CHAPTER 7

CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL DEFENSE/DAMAGE CONTROL

LEARNING OBJECTIVES

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

1. Describe the use of chemical, biological, and radiological (CBR) protective clothing and equipment for each level of Mission Oriented Protective Posture (MOPP).
2. List the procedures for instructing personnel in the correct use of CBR protective clothing and equipment for each level of MOPP.
3. Explain the types of risk assessments used to evaluate the appropriate levels of MOPP.
4. Describe the four levels of MOPP and the associated countermeasures.
5. Describe the duties of the duty division damage control petty officer (DCPO).

In this chapter we will discuss the use of chemical, biological, and radiological (CBR) protective clothing and equipment for each level of Mission Oriented Protective Posture (MOPP) and the types of risk assessments used to evaluate the appropriate levels of MOPP. In addition we will discuss the duties of the division damage control petty officer (DCPO).

MISSION ORIENTED PROTECTIVE POSTURE

MOPP procedures are used to establish levels of readiness for a chemical agent attack. The procedures are flexible. They allow the commanding officer (CO) to adapt the requirements for protective clothing and equipment to the degree of the threat and working conditions at any given time. As an example, personnel doing heavy work in hot weather may suffer heat exhaustion in heavy protective clothing and gas masks. Therefore, unless an attack is actually under way, the CO may relax the protective clothing requirements to prevent certain injury or sickness from heat. Other examples include personnel who cannot do their work wearing protective gear, those who need to eat or attend to body functions, and those who must meet other requirements not possible in protective clothing. The command decision to implement each level of MOPP must be the result of a risk assessment.

RISK ASSESSMENT

Risk is defined as the assessed difference between the threat level and the activation of appropriate levels of shipboard countermeasures. The risk of casualties and contamination must be evaluated and weighed against the ability of personnel to perform their duties while being hindered by individual protective equipment and the effects of heat stress.

MOPP LEVELS AND ASSOCIATED COUNTERMEASURES

The risk of a CBR threat can be categorized into four levels of probability:

1. **SUSPECTED.** An adversary who has CBR-capable delivery systems within the operations area (OPAREA) presents a suspected threat. Implementation of MOPP- 1 countermeasures is indicated.

2. **POSSIBLE.** The expressed affirmation or assessed political will of an adversary to use CBR warfare increases the threat potential to a possible involvement in a CBR environment. Implementation of MOBB-2 countermeasures is indicated.

3. **PROBABLE.** Statements of intent to employ CBR warfare, directed at U.S. forces or allies, changes in political or military posture of an adversary possessing CBR capabilities, or use of CBR warfare within the OPAREA present a chance of probable involvement in a CBR environment. This threat level requires an estimate of the earliest time the CBR environment will be encountered. This estimate must be based on the strike ranges of delivery systems and the time it takes the strike to arrive at the nearest range limits. Implementation of MOPP-3 countermeasures is indicated.

4. **IMMINENT.** Confirmation of increased activity involving delivery systems, recognized platform attack patterns, electronic or visual indication of employment of delivery systems, or the immediate proximity of known CBR hazard areas present an imminent danger of contamination and/or casualties. Implementation of MOPP-4 countermeasures is essential.

RISK MANAGEMENT AND IMPLEMENTATION OF MOPP

The decision to initiate or upgrade the ship's MOPP begins with determining the threat level, ship's mission, and the corresponding MOPP-level countermeasures that provide the minimum acceptable degree of risk. An increase in the threat level does not necessarily justify immediate execution of all countermeasures included in the corresponding MOPP level.

The next step is to determine the time at which the countermeasures comprising that MOPP level should begin. The time required to take countermeasures must be compared to the time remaining until either the threat level increases or the risk becomes unacceptable. Waiting too long to start countermeasures increases the risk to the ship's mission because of the risk to personnel survivability. Alternately, starting countermeasures too early will degrade the crew's performance for sustained operations in the CBR environment and will ultimately limit the ship's ability to complete the mission. All countermeasures must be in effect immediately before the ship becomes involved in a CBR environment.

Immediately following the attack, an assessment of the ship's involvement in the CBR hazard is required to determine which countermeasures should remain in effect to enhance survivability and sustain operation. Frequent reassessments should be made to identify the earliest practical time(s) to secure the countermeasures and upgrade crew performance for optimum mission capability.

MOPP Level-1 (Suspected Threat) Protection

During MOPP level-1 the following actions must be taken:

1. Individual Protection—Issue the following individual protective equipment and medical supply items to shipboard personnel and maintain them at respective battle stations:

   - Protective masks (fitted for immediate use)
   - Chemical protection
     - —Protective masks (with new, unopened canister)
     - —Chemical protective overgarments (2 piece)
     - —Chemical protective overboots
     - —Chemical protective glove set
     - —Personnel decontamination kit
   - Medical supply items
     - —Atropine auto-injectors (3)
     - —2-PAM-\Cl auto-injectors (2)
     - —Pyridostigmine pretreatment tablets (21)
   - Biological protection—Consists of the same protective equipment required for chemical protection, minus the medical items. Chemical threat is assumed to be "worst case," unless reliable intelligence indicates otherwise.
   - Radiological protection—Requires the mask only (with new, unopened canisters).

2. Collective Activities

- Review survival standards and basic operating standards for CBR environments as described by the ships's CBR defense bill.
- Verify that personnel are assigned to CBR defense teams and review required procedures.
- Inventory stowed detection and monitoring equipment, as applicable, for maximum authorized levels, current shelf life, presence of all components, and function within normal limits.
- Inventory stowed supplies for personnel decontamination stations, shipboard decontamination teams, and biological sampling.
- Inventory stowed water canteens to ensure adequacy of allowance serviceability.
- Replace expired, missing or consumed equipment, components, and supplies to maximum authorization levels.
- Set readiness Condition III (wartime steaming).
- Set material condition YOKE.

3. Shipboard Systems

- Operationally test collective protection systems, where available.
- Test installed detection and monitoring systems.

MOPP Level-2
(Possible Threat) Protection

During MOPP level-2 the following actions must be taken:

1. Individual Protection—For all CBR threats, maintain protective mask in carrier and on person.
2. Collective Activities
   - Ž Designate primary and secondary personnel decontamination stations with respective weather-deck and internal access/exit routes.
   - Pre-position decontamination supplies in decon stations and at respective repair lockers as required by the ship's CBR defense bill.
   - Pre-position stowed detection, monitoring equipment, and supplies at locations designated by the ship's CBR defense bill.
   - Pre-position empty canteens at staging areas as designated by the ship's CBR defense bill.
   - Set material condition ZEBRA (modified).
3. Shipboard Systems
   - Ž Operationally test countermeasures washdown system.
   - Ž Test shipboard alarms.

