C. COMILDEPT. The COMILDEPT is responsible for the berthing of evacuees and patients, for their shipboard indoctrination, and for providing them with life jackets and boat station assignments. In the event that evacuees exceed the number of berths available, he shall arrange double assignments to single berths, and the separation of male and female passengers as provided in COMSTS INSTRUCTION 3121.4 or effective revision thereof. He shall coordinate feeding hours with the chief steward and shall prepare and issue the necessary boarding cards and information sheets regarding the ship's services and limitations. The medical officer will receive and treat casualties and train personnel in the handling and treatment of casualties in accordance with the ship's medical department organization plan. In the event that a COMILDEPT is not assigned, the first officer shall assume these duties.

D. Chief Engineer. The chief engineer shall assist the first officer, as directed by the master, in fabricating rigs required to facilitate boarding of evacuees and patients. He shall run all evaporators as soon as an evacuation lift has been ordered. When evacuees are on board, he shall advise the master of the water consumption and shall request restricted water hours if necessary.

E. Chief Steward. The chief steward shall provide linens, blankets, and berthing for evacuees. He shall also provide adequate food and meal servings to accommodate all on board.

IV. CONDITION OF READINESS. This bill does not set a specified condition of readiness. The master shall set the condition of readiness appropriate for the area and the situation.

V. EMERGENCY PROCEDURES.

A. Dockside. Evacuees and patients shall board via gangways. Those unable to walk shall be carried aboard in litters and stretchers. Boarding of litter patients may be expedited by hoisting them aboard on cargo pallets by means of cargo booms rigged over the dockside.

B. Offshore. The boarding of evacuees and patients in midstream presents a more difficult and at times hazardous problem. Boarding procedures for evacuees will vary with the circumstances. In general, ladders, boarding nets and life lines will be rigged over the side for evacuees to board. Cargo booms will be rigged and appropriate cargo pallets equipped with litters for hoisting of litter patients. Sideports should be used as appropriate, with an outrigger improvised for the hoisting rig. Where appropriate, lifeboats can be lowered and used to hoist evacuees and patients directly aboard. Care should be taken not to overload the lifeboats beyond their allowable capacities.

VI. SIGNALS. The master shall provide, in his evacuation plan, for any special signals considered necessary to facilitate rapid embarkation.

VII. TRAINING. Prior to undertaking a casualty evacuation, the master shall brief all officers and crew members involved in the evacuation plan and shall conduct drills or dry-runs necessary to insure the readiness of equipment and familiarity of all-hands with their casualty evacuation duties. The medical officer shall instruct appropriate personnel in the handling of casualties, including the training of crew members who will serve as stretcher bearers.

CHAPTER I

EMERGENCY BILLS

Section 1.14

IN-PORT EMERGENCY BILL

I. PURPOSE. This inport emergency bill establishes general procedures covering inport emergencies. These procedures may be modified by the master or relief officer as circumstances dictate.

II. ORGANIZATION. When inport emergencies occur during normal duty hours, they will be handled in accordance with procedures outlined in other emergency bills, by calling all hands to emergency stations. However, emergencies seem to occur most frequently at times when there is lack of planning or sufficient personnel to cope with them. This is particularly true during ship's inport periods when the full crew is not aboard or with only night relief personnel aboard. The ship's organization during inport periods between 1700 and 0800 and on Saturdays, Sundays and holidays consists of the following:

Relief deck officer
Relief engineer officer
Gangway watch
Quartermaster (passenger ships only)
Master-at-arms (passenger ships only)
Fire watch (passenger ships only)
Oiler
Watertender

III. RESPONSIBILITIES.

A. Master. The master is responsible for preparing the deck night order book daily, for assuring that the relief officers are competent, are instructed in their duties and responsibilities, are familiar with the ship and its damage

control equipment, and that they are aware of the following:

1. Location of nearest fire alarm boxes.
2. Location of repair lockers.
3. Port authorities and master to be contacted in an emergency, including telephone numbers.
4. Material condition of readiness of the ship.
5. Ship's station bill and inport instructions.
6. Personnel available aboard.

B. First Officer (Damage Control Officer). The damage control officer is responsible for setting the required material condition of readiness, as directed by the master, prior to the relief officer taking over the watch. As directed by the master, he shall instruct the deck relief officer regarding the items above as well as his duties, the status of any work in progress, and the condition of damage control equipment which may affect the safety or readiness of the ship. He shall have posted in the repair locker the locations of the following:

1. Submersible pumps and electrical outlet locations.
2. Eductors and 4 inch hoses.
3. Semi-rigid stretchers.
4. Shoring material.

C. Chief Engineer. The chief engineer is responsible for preparing the engine night-order book daily. He shall provide relief engineers with the following information and orders:

1. Machinery in operation.

   a. Changes necessary according to operation, (cargo, repair work, etc.).

   b. Precautions in operating specified machinery in addition to regular operating instructions.

2. Locations of engineroom fire-fighting equipment and emergency fire pumps.
3. Location of damage control locker and associated equipment.
4. Whom to notify in case of emergency.

   a. Deck relief officer
   b. Port authority
   c. Chief and first assistant engineers (home phone numbers available)

5. Material readiness of standby engineroom machinery.
6. Specific duties.

D. COMILDEPT. The COMILDEPT is responsible for maintaining a military watch when presailing boarding parties, troops, and passengers are aboard and for adherance to existing command regulations in effect at each port of call.

E. Relief Deck Officer. The relief deck officer shall familiarize himself with the master's night-order book and with all other pertinent instructions. He shall safeguard the ship by maintaining an alert watch, carrying out all assigned duties as prescribed in written instructions, and by knowing the location and use of fire-fighting and damage control equipment. He shall keep posted regarding personnel available aboard to assist in event of emergency. In the absence of the ship's regular senior officers, he shall act as damage control officer.

F. Relief Engineer Officer. The relief engineer officer shall familiarize himself with the engine night order book and with all other pertinent instructions. He shall assure the proper operation and safety of the engineering plant by keeping an alert watch, carrying out all assigned duties efficiently, and by knowing the location and use of fire fighting and damage control equipment. In

the absence of the ship's regular engineering officers, he will be in charge of casualties occurring in engineering spaces and for coordinating action with the damage control officer (deck relief officer).

IV. CONDITION OF READINESS. A modified "cruising" condition of readiness will be set between the hours of 1700 and 0800 and on holidays and weekends, when the normal working crew is not on board. This modified "cruising" condition will consist of closing all fittings and manual watertight doors below the load waterline. This will enable the relief deck officer to close all other electrical WT doors from the bridge in event of emergency and thus prevent progressive flooding in case of a hull or pipe rupture.

V. EMERGENCY PROCEDURE. In event of an emergency inport when the full crew is not on board:

A. The Deck Relief Officer shall:

1. Alert all on board by steady ringing of the general alarm bells for at least 10 seconds (and ship's bell if possible).
2. Close remote-controlled fire screen doors and watertight doors and initiate any other action to "button-up" the ship--such as securing ventilation.
3. Notify local authorities.
4. In the absence of the ship's regular senior officers, assume the duties of damage control officer and prepare to combat the emergency with available equipment and personnel.
5. Notify the master and other ship's personnel as required by the night-order book.
6. Post a messenger at the gangplank to direct local authorities to scene of emergency.
7. Coordinate with the military watch to assure the safe evacuation of passengers, if any.

