as mowing the lawn or using chain saws and firearms.

Hazardous noise areas and equipment must be so designated and appropriately labeled. Areas and equipment that produce continuous and intermittent sound levels greater than 84 decibels (dB) or impact or impulse noise levels of 140 dB peak are considered hazardous, NAVMED 6260/2, Hazardous Noise Warning Decal, and NAVMED 6260/2A, Hazardous Noise Labels (displayed on hand tools), are the approved decals and labels for marking hazardous noise areas and equipment.

Hearing-protective devices should be worn when entering or working in an area where noise levels are greater than those described above.

A combination insert-type (ear plug) and circumanual-type (ear covering) hearing-protective device that provides double protection should be worn in all areas where noise levels exceed 104 dB. In addition, all personnel should wear hearing-protective devices when exposed to gunfire in a training situation or to artillery or missile firing under any circumstances.

Personal hearing-protective devices should be issued to suit each situation. All personal hearing-protective devices must reduce effective sound levels to less than 84 dB or 140 dB peak.

Where protective devices do not provide noise reduction to a level below 84 dB, administrative control of exposure time is necessary.

Hearing-protective devices used by the Navy are identified in the following list. Also shown are the appropriate stock numbers and effective dB reductions.

EARPLUG TYPES:

Single Flange (V51R) Ear Defender

Size	NSN	Effective dB Reduction
Extra Small (white)	6515-00-442-4765	23 dB
Small (green)	6515-00-467-0085	23 dB
Medium (Int'l orange)	6515-00-467-0089	23 dB
Large (blue)	6515-00-442-4807	23 dB
Extra Large (red)	6515-00-442-4813	23 dB

Triple Flange (Comfit)

Size	NSN	Effective dB Reduction
Small (green)	6515-00-442-4821	26 dB
Regular (Int'l orange)	6515-00-442-4818	26 dB
Large (blue)	6515-00-467-0092	26 dB

Disposable

Silaflex (Blister Pack)	6515-00-133-5416	21 dB
Ear or Deci-Damp	6515-00-137-6345	29 dB

Size	NSN	Effective dB Reduction
Headband, Universal		
Sound Sentry Type	6515-00-181-8058	9 dB
Sound Ban Type	6515-00-392-0726	18 dB
Earplug Case		
Plastic Type	6515-00-299-8287	N/A
Circumaural Muff Types:		
Straightaway Muffs	4240-00-759-3290	23 dB
Overheadband	4240-00-691-5617	23 dB
Type H Napeband (for use with hard hat)	4240-00-022-2946	20 dB
Associated Equipment		
Replacement Filter, dome	4240-00-674-5379	N/A
Replacement Seal, dome	4240-00-979-4040	N/A
Gauge, Earplug sizing	6505-00-117-8552	N/A

NOTE: ALL EARPLUGS SHOULD BE WASHED BEFORE AND AFTER EACH USE.

Sight Conservation Program

Navy policy requires that personnel working in eye-hazardous areas of operations wear appropriate eye-protective equipment. Examples of those operations include pouring or handling of molten metals or corrosive liquids and solids, cutting and welding, drilling, grinding, milling, chipping, and sandblasting or other dust-producing operations. Persons in the vicinity of such operations, including other workers, supervisors, or visitors, must also wear eye-protective equipment.

Various designs of eye protection are available for protection against flying objects, fine dust particles or liquid splashes, and glare and radiant energy. As a minimum, those devices should provide adequate protection for the hazards specified, be reasonably comfortable, and fit snugly without interfering unnecessarily with movement. They must be durable, capable of being disinfected, and easy to clean.

In addition, American National Standards Institute (ANSI) specification Z87.1-1979 outlines reasonable ways to select the right equipment and prescribes its safe use. It defines special terms in the eye- and face-protection field, such as absorptive lenses, bridge size, and cover plate. It also establishes requirements for welding helmets, hand shields, face shields, and shields for eye protection. The standard includes an illustrated selection chart of recommended protectors and an applications chart showing what equipment or combinations of equipment best suit each hazardous operation.

Appropriate warning signs should be posted in all eye-hazardous areas. Also emergency eyewash facilities should be provided and made easily accessible wherever personnel may be exposed to corrosive materials.

The prevention of eye mishaps requires all persons who may be in eye-hazardous areas to wear protective eyewear. That applies to workers, visitors, instructors, or others passing through an eye-hazardous area. Activities should provide protection for those personnel by procuring a sufficient quantity of heavy-duty goggles and plastic eye protectors. Personnel who wear personal glasses to correct their eyesight should be provided with a suitable eye protector to wear over them. Arrangements should always be made for the issue, care, sterilization, and reissue of these “common use” eye protectors and goggles.

Respiratory Protection Program

Many repair and maintenance environments in the Navy are subject to air contaminants that can be dangerous if inhaled. Most air contaminants can be classified as follows:

Dust. Small solid particles created from the breaking up of larger particles by machine shop tools and by processes such as paint chipping, sanding, woodworking, or abrasive blasting.

Fumes. Very small particles of condensation of vaporized solids. This term is generally applied to metal oxides.

Smoke. Carbon or soot particles resulting from the incomplete combustion of coal, wood, and oil products.

Mist and fog. Finely divided liquid droplets suspended in air by condensation or atomization. Examples include solvent sprays and spray painting.

The best way to protect personnel against these contaminants is through the use of engineering controls such as local exhaust ventilation. When these controls are not practical or do not provide sufficient protection, appropriate respirators are required to assure the protection of personnel.

How often have personnel used surgical masks when a respirator was required for painting, chipping, or grinding? That practice should be stopped. Surgical masks are designed to stop only the flow of oral discharges. They are *not* designed to impede the flow of organic vapors or metal fumes. Organic vapors and fumes pass through the mask and into the wearer's respiratory system.

Three general types of respirators are authorized:

Air-purifying respirator. This respirator removes contaminants by filtering or adsorbing them as the air passes through a cartridge. (Adequate oxygen must be present in all spaces where these respirators are used.)

Supplied-air (or air-line) respirator. This respirator is used when there is insufficient oxygen, the contaminant has no odor, or when the contaminant is of such a high concentration or toxicity that a cartridge filter is inadequate.

Self-contained breathing apparatus (SCBA). This apparatus allows the user complete independence from a fixed source of air and offers the greatest degree of protection, but it is also the most complex.

WARNING

The OBA and emergency escape breathing device (EEBD) are to be used *only* in damage control and emergency escape situations, respectively.

Respirator cartridges and gas mask canisters are color-coded as to the type of contaminant they provide protection against. Respirator and cartridge selection guidance and information is provided in OPNAVINST 5100.23B, *NAVOSH Program Manual*

Heat Stress Program

Heat stress may occur in engineering spaces, laundries, and many other work spaces in the Navy. In many cases, it is the result of inadequate or clogged ventilation systems, damaged or missing thermal insulation, or excessive steam or water leaks.

Heat stress is defined as any combination of air temperatures, thermal radiation, humidity, airflow, and work load that may stress the body as it attempts to regulate body temperature. Heat stress becomes excessive when the body cannot adjust to the temperature of its environment. That results in an increase in body temperature. This condition can readily produce fatigue, severe headaches, nausea, and poor physical and mental performance. As the body's temperature continues to increase because of prolonged exposure, heat exhaustion or heatstroke may occur. Severe impairment of the body's temperature-regulating ability also may occur. Heat stress can be life-threatening if not immediately and properly treated. Recognizing heat stress symptoms and obtaining prompt medical attention for affected personnel is an all-hands responsibility, but is of special concern to supervisors.

Further information and guidance on the Navy Heat Stress Program is contained in OPNAVINST 5100.20, *Shipboard Heat Stress Control and Personnel Protection.*

Electrical Safety

Whatever your job in the Navy, chances are great that you and your personnel will be working with or near electrical or electronic equipment during the normal workday. Persons working around electric circuits and equipment must always observe safety precautions to avoid injury from electric shock and short circuits. Detailed safety precautions are contained in the *Naval Ships' Technical Manual (NSTM),* chapter 300, and the Electronics Installation and Maintenance Book (EIMB), NAVSEA SE000-00-EIM-100, section 3. They may also be found in type-command instructions. For purposes of this discussion, the terms *electrical* and *electronic* should be considered interchangeable.

The danger of shock from 220-volt or 450-volt ac service is well recognized by operating personnel. Relatively few reports of serious shock are received from these voltages despite their widespread use. On the other hand, a number of fatalities have occurred because of contact with 115-volt circuits. Low voltage (115 volts and below) is very dangerous, despite a fairly widespread but totally unfounded belief to the contrary. Contact with low voltage can cause

death when the resistance of the body is lowered by moisture. Because of the above conditions, extra care and awareness of this hazard are needed.

Short circuits can be caused by placing or dropping a metal tool, rule, flashlight case, or other conducting articles across an energized line. The arc and fire that result on even relatively low-voltage circuits may cause extensive damage to equipment and serious injury to personnel.

WARNING

All live electric circuits must be treated as potential hazards at all times.

You and your personnel should constantly be on the alert for any indication of an equipment malfunction. The senses of sight, hearing, smell, and touch all serve to make a person aware of possible electrical malfunctions. You should be alert to following signs:

- Unusual sound from an electric motor
- Fire, smoke, sparks or arcing
- Frayed or damaged cords or plugs
- Receptacles, plugs, and cords that feel warm to the touch
- Slight shocks felt when handling electrical equipment
- Odor of burning or overheated insulation
- Electrical equipment that either fails to operate or operates irregularly
- Electrical equipment that produces excessive vibration

If you or your personnel notice any of the above signs, report them immediately to the electric shop supervisor. Do not delay. Do not operate the equipment or attempt to make any repairs yourself. Stand clear of any suspected hazard, and instruct others to do likewise.