MOPP Level-3
(Probable Threat) Protection

During MOPP level-3 the following actions must be taken:

1. Individual Protection
   - For all CBR threats, install new filter canisters on protective masks; maintain in carrier and on person.
   - Provide wet-weather gear for donning over other protective clothing and equipment for all weather-deck activities.
   - Chemical:
     - —Don chemical protective overgarments (CPO) (jumper and trousers) with hood down.
     - —Don chemical protective overboots.
     - —Stow personnel decontamination kit in mask carrier.
     - —Stow chemical protective glove set and medical supply items in the jumper cargo pocket.
     - —Initiate pyridostigmine pretreatment regimen.

- Biological:

  —Don chemical protective overgarments (jumper and trousers) with hood down.

  —Don chemical protective overboots.

  —Stow personnel decontamination kit in mask carrier.

- Radiological:

  —Don battle dress.

  —Issue individual dosimeters and dose indicators (DT-60, etc.).

2. Collective Activities

   - Direct the ship to general quarters (readiness Condition I maybe relaxed and readiness Condition II set at CO's discretion).
   - Fill pre-positioned canteens with potable water.
   - Assign personnel to decontamination stat ions and assure operability y,
   - Post CBR detection and monitoring teams equipped with required instruments and supplies designated by the ship's CBR defense bill for readiness Condition I or II.
   - Strike below, as appropriate, vulnerable flammable and absorbent weather-deck materials.
   - Set material condition ZEBRA.
   - Limit weather-deck activities to essential functions.
   - Post and monitor installed CBR detection equipment and materials as designated by the ship's CBR defense bill.

3. Shipboard systems

   - Activate countermeasures washdown system intermittently.
   - Ensure collective protection systems are fully operational and access/exit procedures are in effect.

MOPP Level-4
(Imminent Threat) Protection

During MOPP level-4 the following actions must be taken:

1. Individual Protection

   Ž For all CBR threats, don protective mask.

   Ž Chemical/Biological:

   —Secure jumper hood over head and around mask.

   —Don chemical protective glove set.

   Ž Radiological: Don battle dress.

2. Collective Activities.

   - Direct the ship to general quarters (if not previously in effect).
   - Implement mandatory water-drinking regimen.
   - Initiate continuous monitoring and operation of detection equipment.
   - Set Circle WILLIAM on ventilation systems (except Collective Protection System [CPS]).
   - Radiological: Secure sea chests for underwater nuclear detonations, as directed by the Ship's CBR defense bill.
   - Prepare NBC Warning and Reporting system (NBCWRS) messages for transmission.

3. Shipboard systems—Activate countermeasures washdown system to operate continuously.

DUTIES OF THE DIVISION DAMAGE CONTROL PETTY OFFICER

Damage control petty officers (DCPOs) normally serve for a period of 6 months. They are required to check with the fire marshal and

damage control assistant (DCA) upon being assigned to or released from these duties. The executive officer is the final approving authority for nomination, replacement, and rotation of all DCPOs. The duty DCPO performs the normal DCPO's duties in his or her absence. Therefore, the duty DCPO must be fully qualified as a DCPO.

The normal DCPOs and duty DCPOs are responsible for the following duties:

- Acquainting themselves with all phases of the ship's damage control, fire-fighting, and defense procedures
- Assisting with the instruction of division personnel in damage control, fire-fighting, egress, and CBR defense procedures
- Ensuring the preparation and maintenance of a damage control checkoff list for all spaces under their cognizance
- Supervising the setting of specified damage control material conditions within division spaces and making required reports
- Weighing portable CO_2 bottles, inspecting and testing damage control and fire-fighting equipment, and preparing required reports for approval of the division officer in accordance with current ship's instructions
- Ensuring all battle lanterns, dog wrenches, spanners, and other damage control equipment are in place and in a usable condition in all division spaces
- Ensuring all compartments, piping, cables, and damage control and fire-fighting equipment are properly stenciled or identified by color codes
- Ensuring safety precautions and operating instructions are posted in required division spaces
- Assisting the division officer in the inspection of division spaces for cleanliness and preservation and assisting in the preparation of required reports
- Conducting daily inspections of division spaces for the elimination of fire hazards
- Performing such other duties with reference to damage control and maintenance of division spaces as maybe directed by the division leading petty officer, division officer, fire marshal, DCA, and executive officer
- Following the ten commandments of damage control (See fig. 7-1.)

PHASES OF THE SHIP'S DAMAGE CONTROL FIRE FIGHTING AND DEFENSE

The five phases of the ship's damage control fire fighting and defense are the fire-main system, communications equipment, electrical systems, watertight closures, and ventilation systems.

Fire-Main System

The fire-main system receives water pumped from the sea. It distributes this water to fireplugs,

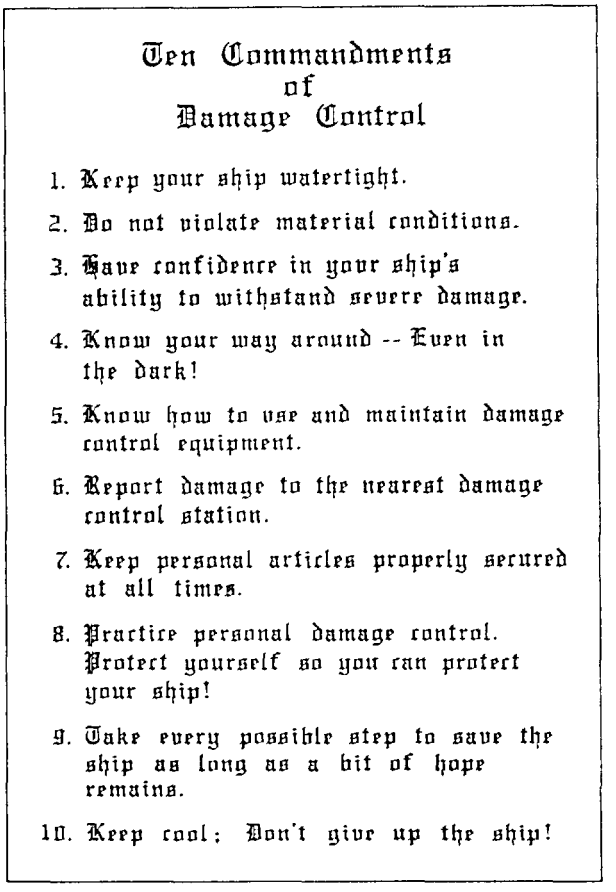

Figure 7-1.-The ten commandments of damage control.

sprinkling systems, flushing systems, machinery-cooling water systems, washdown systems, and other systems as required. The fire-main system is used primarily to supply the fireplug and the sprinkling system; the other uses of the system are secondary.

Naval ships have three basic types of fire-main systems: the single-main system, the horizontal-loop system, and the vertical-loop system. The type of fire-main system in any particular ship depends upon the characteristics and functions of the ship. Small ships generally have straight-line, single-main systems. Large ships usually have one of the loop systems or a composite system, which is some combination or variation of the following three basic types:

Ž The single-main fire-main system consists of one main that extends fore and aft. The main is generally installed near the centerline of the ship, extending forward and aft as far as necessary.

