

FIREFIGHTING AND DAMAGE CONTROL

Everyone on boardship have another big job - to work aside from their primary duties. This big job is to look out constantly for the safety of the ship and crew. When the ship puts out on a mission, all hands must do everything they can to:

- 1) Keep the ship afloat
- 2) Keep the ship underway
- 3) Keep the guns firing or ready to fire
- 4) Protect the lives of the crew

Causes of damage to a ship is divided into:

- 1) Fire
- 2) Collision
- 3) Enemy Action
- 4) Grounding
- 5) Weather

Fire - Is a chemical reaction between three elements such as oxygen, fuel and heat.

Classification of fire and remedy:

- 1) Class A - Involves common combustible materials like papers, woods, ropes, canvass etc. Best remedy is solid stream or water spray.
- 2) Class B - Involving flammable liquids and gases.
Examples:
Kerosene, LPG, Gasoline etc. Best remedy is water fog, Foam forming fire extinguisher. Last resort is steam.
- 3) Class C - Involved energized electrical equipment. First choice is CO2. Last resort is water fog. But is harmful to equipment and dangerous to personnel.
- 4) Class D - Involves combustible metal such as thermite, sodium and magnesium.
 - a) Thermite fire - has no known extinguishing agent. Flooding the surrounding may help
 - b) Magnesium fire - CO2 has no effect. Water fog is effective.
 - c) Sodium Fire - Use dry chemical.

FIREFIGHTING EQUIPMENT:

Firefighting equipment are classified into:

- 1) Portable - can be carried to the scene of fire. Contained in a cylindrical bottle.
- 2) Installed - are permanently or semi-permanently fitted on a ship and include the following:
 - a) Fire Main System
 - b) All-purpose fire nozzles and applicators.
 - c) Foam equipment
 - d) Fog sprays
 - e) CO2 Rail system
 - f) Mechanical Foam Equipment

SPECIAL PROTECTIVE EQUIPMENT:

The Navy believes in protecting its fire fighter. This protection includes the use of the following:

- 1) Oxygen Breathing apparatus (OBA)
- 2) Asbestos Suits
- 3) Hose (Air line) Mask
- 4) Life line

DAMAGE CONTROL - Is any procedure, which helps to reduce the harmful effect of damage to the ship.

- a) Preserve the watertight integrity of the ship.

- b) Maintain the stability and maneuverability of the ship.
- c) Make rapid repairs to damage gear on structures.
- d) Furnish fire protection and extinguish fires.

THE DIFFERENT DAMAGE CONTROL SYSTEM

- 1. Drainage and flooding system.
- 2. Fire Main and Sprinkling system.
- 3. Ventilation system.
- 4. Fuel and fresh water system.
- 5. Compressed Air system.
- 6. Communication system.

Drainage and flooding System

Drainage used for -

- a) Removing large quantity of water from compartment
- b) Removing water from the hull under normal operating condition.

Flooding used for -

Flooding compartments to balance the ship.

Three (3) Principal types of drainage system:

- (1) Main drainage System - has high capacity and is made up of piping and pumps that can move large quantities of water in short time.
- (2) Secondary Drainage System - Serves to drain small compartment forward and aft of the main drainage system.
- (3) Main condenser circulatory pumps - can be used for emergency drainage of the engine room.

Fire Main System - made up of piping, pumps, plugs, valves and controls designed to supply plenty of water for fire fighting.

Ventilation System - Supply fresh water, air, and remove stale air and gases. It helps to prevent fires and explosion by preventing the accumulation of explosive gases.

Fuel Fresh Water System - Consists of tanks, filling lines and feed lines. This is important in damage control because the list and trim of the ship can be partially controlled by shifting the contents of the tanks. This method of balancing is better than flooding when the damage is below the waterline.

Compressed Air system - Provides air for guns and torpedoes and for testing and blowing out compartment and tanks.

Communication System - When ship is in action, the communication system is vital importance in notifying the control station as to:

- 1) location of casualties
- 2) extent of damage
- 3) corrective measure taken
- 4) progress being made

SHIP COMPARTMENTATION

The ship is divided into compartments to:

- 1) Control flooding
- 2) Restrict chemical agents and gases
- 3) Segregate activities of personnel
- 4) Provide underwater protection by means of tanks and voids
- 5) Strengthen the structure of the ship.

Compartments are designated and identified by symbols, which are made up of letters and numbers. Symbols are stenciled on bulkheads.