You should ensure that personnel working on electrical circuits are provided with appropriate rubber protective equipment as necessary. These include rubber insulating gloves, sleeves, hoods, blankets, and rubber floor matting.

Foot Protection

Navy policy requires that all employees (military and civilian) exposed to designated occupational foot-hazardous operations or areas be furnished appropriate safety shoes or boots at government expense. Each activity commander designates local foot-hazardous areas and specifies the type of foot protection required. The commander makes those designations based on advice from the safety and health professionals of the activity's safety office.

Foot-hazardous operations are those that have a high incidence of, or potential for, foot or toe injuries. Occupations involving construction, materials handling, maintenance, transportation, ship repair and operation, aircraft overhaul and repair, and explosives manufacturing and handling generally have a high incidence of foot injuries.

Safety shoes with built-in protective toe boxes provide protection from heavy falling objects. General-purpose safety shoes (chukka style) are issued in boot camp and are available through normal supply channels.

Head Protection

Helmets and hats are used for protection against falling and flying objects and limited electric shock and burns. They must meet American National Standards Institute (ANSI) specification Z89.1-1981, Head Protection.

Helmets should be worn by Navy personnel in all industrial environments. Warnings signs should be posted in all places requiring the use of hard hats.

Toxic Material Hazards

Supervisors have always been concerned with the prevention of property damage and mishaps causing injury to personnel. Now OSHA requires supervisors to recognize and eliminate industrial hazards by enforcing local regulations and federal standards. Supervisors must be concerned with hazards caused by combustible materials, flammable liquids, pollution, and toxic materials. They also must be concerned with industrial-related diseases.

In the routine activity of running the work center, supervisors should be able to identify health hazards arising from production activities. In some instances, they must survey the raw materials and the by-products that may be

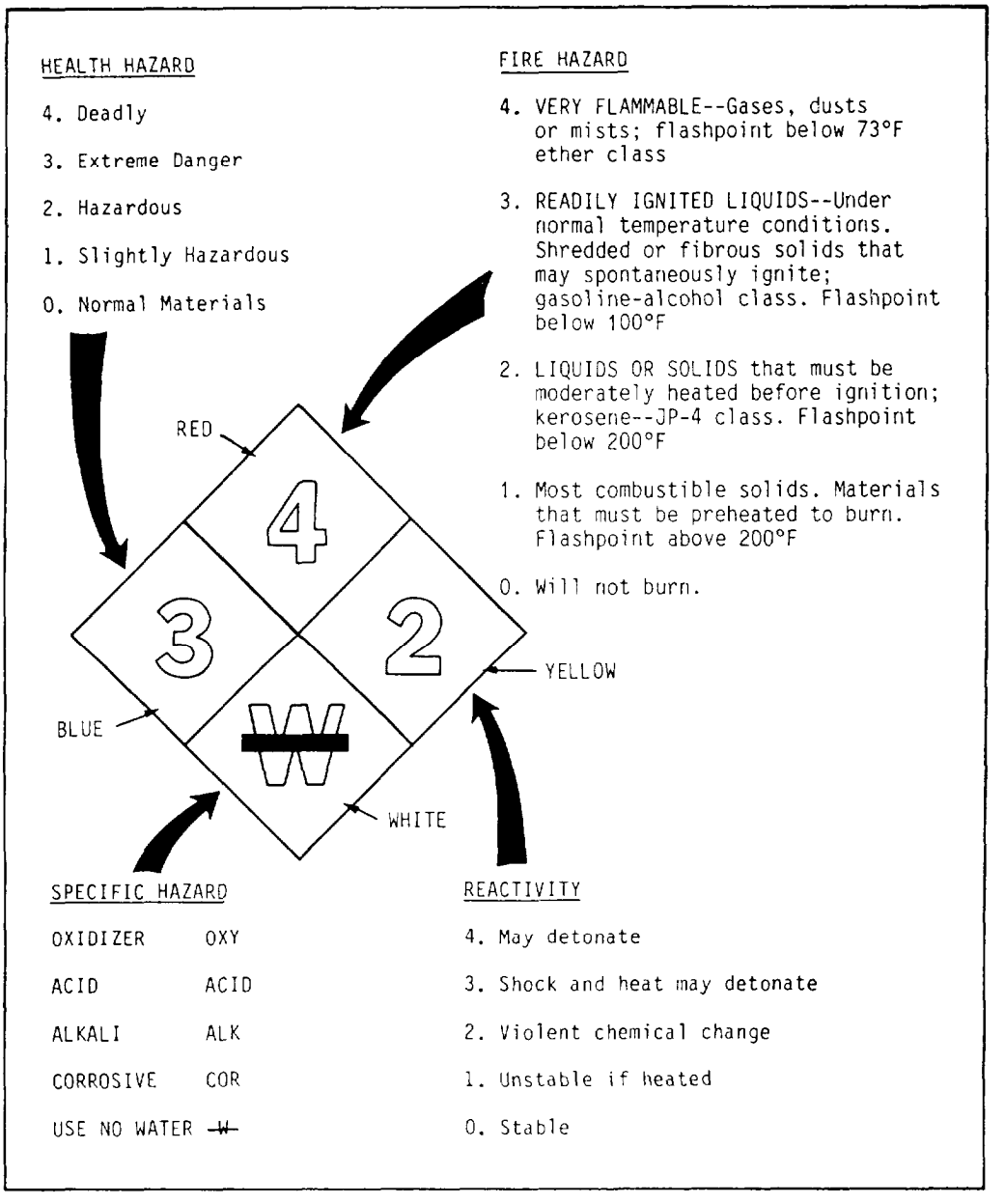


Figure 6-1.-Hazardous material label.

produced either intentionally or unintentionally. They must also determine the source and the methods of dispersion of airborne contaminants. Since hazards exist in almost all jobs, supervisors should examine all tasks to ensure a potentially unsafe condition is not overlooked.

All hazardous materials used in the Navy must be labeled. That applies to buckets or cans of hazardous materials taken from bulk containers. All hazardous materials received from the Navy supply system should already be marked with a label similar to the one shown in figure 6-1. Hazardous materials used in the work center are often bought locally, so they are not properly labeled. In such cases, the supervisor is responsible for properly labeling the material. You can order hazardous material labels through the supply system using stock number 7690-00-152-0030. For more information on hazardous material labeling, refer to NAVSUP Publication 4500.

Electromagnetic Radiation Hazards

Almost everyone is constantly subjected to nonionizing radiation in varying degrees. Nonionizing radiation is electromagnetic radiation restricted to the frequency spectrum commonly referred to as the radio-frequency (rf) region up to and including laser radiation (visible light). Common types of rf-producing equipment are radio transmitters, radars, microwave ovens, and gun and missile directors.

The development of systems with high-power rf transmitters and high-gain antennas has increased the possibility of biological injury to personnel working in their vicinity. Presently, the only known effects of overexposure to rf radiation are an increase in body temperature or a temperature rise in specific organs of the body. Nonthermal effects (such as sterility) are not certain at this time.

The Naval Medical Command established safe limits for exposure to radiation in BUMEDINST 5470.13. Those limits are based on the power density of the radiation beam and the exposure time of the human body in a radiation field. The following precautions should be taken to ensure that personnel are not exposed to radiation that exceeds the established safe limits:

- Keeping radar beams pointed away from personnel working areas
- Observing warning signs that indicate the existence of rf radiation hazards in a specific location or area

Another hazard of rf radiation is rf burns. An rf burn hazard exists if sufficient rf voltage is induced on a metallic object to cause pain, visible skin damage, or involuntary reflex action to a person who contacts the object. Any burn injury that occurs is the result of the heat produced by a current flow through the skin at the contacted area. The rf voltages on metallic objects can be induced by radiation from nearby transmitting antennas. Hazardous voltages have been found on crane hooks, running rigging, booms, antisubmarine rocket (ASROC) launchers, and parked aircraft. Attempts to reduce these hazards are being managed by the Naval Sea Systems Command (NAVSEA) and involve equipment design modifications. However, the most important deterrent is personnel training and awareness.

CBR PROTECTIVE EQUIPMENT

Personnel protective equipment used in chemical warfare (CW) defense includes masks, clothing, decontaminating kits, and antidotes for certain chemical agents. Depending on your duty station and actual combat assignment, you may be issued certain items of this equipment. Knowing the correct procedures for the use of the equipment is vital. The following paragraphs provide descriptions of these procedures, but only practice can assure that you follow them properly. *Chemical, Biological, and Radiological Defense, Handbook for Training,* S-5080-AA-HKB-010, and *NSTM,* chapter 470, list detailed procedures for the use and maintenance of CW protective equipment.

CBR PROTECTIVE MASKS

The protective mask is your personal first line of CBR defense since it protects vulnerable areas such as the eyes, face, and respiratory tract. The protective mask removes airborne radioactive material and biological warfare (BW)/chemical warfare (CW) agents from the air before they are inhaled. However, the mask does not provide protection against some common gases, such as carbon monoxide, carbon dioxide, tritium, and ammonia. It also does not protect against oxygen deficiency. If you must enter areas or compartments that have a deficiency of oxygen, the Navy's oxygen breathing apparatus (OBA) must be used.