B. The Relief Engineer Officer will ready necessary engineering machinery. In the event any machinery cannot be activated immediately, he shall notify the damage control officer of any delays and/or limitations. In the absence of the ship's regular engineering officers, he shall be in charge of casualties in engineering spaces, coordinating his action with the damage control officer, and shall see that the chief engineer and first assistant engineers are notified.

C. All Hands. All hands on board will be in duty status in emergencies and shall report to damage control locker number one immediately upon sounding of the alarm. All hands shall assist as directed by the damage control officer in controlling the casualty.

VI. TRAINING. The master and chief engineer are responsible for the adequate instruction of respective relief officers. The training branch, IRD shall assign relief officers to fire fighting and damage control training, as authorized by CMPI-410, to assure their readiness to cope with emergency situations.

CHAPTER I

EMERGENCY BILLS

SECTION 1.15

MERCY & RESCUE BILL

I. PURPOSE. The Mercy-Rescue Bill prescribes responsibilities and procedures to assure the safe and expeditious transfer of injured or seriously ill personnel from ship to plane, from plane to ship, and from ship to ship for medical care and treatment, and for transfer to shore medical facilities. The same procedures apply in the rescue of survivors of disaster at sea.

II. ORGANIZATION.

A. Bridge. Sufficient personnel shall be detailed to hoist signals, man sound-powered phones and radio-telephone, and for other necessary duties as assigned by the Master.

B. Emergency Crews. Emergency crews for Mercy-Rescue transfer operations shall be organized for action as follows:

1. Launching crews. Assignment of personnel and their duties shall be as provided in the ship's standard station bill.

2. Emergency boat crew. Assignment of personnel and their duties shall be as provided in the ship's standard station bill.

III. RESPONSIBILITIES.

A. Master. The master is responsible for the planning, organization, training of the crew, and execution of Mercy-Rescue transfers. The master shall maneuver the ship to provide a lee for launching boats and to provide a lee between his ship and the rescue situation. The method of removing survivors from the lifeboats will depend on weather conditions, therefore the master shall use his own best judgment according to the circumstances.

B. First Officer. The first officer, under the master, is in charge of the crew on deck at the emergency boat launching or transfer station. In addition, he is responsible for the recovery of survivors and the emergency boat. The first officer will also train all personnel concerned with Mercy-Rescue transfer operations.

C. Chief Engineer. The chief engineer shall:

1. Assign sufficient engine room personnel to maneuver the ship.

2. Assign the electrician to stand-by with tools and equipment for electrical casualties, particularly while hoisting boats.

3. Assign an additional engineer in each engine room and a qualified crewman in the steering engine room during transfer operations.

D. COMILDEPT (passenger ships only). The COMILDEPT shall:

1. Direct one of the medical officers or hospital corpsmen, with necessary first-aid equipment, to embark in the emergency boat.

2. Have stretcher, resuscitator, and other medical equipment as required at the boat or transfer station.

3. Station additional medical personnel to receive the patient or patients when they are brought aboard.

4. Assign additional guards to help the master-at-arms keep personnel not engaged in the operation clear of assigned areas.

E. Chief Steward. The chief steward shall provide blankets and berthing as needed. He shall arrange for adequate food and meal servings to accommodate all on board, including immediate servings to survivors, of soup, sandwiches and warm liquids.

F. Second Officer. The second officer shall calculate the course, distance and time to rendezvous when directed by the master. He shall ready the required signal flags and shall make the appropriate signals when directed by the master. He shall test and ready the signal searchlight. He shall assist the master in conning the ship during transfer operations.

G. Senior Engineering Officer. The senior engineering officer on watch shall energize searchlights, embarkation lights, emergency boat winches and ready the plant for emergency maneuvering.

H. Master-at-Arms (passenger ships only). The master-at-arms shall keep all personnel not concerned with the operation clear of assigned areas.

I. Boat Commander. The emergency boat commander shall:

1. Establish communication with the ship and with the plane on designated frequencies.

2. Maneuver the emergency boat as directed by radio, whistle, blinker or flag signals from the ship.

3. Relay information from the ship to other boat commanders of boats not equipped with radios.

4. In the case of a transfer from an aircraft, the boat commander shall approach the stern of the plane and then stand off at a safe distance. He shall direct the heaving of a buoyant lifeline to the rubber liferaft after the raft rows clear of the plane.

J. Radio Officer. The radio officer shall establish and maintain communications on the scene between the emergency boat, ship(s), and aircraft; he shall supply the pilot of the aircraft with any requested information regarding sea surface and wind conditions. In passenger ships, the first or second radio officer shall operate the radio in the emergency boat.

K. Medical Officer (passenger ships only). Depending on the known situation, the senior or junior medical officer, or a hospital corpsman, shall board the emergency rescue boat, with a first-aid kit, in rescues involving injured personnel. He shall be responsible for preparing the patient for transfer, or for receiving patient(s) from another ship. The other medical officer shall have designated members of the medical department standing by to assist survivors requiring medical attention.

IV. CONDITION OF READINESS. In ships preparing for Mercy-Rescue transfer operations with aircraft or ship-to-ship, "cruising" condition shall be set and maintained throughout the operation.

A. "Cruising" Condition (in both steam and diesel ships).

1. During normal "cruising" condition, machinery required to operate the plant in the most efficient and economical manner shall be used.

2. When the ship is in confined or inland waters, in heavy traffic, heavy weather, low visibility, or in a combat zone, additional machinery shall be warmed up or started as advisable.

B. "Emergency" Condition. "Emergency" condition shall be set by the master if conditions warrant.

V. EMERGENCY PROCEDURES.

A. General. MSTS ships are frequently called upon to participate in mercy or rescue missions. These involve a wide variety of procedures, depending upon whether an ill or injured person is to be transferred to or from another ship for treatment, or be transferred to or from a plane, or whether it is a rescue mission involving a disabled ship or plane. An important factor in any mercy or rescue situation is the manueverability of the ship or plane and the availability of its lifesaving equipment. Each of these procedures will be covered in a general manner; specific procedures will depend upon the particular situation, weather and sea conditions, and the judgement of ships' officers.

B. Ship-to-Plane Mercy Transfers.

1. Hazards. Ship-to-plane transfers are difficult and hazardous. Air-sea-rescue personnel emphasize the hazards indicated herein and recommend the procedures below as most suitable.

a. When a seaplane lands on open water it will, because of its design, normally "weathercock" or head into the wind. The pilot will generally keep one or both engines running for manueverability. If the plane should broach-to in the trough of the sea, it may substain wing damage which would prevent take-off.

b. The plane's propellers pose a hazard to a lifeboat and its crew--therefore the boat must approach from the plane's quarter, on the lee side, and stand off at a safe distance while the transfer is made by means of the plane's raft. The lifeboat also poses a hazard to the plane since, approaching too close in a seaway, it may damage the plane's hull, wings, tail surfaces, or propellers to an extent which would make it impossible for it to take off or may even sink it.

c. In a transfer case some time ago, the lifeboat commander ran his boat under the plan's wing in trying to approach the plane's side hatch. The boat was hit by the spinning propeller and was badly damaged; the crew had to dive overboard to escape and one man was injured; and the plane could not take off and had to be towed into port.

d. Every minute on the water is hazardous for a plane, therfore it must become airborne as soon as possible.

2. Preparation of patient. The patient is prepared for transfer and, if not ambulatory, should be secured in a Stokes litter equipped with flotation gear. He is then placed in the lifeboat. Where the transfer is from plane to ship, preparations are made to receive the patient.