Port compartments have even numbers while starboard compartments carry odd numbers:

NAVAL ENGINEERING AND DAMAGE CONTROL

MISSION: The mission of the Engineering Department is to ensure the availability of power for a ship/craft seaworthiness at all times with readiness for all speed for period equal to the designed endurance of the main propelling machinery.

The secondary mission is to ensure that all other departments will constantly carry out assigned mission.

Administrative Organization

For the purpose of administration, the Engineering Department shall be divided into four (4) major divisions:

1. The main propulsion and auxiliary division
2. Electrical division
3. Damage control division
4. Repair division

These divisions are manned by officers when assigned on capital ships otherwise assigned by the Engineering Officer of a smaller type vessel assisted by the leading qualified Petty Officers.

The Engineering Officer:

The Engineering Officer is responsible for the Commanding Officer for the operation, care and maintenance of the ship's main propulsion plant, auxiliary machinery and piping system for the control of damage, for the operation and maintenance of the power generators and distribution system, repair or ships hull and for repairs to materials and equipment of other departments.

Department Administrative Assistant:

The Department Administrative Assistant Functions as aid to the Engineering Officer in the details of department and supply administration.

Responsible for the operation of the department administrative offices, the care and upkeep of the office equipment and spaces.

In-charge on all reports of the engineering department.

The Electrical Officer:

The Electrical Officer heads the electrical division and shall be responsible for the Engineering Officer for the operation, care and maintenance of the ship's electric power generators and distribution systems, interior communication equipment and systems, master gyro compass and other associated electrical equipment assigned to the engineering department.

The Damage Control Assignment

The Damage Control Assistant heads the Damage Control division and shall assist the Engineering Officer in the establishment of an effective damage control organization and training programs.

Main Propulsion Assistant:

The Main Propulsion Assistant is the head of the main propulsion and auxiliary division and is responsible to the Engineering Officer for the operation, care and maintenance of the ship's main propulsion and auxiliary machinery and the ship's service boilers and distilling plant.

The Damage Control Organization:

The Damage Control Administrative Organization is a necessary integral part of the Engineering Department Organization. The term "Damage Control Organization" is used in this information manual to include all parts of the ship's organization concerned with damage control.

MAJOR ADMINISTRATIVE RESPONSIBILITIES

1. In ships where the control of damage is not exercised from a central engineering and damage control station, the damage control functions is delegated to the damage control assistant located in the damage control central (or designated repair party station on smaller ships).
2. Central aspects of damage control can be accomplished only by the participation of all department aboardship. For this reason, each department is responsible for the following:
 - a. Set material condition of readiness within the department.
 - b. Enforce watertight integrity, discipline within the department.
 - c. Course inspection of department spaces by and officer in accordance with the hull report.
 - d. Required that damage control equipment and fittings be maintained in their proper location and in operation order.
 - e. Require the assignment of specific damage control duties to individual within each division, including the designation of a division damage control Petty Officer.
 - f. Supervise the securing of department material and equipment against possible damage by a heavy weather.
 - g. Required an immediate report to be made to the damage control assistant of any deficiency in damage control markings, devices, fittings, equipment or materials.
 - h. Train personnel in damage control matters.
 - i. Furnish personnel to repair parties as required by battle bill.
 - j. Be prepared to strip ship or clear for actions.
 - k. Emphasize self-sufficiently in all battle stations by OJT in handling casualties to personnel and equipment.

3. The Engineering Officer

He is responsible to the Commanding Officer for the operational readiness of the damage control organization. He is further responsible for the following:

- a. Organize repair party
- b. Supervise the training of repair party
- c. Assigned appropriate engineering ratings to other repair party

4. Damage Control Assistant

Responsible for the engineering officer for the prevention and control of stability, list and trim. In carrying out this damage control duties of ship ware nature. The damage assistant is responsible for the following:

- a. Prepare and maintain bills and directive that relate to damage control.
- b. Furnish the standard damage control ratings to various repair parties.
- c. Assigned damage control ratings to various repair parties.
- d. Ensure that DC check of list are posted in accordance with DC book.
- e. Ensure that inspections of the watertight integrity of the ship is being maintained throughout the ship.
- f. Inform the Engineering Officer of any condition or practice which lowers the DC readiness of the ship.

5. Gunnery Officer:

He is responsible for the following:

- a. Organize repair party.
- b. Supervise the training of repair party 6.
- c. Assign gunnery ratings to other repair parties.

6. Air Officer:

- a. Organize repair parties 7 & 8.
- b. Supervise the training of repair 7 & 8.
- d. Assign appropriate air department ratings to other repair party.