Ž The horizontal-loop fire-main system consists of two single fore-and-aft, cross-connected mains. The two mains are installed in the same horizontal plane but are separated athwartships as far as practical.

Ž The vertical-loop fire-main system consists of two single fore-and-aft, cross-connected mains. The two mains are separated both horizontally and vertically. As a rule, the lower main is located below the lowest complete watertight deck, and the upper main is located below the highest complete watertight deck.

Ž A composite fire-main system consists of two mains installed on the damage control deck and separated athwartships. A bypass main is installed at the lower level near the centerline. Cross connections are installed alternately between one service main and the bypass main.

Communications Equipment

Damage control communications are vital to a ship's survival during emergency conditions. If adequate damage control (DC) communications are not maintained, the entire DC organization could break down rapidly and fail to perform its primary functions.

The following communication methods are used for DC communications:

- Sound-powered battle telephone circuits
- Interstation two-way intercoms
- Ship's service telephones
- Ship's loud speaker or general announcing system
- Voice tubes
- Messengers

Detailed information on each method can be found in *Damage Controlman 3 & 2,* NAVEDTRA 10572.

Electrical Systems

DCPOs perform periodic maintenance (PM) on electrical systems within their division spaces. They must know the location of fuse boxes and circuit breakers that control the circuits. Proper tag out procedures are also required to prevent harm to other crew members while the PM is performed.

You should be able to identify the following electrical systems in your areas:

Ž Lighting

Ž Lighting panels

Ž Electrical power outlets

Ž Motors and fans

Ž Casualty power terminals and panels

Ž Battle lanterns

Watertight Closures

The watertight integrity of a naval ship is established when the ship is built. This original watertight integrity may be reduced or destroyed through enemy action, storm damage, collision, standing, or negligence. As a duty DCPO, you will be responsible for ensuring the proper material condition is set. Later in this chapter we will discuss in depth the material conditions and required reports.

Ventilation Systems

The purpose of the ventilation system is to maintain a standard of air quality in temperature and humidity for personnel habitation and for the removal of equipment-generated heat.

Areas requiring critical temperature control are supported by heating and/or air conditioning essential to the equipments' operation. Normal operations of the ventilation system are necessary to the removal of internally-generated contaminants, fumes, and humidity.

Ventilation may be accomplished by either natural draft or by electrically driven blowers. Ventilation systems are designated as supply, exhaust, or recirculating systems.

Individual ventilation systems between the main transverse bulkheads are large piping systems that can hinder watertight or fumetight integrity. This potential problem is overcome by ventilation closures installed in fire and flooding boundary bulkheads where penetrations are necessary. Ventilation systems are not installed in spaces that are entered infrequently. That minimizes the number of holes in bulkheads and decks and improves resistance to damage. Some examples are storerooms and voids. Wherever ventilation systems cross fire zone boundaries, fire dampers are installed at the bulkhead penetration.

Portable ventilation systems consisting of electric driven (RED DEVIL) or air-turbine-driven blowers with attached flexible trunks are available for emergency application when the installed ventilation is inoperable. Portable ventilation systems are a primary means of smoke and gas removal during post fire conditions.

DAMAGE CONTROL, FIRE-FIGHTING, EGRESS, AND CBR DEFENSE PROCEDURES

During a crisis situation, such as battle damage or shipboard fires, your division's survival depends on its members' knowledge and experience in damage control, fire-fighting, egress, and CBR defense procedures. DCPOs and duty DCPOs are responsible for ensuring division personnel understand these procedures.

Damage Control

The ship's damage control organization is the means by which you can reach the damage control objectives. In fact, organization is the key to all successful damage control. The damage control organization establishes standard procedures for handling various types of damage. It also sets up training in those procedures so that every person will know immediately what to do in each emergency situation.

Both preventive and corrective actions are vital. The prevention of damage requires that all departments carry out the following actions:

1. Maintain the established material conditions of readiness
2. Train all departmental personnel in all aspects of shipboard damage control
3. Maintain the ship in the best condition possible to resist damage

To achieve these goals, the ship's damage control organization must be coordinated with other elements of the ship's organization. Therefore, each department must assign specific damage control duties to individuals in each division. That includes the designations of a divisional DCPO and duty DCPOs. The corrective aspect of damage control requires the damage control battle organization to promptly restore the offensive and defensive capabilities of the ship.

The damage control organization consists of two elements: the damage control administrative organization and the damage control battle organization.

ADMINISTRATIVE ORGANIZATION. — The damage control administrative organization is part of the engineering department organization. However, each department has major administrative and preventive maintenance responsibilities, These responsibilities include the planned maintenance covering damage control equipment, systems, and fixtures within the departmental spaces. Each department head is to ensure the damage control planned maintenance system (PMS) assignments are completed and that discrepancies are documented and corrected.

BATTLE ORGANIZATION. —The damage control battle organization includes damage control central (DCC), various repair parties, and battle dressing stations. The organization varies somewhat from one ship to another. The difference will depend upon the size, type, and

mission of the ship. The battle organization is based on the following principles:

1. All personnel within the organization must be highly trained in all phases of damage control. They should also be trained in the technical aspects of their ratings to assist in the control of damage.

2. The organization must be decentralized into self-sufficient units. These units must have communication with each other and be able to take corrective action to control the various types of damage.

3. One central station (DCC) receives reports from all damage control units. This station evaluates and initiates those orders necessary for corrective action from a shipwide point of view. This station also reports to and receives orders from command control. These reports concern matters that affect the ship's buoyancy, list trim, stability, watertight integrity, and CBR defense measures.

4. Damage control units assigned work that is peculiar to a single department are under the direct supervision of one of that department's officers.

5. Provisions are made for relief of personnel engaged in difficult tasks, for battle messing, and for the transition from one condition of readiness to another. Procedures are developed to ensure all relief crews are informed of the overall situation. These procedures ensure continual and proper action to combat casualties.

6. Positive, accurate, and rapid communications are provided for between all damage control units. An overall coordination of effort and direction can then be readily accomplished.

7. A repair party, remotely located from DCC, assumes the functions of DCC in the event that DCC becomes a battle casualty.

Damage Controlman 3 & 2, NAVEDTRA 10572, provides in-depth information about the damage control organization, function, and responsibilities.

Fire fighting

Some fires aboard ship may start from an enemy hit, a cigarette or match carelessly thrown away, or the spontaneous ignition of various combustible substances. Others may start from the use of spark- or flame-producing tools and equipment in an atmosphere containing explosive vapors, the improper stowage of flammable materials, or static electricity. Fires aboard ship can start from many various causes.

The prevention as well as the fighting of fires has proved essential to the survival of a ship in peacetime and combat. Efforts must be continually made to reduce the damage resulting from fire through elimination of hazards, properly maintained and operational fire-fighting equipment, and effectively trained emergent y response parties. As the DCPO or duty DCPO, you should have an understanding of fire party organization and responsibilities and the types of fire-fighting agents and their use. This knowledge will enable you to train your division personnel in effective fire-fighting techniques.