The general operation of all types of protective masks is essentially the same. As the wearer inhales, air is drawn through a filtering system. This system consists of two filters: a mechanical filter, which clears the air of solid or liquid particles, and a chemical filter, usually activated charcoal, which absorbs or neutralizes toxic and irritant vapors. The purified air then passes to the region of the mask where it can be inhaled. Exhaled air is expelled from the mask through an outlet valve constructed to open only to permit exhaled air to escape.

The useful life of any filter element depends on four conditions: (1) the type and concentration of the toxic agent or agents in the air, (2) the duration of exposure to the contaminated air, (3) the breathing rate of the wearer, and (4) the temperature and humidity. A change in any of these conditions may affect the useful life of a filter element; it can hold only a definite weight of a toxic agent under given circumstances. Minor

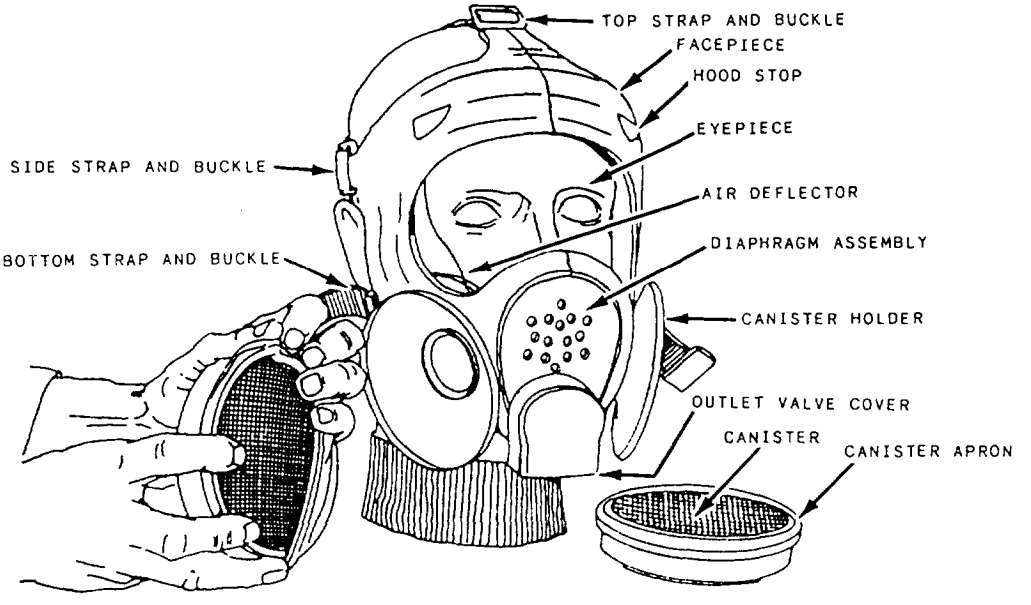


Figure 6-2.-The ND Mk V protective mask.

sensory effects, such as a continuous flow of tears, might indicate that replacement is needed.

Two types of protective masks have been in general use in the Navy: the M17A1, issued to shore-based personnel, and the ND Mark (Mk) V, issued to forces afloat. Both of these, however, are being phased out and replaced by the MCU-2/P mask. All masks consist of a facepiece and filter system. The facepiece provides a gastight seal around the face, protecting the eyes, lungs, and facial skin. The filter system is attached to the facepiece; it filters out or absorbs airborne radioactive material and BW/CW agents before air enters the facepiece for inhalation. The main purpose of the mask is to purify the air being breathed by its wearer. To effectively purify the air, the mask must meet two requirements. First, the facepiece must fit snugly over the face to provide a perfect seal. Second, the filter system must prevent any contaminated material or chemical agent from entering the mask.

ND Mk V Protective Mask

A unique design feature of the ND Mk V protective mask makes it ideally suited for shipboard use. A pneumatic cushion located around the underside edge of the facepiece allows the facepiece to conform to the wearer's face; therefore, an airtight seal is possible for virtually all facial shapes. This feature permits the issue of the mask in only one size and, thus, eliminates the need for stowing and issuing various sizes of protective masks aboard ship.

The major components of the ND Mk V protective mask are shown in figure 6-2. The mask facepiece is made of a black, flexible rubber compound formulated to retard the penetration of chemical agents. The wide-vision eyepiece is a clear, flexible, one-piece plastic lens curved to the shape of the facepiece. Voice transmission is permitted by a thin plastic membrane in the diaphragm assembly. Other features of the facepiece include the air-inlet and exhaust valves and the canister holders. Air deflectors, located inside the mask, create a flow of air from the air-inlet valves across the eyepiece to reduce fogging.

Filtration for the mask is provided by filter canisters mounted on the two canister holders on the facepiece. Each of these filter canisters contains a treated paper filter and an activated charcoal filter. The treated paper filter removes particulate matter, and the activated charcoal filter absorbs toxic vapors and aerosols from the inhaled air. A rubber apron affixed to each canister attaches the canister to the holder on the facepiece. The rubber apron provides an airtight seal around this connection when it is rolled over the back of the canister holder.

The head harness consists of a thin rubber pad from which the inelastic top strap, two elastic side straps, and two elastic bottom straps extend. These straps, secured to buckles on the facepiece, hold the facepiece against the face.

The mask is issued with a carrier in which the mask should be stowed when not in use. The carrier is equipped with straps that keep the carrier snug against the body to prevent interference with normal work routine. The flap on the carrier pouch is held closed by a snap latch that can be quickly and easily opened in emergency situations. A metal shield is sewn into the front of the carrier to protect the eyepiece of the mask when the mask is properly placed in the carrier. The only authorized equipment that should be placed in the carrier with the mask is nerve agent antidote (when issued) and antifogging solution. The antifogging solution reduces fogging of the mask eyepiece when properly applied to its interior.

FITTING AND TESTING THE ND MK V MASK. —The amount of protection provided by the Mk V mask depends greatly on the wearer. Careful attention to proper fitting of the mask is required to provide maximum protection and comfort.

The following steps outline the procedure for properly fitting the protective mask:

1. Let the harness straps out to their full length.
2. Don the mask by inserting your chin in the lower end of the facepiece and pulling the head harness over your head.
3. While holding the head harness pad against the center of the back of your head, pull back on the top strap tab until the mask rests lightly under your chin.
4. Pull back on the two side strap tabs until the upper sides of the mask rest lightly against your face.
5. Pull back on the bottom strap tabs until the lower sides of the mask rest lightly against your face.
6. Check the mask for an airtight seal by placing your hands over the canisters so that no air can enter and by inhaling normally until the mask collapses. Hold your breath for about 10 seconds to see if the mask remains collapsed. If the mask does not collapse, or does not remain collapsed, the mask is defective or the straps are not properly adjusted.

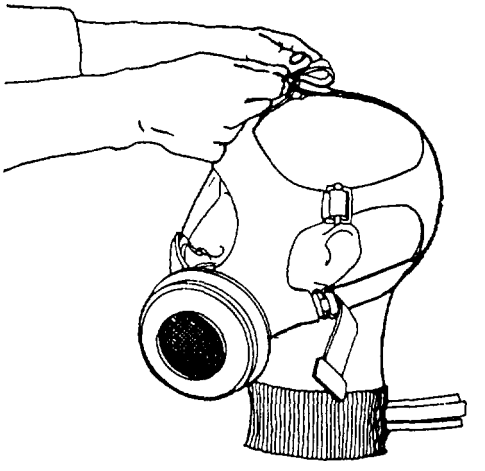


Figure 6-3.-Securing the top and side straps for permanent fit.

NOTE: A leakproof fit cannot be expected unless the wearer is smooth shaven.

After the foregoing tests have been made and the strap adjustments are correct, adjust the top and side straps for a permanent fit. Permanently fit the mask by threading the loose ends of the top and side straps through the buckles between the body and the sliding member, as shown in figure 6-3. These straps will then be permanently adjusted to the individual. Only the two bottom straps will have to be loosened each time the mask is removed or donned. Both the mask and the carrier should be securely marked with the name of the person on whom the mask has been fitted.

DONNING THE ND MK V MASK. —To train your personnel in the proper procedures for donning and removing the mask, you should conduct periodic drills. During these drills, you should emphasize speed as well as accuracy in donning the mask. The general procedures for donning and removing the mask are as follows:

At the command "GAS," take the following actions:

1. Stop breathing and remove your headgear.
2. Yank open the carrier flap and remove the mask from the carrier.
3. Insert your thumbs under the head harness straps and grasp the top of the facepiece.

4. Raise the mask to your outthrust chin and bring the head harness over the back of your head.

5. Center the head harness pad on the back of your head and adjust the bottom straps as necessary for proper fit.

6. Close the outlet valve with the heel of the hand and exhale forcibly to clear the mask of contaminated air.

7. Test the mask for possible leakage by placing your palms over the canisters and inhaling normally until the mask collapses against your face and remains collapsed for approximately 10 seconds.

8. Resume normal breathing.

9. Replace headgear and close the carrier flap.

The protective mask outlet valve sometimes sticks closed because saliva or sweat has dried on it. If this occurs, you may loosen the valve by blowing into the valve or by massaging the valve. The valve may be massaged with the valve cover partially removed as shown in figure 6-4.

CANISTER REPLACEMENT. —A pair of replacement canisters for the ND Mk V mask is provided in a hermetically sealed "coffee can" container. While sealed in this container, the canisters have an indefinite shelf life. Therefore, the container seal should not be broken until the canisters are to be mounted on the mask. Once unsealed, the container should not be resealed, and the canisters should be permanently removed from it.