3. Ship's manuever. The master manuevers the ship to provide a lee for the plane after it has landed.

4. Boat's approach. After launching, the lifeboat should approach the plane from astern, on its lee quarter, and stand off a safe distance. The side will be determined by which side hatch the plane crew opens to launch their raft, generally on the lee side. The plane will keep one or both engines running and will head into wind and sea. Emergency boats equipped with radio should attempt to communicate with the plane, having arranged for the frequency in advance over the ship's radio.

5. Use of raft by plane. The plane's crew will generally launch their inflatable raft from a side hatch on the lee side, with a crewman aboard. The raft's painter will be tended from the side hatch and will be used to haul the raft back. The man in the raft will row to the ship's boat, standing off astern. Since the rubber raft is difficult to control under oars in any appreciable wind or sea, the boat's crew should toss the buoyant heaving line to the raft alongside. The plane crew tend their line to steady the raft. After transfer of the patient to or from the raft, the plane crew haul it back alongside their side hatch while the boat crew tends their line to steady the raft and to keep it from drifting into danger. The plane will generally abandon their raft after the transfer is completed because of the time element and the difficulty of deflating the cumbersome raft. If so, the boat crew should retrieve, deflate, and stow it.

6. Return to ship. The boat will return to the ship, which will have manuevered as appropriate and to provide a lee, and will be recovered as quickly as possible.

C. Rescue from Disabled Plane.

1. Difference in procedure. The major difference in transfer from a manueverable plane and rescue of personnel from a disabled plane is in the boat's approach to the plane. A plane on the water will generally "weathercock" or head into the wind unless it has shipped water or been damaged. A disabled plane, unless low in the water, will drift faster than a lifeboat. Therefore the boat should generally approach the plane from windward to avoid being rammed.

2. Removal of personnel. Personnel are taken off using the plane's raft as described above. If not available, the boat should approach as close as is safe, toss the plane a line and haul crewmen to the boat after they have fastened the line around themselves and jumped into the water. In heavy seas, the boat may tow a rubber raft out and drift it down to the plane. The rescue of all personnel is the main objective. Check to see that all the plane's personnel are accounted for and take immediate steps to rescue any who may still be trapped in the plane.

3. Salvage of plane. After transfer of all personnel to the ship, consideration may be given to salvage of the plane.

D. Ship to Ship Transfer.

1. General. MSTS officers and crew members are skilled in ship-to-ship transfer procedures as a result of the numerous mercy and rescue missions they are called upon to perform, their professional competence, and continuing training in emergency seamanship, highline transfer, and lifeboat handling. While ship-to-ship transfers are relatively simple under favorable conditions, high winds, heavy seas, or freezing weather will make such transfers difficult and dangerous. Here the master must use his good judgement to decide upon the best procedure--by highline transfer if too rough for boats and if the other ship is so equipped; by emergency boat where appropriate; and even by shooting a line across and hauling or drifting a boat or a raft down and hauling it back and forth in heavy seas. Under extreme conditions it may even be appropriate to manuever your ship close to a wreck to pick survivors up directly from the water. Each case will depend upon the specific conditions and the master will have to make a command decision regarding the risk and procedures.

2. Manuevering. The master will manuever the ship to best advantage, generally to provide a lee for the emergency boat, to distribute storm oil when necessary, and to pick up the emergency boat.

3. Launching. Launching the emergency boat under adverse conditions will be aided by proper use of frapping lines, bow and stern painters, mattresses slung over the side, and prompt skillful action of the emergency boat crew and the launching crew. Procedures for launching and handling boats are described in detail in the MSTS Lifeboat Training Guide.

4. Use of liferaft. Under difficult sea conditions, an inflatable liferaft can be used by first shooting a messenger to the other ship with an out-haul line attached. The inflatable liferaft should be inflated on deck, then the out-haul and in-haul lines attached by passing them through and attaching them to the towing rings as a bridle so that the strain is distributed evenly around the raft. Since currently-approved rafts were not designed for rescue work, this method will serve to strengthen the raft for rescue purposes until a suitable built-in towing bridle is developed and approved by the U.S. Coast Guard. *

5. Swimmers. A strong swimmer shall always be assigned to the emergency boat to aid in recovery of persons in the water, including personnel who may jump over the other ship's side to be picked up in a rescue situation. Buoyant lifelines serve to good advantage here. Swimmers will also be stationed to aid if needed during embarkation of personnel and recovery of the emergency boat.

6. Recovery of emergency boat. Safety of life and avoidance of injury shall be paramount and shall take precedence over recovery of the boat. Embarkation ladders and cargo nets shall be readied over the side to get passengers and boat crew aboard quickly. Lifelines shall be used to help personnel aboard. In some cases, the boat may be hooked on to the falls and hauled aboard with all personnel in it without delay. In others, where recovery of the boat would be hazardous, it may be cast adrift as soon as personnel are safely aboard.

VI. TRAINING. All personnel who may be engaged in a Mercy and Rescue transfer shall be carefully instructed in their duties and responsibilities. Emergency boats and launching crews shall be instructed and drilled in all aspects of Mercy and Rescue procedures, by day or by night.

A. Ship-to-Plane Transfer. Emphasis must be placed on the fact that it is dangerous for the emergency boat to approach too close to the plane on the water. The main dangers are:

1. Wing tip floats, due to rolling of the plane when down on the water, can injure personnel and can capsize or damage the rubber raft or lifeboat. If the plane's floats are damaged, it may prevent its take-off.

2. Tail surfaces of a plane when down on the water are a danger to boats approaching and if damaged may prevent the plane from taking off. Additional hazard to the plane, and to the boat and its crew, is caused by the vertical motion of the tail surfaces of the plane while pitching in seas.

3. The plane's hull is very easily damaged by contact with a boat. Even slight damage from collision with the boat may cause sinking of the plane.

4. The lifeboat must keep clear of the plane's propellers at all times, even when the propellers are stopped, and must not pass under the plane's wings, in most circumstances, due to low clearance. If absolutely necessary to pass under the wing, insure that there is sufficient clearance and proceed with caution.