Repair Party Organization

- a. Repair 1
 - 1) Main deck repair party.
 - 2) An officer or Chief Petty Officer from a deck division is in charge of this party.
- b. Repair 2 - Forward repair party below deck.
 - 1) A suitable trained officer or Chief Petty Officer-in-charge.
- c. Repair 3 - After repair party below deck.
 - 1) A suitable trained Officer or Chief Petty Officer-in-charge.
- d. Repair 4 - Amid ship below deck repair party.
 - 1) A suitable Officer or Chief Petty Officer-in-charge.
- e. Repair 5 - Propulsion Repair Party
 - 1) Propulsion department officer should be in charge of this repair party.
- f. Repair 6 - Ordinance Repair Party.
 - 1) An Officer or Chief Petty Officer of the Gunnery Department should be in charge of this party.
- g. Repair 7 & 8
 - RP 7 - Gasoline repair party and,
 - RP 8 - Flight deck repair party,

General Functions of Repair Parties:

- 1. Each repair parties must be capable of effecting repairs to electrical and battle telephone circuits.
- 2. Each repair parties must be capable in rendering first aid.
- 3. Each repair parties must be capable of detecting, identifying, measuring dose rate intensities and decontaminating the effect of nuclear, biological, and chemical (NBC) attack.
- 4. Each repair party must be organized to evaluate correctly the extent of damage in the areas in order to ensure the accuracy of on scene reports.

MATERIAL CONDITION OF READINESS

This has been prepared as a ready reference to the students for the basic facts concerning material condition of readiness and proper classification of fittings.

Definition:

- 1. Condition X-Ray (X)
 - a. Settings provides the last amount of protection and is used only in well protected areas.
 - b. All X-Ray fittings are closed, except actually in use.
 - 1) X-Ray are assigned to storage, tanks, air test fittings and fire main valve.

2. Condition Yoke (Y)

- a. Next higher degree of watertight integrity.
- b. All X-Ray and Yoke fittings closed, except when in used for the operation of the ship.
 - 1) Classification Yoke is assigned to work ship's, pump rooms, fire main valves.

3. Condition Zebra (Z)

- a. Provides for the maximum degree of watertight integrity.
- b. Used in battle conditions, emergencies when entering or leaving port during wartime.
- c. All X-ray, yoke, and Zebra fittings are closed.
 - 1) Classification Zebra is assigned to fittings that would normally be opened at all times, except during battle condition or emergencies.

Modification to the Material Condition of Readiness:

Those fittings which can be opened at certain times during different conditions of readiness.

2. Types of Modification:

A. Black circle X-ray and black circle Yoke

- 1) Applies to special fittings that give access to battle stations, ammunition transfer, operation of vital system.
- 2) Can be opened without DC central permission.
- 3) Must be closed when not in use.

B. Red Circle Zebra

- 1) Applies to fittings that may be opened during prolonged periods of general quarters.
- 2) Can be set when authorized by the Commanding Officer.
- 3) Allows for;
 - a. Preparation and distribution of battle rations.
 - b. Ventilation of certain vital spaces, such as magazines, engine rooms, etc.

C. Condition William

- 1) Applies primarily for ventilation fittings.
- 2) Certain access opening which are closed only in the event of NBC attack to prevent smoke or other airborne contamination from entering the ship.
- 3) Applies to non-vital sea suction valves which secured, would not impair the mobility of fire protection of ship.

D. William

- 1) Special fittings assigned to fittings essential for the operation of the ship.
- 2) If closed would seriously hamper the mobility and fire protection of the ship.
- 3) Closed only to protect repairs or when causing flooding.

E. Red Zebra

- 1) Applies to access to weather decks not equipped with light docks.
- 2) Fittings used for darken ship.

CHEMISTRY OF FIRE

The process of fire or its occurrence may be regarded as a Chemical Triangle. Its three sides are, Fuel, Heat and Oxygen.

Classes of Fire and its extinguishing agents.

Class "A" fire - A deep seated that leaves ash or embers.

Extinguishing agent is water, high 7 low velocity fogs, solid streams, CO₂.

Class "B" fire - Flammable liquids surface burning may leave carbon.

Extinguishing agent, is a mechanical foam, water for, or CO₂.

Class "C" fire - Electrical equipment

Extinguishing agent, CO₂ (water for may be used as a last resort).

Class "D" fire - Special hazards (Metal Fires) - Magentis, themites, sodium and phosphorous. Extinguishing agent is Graphite.