FIRE PARTY. —The fire party is a component of the ship's DC organization. The minimum fire party should consist of sufficient personnel to perform the functions shown in figure 7-2. A person for each function is not necessary. A person may perform one or more functions simultaneously or sequentially. Each ship will determine the number of personnel required for a particular condition. Figure 7-2 shows the criteria ships use in determining their degree of flexibility in functional fire party assignments. All ships will have a contingency plan within their general emergency bill to augment the assigned fire party (for example, other repair lockers, personnel on board not assigned to the fire party or other ships' recovery, and assistance details). Fire parties are divided into two types, in-port and at-sea fire parties:

Ž IN-PORT FIRE PARTY. Each duty section must have an effective fire-fighting force. Care must be taken to ensure assigned personnel have the proper training and experience required based on the ship's general emergency bill. Personnel should not be assigned to additional in-port duties that might require them to leave the ship.

While in port, the fire party may require additional personnel and material support. These additional personnel should assemble at a designated location and assist in setting fire boundaries. They should be available to back up

Number of Personnel	Function
1	Repair Party Leader[1]
1	Fire Marshal[2]
1	Scene Leader
1	Team Leader "Attack Team"[3]
2	Nozzleman "Attack Team"
4	Hoseman "Attack Team"[4]
2	Plugman
2	Investigator
4	Boundaryman
2	Messenger/Phone Talker
1	Electrician
1	NFTI Operator[5]*
1	Access*
1	Reflashwatch*
1	Overhaul*
2	Smoke Control*
1	Post Fire Gas Free Test Assistant*
2	Dewater*
As Assigned	First Aid[6]*
4	Rapid Response[7]*

[1]Repair locker leader function is required only during Condition I.

[2]Fire marshal function is required inport and at-sea during non-Condition I.

[3]If conditions warrant, as determined by the scene leader, number 1 nozzleman may assume team leader responsibilities. The assigned team leader may then carry out other functions as directed. At a minimum the following situations require a person other than the nozzleman to perform as a team leader: when hose team(s) requires the use of NFTI to advance and/or when hoses(2) equipped with vari-nozzles are employed within the same compartment.

[4]Number of hosemen required is based on minimum manning for two 1 1/2 inch hoses. More hosemen may be required based on compartment layout, length of hose run, and size of hose employed.

[5]NFTI operator function may be combined with other functions. At a minimum personnel assigned the function of scene leader, team leader, nozzleman, investigators, electrician and overhaulman shall be qualified in its use.

[6]All personnel assigned shall be trained in performing basic first aid and burn treatment, and at least one person should be trained in CPR.

[7]The rapid response team is required inport and at-sea during non-Condition 1. The team shall be lead by the fire marshal. Several of the assigned boundarymen and the electrician may be used to comprise the remainder of this team.

*Denotes functions which may be performed by personnel assigned other functions.

Figure 7-2.-Minimum fire party functions.

FIRE DUTIES	COLLISION/FLOODING DUTIES
(1) DCC Supervisor/Locker Leader	DCC Supervisor/Locker Leader
(2) On-Scene Leader	On-Scene Leader
(3) #1 Nozzleman	Investigator
(4) #2 Nozzleman	Assistant Investigator
(5) #1 Hoseman	Shoring Detail
(6) #2 Hoseman	Pump Detail
(7) #1 Plugman	Shoring Detail
(8) #2 Plugman	Shoring Detail
(9) Electrician	Electrician
(10) Accessman/Compartment Tester	Pump Detail
(11) Stretcher Bearer	Stretcher Bearer
(12) Boundary Setter	Boundary Setter
(13) Boundary Setter	Boundary Setter
(14) CO_2 Man	Pump Detail
(15) Foam Man	Pump Detail
(16) Sprinkleman	Pump Detail
(17) DCC/Repair Locker Phone Talker	DCC/Repair Locker Phone Talker
(18) On-Scene Phone Talker	On-Scene Phone Talker

Figure 7-3.-Minimum acceptable duty in-port fire party assignments.

the primary fire team if needed. Figure 7-3 lists the minimum acceptable duty in-port fire party assignments.

Ž AT-SEA FIRE PARTY. Ships are required to organize an at-sea fire-fighting party (fig. 7-4). It may serve either as a standing organization or as a special detail for evolutions such as weapons handling, underway replenishment, helicopter operations, and towing operations. The at-sea fire party must be prepared to do the following:

1. Respond immediately to fire alarms when repair parties are not available
2. Extinguish fires effectively without disrupting other ship operations
3. Control fires until ongoing critical evolutions can be terminated and general quarters stations are ready

NUMBER OF MEN	FUNCTION/PROVIDE
1	Scene Leader
2	Investigator—OBA
2	OBA Tenders—Kit
2	Nozzleman—OBA
2	Hoseman—Foam Cans
2	Plugman—$C0_2$ Bottles
1	Talker—Sound Powered (2JZ) Phones
1	Messenger—Message Forms
1	Electrician—Kit, OBA
1	Corpsman—Kit
X	Aircraft Fire Fighters, as appropriate

Figure 7-4.-At-sea fire party organization.

FIRE-FIGHTING AGENTS. —Many materials may be used as fire-fighting agents. The following are the fire-fighting agents used most often aboard naval ships:

Ž **Water.** Water is a cooling agent, and aboard ship the sea provides an inexhaustible supply. If the surface temperature of a fire can be lowered below the fuels' ignition temperature, the fire will be extinguished. Water is most efficient when it absorbs enough heat to raise its temperature to 212°F (l00°C). At this temperature, the water will absorb still more heat until it changes to steam. The steam carries away the heat, which cools the surface temperature.

A secondary method of water extinguishment is caused by steam smothering. When water changes into steam by absorbing heat, it expands about 1,700 times in volume. The large quantity of steam displaces the air from the fuel, which smothers the fire. Steam-smothering systems are installed in boiler casings and catapult troughs.

Ž **Aqueous Film-Forming Foam.** Aqueous film-forming foam (AFFF) is composed of synthetically produced materials similar to liquid detergents. These film-forming agents are capable of forming water solution films on the surface of flammable liquids. The Navy mixes AFFF by volume in the following proportion: 6 parts of AFFF concentrate to 94 parts water.

AFFF concentrate is a clear to slightly amber-colored liquid concentrate. The AFFF solution of water and concentrate possesses a low viscosity and spreads quickly over a surface. AFFF concentrate is nontoxic and biodegradable in diluted form. AFFF concentrate may be stored for long periods without losing its effectiveness. The concentrate will freeze when exposed to temperatures below 32°F (0°C) but can be reused when thawed.

AFFF, when mixed with water, provides three fire-extinguishing advantages. First, it forms an aqueous film on the surface of the fuel, which prevents the escape of the hydrocarbon fuel vapors. Second, the layer of foam effectively excludes oxygen from the fuel surface. Third, the water content of the foam provides a cooling effect.

Foam is used mainly to extinguish burning flammable or combustible liquid spill fires (class B). AFFF has excellent penetrating characteristics and is superior to water in extinguishing class A fires.