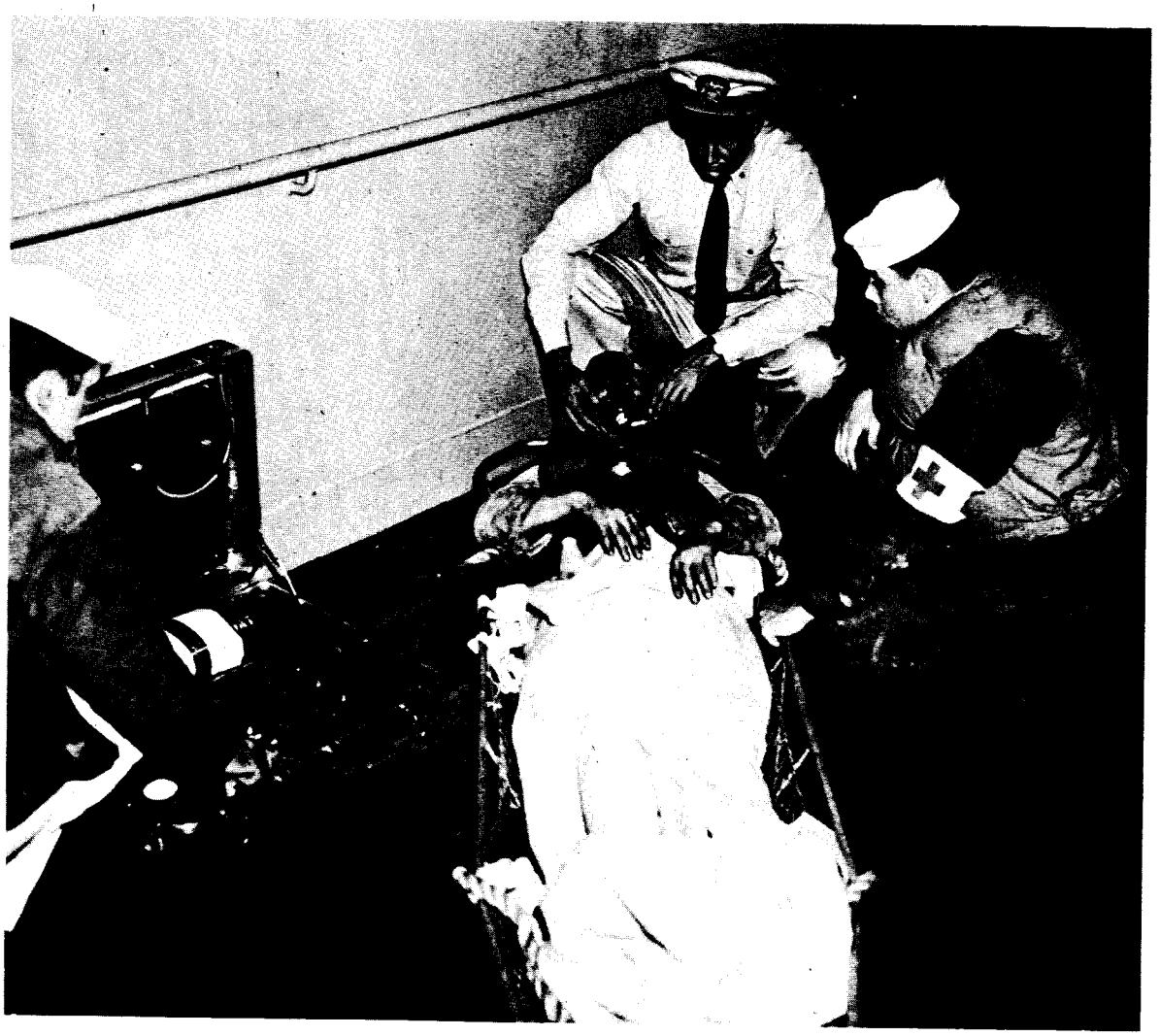
5. Seaplanes normally "weathercock" or point into the wind when on the water. The type approach, whether from ahead or from the quarter, will depend on the situation. The pilot will have the final say concerning the approach. If weather or wind conditions permit a boat to safely come alongside a plane, the approach from the quarter will probably be the best. Ease of transfer is normally greater at the waist than at the nose. However, a hard and fast rule can not be made.

B. Ship-to-Ship Transfer. In training, refer to the man overboard emergency bill, the highline transfer bill, and the Lifeboat Training Guide and procedures. Discuss with all personnel involved how these procedures would be modified for ship-to-ship transfer under all conditions of wind, sea, freezing weather, and during day or at night.

C. Rescue of Personnel from a Sinking Ship.

1. Case Studies. The best possible instruction and preparation for rescue of personnel from a sinking ship is the discussion of appropriate lessons from casualties or MSTS casualty reviews. Recommended are the TITANIC, ANDREA DORIA, and EMPIRE WINDRUSH casualties in Chapter 7. Also, the rescue of the FLYING ENTERPRISE crew by the USNS GEN. GREELY, described in the MSTS magazine of March 1952.

2. Emergency Evacuation Bill. This bill, Section 1.13, should be reviewed with particular attention to the offshore boarding of evacuees and patients.



CHAPTER I

EMERGENCY BILLS

Section 1.16

HELICOPTER LAUNCHING AND RECOVERY BILL

I. PURPOSE. The Helicopter Launching and Recovery Bill prescribes responsibilities and procedures for assuring the safe take-off and landing of helicopters in project ships which have helicopters assigned and the personnel and equipment to handle them. Other ships may, on occasion, be required to provide a landing platform for helicopters and to aid them take off again. Helicopters provide valuable rescue and assistance support in special situations. Therefore all ships should be prepared to provide a landing and take-off platform for helicopters when necessary. A helicopter faces hazards which must be anticipated and guarded against. This bill identifies these hazards, designates preventative measures,. and thus provides for efficient helicopter operations. Additional information will be found in the effective revision of the Handbook of Helicopter Operations and Procedures, COMNAVAIRLANT INSTRUCTION P3700.5. When a helicopter deck crew is on board, they will handle launching and recovery. The ship's crew will assist as requested. *

II. ORGANIZATION.

A. Bridge. Sufficient personnel shall be assigned to hoist signals, man sound-powered phones to the flight deck area, operate the radio-telephone, and for other necessary duties as designated by the Master.

B. Engine Room. Sufficient personnel shall be assigned to the engine room for the maneuvering of the ship.

C. Flight Deck Area. Personnel at the flight deck area shall include a plane director, fire guard, first aider, and tie-down and chock personnel. A ship's fire party shall man two fire stations in the flight deck area and shall be equipped with at least four 5-gallon cans of foam at each station. Additional personnel shall be assigned by the Master, as necessary, to combat a fire on the flight deck and to effect rescue of personnel. Continuous sound-powered telephone communications will be maintained between flight deck and bridge during operations. *

D. Emergency Boat. The emergency boat shall be lowered to the embarkation deck with crew embarked, engine warmed up, and ready for immediate launching.

E. Engine Department. Engine department personnel will be assigned to assist the deck crew as directed by the Master. *

III. RESPONSIBILITIES. Key personnel shall have the following responsibilities for helicopter launching and recovery.

A. Master. The Master shall ensure that the officers and crew are trained in damage control procedures in the event of casualty to the helicopter during launching and recovery. He shall maneuver the ship and make every effort to provide ideal relative winds (approximately 35 degrees on either bow), keep the platform as steady as possible subject to weather conditions, proximity to land, and other ships in the vicinity.

B. Chief Engineer. The Chief Engineer shall ensure that sufficient engineering personnel are assigned in the machinery spaces to maneuver the ship during launching and recovery operations.

C. First Officer. The First Officer, under the Master, is in overall charge of the ship's crew at the flight deck area. He shall thoroughly train ship's personnel who are involved in launching and recovery operations in their duties and responsibilities. He shall ensure that appropriate gear is at the scene and ready for use -- two hoses with full pressure to the nozzles, sufficient foam, two OBA's, applicators, and proximity fire fighting suit. In addition he shall see that the emergency boat is readied at the embarkation deck for immediate lowering.

D. Second Officer. The Second Officer, under direction of the Master, will see that the radar is manned and that a position plot of the helicopter is kept while it is airborne, within the capability of the radar set.

* E. Third Officer. The Third Officer, under direction of the First Officer, is assigned the duties of plane director when a helicopter deck crew is not assigned. He will give the appropriate commands to the handling crew and will also give the proper helicopter launch and recovery signals.

* F. Fourth Officer. The Fourth Officer, under the direction of the Master, will collate weather information during the period that the helicopter is airborne. He will relay weather information to the helicopter pilot upon request, via radio-telephone. He will also be alert to relay changes in weather information; such as, fog setting in, squalls, or other weather information that might jeopardize the safe return of the helicopter to the ship.

G. Radio Officer. The Radio Officer will test and operate the radio-telephone during helicopter operations. He shall establish communications prior to launching and shall maintain a radio-telephone watch while the helicopter is airborne.