Figure 6-4.-Correcting sticking outlet valve with cover partially removed.

The following procedures are used for removing and replacing canisters on the ND Mk V mask. To remove each canister from the facepiece, you should take the following actions:

1. Roll approximately one-third of the rubber apron back over the edge of the canister.

2. Slide the canister off the holder.

To install new canisters on the facepiece, you should proceed as follows:

1. Remove the canisters from the hermetically sealed container.

2. Roll the rubber apron of each canister completely over the outer edge of the canister.

3. Position each canister snugly against its holder so that the holder contacts the perforated plate of the canister at all points of its outer edge.

4. Roll the rubber apron of each canister over the back of the canister holder.

CARE OF THE ND MK V MASK. —Because of the importance of the mask, it should be maintained in an efficient operating condition. Careful attention should be given to stowing, cleaning, handling, and inspecting the mask to prolong its useful life.

The mask should be stowed in a cool, dry, dark area free from solvents and their vapors. Oil and gasoline vapors weaken the rubber and are especially damaging to the activated charcoal in unsealed canisters. The mask must be kept dry. Moisture causes rotting of parts, corroding metal, deteriorating canisters, and mildewing carriers.

The mask should be thoroughly cleaned with soap and water and dried before it is stowed. If the mask was previously used and is to be issued to another person, it should be sterilized with a

disinfectant solution; the canisters should be replaced with new ones.

The mask must be handled carefully to prevent any mechanical damage to the metal parts, tears in the delicate portions, or scratched or broken lenses. If you must stack unpackaged masks, they should not be stacked more than five high. You must also take measures to prevent stowage of heavy material on the stack.

By following proper handling, cleaning, and stowage procedures, you can expect the mask to provide designed protection for 5 to 10 years.

MCU-2/P Protective Mask

The MCU-2/P protective mask is designed to provide full protection and is intended to replace other previously used masks, including the Mk V and M17A1. This new mask has improved performance and storage characteristics. It provides protection against tactical concentrations of chemical and biological agents, toxins, and radiological fallout particles. The MCU-2/P mask also accommodates the use of the tri-service/ NATO canisters.

The MCU-2/P protective mask (fig. 6-5) is built with a silicone rubber facepiece. Features include two voicemitters; a drinking tube; a flexible lens that permits the use of binoculars, gunsights, and other optical equipment; and the option to put the filter canister on either side. The mask can be worn over approved mask-compatible spectacles, which can be ordered through your medical department using DD Form 771. The large lens size provides the user with a good all-around view.

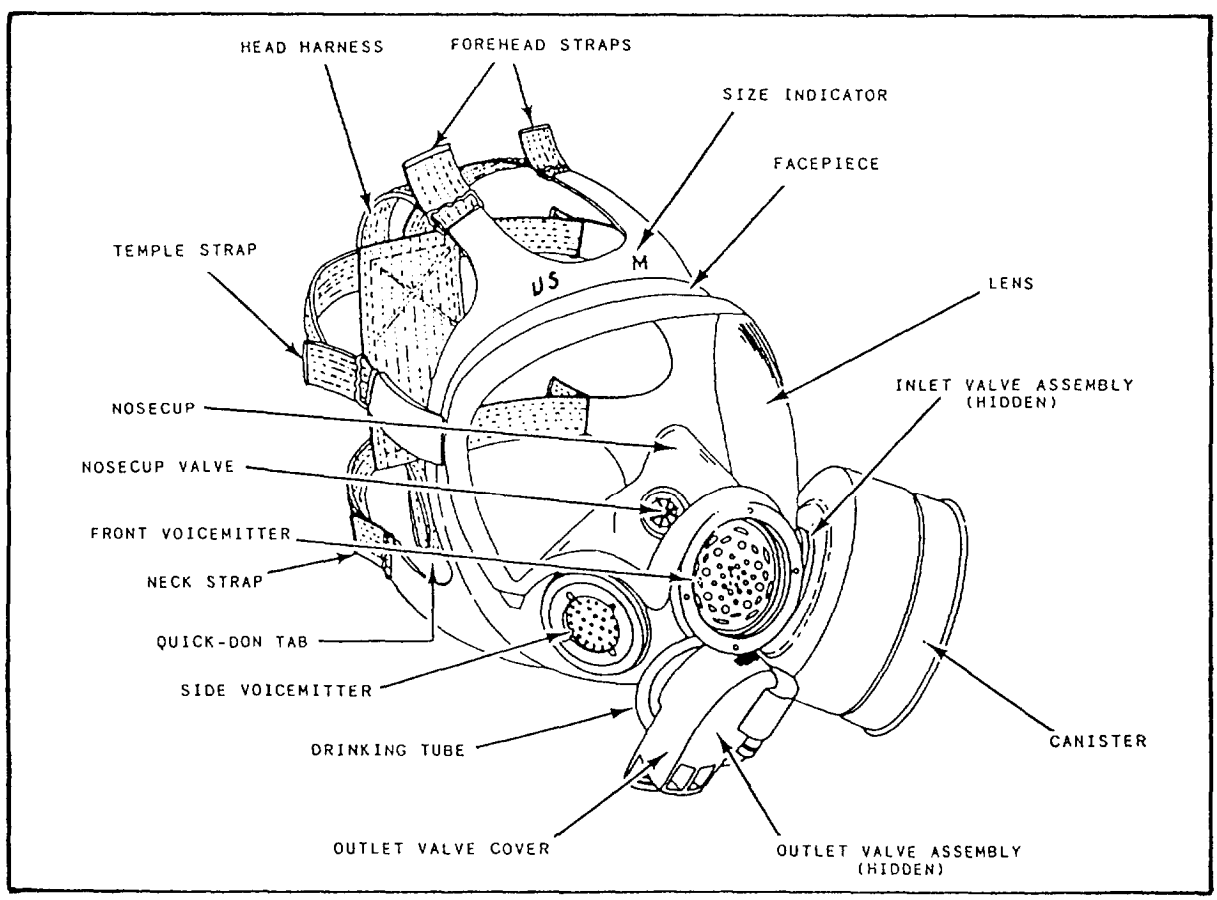


Figure 6-5.-MCU-2/P protective mask.

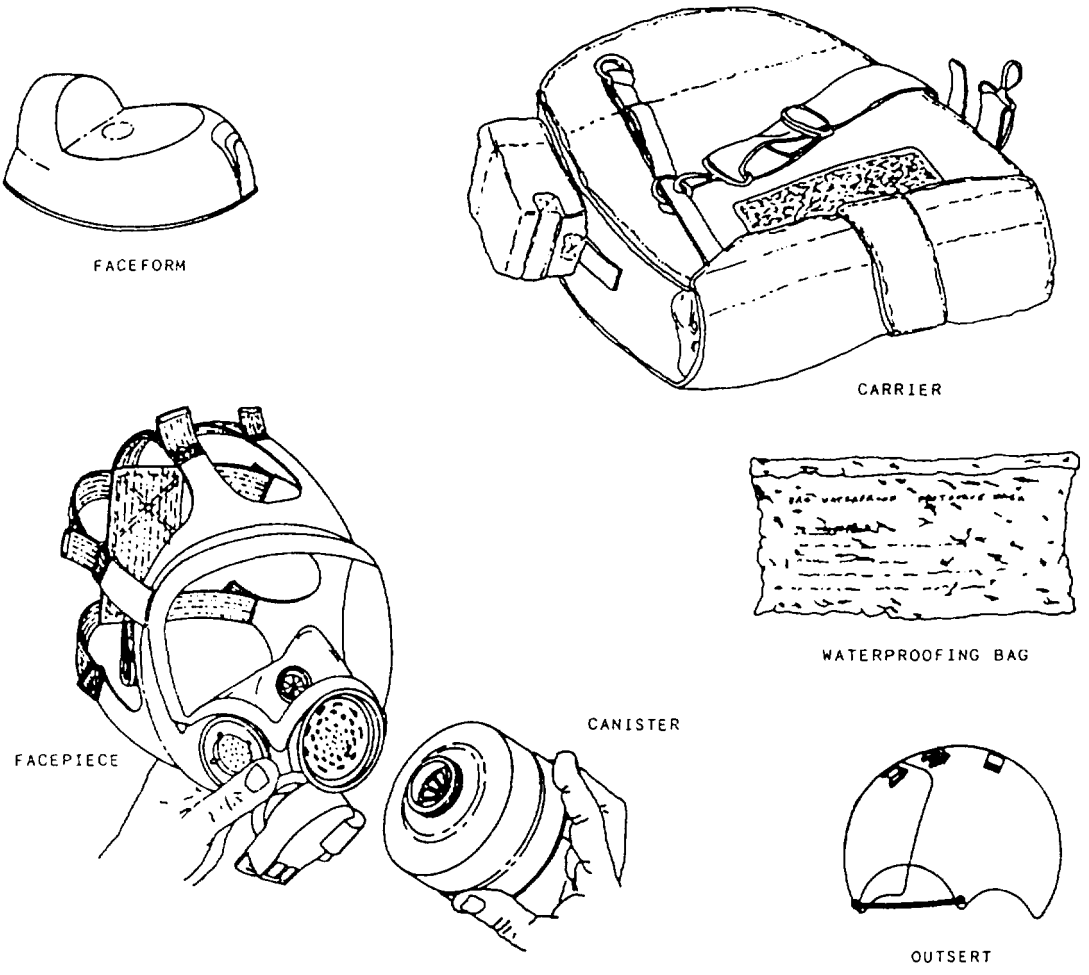


Figure 6-6.-MCU-2/P mask and accessories.