Ž Carbon Dioxide (CO_2). CO_2 extinguishes fires by smothering. Co_2 is about 1.5 times heavier than air. That makes CO_2 a suitable extinguishing agent because it tends to settle and blanket the fire.

CO_2 is a dry, noncorrosive gas that is inert when in contact with most substances and will not leave a residue that damages machinery or electrical equipment. In both the gaseous state and the finely divided solid (snow) state, it is a non-conductor of electricity y regardless of voltage. CO_2 can be safely used in fighting electrical fires.

CO_2 extinguishes the fire by diluting and displacing its oxygen supply. If gaseous CO_2 is directed into a fire so that sufficient oxygen-supporting combustion is no longer available, the flames will die out. Depending on what is fueling the fire, that action will take place when the 21-percent oxygen content, normally present in air, is diluted with CO_2 below 15 percent oxygen. Some ordinary combustible class A fires require that the oxygen content be reduced to less than 6 percent to extinguish glowing combustion (smoldering fire). CO_2 has limited cooling capabilities, may not cool the fuel below its ignition temperature, and is more likely than other extinguishing agents to allow reflash. Therefore, the fire fighter must remember to stand by with additional backup extinguishers. The temperature of the burning substance and its surroundings must be below its ignition temperature if the fire is to remain extinguished.

CO_2 is not an effective extinguishing agent for fires in materials that produce their own oxygen supply (as an example, aircraft parachute flares). Fires involving reactive metals, such as magnesium, sodium, potassium, or titanium, cannot be extinguished with CO_2. Because of the relatively high temperatures involved, these metal fuels decompose CO_2 and continue to burn.

WARNING

CO_2 can produce unconsciousness and death when present in fire-extinguishing concentrations. The reaction in such cases is more closely related to suffocation. A concentration of 9 percent will cause most people to lose consciousness within a few minutes. Caution must be exercised when discharging CO_2 in confined spaces.

A typical discharge of liquid CO_2 has a white, cloudy appearance caused by finely divided dry ice particles carried along with the flash vapor. Some water will condense from the atmosphere creating additional fog, which will persist for a long time.

Ž **Halon.** Halon is a halogenated hydrocarbon in which one or more of the hydrogen atoms have been replaced by atoms from the halogen series (fluorine, chlorine, bromine, or iodine). This substitution provides nonflammability and flame extinguishing properties. A halon numbering system has been developed to describe the various halogenated hydrocarbons. The first digit in the number represents the number of carbon atoms in the compound molecule; the second digit, the number of fluorine atoms; the third digit, the number of chlorine atoms; the fourth digit, the number of bromine atoms; and the fifth digit, the number of iodine atoms, if any. In this system, terminal zero digits are not expressed.

The two types of halon used aboard Navy ships are Halon 1301 (the most commonly used) and Halon 1211, introduced for twin-agent (AFFF/Halon 1211) applications on flight and hangar deck mobile fire-fighting apparatus. Portable Halon 1211 extinguishers are also planned for backfit into vital electronics spaces of all surface combatant ships.

Halon 1301 consists of one atom of carbon, three atoms of fluorine, no chlorine atoms, one bromine atom, and no iodine atoms. For shipboard installation, Halon 1301 is superpressurized with nitrogen and stored in compressed gas cylinders as a liquid. When released, it vaporizes into a colorless, odorless gas with a density of approximately five times that of air.

Halon 1211 consists of one atom of carbon, one atom of chlorine, two atoms of fluorine, and one atom of bromine. Halon 1211 is also colorless, but it has a sweet smell. Halon 1211 is stored and shipped as a liquid and pressurized with nitrogen gas. Pressurization is necessary since the vapor pressure is too low to convey it properly to the fire area.

The mechanism by which halon extinguishes a fire is not thoroughly known. However, Halon (1211 and 1301) chemically inhibits the flame front; the halons act by removing the active chemical species involved in the flame's chain reaction.

Halon decomposes upon contact with flames or hot surfaces above 900°F (482°C). Decomposition products are principally hydrogen fluoride and hydrogen bromide.

The short discharge time of Halon 1301 (10 seconds maximum) keeps the thermal decomposition products well below lethal concentrations. The real hazard lies not in the by-products of the halon, but rather in the products of combustion from the fire. Products such as CO, combined with the oxygen depletion, heat, and smoke, pose a greater hazard to personnel. Personnel should not remain in a space where Halon 1301 has been released to extinguish a fire unless an oxygen breathing apparatus (OBA) is worn. If Halon 1301 should inadvertently be released into a space where no fire exists, personnel can be exposed to 5-to-7 percent concentrations of Halon 1301 for up to 10 minutes (depending upon the individual) without danger to their health. Halon 1301 can be considered a nontoxic and nonsuffocating extinguishing agent in the normal 5-to-7-percent concentrations; however, spaces should be evacuated on halon system discharge.

Exposure to Halon 1301 concentrations of up to about 7 percent by volume and Halon 1211 concentrations of 2 to 3 percent by volume has little noticeable effect on humans. Exposure to Halon 1301 concentrations of between 7 and 10 percent and Halon 1211 concentrations of between 3 and 4 percent may cause personnel to experience dizziness and tingling of the extremities. Those symptoms indicate mild anesthesia. At Halon 1301 concentrations above 10 percent and Halon 1211 concentrations above 4 and 5 percent, the dizziness becomes pronounced. Subjects feel as if they will lose consciousness (although none have), and physical and mental dexterity is reduced. No significant adverse health effects have been reported from the use of Halon 1301 or 1211 as a fire extinguisher since their introduction into the marketplace.

Direct contact with vaporizing liquid being discharged from Halon 1301 and Halon 1211 has a strong chilling effect on objects and can cause frostbite and burns to the skin. The liquid phase vaporizes rapidly when mixed with air and therefore limits this hazard to the immediate vicinity of the nozzle.

Note

In flammable gas cylinder storerooms, 20 percent Halon 1301 is required to extinguish a fire. Therefore, if the system is activated, personnel must leave the space immediately.

Halon 1301 is installed and used in fixed flooding systems for extinguishing flammable liquid fires. Halon 1211 is not used in total flooding systems. Its lower volatility, plus a high liquid density, permits the agent to be sprayed as a liquid and therefore propelled into the fire zone to a greater extent than is possible with other gaseous agents. Halon 1211 will replace Purple-K-Powder (PKP) in twin-agent systems installed on mobile fire-fighting apparatus on aircraft carriers.

Ž **Steam.** Steam smothers a fire by reducing the concentration of oxygen or the gaseous phase of the fuel in the air to the point that combustion stops. As long as the steam blanket is maintained, it will prevent reignition.

Since steam is a vapor when applied, it provides little cooling. Additionally, steam condenses when its supply is shut off. Its volume decreases rapidly and combustible vapors and air rush in to replace it. A fire can reflash if it has not been completely extinguished and cooled. The temperature of steam itself is high enough to ignite many liquid fuels. Steam is hazardous to personnel because the heat it carries can inflict severe burns.