H. Helicopter Pilot. The Senior Pilot should arrange an early conference with the Master and key officers to brief them on the technical aspects of helicopter operations. A survey of the helicopter area should be made to ensure that the helicopter can be launched and recovered safely and that all necessary arrangements are made.

IV. CONDITION OF READINESS. In ships preparing for helicopter landings and take-offs, "cruising" condition shall be set and maintained throughout the operation.

A. "Cruising" Condition (steam and diesel ships).

1. During normal "cruising" condition, machinery required to operate the plant in the most efficient and economical manner shall be used.

2. When the ship is in confined or inland waters, in heavy traffic, heavy weather, low visibility, or in a combat zone, additional machinery shall be warmed up or started as advisable.

3. Access openings in the area of the flight deck will be secured during launching and recovery of the helicopter.

B. "Emergency" Condition. "Emergency" condition shall be set by the Master of the ship if conditions so warrant.

V. EMERGENCY PROCEDURES

* A. General. Utility helicopters carried aboard MSTS ships normally consist of one helicopter, two pilots and six men. Helicopters are extremely vulnerable to deck damage because of their relatively light weight, top heaviness, and fragile rotor blade system. Therefore, care is required in spotting the aircraft,

lashing it down, and handling it on deck. Similar care is necessary in handling helicopters not assigned to MSTS ships but which may land and take off on special missions.

B. Launching and Landing Procedures.

1. Special Hazards.

a. All unnecessary personnel shall be kept clear of the flight deck during operations.

b. No smoking will be permitted during launching, recovery, and refueling of the helicopter. No smoking will be permitted topside at any time (except in enclosed spaces) while helicopter is on flight deck.

c. The flight deck should be coated with a standard non-skid surface, as prescribed by BUSHIPS INSTRUCTION 9140.1 (effective edition).

d. Flight operations and deck handling of the helicopter are undesirable when the ship is rolling more than 10 degrees. Operations under these adverse conditions should be left to the discretion of the helicopter pilot.

e. Deck padeyes, cleats, chocks, and obstructions should be covered with canvas to prevent snagging of cargo nets during helicopter replenishment operations.

f. To avoid injuries, only the assigned men required to assist shall be permitted at the scene of helicopter operations, and these men should be thoroughly trained and regularly drilled in all procedures and safety precautions. *

g. It is not considered safe to taxi a helicopter around the deck of a ship under its own power. The helicopter should be pushed or pulled into position by hand, and then only with the rotors stopped. *

h. A main consideration in helicopter operations is the small space available for landing and take-off. The First Officer must ensure that all boats and movable deck gear are stowed so as to provide maximum room. *

i. The ship will provide a fire party with two $2\frac{1}{2}$" hoses and foam, a first aider, and other required personnel to assist as necessary. *

j. A crewman should stand by the helicopter at all times it is not completely secured. However, it should be completely secured at all times except during landing and take-off procedures. *

k. Personnel assigned to flight deck area will wear goggles. *

l. Personnel assigned to the flight deck area shall have no loose gear on their person, no pencils in pockets or hats not properly secured. *

2. Launching. Launching is a ticklish operation requiring the ship to be maneuvered into the best possible position. All hands must be alert to assist and to avoid casualties. *

a. Helicopter hand signals are given by means of:

(1) Red or green flags for daytime operations.

(2) Red, amber or green wands for night operations.

(3) Red and green wands or flags should never be displayed simultaneously during helicopter operations.

b. The plane director positions himself in plain view of the pilot.

c. The pilot will not start his engine until properly directed and signaled.

d. A fire guard is stationed by the helicopter exhaust stack with a CO2 extinguisher. The plane director will then signal the pilot to start by giving a "thumb up" signal, making a rotating vertical motion with his right index finger, and holding a red flag in his left hand above his head.

e. The plane director will display a red flag during daylight (green flag shall be out of sight) until lines, chocks and tie-downs are clear prior to take-off.

f. When engine temperatures are within operating limits, the pilot will not engage the rotors until the plane director has checked to see that all blades are free and personnel are clear.

g. The plane director will then respond to the pilot's signal (circular motion of hand at eye level, with index finger pointing up) with a horizontal rotating motion of his hand with index finger at eye level and red flag in left hand above head.

NOTE: The HTL/HUL type helicopter blades rotate when engine starts.

h. On completion of the warm-up, the pilot will notify the director with a "thumb up" signal when he is in all respects ready for take-off.

i. The director relays this information to the bridge.

j. When he receives instructions to launch the helicopter, the director shall check the take-off area to see that it is clear of obstructions and personnel, direct the removal of tie-downs and chocks, and only then display the green flag, simultaneously concealing the red flag.

k. The green flag indicates that the ship is ready to launch the helicopter.

l. The pilot shall not take-off until he is sure all tie-downs are off and that the intended flight path is clear.

* 3. Landing. The ship is maneuvered to provide ideal relative winds and to afford a steady platform.

a. When the ship is ready to receive the helicopter, the order to land aboard may be given by any of the following standard signals:

(1) Radio-telephone.

(2) Flag hoist.

(a) Display KILO at dip ..... Helicopter operations imminent.

(b) KILO two-blocked ..... Cleared for helicopter operations.

(3) Blinker light.

b. The director takes station in the landing area and is equipped with red and green flags.

c. He displays a red flag if the helicopter area is not clear for landing.

d. A green flag indicates that the landing area is clear and that the helicopter pilot may complete his approach and land.

e. Immediately after the helicopter has landed aboard, and upon signal from the pilot, tie-downs are attached to all landing gear struts.

f. The tail wheel should be locked, if applicable.

g. The director displays the green flag or signal until the first tie-down has been made fast.

h. As soon as one or more tie-downs are secured to the helicopter, the director shall display the red flag, or signal, indicating to the pilot that the aircraft is tied down.

i. The red flag is displayed until the engine has been cut and rotors have stopped.

j. Except in an emergency, helicopter landing operations shall not be conducted while the ship is turning because of the dangerous combination of:

(1) The tilted deck.

(2) The rapidly changing velocity and direction of wind.

4. Communications.

a. No flights shall be conducted, except in extreme emergency, without two-way radio communication.

b. Frequent radio checks while airborne are desirable since sudden adverse weather conditions are not uncommon. Failure of communications should automatically be the recall signal for the helicopter.

5. Launching and Landing Precautions. Whenever the helicopter is airborne over the water, all stations should be manned and ready, with the deck prepared for emergency recovery in the event an immediate landing is necessary. The emergency boat should be cleared away at the embarkation deck, with crew standing by ready for immediate lowering, and a fire party should also stand by.

6. Safety. Safety precautions should be observed during all helicopter operations.

a. Fire. The magnesium alloy skin of most helicopters when ignited produces a very hot fire which is extremely difficult to extinguish.

(1) Mechanical foam should be used to insulate and protect the deck in the fire area.

(2) Water fog should be used to keep fire in check while the magnesium burns itself out.

(3) Never use a solid stream of water on a magnesium fire since water will cause an explosion.

(4) An adequate fire watch must be maintained during all flight operations.

b. Refueling.

(1) The First Officer shall station a fire party at the helicopter during refueling operations.

(2) Gas or oil spills shall be washed down promptly.

(3) Refueling with the helicopter engine running will **not be permitted even during extreme emergencies. It is far better to take the few extra minutes to stop the engine and then start it up again only after completing fueling.**

VI. EQUIPMENT. Equipment required to support helicopter operations includes the following: *

A. Signaling Equipment. Red and green signal flags and wands.

B. Helicopter Lashings. Tie-downs, chocks, and other lashings are brought with the helicopter or can be provided from ship's gear.