Mask accessories (fig. 6-6) include a carrier, outserts, a waterproofing bag, and a faceform.

SELECTION OF MASK SIZE. —The MCU-2/P mask comes in three sizes: small, medium, and large. Correct selection of the proper mask size is essential for maximum protection. A face length measurement using a special caliper is made before the mask is issued.

MASK ADJUSTMENT AND PREPARATION. —A correctly adjusted mask is necessary for a proper fit that will prevent leaks and be as comfortable as possible. To adjust the mask and prepare it for use (upon issue), you should use the following procedures:

1. Remove one canister from the shipping container and screw it onto the facepiece.
2. Loosen the straps of the head harness. Be sure the strap end tabs are about 1 inch from the buckles.
3. Remove the outsert, if mounted.
4. Pull the head harness over the front of the mask.
5. Hold the outlet valve assembly in the palm of one hand. Using the free hand, push any forehead hair aside or back. Place the mask against the face, forcing the chin cup very tightly against the chin. Pull the head harness over the head using the quick-don tab.
6. Using a circular massaging motion, push the mask as high on the face as possible. Ensure that the mask is centered. Hold in this position with one hand while tightening the temple straps.
7. Ensure that the head pad is centered at the high point of the rear of the head.

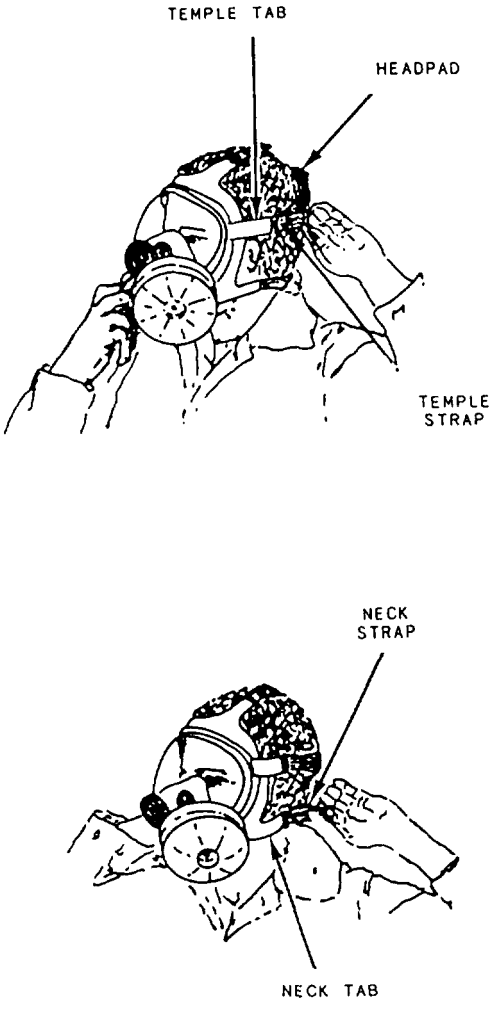


Figure 6-7.-Adjusting straps.

8. Tighten one temple strap (fig. 6-7) until the mask feels snug on that side. Tighten the other temple strap until both sides feel the same. (Tighten all straps toward the rear of the head with small jerks vice a long pull.)
9. Run a finger under each temple tab front-to-back to check for snugness and to remove stray hair from sealing area.
10. Grasp a neck strap in each hand and tighten.
11. Grasp a forehead strap in each hand and tighten.
12. Shake head quickly from side to side and up and down. Retighten mask straps as necessary.

NOTE: In subsequent donnings, only the neck straps should need adjusting.

LEAK CHECK AND REMOVAL. —You must check the mask for leaks when it is fitted and each time you put it on. A leaky mask will not protect you from toxic agents that can cause sickness or death.

> **WARNING**
>
> Do not hold a mask by its canister. An unscrewed canister is the most common cause of leaks.

Use the following procedures to test for leaks

1. Steady the mask and pull the external end of the drinking tube (a quick-disconnect coupling) out of the outlet valve cover.
2. Grasp the outlet valve assembly with the thumb at the bottom and the forefinger at the top. Push the forefinger toward the mouth to get the internal end of the drinking tube between the teeth.
3. Test the drinking tube for leaks by blowing into the tube. If resistance is not felt, the drinking tube is leaking; repair or get a replacement.
4. Push the coupling firmly back into its socket.
5. Make sure the canister is screwed in tight.
6. Press the palm of the hand over the end of the canister. Breathe in until the lens collapses, Hold your breath for 10 seconds. If the lens remains collapsed, the mask is

airtight; if not, the mask straps need readjusting.

7. Remove the mask by loosening the neck straps. Use your fingers to rotate the rear of the buckle forward. Grasp the mask by the outlet valve assembly and pull the mask down, outward, and up. Adjust the mask neck straps so that the ends are within 1 inch of the buckles.
8. Install an outsert (if prescribed).

The mask is now ready for quick donning. Stow your mask carefully to avoid any damage or deformation by ensuring that accessories are installed in their proper order and position, as follows:

1. Stow the waterproofing bag in the large inside pocket at the front of the carrier.
2. Install the outsert (if available) in the carrier.
3. Put a second outsert in the outsert bag and place over the first outsert.
4. Put a faceform in the mask. (Place the open end towards the bottom of the facepiece.)
5. Stow the M258A1 Decontaminating Kit, if issued, in the outside side pocket.
6. Stow the M8 or M9 paper, if furnished, with the waterproofing bag.
7. Slide the mask, top first, into the carrier, with the opening of the mask against the short side of the carrier.
8. Place the carrier in a cool, dry place. Hang it by the shoulder strap or D-ring if possible.

DONNING PROCEDURES. —Perform the following steps for putting on your mask quickly and correctly. (These procedures are based on the presumption that unapproved eyeglasses have been removed.) When given the command, take the following steps:

1. **STOP BREATHING.**
2. Close your eyes tightly.
3. Remove any headgear.
4. With the left hand, grasp the carrier flap tab and open. Reach into the carrier with the right hand and grasp the mask by the front portion of the facepiece in the area of the voicemitter outlet valve assembly. Withdraw the mask.
5. Hold the outlet valve assembly in the palm of one hand. Using the free hand, push any forehead hair aside. Place the mask on the face, forcing the chin cup very tightly against the chin. Pull the head harness over the head, using the quick-don tab.
6. Hold in this position and tighten each neck strap snugly.
7. Expel the air that has been held in the lungs.
8. Press the palm of one hand over the canister and inhale to check seal.
9. Open your eyes and **RESUME NORMAL BREATHING.**

CBR PROTECTIVE CLOTHING

Basically, any clothing or coverall that covers the body can provide a degree of protection from CBR contaminants. However, the type of clothing and its proper wear will determine the amount of protection. Three types of clothing are useful, to varying degrees, in CBR defense: impregnated (permeable) clothing or the newer chemical-protective overgarment, wet-weather clothing, and ordinary work clothing.

Impregnated Clothing

Impregnated clothing and rubber overshoes are supplied to ships in quantities sufficient to outfit 25 percent or more of the ship's personnel. An impregnated clothing outfit consists of impregnated socks, gloves, trousers with attached suspenders (overalls), and a jumper (parka) with an attached hood. These items have been treated with a CW agent-neutralizing chemical, CC2, plus a viscous binder, chlorinated paraffin. The presence of these two chemicals results in a faint odor of chlorine and a slightly greasy or clammy feel. Figure 6-8 shows a person dressed in a suit of impregnated clothing with an ND Mk V protective mask, rubber gloves, and overboots.

Impregnated clothing is primarily effective against the blister agents; it provides little protection against the G-nerve agents. It offers limited protection against other types of CW/BW contaminants. If this clothing is contaminated by large drops or splashes of blister agents, clean clothing should be put on as soon as possible.

Impregnated clothing alone is effective against CW agent vapors or very fine aerosols. However, large aerosol particles or droplets can partially penetrate the fabric when carried by a strong wind. In addition, clothing cannot be impregnated

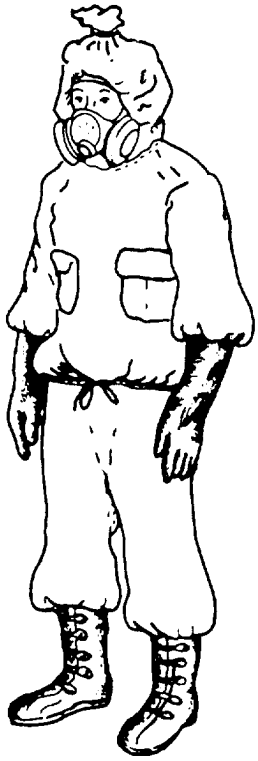


Figure 6-8.-Impregnated clothing with Mk V mask, gloves, and rubber footwear.

with enough CC2 to neutralize agent drops of sizes that can soak through the fabric. Therefore, impregnated clothing is not worn topside without the additional protection given by wet-weather clothing worn as the outside garment. The wet-weather clothing protects the impregnated clothing from large drops or quantities of CW agents; the impregnated clothing neutralizes CW agent vapors and aerosols that may enter the wet-weather clothing.