Ž **Dry Chemical Extinguishing Agent.** PKP is a dry chemical principally used as a fire-extinguishing agent for flammable liquid fires. It is used in portable extinguishers and handheld hose-line systems aboard ship.

Various additives are mixed with PKP base materials to improve their storage, flow, and water-repellency characteristics. The most commonly used additives are silicones, which coat the particles of PKP to make them free flowing and resistant to the caking effect of moisture and vibration.

When PKP is applied to fire, the dry chemical extinguishes the flame by breaking the combustion chain. PKP does not have cooling capability. When PKP is applied, an opaque cloud is formed in the combustion areas. This cloud limits the amount of heat that can be radiated back to the heart of the fire. Less fuel vapor is produced because of reduced radiant heat.

PKP attacks the chain reaction required to sustain a fire. It is believed that PKP reduces the ability of the molecular fragments to recombine, thereby breaking the chain reaction.

PKP is primarily used to extinguish flammable liquid fires but can also be used on electrical fires (class C). PKP is highly effective in extinguishing both flammable liquid pool fires and oil spray fires. Although PKP can be used on electrical fires, it will leave a residue that may be hard to clean. PKP can be used in the galley for fighting fires on such items as the cooking hood, ducts, and ranges.

WARNING

The ingredients presently used in PKP are nontoxic. However, the discharge of large quantities of PKP may cause temporary breathing difficulty during and immediately after discharge and may seriously interfere with visibility.

The following is a list of limitations for PKP use.

1. PKP is not effective on materials that contain oxygen.
2. PK should not be used in installations where relays and delicate electrical contacts are present.
3. PKP is not effective on combustible metals and may cause a violent reaction.
4. Where moisture is present, PKP may combine with the moisture to corrode or stain surfaces on which it settles; when possible, PKP should be removed from all surfaces.
5. PKP does not produce a lasting inert atmosphere above the surface of a flammable liquid; consequently, its use will not result in permanent extinguishment if ignition sources such as hot metal surfaces or persistent electrical arcing are present.
6. PKP is not effective on fires involving ordinary combustibles (class A). However, it can be used to knock down a flaming fire, keeping it under control, until hose lines are advanced to the scene.

● **Aqueous Potassium Carbonate.** Aqueous potassium carbonate (APC) is used aboard ships for extinguishing burning cooking oil and grease in deep fryers and galley ventilation exhaust ducts. An APC solution consists of 42.2 percent K_2CO_3 and 57.8 percent water. Alkaline solutions such as APC are often used in combating liquid grease fires involving unsaturated animal fat and

vegetable oil. Upon contact with the burning surface, APC generates a soap-like froth that contains steam, which causes CO_2 and glycerine bubbles to float on top of the burning oil. The bubbles exclude air from the surface of the grease or oil, which extinguishes the fire.

Egress Procedures

Escape routes from below-deck spaces to weather decks should be clearly marked with directional arrows and appropriate labeling. Phosphorescent markings and appropriate emergency lighting of egress routes, hatches, and ladders will ensure that personnel will be able to safely find their way topside in the event of a loss of ship's power.

The emergency escape breathing device (EEBD) provides personnel with respiratory and eye protection in an atmosphere that will not support life.

All personnel must learn to follow escape routes to weather decks by taking part in blindfold drills. Additionally personnel should be trained on the location and the proper wearing of EEBDs. The method of and frequency required for egress training are contained in type commander directives.

CBR Defense

CBR defense means defense against chemical or biological agents used in attacks or defense against radiation from nuclear explosions. Personnel must be able to detect and identify contamination, to decide on the protective measures needed, and to decontaminate ship surfaces, equipment, and personnel.

In studying CBR defense, remember that weapons are always developed and new defense measures are being established to deal with them. You will need to keep up to date with these changes.

The ship's bills that apply to shipboard CBR defense include the general emergency bill; the CBR defense bill; and the ship's battle bill. All personnel must be indoctrinated and trained to carry out the duties described in these bills. For information on the ship's battle bill and for additional information on other bills, see *Standard Organization and Regulations of the U.S. Navy,* OPNAVINST 3120.32.

Personnel under CBR attack should be protected through individual and group measures. Individual protection is of immediate concern. What you do in the first few moments after a CBR attack may determine whether or not you survive. Know the symptoms of exposure to radiation and to biological and chemical agents. Know the action to take when you are exposed and any self-aid and first-aid measures that might help you or your shipmates. This knowledge may mean the difference between life and death.

COMPARTMENT CHECKOFF LISTS

Compartment checkoff lists (fig. 7-5) provide an itemized listing of all classified fittings and closures used in damage control to set the specified material condition of readiness. They are originally prepared and furnished by the ship builder's design agent during the construction of a ship or class of ships. It is each ship's responsibility to keep the lists current. Follow the guidelines listed in the *Naval Ships' Technical Manual,* chapter 079, volume 2, when you check and update your compartment checkoff lists.

All compartments must have a compartment checkoff list permanently posted within them in clear view of the space access. Weather decks that have damage control facilities must also have a compartment checkoff list posted. The compartment name and number are entered on the list along with all classified fittings and certain other damage control facilities in the compartment that are necessary to help damage control personnel in the performance of their duties. The information listed for each of the classified fittings and other facilities on a compartment checkoff list includes the following:

- Name of item
- Number of item
- Location of item
- Purpose of item
- Classification of item (if classified)
- Division responsibility for the proper operation of each fitting

When a compartment has more than one entrance, duplicate compartment checkoff lists must be posted at each entrance. The compartment checkoff lists shall be clearly labeled DUPLICATE. Partial compartment checkoff lists may be desirable when a compartment contains

COMP'T NO. 2-108-1-L **NAME** Crews Berthing (LSD Wing Wall)

ITEM	FITTING	NUMBER	LOCATION AND PURPOSE	CLASSIFICATION	DIVISION RESPONSIBLE
	ACCESS				
1.	WT DOOR	2-108-1	Access to: 2-96-1-L	Z	REPIII
2.	WT DOOR	2-120-3	Access to: 2-120-1-L	Z	REPIII
3.	WT HATCH	2-108-1	Access to: 3-108-1-L	X	S
	MISCELLANEOUS CLOSURES				
4.	ATC	2-109-1	In WTH 2-108-1 used to test: 3-108-1-L 3-103-3-A 3-115-1-A	X	E
5.	ATC	2-108-1	In WTD 2-108-1 used to test: 2-96-1-L	X	E
	DRAINAGE				
6.	DECK SOCKET (remote)	2-112-1	Bilge eductor overboard discharge valve 5-112-1	X	M
7.	STC	2-118-1	Sound Ball 6-108-1-W	X	R
8.	GAGGED SCUPPER	2-109-1	Plumbing drain from 1-110-1-L	Z	REPIII
	FIRE MAIN & SPRINKLING SYSTEM AND WASH DOWN				
9.	FMCOV	2-109-1	Cut out to FP 1-109-1	W	REPIII
10.	FMCOV	2-110-1	Cut out to Group IV magazine sprinkler	W	REPIII
	FUEL OIL				
11.	STC	2-116-1	Sound F.O. & Ball. 6-108-3-F	X	B
	REMOTE OPERATION				
12.	Remote start/ stop switch	2-119-1	For exhaust blower 2-108-1	Z	REPIII
	MISCELLANEOUS UNCLASSIFIED				
13.	Loud Speaker		General announcing 1MC		
14.	C.P. Riser Terminal	2-114-1	Casualty Power outlet		
15.	15lb CO2	2-119-1	Portable fire extinguisher		
16.	One OBA		In box at Fr. 110 stbd.		