C. Communications Equipment. Communications are provided utilizing ship's equipment, including sound-powered phones to the flight deck.

D. Fire Fighting Equipment. This is provided from the ship's damage control allowances.

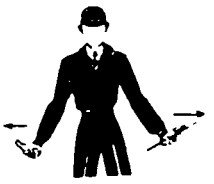
E. First-Aid Equipment. This is provided from the ship's medical equipment allowances.

VII. TRAINING. All personnel involved in the launching and recovery of helicopters shall be thoroughly instructed and drilled in their duties and responsibilities. Fire fighting parties and personnel assigned to the emergency boat shall be instructed and trained in all aspects of launching, recovery, and refueling procedures. The helicopter crew and ship's crew should discuss launching and recovery procedures in order to assure close coordination and full understanding of all operations, including emergency action. Detailed operating procedures, signals, and precautions will be found in the effective revision of Handbook of Helicopter Operations and Procedures, COMNAVAIRLANT INSTRUCTION P3700.5 & NAVAIR SHIP HELICOPTER OPS, NWIP 41-6 ch 3

VII. SIGNALS. The assigned helicopter flight deck crew will handle all signaling and flight deck operations. In ships without flight deck crews, designated ship's personnel will be trained and checked out in these functions. Helicopter launching and recovery signals used by the plane director and pilot are shown in the accompanying illustrations.

NOTE: Training Film MN-9763, "Helicopter Operations Aboard Non-Aviation Ships," 22 minutes, in color, unclassified, is available for orientation purposes.

HELICOPTER LAUNCH SIGNALS

PILOT TO DIRECTOR	DIRECTOR TO PILOT
 "READY TO START ENGINE" SIGNAL THUMB UP	 "READY-START ENGINE" SIGNAL RED FLAG THUMB UP-ROTATE
 "READY TO ENGAGE ROTORS" SIGNAL INDEX FINGER-ROTATE	 "ENGAGE ROTORS" SIGNAL RED FLAG INDEX FINGER-ROTATE
 "READY FOR TAKE OFF" SIGNAL THUMB UP	 "TAKE OFF" SIGNAL GREEN FLAG ROTATE DIRECTION OF TAKE OFF
 "REMOVE CHOCKS" AND/OR TIE DOWNS" SIGNAL ARMS APART THUMBS OUT	 "HOLD POSITION OR STOP" SIGNAL FISTS CLENCHED
DIRECTOR TO DECK CREW SIGNALS	
 "REMOVE BOOTS" SIGNAL RED FLAG POINT TO BOOT	 "REMOVE TIE-DOWNS" SIGNAL ARMS APART THUMBS OUT

HELICOPTER RECOVERY SIGNALS

DIRECTOR TO PILOT

"LANDING DIRECTION"

SIGNAL

BACK TO WIND
GREEN FLAG
POINT TO
LANDING SPOT

"LOWER YOUR WHEELS"

SIGNAL

GREEN FLAG
CIRCULAR MOTION
OF HANDS

"ROGER" TO LAND

SIGNAL

GREEN FLAG
ARMS HELD
STRAIGHT OUT

"REVERSE SLANT"
MOVE TO YOUR RIGHT

SIGNAL

GREEN FLAG
RIGHT HAND UP

"SLANT"
MOVE TO YOUR LEFT

SIGNAL

GREEN FLAG
LEFT HAND UP

"MOVE FORWARD"

SIGNAL

GREEN FLAG
BECKONING MOTION
WITH BOTH HANDS

"MOVE BACK"

SIGNAL

GREEN FLAG
PUSHING MOTION
WITH BOTH HANDS

"SWING TAIL"
RIGHT OR LEFT

SIGNAL

GREEN FLAG
POINT TO PIVOT WHEEL
COME-ON WITH OTHER

"HOVER"

SIGNAL

GREEN FLAG
ARM FOLDED
OVER CHEST

"LAND"

SIGNAL

GREEN FLAG
HANDS AT CHEST THEN
RIGHT HAND UP WITH
LEFT POINT TO SPOT

"WAVE-OFF"

SIGNAL

GREEN FLAG
WAVE ARMS
OVERHEAD

"CUT ENGINE"

SIGNAL

RED FLAG
CUT THROAT WITH
RIGHT HAND

PILOT TO DIRECTOR

"ATTACH TIE-DOWNS
AND/OR INSERT CHOCKS"

SIGNAL

SWING ARMS TOGETHER
THUMBS INWARD

DIRECTOR TO TIE-DOWN CREW

"ATTACH TIE-DOWNS"

SIGNAL

GREEN FLAG
SWING ARMS TOGETHER
THUMBS INWARD

CHAPTER 2

BASIC DAMAGE CONTROL - For All Hands (Lesson Plans)

Section 2.1

INTRODUCTION TO DAMAGE CONTROL

I	Objectives	IV	Presentation
II	Material	V	Summary
III	Introduction	VI	Test

I. OBJECTIVES. The objectives of this session on Introduction to Damage Control are:

A. To introduce the Basic Damage Control course.

B. To cite the authority for damage control training in MSTS ships in-service (USNS) (civil-service-manned).

C. To establish the objectives of damage control training.

D. To acquaint all hands with the organization for and conduct of the damage control program.

E. To enlist active participation of all hands in the program.

II. MATERIAL.

A. Training Aids.

1. Film MN-8387, "Damage Control Training, Civilian-Manned Ships."

2. Chart, Typical MSTS Ship's Damage Control Organization.

B. References.

1. Damage Control, Thos. J. Kelly, Chap. I-IV.

2. Damage Controlman 3 & 2, NAVPERS 10571-C, Chap. 1.

3. COMSTS INSTRUCTION 3120.2, (effective revision).

4. Damage Control Bill, Section 1.1.

5. Disaster Control, NAVPERS 10899.

C. Handouts. Reproduce an appropriate selection(s) from Chapter 7.

III. INTRODUCTION.

A. Introduce self and subject (Introduction to Damage Control).

B. Establish scope of session and state objectives.

C. Arouse interest:

1. Damage control consists simply of equipping ships and organizing and training their crews to prevent, prepare for, and control emergency situations; making emergency repairs to keep the ship operating; and the safeguarding of personnel. It is far better to prevent casualties in advance than to control them after they occur. If a casualty should occur, preparation will pay off--for an effective damage control program is 90% preparation and only 10% application.

2. Naval architects are continually improving the design and safety characteristics of our ships. Yet ships and lives are still lost. Why?

a. Because, in most cases, ships are manned by incompetent crews. That is, crews are not organized and trained in the proper use and care of emergency equipment such as portable firefighting and pumping equipment and such built-in damage control features as WTD's, FSD's, piping systems, CO2 systems, electrical systems, and lifesaving gear. An effective damage control organization is necessary to assure good teamwork in coping with emergencies that may arise.

b. Let's discuss a few of the casualties which might have been averted if crews had been properly equipped and trained:

(1) The S.S. MORRO CASTLE (see Section 7.1)

(a) Caught fire September 8, 1934.

(b) 318 passengers and 231 crew members were aboard at the time.

(c) Even today, the MORRO CASTLE would be considered a modern vessel.

(d) She had nine watertight transverse bulkheads, electrically operated watertight doors, and her decks were of steel, laid with teak.

(e) Her firefighting equipment consisted of two types of smoke detecting systems, nearly one hundred fire extinguishers, and 2100 feet of fire hose.

(f) Yet, with all this, she became a total loss, and 135 lives were lost.

(2) The S.S. TITANIC (see Section 7.2)

(a) Another ship that today would be considered a modern vessel.