DONNING IMPREGNATED CLOTHING.— To obtain the maximum protection afforded by impregnated clothing, you must properly don the clothing. The procedures for donning impregnated clothing, rubber boots, and gloves, using the buddy system, are as follows:

1. Under extremely hot conditions, or if desired, remove all regular clothing except underwear. Always remember, however, the more clothing, the better the protection,
2. Put on socks.
3. Put on the overalls; fasten all straps for a snug fit by crossing them across the chest.
4. Put on the butyl rubber boots and bring the pant legs of the overalls down over the tops.
5. Raise the pant legs up to within 2 inches of the top of the boots and wrap them with two turns of masking tape. Leave tabs so that the tape can easily be removed. Blouse the excess pant legs over the tape.
6. Pull on the jumper, leaving the hood thrown back.
7. Blouse the jumper approximately 2 inches below the top of the overalls. Wrap with two turns of masking tape around the jumper. Be sure that the jumper is securely taped down, but leave a tab for easy removal later. Take up the slack by folding the jumper over the back. Blouse the jumper over the tape.
8. Don the undergloves and the butyl rubber overgloves.
9. Pull the jumper arms down over the rubber gloves to within 2 inches of the top of the gloves. Wrap jumper arms twice with masking tape, leaving a tab for easy removal. Blouse the excess material of the arms over the tape.
10. Tape closed all pocket openings and zippers (optional).
11. Don the protective mask.
12. Pull the jumper hood over the head. Secure the neck of the jumper with the drawstring.
13. Take up the slack around the neck and facepiece of the mask with the drawstring provided at the top front of the hood. Then fold over any extra material at the top of the hood and secure with tape.
14. Tape the edges of the hood securely to the mask.

CARE OF IMPREGNATED CLOTHING. — You should not wear impregnated clothing for general-purpose coveralls or for any purpose other than CBR defense training or actual CBR defense operations. The effectiveness of the impregnant is reduced by contact with oil, grease, moisture, or dirt and by exposure to sunlight. After the clothing is worn in drills, it should be thoroughly dried in a warm current of air; moisture is the principal factor in the deterioration of the CC2 impregnant.

The clothing is to be stowed in a clean, dark, thoroughly dry location, and in the original package if possible. In cool-to-warm stowage and

in the absence of sunlight or daylight, the impregnation treatment should remain effective for 5 to 10 years or more.

NOTE: Impregnated clothing is being phased out and will be replaced with the chemical-protective overgarment.

Chemical-Protective Overgarment

The chemical-protective overgarment consists of two pieces—a smock and trousers (fig. 6-9). The smock has two layers of materials: inner (antigas) and outer (modacrylic/nylon). The smock is generously cut to allow complete freedom of movement. It has a large front flap pocket for gloves and so forth and a sleeve patch where you can place detector paper for easy visibility. You can make quick and easy adjustments with hook-and-pile fasteners at the wrist and waist. The trousers are made of the same two layers of material and have suspender-type fittings located at the waist and across the shoulders. Hook-and-pile fasteners are located at the base of each leg for adjustment.

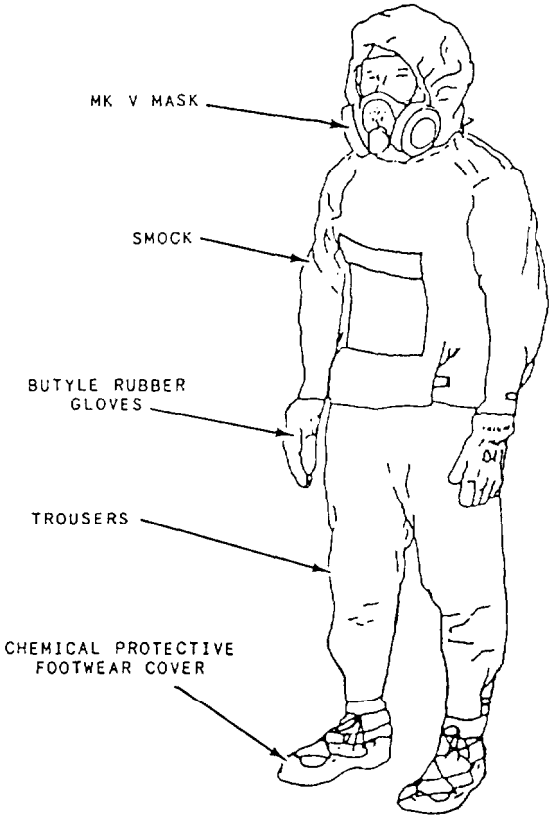


Figure 6-9.-Chemical-protective overgarment.

The chemical-protective overgarment is issued in a plastic envelope that is pressure packed, air evacuated, and heat sealed. It is then placed in a polyethylene bag and heat sealed. The overgarment has a shelf life of 5 years when unopened.

The protective overgarment protects against all CBR agents and is permeable to water vapor. Once removed from its protective envelope, it has a shelf life of 14 days in a nonchemical environment. If it is opened but uncontaminated, keep it for training purposes. Once exposed to chemical contamination, the overgarment provides 6 hours of continuous protection, after which it should be discarded.

The following donning procedures include the use of the chemical-protective glove set and footwear covers (overboots):

1. Don the trousers. Tighten the waist by using the hook-and-pile fasteners.
2. Bring the straps over the shoulders and cross them at the chest. Insert the straps into the belt loops and secure snugly.
3. Don the parka.
4. Secure the bottom of the parka with hook-and-pile straps.
5. Raise the trouser legs.
6. Don the chemical-protective footwear cover (see fig. 6-10).
   a. Attach tie laces (in the center) to the toe loop. Be sure the laces are even (see fig. 6-10, view 1).
   b. Put one lace through A and one through B from the inside to the outside and pull until snug. Make sure the toe loop is over the top of your shoe (see fig. 6-10, view 2).
   c. Put one lace through C and one through D (on the opposite side of the foot, crossing the instep) from inside to outside. Pull until snug (see fig. 6-10, view 3).
   d. Cross the laces over the instep.
   e. Thread the laces through A and B again, from inside to outside (see fig. 6-10, view 4).
   f. Cross the laces over the instep again and pull them until snug.
   g. Wrap the laces behind the ankle and back to the front. Pull until snug and tie securely (see fig. 6-10, view 5).
7. Pull the trouser legs down over the footwear covers and secure with the hook-and-pile fasteners.
8. Don the mask.

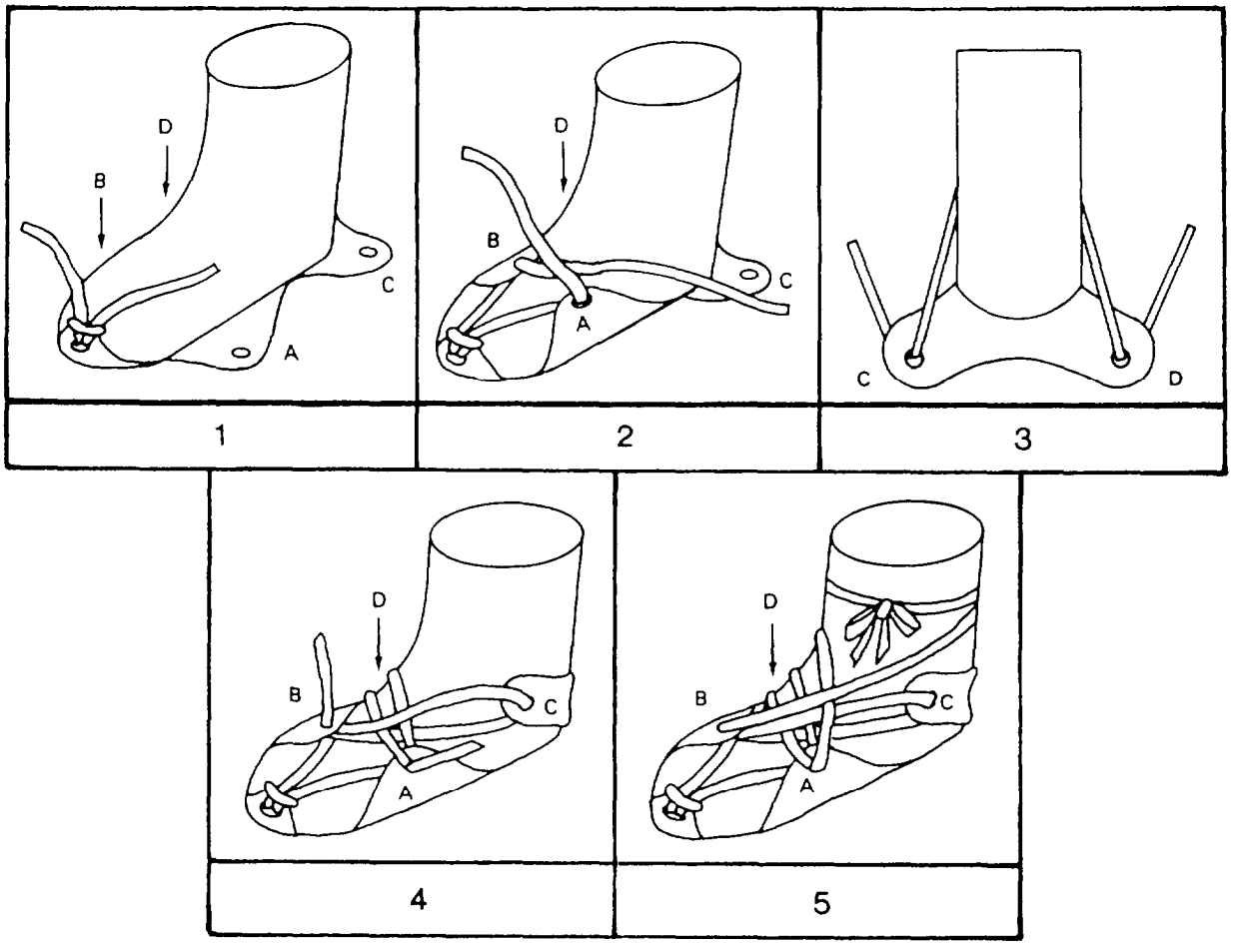


Figure 6-10.-Lacing the chemical-protective overboots.