Figure 7-5.-Compartment checkoff list.

alcoves. The partial compartment checkoff list shall be clearly labeled PARTIAL. The item numbers on the partial list must correspond with the numbers on the original list. Compartment checkoff lists for the weather decks, and other decks, may be divided by sections; for example, main deck, frame 90-120, port side. The DCA maintains a master copy of each original and partial compartment checkoff list on file in DC central. The DCA, together with the DCPOs, is responsible for ensuring that the compartment checkoff lists are posted and correct.

The individual division officers are responsible for maintaining the list in good physical condition.

The commanding officer, assisted by the DCA, is responsible for filling in the column marked Division Responsibility.

The divisions concerned are responsible for securing fittings that are classified as XRAY or YOKE. The ship's repair parties are responsible for securing ZEBRA fittings.

MATERIAL CONDITION OF READINESS

The term *material condition of readiness* refers to the degree of access and system closure in effect at any given time. The securing of access fittings or systems limits the extent of damage that could occur to a ship. To prevent interference with normal operations, the ship does not maintain maximum closure at all times.

For damage control purposes, naval ships have three material conditions of readiness. Each condition represents a different degree of tightness and protection. The three material conditions of readiness are called XRAY, YOKE, and ZEBRA. These titles have no connection with the phonetic alphabet. Furthermore, the titles are used in all spoken and written communications that concern material conditions.

Condition XRAY provides the least amount of protection. It is set when the ship is in no danger of attack. Examples are when the ship is at anchor in a well-protected harbor or when secured at a home base during regular working hours.

Condition YOKE provides more protection than condition XRAY. It is set and maintained at sea during peacetime and in port during wartime. It is also maintained in port during peacetime outside of regular working hours.

Condition ZEBRA is set before a ship leaves or enters port during wartime. It is also set immediately, without further orders, when the ship is manning general quarters stations. Also, condition ZEBRA is set to isolate and control fires and flooding when the ship is not at general quarters.

All watertight, airtight, firetight, and fume-tight access fittings belong to a certain classification of fittings. Although the fittings usually have a basic classification, a select group of closures within each of the three material conditions of readiness are modified. The purpose of the modified closures is to allow access to a space that is secured because of the material condition that is set. Once a material condition is set, no fitting within the condition is to be opened without prior authorization. Closures that are not modified require permission of the commanding officer to be opened. Permission to open a closure is obtained through the damage control central (DCC) watch or the officer of the deck (OOD) when the ship is not manning the general quarters stations. Repair party officers control the opening and closing of all fittings in their assigned areas when the ship is at general quarters. Any change in the status of a fitting must be reported to DCC so that the ship's DC closure log maybe updated. You may open a modified closure without any special authorization. However, you are not authorized to leave the closure open unattended. Through careful attention to these procedures, a ship's watertight integrity can be maintained at a safe level.

The following discussion will help you learn about each classification, how the classification is marked, what group of fittings have the classification, and when you may or may not open a fitting with that classification.

XRAY fittings are marked with a black X. These closures are secured during conditions XRAY, YOKE, and ZEBRA. You must not open fittings with this classification without proper authorization. You will find this classification on the following access closures:

- Doors and hatches to storerooms and stowage spaces, including cargo ammunition spaces
- Hatches that are provided with a scuttle and lead to magazines and handling rooms
- Bolted-plate manhole covers
- Escape scuttles not covered elsewhere
- Doors and hatches located only on the weather deck and below that are used to strike down stores and ammunition
- Access to an aircraft fueling station compartment
- Access to escape trunks in machinery spaces
- Access to the arresting gear machinery room
- Access to the eductor room

- Access to the capstan and winch control room
- Access to the chain locker
- Access to the stores elevator
- Access to the catapult machinery room
- Access to forced draft blower rooms
- Access to fan rooms

CIRCLE XRAY fittings are marked with a black X inside of a black circle. These modified closures are secured during conditions XRAY, YOKE, and ZEBRA. However, personnel may open these fittings without special authorization when proceeding to battle stations or as required in routine inspection checks. You may open these closures, but you must secure them immediately after use. You will find this classification on the following closures:

- Doors to magazines and handling rooms
- Hatches that do not have a scuttle and lead to magazines and handling rooms
- Access to the missile handling and check-out area compartments
- Scuttles in hatches to the shaft alley, pump rooms, magazines, and handling rooms
- Access to the gas and fuel station and filter rooms
- Access to the oxygen-nitrogen rooms (compressor and producing)
- Access to the switch gear room, ammunition hoist, and elevators
- Access to the underwater log room
- Access to the equipment rooms that are unoccupied
- Scuttles for passing ammunition

YOKE fittings are marked with a black Y. These closures are secured during conditions YOKE and ZEBRA. You must have proper authorization to open fittings with this classification when the ship is at condition YOKE or ZEBRA. You will find this classification on the following closures:

- Hatches that are provided with a scuttle and lead to shaft alleys and pump rooms
- Alternate accesses to machinery rooms
- Weather-deck hatches not classified as XRAY
- Some alternate accesses on the DC deck and above
- Access to the windlass room
- Access to the air-compressor room
- Access to the air-conditioning machinery room
- Access to the refrigeration machinery room
- Access to the elevator machinery room
- Access to the missile director machinery room
- Access to the drying room

CIRCLE YOKE fittings are marked with a black *Y* inside of a black circle. These modified fittings are secured during conditions YOKE and ZEBRA. However, these fittings may also be opened without special authorization when personnel are proceeding to battle stations or as required in routine inspection checks. Again, you must secure these closures immediately after use. You will find this classification on the following closures:

- Hatches that lead to the shaft alley and pump room and do not have a scuttle
- Scuttles in the deck to the shaft alley and pump room
- Doors at the bottom of the trunk to the shaft alley and pump room
- Access to the steering gear power and ram room
- Access to the chill room

ZEBRA fittings are marked with a red Z. These closures are secured during condition ZEBRA. You must have proper authorization to open fittings with this classification when the ship is in condition ZEBRA. You will find this classification on the following closures:

- All remaining doors and hatches for routine access
- Access to all shops; labs; and commissary, utility, control, and hospital spaces
- Access to all offices
- Access to equipment rooms occupied when associated control room is in use
- Main access to machinery spaces
- Access to issue rooms
- Access to the steering gear room
- Access to the enclosed operating stations
- Access to hangar and flight deck control stations
- Access to the garbage disposal room
- Access to the trash burner and bin room