(b) With 2224 persons aboard, she struck an iceberg.

(c) She struck so lightly that card players in the smoking room were not even aware of the situation.

(d) As a result of the collision, 1513 persons lost their lives. When the bodies were examined it was found that only one had drowned; the rest had died of exposure.

(3) S.S. ANDREA DORIA AND S.S. STOCKHOLM (see Section 7.4)

(a) On the night of 25 July 1956, the DORIA and STOCKHOLM collided violently. As a result, fifty persons lost their lives. Only very favorable weather conditions and outstanding rescue efforts by other ships at the scene prevented a much greater loss of life.

(b) The DORIA was subdivided into twelve watertight compartments with a double hull and double bottom.

(c) She was designed to remain afloat even with two compartments flooded.

(d) The STOCKHOLM's ice-strengthened bow cut a hole 40 feet wide, and penetrated a distance of 40 feet, almost half the DORIA's beam and extending through all its 10 decks.

(e) The DORIA took a starboard list almost immediately. Within a half hour she was listing 25 degrees, and 45

degrees two hours later. Because of this list, the port lifeboats could not be lowered.

(f) It is apparent that watertight integrity was not maintained and that the ship's sinking was caused by progressive flooding. The STOCKHOLM's watertight doors were closed thus keeping her afloat and permitting her to assist in rescue efforts and to make port.

(g) An effective damage control organization, training, and teamwork might have saved the DORIA.

3. Bright spots in marine casualties where training has paid off:

a. The S.S. EMPIRE WINDRUSH (see Section 7.6)

(1) A fire caused by an engine room explosion gutted the ship.

(2) Over 1500 passengers, including women, children and invalid soldiers, were aboard at the time.

(3) Four lives were lost in the initial explosion, none in the action that followed.

(4) Abandon ship was accomplished calmly and without panic in spite of the raging fire, the threat of exploding boilers, and immediate loss of power.

(5) This can be attributed to preparation through organization, training and drills.

b. The USNS FREEMAN and USNS SAN LUIS OBISPO (see Section 7.5)

(1) On 21 July 1956, the FREEMAN and the tanker SAN LUIS OBISPO collided in a dense fog.

(2) The FREEMAN was damaged over a vertical and horizontal area 32 feet by 32 feet on the 4th and 5th decks to a depth of 6 feet, and 10 inches above the waterline.

(3) The ship was heeled over by transferring fuel and water, and temporary repairs were completed by repair parties in 40 minutes.

(4) The SAN LUIS OBISPO was damaged between her stem and forward edge of the hawse pipe, a fore and aft distance of approximately 4 feet.

(5) There were no personnel casualties in either ship. Both ships made port safely.

c. The USNS MARINE CARP (see Section 7.7)

(1) While on Arctic operations, ice gashed her hull at #2 hold. Water level in #2 hold reached 21 feet. Portable eductors, electric submersible pumps and comprehensive shoring enabled the crew to control and repair this damage effectively.

4. Good damage control training and teamwork has also paid off in many other ships. No doubt many examples of both poor as well as effective damage control can be recalled by any group of seamen.

5. What are the factors that insure readiness to cope with such disasters?

a. Care and maintenance of equipment.

b. Organization and training.

6. This Introduction to Damage Control will teach you:

a. The meaning of damage control.

b. The results of effective and poor damage control.

c. The objectives of damage control training.

d. The damage control organization and your place in it.

e. How damage control training is carried out in MSTS.

7. Effective damage control training:

a. Will insure proper maintenance and use of damage control characteristics of the ship such as:

(1) Stability.

(2) Hull construction.

(3) Installed damage control equipment.

(4) Portable damage control equipment.

b. Will assure proper action by all hands in event of a casualty.

c. Will assure the safe arrival at its destination of your

ship, your passengers, and your cargo.

d. Is an invaluable insurance.

8. Upon successful completion of this course you should:

a. Know your role in the damage control organization of your ship.

b. Be able to carry our your emergency assignments properly.

c. Be able to carry out other emergency assignments in addition to your own.

d. Know that damage control is an all-hands coordinated operation.

IV. PRESENTATION - Introduction to Basic Damage Control Course

A. Scope of damage control course. The basic damage control course, for all-hands, covers:

1. Watertight integrity.

2. Damage control markings.

3. Fire fighting equipment and tactics.

4. Shipboard organization for damage control.

5. ABC (atomic, biological and chemical) defense.

B. Methods of Instruction. Damage control instruction includes the following methods:

1. Lectures and discussions by damage control instructors and ship's officers.

2. Practical demonstrations of techniques and use of equipment, in class ashore or aboard ship.

3. Training films

4. Quizzes

5. Skill tests in use of equipment and proper damage control techniques.

C. Certification.

1. Completion of this basic course is noted in each man's Training Record and entries are made recording completion of all other training courses. Call attention to Thucydides quotation on back (see Forward, first paragraph). Explain that the MSTS program is aimed at developing confidence through skills acquired and retained in an organized program of instruction and drills.

2. Civilian Marine Employee Ship Record, contains a complete record of all in-service training completed by each man. A duplicate record is maintained in his individual Continuous Sea Service Record and Training Record booklet.

D. History of Damage Control. World Wars I and II have offered many examples of both effective and poor damage control in ships.

1. German Navy. The German Navy had an effective damage control program before World War I. This was centered around built-in damage control facilities and shipboard organization.

a. Ships were constructed with duplicate systems and small watertight compartments extending to the main deck -- you could get from one compartment to another only by going up and over.

b. New damage control equipment was developed.

c. Schools were established and men trained.

d. Ships crews were organized to make the best use of built-in facilities and equipment.

2. Bismark. It was not just a matter of luck that in the Spring of 1941 the 50,000 ton German battleship Bismark remained afloat after a North Atlantic raid in which she blew up HMS Hood, damaged HMS Prince of Wales and engaged practically the entire British fleet in the area. A lucky hit by a torpedo plane disabled the Bismark's steering gear and reduced her speed and maneuverability. She absorbed 30 hits from 16-inch, 15-inch and 14-inch shells from battleships (each projectile weighs about a ton), 300 8-inch shells from cruisers, and innumerable hits by 4.7 inch guns of destroyers. In addition, she had been hit by three aircraft torpedoes, two torpedoes from destroyers, and one large 24 inch torpedo. After all this, the Bismark still remained afloat. Three more torpedoes were required to sink her.

3. U. S. Navy.

a. In the early days of World War II many ships were lost due to the lack of proper damage control equipment and trained crewmen.

OBJECTIVES OF DAMAGE CONTROL

PREVENT DAMAGE BY:

Maintaining WT Integrity
Eliminating Fire Hazards
Maintaining Ship & Equipment
Practice of Good Seamanship & Good Housekeeping

CONTROL DAMAGE BY:

Combating Fire
Controlling Flooding
Maintaining Stability

REPAIR DAMAGE & KEEP SHIP OPERATING

PROTECT PERSONNEL BY:

Safeguarding Passengers
First-Aid Treatment of Injured
Abandon Ship Safely as Last Resort

TRAIN CREWS & INSTRUCT PASSENGERS

ASSURE OPERATIONAL READINESS OF SHIPS

b. Later in World War II, ships were adequately equipped, effective damage control organizations were established, and crews were properly trained. Two ships which were badly damaged but were saved by application of damage control measures were the USS Franklin and the USS Pittsburg. The Franklin was gutted by fire resulting from two 500 pound bombs which penetrated through her flight deck, and exploded in the hanger deck, setting fire to fuel and ammunition in planes on the hanger deck. The Pittsburg lost her bow in a typhoon, yet both ships effected emergency repairs and made port under their own power.