9. Pull the hood over the mask and secure under the chin with the slide on the draw strings.

CAUTION

Make sure that the hood is pulled down securely around the mask and canisters so that no skin is exposed.

10. Pull the sleeves up to the elbows.
11. Don the white cotton undergloves and the black, butyl rubber chemical-protective gloves.
12. Pull the sleeves down over the rubber gloves and secure with the hook-and-pile fasteners.

WARNING

Be sure that you are able to move with relative ease without the suit binding or pulling apart the fasteners.

Chemical-Protective Footwear Covers

The chemical-protective footwear covers (overboots) are worn over the standard work shoe and provide protection to the feet against exposure to all known concentrations of nerve and blister agents. The overboots are made of loose-fitting, impermeable, butyl sheet rubber and have a pre-molded, nonslip, butyl rubber sole. The overboot is approximately 16 inches high with a grommet lace closure, including five eyelets to allow lacing around the foot. The overboots are

available in two sizes and can be worn on either foot. They are issued in a polyethylene bag with two pairs of laces and an instruction sheet.

The undamaged overboots provide protection to the feet against chemical agents. Upon contamination, the overboots provide 6 hours of protection from agent penetration.

Donning procedures are listed with the chemical-protective overgarment.

Chemical-Protective Glove Set

The chemical-protective glove set is worn to protect the hands against nerve and blister agents, liquids, and vapors. The set consists of an outer glove to provide chemical protection and an inner glove to assist in absorption of perspiration. The 5-finger outer glove is made of impermeable, unsupported, black butyl rubber and is manufactured for both the right- and left-hand. The thin, white cotton inner glove can be worn on either hand. The glove set is issued in a clear polyethylene bag with an instruction sheet.

The black outer glove protects against chemical agent vapors, aerosols, and small droplets. Upon contamination, the set provides at least 6 hours of protection from agent penetration. These gloves, in good condition, can be decontaminated and reissued,

Wet-Weather Clothing

Wet-weather clothing is often described as impermeable or rubberized clothing. Its value results from the fact that the previously described impregnated/protective clothing can be partially penetrated by all but the smallest droplets of liquid agents, especially in relatively high winds. Moreover, the impregnated/protective clothing is not equally efficient in neutralizing all liquid CW agents. Wet-weather clothing, on the other hand, is for a limited time resistant to all liquid CW agents, provided that the closures at the neck, wrists, and protective mask are well adjusted or taped.

Wet-weather clothing provides a measure of protection against CBR contaminants when worn over ordinary clothing; but as was previously stated, it provides the most complete protection when worn over impregnated or protective clothing. Gradual penetration of the synthetic rubber layer of the wet-weather clothing will eventually occur unless CW agent contaminants are promptly removed. The contaminants are removed by frequent and thorough flushing of the surface with a seawater washdown or an equivalent, such as jury-rigged topside seawater showers, or by swabbing with liquid hypochlorite.

In warm weather or during periods of increased physical activity, wet-weather clothing has a major disadvantage in that it can only be tolerated for relatively short periods of time. Tolerance is limited because no air can pass through the clothing to cool the wearer's body by the evaporation of perspiration.

Perspiration is normally accumulated inside an impermeable suit. Underclothing, gloves, socks, and shoes may become saturated. Sweating can be reduced and tolerance times lengthened by reducing the exercise rate, by using water-spray cooling, and by reducing exposure to direct sunlight.

Ordinary Work Clothing

Special protective clothing is not required for all personnel. Ordinarily, it is worn only by the personnel of monitoring and decontamination teams who must work in or near hazardous areas. All other personnel working near these areas should wear two layers of ordinary clothing, which provide partial protection against agents and radioactive particles.

M258A1 SKIN DECONTAMINATING KIT

The M258A1 kit will decontaminate skin and selected personal equipment that has been contaminated with chemical agents. The kit is housed in a plastic waterproof case with a metal strap hook for easy attachment to clothing or equipment such as the mask carrier. The kit consists of three Decon 1 towelette wipes and three Decon 2 towelette wipes that are sealed in tear-away, impermeable foil packets.

The Decon 1 packet has a tab for immediate identification at night. The Decon 1 packet contains a pad prewetted with hydroxyethyl phenol, sodium hydroxide, ammonia, and water. The Decon 2 packet consists of a pad impregnated with chloramine-B and sealed glass ampules filled with a solution of hydroxyethyl, zinc chloride, and deionized water. The glass ampules are enclosed in a mesh bag to prevent injury to fingers or hands when crushing the ampules. The M258A1 kit is used to remove and decontaminate blister and nerve agents from the exposed skin. It can be used to decontaminate the face (except eyes and mouth), mask interior, rubber gloves, or rubber

overboots. The kit contains supplies for three complete skin decontamination. (The older kit, M258, cannot be used on the face.)

The procedures for using the M258A1 kit vary slightly depending on whether or not the face is being decontaminated. We will look at general procedures first and then at how they are modified for use on the face.

General Skin Decontamination

The procedure for using the M258A1 kit to decontaminate skin other than facial skin is as follows:

1, Snap open the container. Pull out one Decon 1 wipe packet by its tab.
2. Fold the packet on the solid line marked BEND; then unfold.
3. Tear open quickly at the notch; remove the wipe and fully unfold.
4. Wipe the skin for 1 minute.
5. Deposit the wipe in a suitable place.
6. Pull out one Decon 2 wipe packet. Crush the enclosed glass ampules between the thumb and fingers.
7. Fold the packet on the solid line marked CRUSH AND BEND; then unfold.
8. Tear open quickly at the notch and remove the wipe.
9. Fully open the wipe. Let the encased crushed ampule fall to the ground or into a suitable container.
10. Wipe the contaminated skin for 2 to 3 minutes.
11. Deposit the wipe in a proper container.

Facial Skin Decontamination

A modified procedure is used to decontaminate the face. That is because of the protective mask, which should be donned immediately when a decontaminating agent is detected or suspected. The facial decontamination procedure is as follows:

STEPS 1-3. Same as for general use.

4. Hold your breath, close your eyes, and lift the mask from your chin. While continuing to hold your breath, wipe your face and the inside of your mask *quickly* with the Decon 1. Dispose of the wipe. Reseal, clear, and check the mask.

STEPS 5-9. Same as for general use.

10. Same as step 4 except use Decon 2 and wipe *only* the face and *not* the mask.
11. Deposit the wipe in a proper container.

The M258A1 kit is an improvement over the old M258 kit in that it provides for three complete skin decontamination and can be used on the face and interior of the mask. Also, an M58A1 training kit (NSN 6910-01-101-1768) and a training refill kit (NSN 6910-01-113-2434) are available.

ELECTRICAL SAFETY PETTY OFFICER DUTIES

As an electrical safety petty officer, you will be responsible for electrical safety within your division. The following information will assist you in the performance of this task.

ELECTRICAL SAFETY PROGRAM

The Navy's Electrical Safety Program has two purposes. The first purpose is to provide guidance in the identification of electrical hazards. The second is to prevent mishaps that could cause fatal injuries to personnel and extensive damage to shipboard equipment. Electrical mishaps could compromise the ship's mission capabilities.

To provide you with a better understanding of the program, we will discuss program responsibilities and elements.

Program Responsibilities

The Electrical Safety Program responsibilities, as outlined in OPNAVINST 5100.19B, are as follows:

- **Commanding Officer** —The commanding officer assigns the electrical safety officer.
- **Safety Officer** —The safety officer ensures the Electrical Safety Program is evaluated for compliance and effectiveness.
- **Electrical Safety Officer** —The Electrical Safety Officer ensures an up-to-date ship's electrical safety instruction exists. Copies of the ship's electrical safety instruction are distributed to all departments and divisions and are available in the electrical tool issue room. Upon request, the electrical safety officer provides qualified Electrician's Mates and training aids for divisional electrical safety training. The electrical safety

officer also coordinates with the electronics material officer to provide qualified personnel of other rates to conduct electrical safety training.

Ž **Supply Officer** —The supply officer ensures all electrical tools received aboard the command are turned over to the electrical tool issue room for a safety inspection before they are issued. The supply officer must ensure items received through open purchase or from SERVMART comply with that requirement.

Ž **Division Officers** —Division officers ensure assigned personnel are trained, that training records are maintained, and that electrical equipment tools are properly maintained. They ensure portable electrical equipment, such as vacuum cleaners, buffers, and coffeepots, are electrically checked at proper time intervals. They also ensure portable electrical tools drawn from the portable electrical tool issue room are returned at the end of each workday.

Ž **Medical Department** —The medical department ensures that electrical first aid training, especially cardiopulmonary resuscitation (CPR), is provided to divisions when requested.

Ž **Electrical Safety Petty Officer** —The electrical safety petty officer works for the electrical safety officer. Before a person can be assigned as an electrical safety petty officer, he or she must meet the following qualifications:

—Complete a basic electrical/electronics school or equivalent training

—Be fully qualified in personnel qualification standards (PQS) as ship's maintenance and material management (3-M) (NAVEDTRA 43241E) watch station (301) maintenance personnel

—Be fully qualified in PQS as a division safety petty officer/electrical safety petty officer (NAVEDTRA 43460-3A)

Type commanders (TYCOMs) and the ship's electrical safety instructions can provide additional information about the Electrical Safety Program and your responsibilities.