CIRCLE ZEBRA fittings are marked with a red Z inside a red circle. These modified fittings are secured during condition ZEBRA. CIRCLE ZEBRA fittings may be opened with the commanding officer's permission during prolonged periods of general quarters. The opening of these fittings allows evolutions such as the preparation and distribution of battle rations, opening of limited sanitary facilities, ventilation of battle stations, and access for aviation personnel to the flight deck. When open, CIRCLE ZEBRA fittings must be guarded so that they may be closed immediately if necessary. You will find this classification on the following closures:

- Ž Limited doors or scuttles from the weather deck to the crews' galley
- Ž Doors from aviators and flight crew ready rooms to the flight deck

DOG ZEBRA fittings are marked with a red *Z* inside a black *D*. These modified fittings are secured during condition ZEBRA and darken-ship conditions. You must have proper authorization to open fittings with this classification when the ship is at either condition ZEBRA or darken ship. You will find this classification on the following closures:

- Ž Doors to the weather deck, excluding those classified XRAY or YOKE, that do not have a darken-ship switch or a darken-ship curtain
- Ž Airports (portholes)

WILLIAM fittings are marked with a black *W*. These fittings are kept open during all material conditions. WILLIAM fittings are secured only as necessary to control damage or CBR contamination and to make repairs to the equipment served. You will find this classification on the following fittings:

- Vital sea suction valves that supply the main and auxiliary condensers, fire pumps, and spaces that are manned during conditions XRAY, YOKE, and ZEBRA
- Vital valves that if secured would impair the mobility and fire protection of the ship

CIRCLE WILLIAM fittings are marked with a black *W* inside a black circle. These fittings are normally kept open, as is the case with WILLIAM fittings. They must, however, be secured to prevent the spread of damage and as a defense measure when a CBR attack is imminent. You will find this classification on the following closures:

- Doors to the pilot house, flag bridge, and signal shelter
- Ventilation systems to main and auxiliary machinery spaces, generator spaces, and other systems and fittings serving spaces in continuous use

If access to a space is through a series of hatches and/or scuttles, all of the closures that provide that access must bear the same classification as that of the space. For example, a pump room is classified as CIRCLE YOKE. This means it is open during condition XRAY and closed during condition YOKE. All hatches, scuttles, and doors that provide access to the pump room must also be classified CIRCLE YOKE to allow routine access to the pump room.

When a fan room door must be kept open to supply air to a fan or to exhaust air from it, the door should have the same classification as that of the fan. For example, a fan room containing a YOKE fan has a YOKE door; a room containing YOKE and ZEBRA fans has a ZEBRA door. All other fan room doors are classified XRAY.

A classification has no bearing on the security of a space. A space classified ZEBRA may, for security reasons, be locked during condition YOKE if the space is unattended. However, the locking must be reported to the DCA or to the OOD.

When material conditions of readiness are being set, the ship's first concern is the requirement for watertight, airtight, firetight, and fumetight integrity. Living conditions and access to spaces are secondary requirements. During long periods at general quarters, however, condition ZEBRA may, with the commanding officer's permission, be relaxed to pass battle rations and to allow the crew to use the head facilities. The opening of certain weather-deck doors permits natural ventilation to replace the stuffiness at some general quarters stat ions with fresh air. Condition YOKE may also be modified in a similar manner when appropriate.

All ships are required to prepare and maintain a DC closure log (fig. 7-6).

Strict discipline must be maintained in the modification of a material condition of readiness. As mentioned before, you must obtain permission before you change a material condition setting in any way. Obtain the permission from the DCA or the OOD. During general quarters, repair party officers control the opening and closing of all fittings in the assigned areas. The repair party officers must keep DCC informed so that the ship's DC closure log can be kept up-to-date.

The closure log is maintained at all times, whether the ship is in port or under way. The closure log is used to show the following:

- Where the existing material condition of readiness has been modified
- The fitting's type, number, and classification

D C CLOSURE LOG

IN ACCORDANCE WITH OPNAVINST 3120.32

PERSON REQUESTING PERMISSION			IDENTIFICATION OF FITTING			OPENED		CLOSED			PERSON GRANTING PERMISSION	
NAME	RATE	DIV.	TYPE	CLASSIFI-CATION	NUMBER	DATE	TIME	DATE	TIME	EST. TIME OPEN	NAME	RANK OR RATE

Figure 7-6.-DC closure log.

- The name, rate, and division of the person who requested permission to open or close the fitting
- The date and time the fitting was opened or closed
- The date and time the fitting was returned to its specified material condition of readiness setting
- The name and rate/rank of the person granting permission

The commanding officer prescribes the limit to which the modification of a material condition of readiness may be approved by the DCA or OOD. Reporting the temporary closing of a fitting that should be open is just as important as reporting the opening of one that should be closed. For example, a ZEBRA watertight hatch that is secured at the time general quarters is sounded could seriously interfere with personnel trying to get to their battle stations.

The damage control closure log is normally kept on the quarterdeck in port, on the bridge at sea, and in DCC during general quarters. However, if your ship has a 24-hour watch in DCC at all times, the closure log will be kept there no matter where the ship is. The closure log is updated when there is a change in the status of a classified closure or fitting. If a classified closure is to remain open for several days, it must be logged open each day. The maximum time a closure or fitting may be logged open is 24 hours.

DIVISION DAMAGE CONTROL AND FIRE-FIGHTING EQUIPMENT

Numerous pieces of damage control and fire-fighting equipment are located in division spaces. They include such items as battle lanterns, dog wrenches, spanners, fire stations, and portable fire extinguishers. These items must be inspected and tested based on the equipment's maintenance requirement cards (MRCs). That includes ensuring all damage control equipment, piping, cables, and compartments are properly stenciled and identified.

INSPECTIONS OF DIVISION SPACES

DCPOs are responsible for conducting daily inspections of division spaces for the elimination of fire hazards, They also assist division officers in the inspection of division spaces for fire hazards and good housekeeping practices. Special emphasis should be placed on safety precautions, and operating instructions must be placed in required spaces.

SUMMARY

In this chapter you were introduced to MOPP and risk management and implementation of MOPP. New weapons are being developed and new protective and defensive measures are being established all the time. Therefore, staying up-to-date in the area of CBR defense is important.

The responsibilities of the duty DCPO are both numerous and important. Training your division personnel in damage control, fire fighting, egress and CBR defense could save their lives during a crisis situation. You must ensure that the material condition of your spaces are properly set and that fire-fighting and damage control equipment are in excellent condition. These precautions will provide your division with a fighting chance in the event of a fire or CBR attack.

REFERENCES

Damage Controlman 3 & 2, NAVEDTRA 10572, Naval Education and Training Program Management Support Activity, Pensacola, Fla., 1986.

Surface Ship Survivability, NWP 62-1, Office of the Chief of Naval Operations, Washington, D.C. 1989.