Electrical safety is the responsibility of all hands. All Navy members must request permission from their division officer to bring personal electrical/electronic equipment aboard. This equipment must be safety inspected.

Program Elements

The Electrical Safety Program consists of the following seven elements:

- Proper installation, maintenance, and repair of electrical equipment
- Routine and periodic testing to detect and correct unsafe equipment
- Setting of portable electrical standards
- Setting of electrical safety standards
- Training
- Proper use of equipment tag-out procedures
- Control and safety testing of personal electrical/electronic equipment

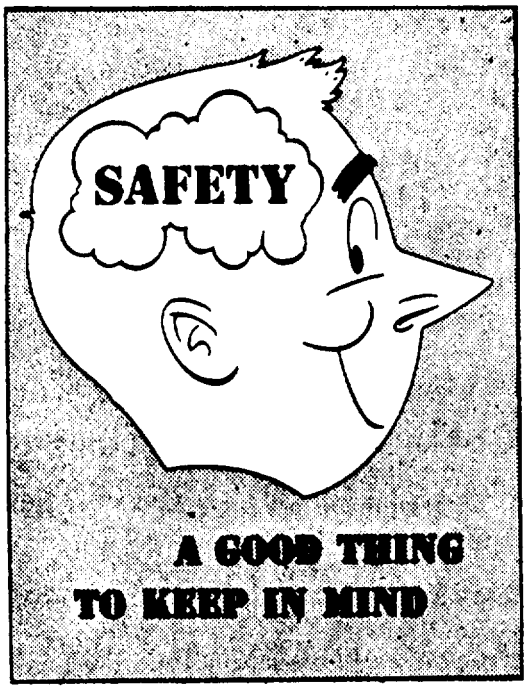
ELECTRICAL HAZARDS AND PRECAUTIONS

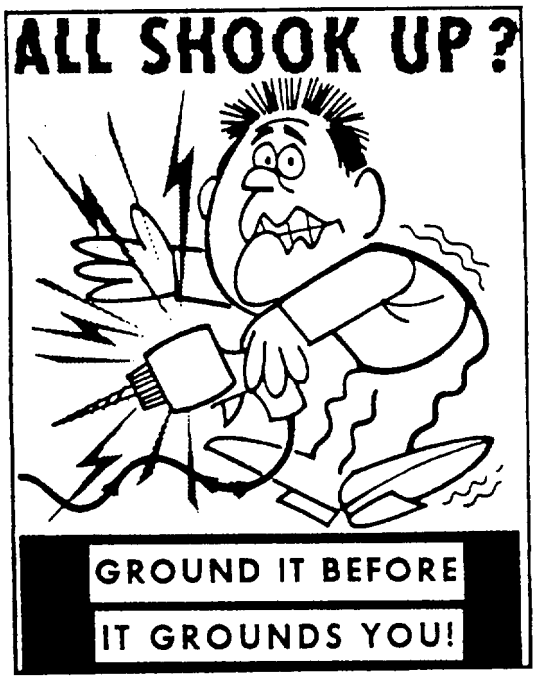
Recognizing a hazardous condition and taking immediate steps to correct it is important. Safety posters (fig. 6-1 1) help warn of dangers in working areas or remind personnel to be safety conscious. Warnings signs (red) and caution signs (yellow) should be located where hazardous conditions exist. Be aware of areas that are wet or oily or have stumbling hazards. Wear rubber gloves and protective clothing wherever working conditions warrant it. Make it a habit to look for and to correct defective tools and equipment, improper grounding, and rotating machinery hazards.

Handtools

Normally, you should have no problems when working with handtools. In all likelihood, however, you have seen some dangerous practices in the use of handtools that should have been avoided. One unsafe practice involves the use of tools with plastic or wooden handles that are cracked, chipped, splintered, broken, or otherwise unserviceable. This practice is sure to result in accidents and personal injuries, such as cuts, bruises, and foreign objects being thrown in the eyes. If unserviceable handtools are not repairable, they should be discarded and replaced.

When necessary (in an emergency only) to improvise an insulated handtool, use the following approved method to protect the user against the





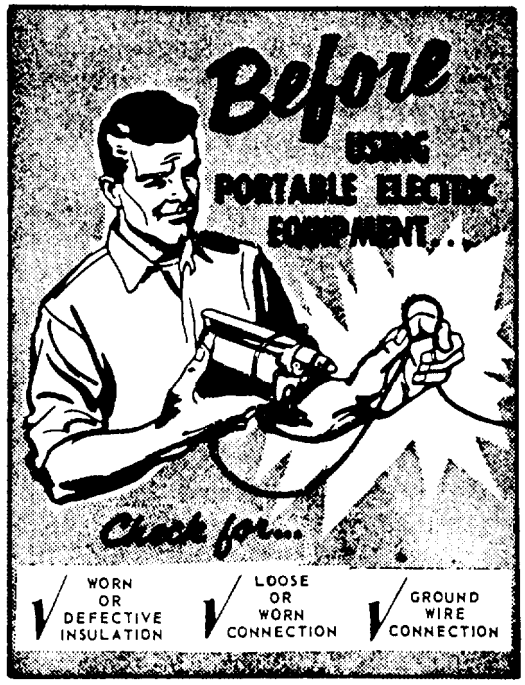


Figure 6-11.-Safety posters.

effects of electric shock: First, apply several layers of approved rubber insulating tape on the metallic handle. Next, apply a layer or two of friction tape over the insulating tape, Friction tape when used alone does not provide adequate protection from electrical shock. It should be used only for griping purposes and to protect the insulating tape. For other instructions on the safe use of handtools, consult *Tools and Their Uses,* NAVPERS 10085-B.

Portable Electric Power Tools

Portable electric power tools should be clean, properly oiled, and in good repair. Before they are used, inspect them to see that they are properly grounded. The newer, double-insulated, plastic framed tools do NOT have ground wires and have only a 2-prong plug.

If a tool is equipped with a 3-prong plug, it should be plugged into a 3-hole electrical receptacle. Never remove the third prong. Make absolutely sure the tool is equipped with a properly grounded conductor. If the tool has a metal case, be sure to ground it according to chapter 300 of *NSTM.* Observe safety precautions and wear rubber gloves when plugging tools into any 110-volt circuits or operating any portable electric equipment under particularly hazardous conditions. Also observe safety precautions and wear rubber gloves in environments such as wet decks or bilge areas or when working over the side in rafts or small boats.

Before issue, any portable electrical equipment, with its associated extension cords connected, should be tested for resistance from the equipment housing to the ship's structure (the resistance must be less than 1 ohm). Equipment should be tested with an approved tool tester or plugged into a dummy (or deenergized) receptacle and tested with an ohmmeter. The cable should be moved or worked with a bending or twisting motion. A change in resistance will indicate broken strands in the grounding conductor. If this is found, the cable must be replaced. At the discretion of the commanding officer, a list may be established of portable equipment requiring testing more or less often than once a month. When the planned maintenance system is installed, tests should be conducted based on the maintenance requirement cards.

When using portable electric power took, you should take the following precautions:

- Inspect the tool cord and plug before using the tool. Do NOT use the tool if its cord is frayed or its plug is damaged or broken. Do NOT use spliced cables except in an emergency that warrants the risk involved.
- Before using the tool, lay all portable cables so that you and others cannot trip over them. The length of extension cords used with portable tools should not exceed 25 feet. Extension cords up to 100 feet are authorized on flight and hangar decks. Extension cords up to 100 feet are also found in damage control lockers, but are labeled for Emergency Use Only.
- Do not use jury-rigged extension cords that have metal "handy boxes" for receptacle ends of the cord. All extension cords must have non-conductive plugs and receptacle housings.
- Connect the tool cord into the extension cord (when required) before inserting the extension cord into a live receptacle.
- After using the tool, first unplug the extension cord (if any) from the live receptacle before unplugging the tool cord from the extension cord. Do not unplug the cords by yanking on them.
- Stow the tool in its assigned place after you are through using it.

SUMMARY

The Navy's safety programs strive to maintain safe and healthy working environments. The keys to successful mishap prevention are a safety-minded supervisor and a comprehensive training program. Safety inspections are an important tool for maintaining mishap-free working conditions.

Some of the Navy's major safety programs are the Hearing and Sight Conservation Programs, Respiratory Protection Program, Heat Stress Program, Electrical Safety Program, Foot and Head Protection Program, and Toxic Material and Electromagnetic Radiation Hazard Programs. As a supervisor, you should be familiar with these and other safety-related programs.

Personnel safety includes an awareness of the possibility of chemical warfare and its associated countermeasures.

You should ensure that your personal are adequately trained in the use of whatever CBR protective equipment they are issued. This includes protective masks, overgarments, footwear, and gloves as well as the personal skin decontaminating kit.

Electrical safety petty officers report to the electrical safety officer when performing their duties. Before a person is assigned as an electrical safety petty officer, he or she must complete certain qualifications. After being assigned, the division electrical safety petty officer is responsible for the electrical safety within his or her division.

REMEMBER, PERSONAL SAFETY IS SERIOUS BUSINESS.

REFERENCES

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Navy Occupational Safety and Health (NAVOSH) Program Manual, OPNAVINST 5100.23B, Chief of Naval Operations, Washington, D.C., 1983,

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