E. Authority for Damage Control Training in MSTS.

1. COMSTS INSTRUCTION 3120.2 (effective revision), Section 18 on damage control and Section 19 on shipboard drills, spells out procedures for the damage control program and shipboard drills.

2. CMPI 410 contains MSTS training policy and states who will be trained, how training will be accomplished, and what training will be undertaken.

3. Standard station bills and the MSTS Damage Control Manual, COMSTS INSTRUCTION 3541.5 (effective revision) standardize organization for damage control in all MSTS ships and provide standard emergency bills and training material.

F. Objectives of Damage Control Training. These are to assure competent, skilled crews capable of:

1. Preventing fires and other casualties.

2. Controlling damage that does occur.

3. Accomplishing emergency repairs as rapidly as possible.

4. Protecting personnel in emergencies:

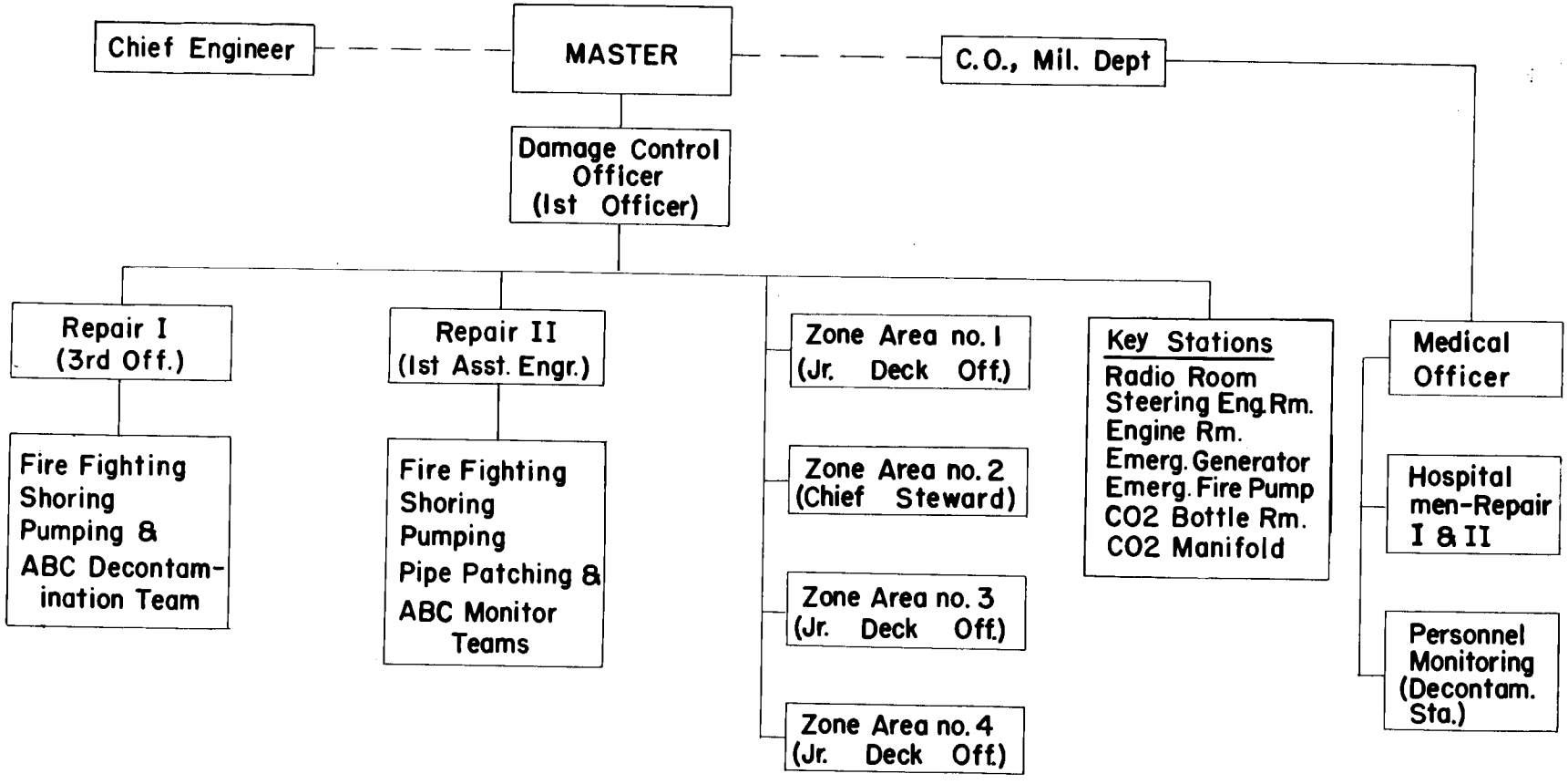
a. By applying first-aid.

b. By abandoning ship if necessary, safely and efficiently.

c. By assisting other ships in difficulty.

G. Organization for Damage Control.

1. Refer to the illustration, Typical MSTS Ship's Damage Control Organization, and explain the organization, responsibilities, and stations.



TYPICAL MSTS SHIP'S DAMAGE CONTROL ORGANIZATION

2. Standard Station Bills. Use the ship's station bill in discussing:

a. Fire and emergency assignments.

b. ABC defense assignments.

c. Abandon ship assignments.

d. Emergency boat assignments.

e. Emergency signals (stress the importance of knowing them).

f. Safety-at-sea instructions (stress these).

g. Locations of fire stations, watertight doors, and remote-controlled reach-rods (relate their identification to the marking system and the ship's profile drawing).

h. Zone areas. Explain the division of the ship into zone areas based on watertight compartmentation and the use of zone areas in the ship's damage control organization. Use the ship's station bill to show the zone areas and give examples of crew members' stations and duties within zones.

3. Bunk cards. Emergency Assignments card (MSTS Form 3541-2). Show card and explain use and location at each man's bunk to supplement information on the station bill.

H. Damage Control Organization. Damage control organization and responsibilities are outlined in the Damage Control Bill (see Section 1.1).

I. Emergency Signals. General emergency signals are listed on standard MSTS station bills as follows:

1. Fire, Collision, and General Emergency. (———————) For fire, collision, and general emergencies steady ringing of the general alarm bells and ~~rapid ringing of the ship's bell~~ A CONTINUOUS BLAST OF THE SHIP'S WHISTLE for at least 10 seconds followed by appropriate announcement on the PA system.

2. ABC Defense (——————— - —— - —— - ——) For ABC defense, the steady ringing followed by short and long rings (- ——) ("A") on the general alarm bells for at least another 10 seconds. Supplementary PA announcements shall be made in ships so equipped.

3. Abandon Ship (▬▬▬▬▬▬▬▬▬▬). More than six (seven or more) short blasts and one long blast on the ship's whistle and the same signal on the general alarm bells, followed by PA announcement in ships so equipped.

4. Whistle Signals For Handling Boats.

Lower boats.....one short blast (-)
Stop lowering boats.....two short blasts (--)
Recall and recover boats ..... a short, a long, and a short blast (-▬▬-) ("R")

5. Man Overboard (▬▬▬▬▬ ▬▬▬▬▬ ▬▬▬▬▬). Three long rings on the general alarm bells ("O"), announcement on the PA system in ships so equipped, three long rings on general alarm bells.

6. Signals for Directing Emergency Boat. Use radio as first choice - otherwise by whistle, light, or flags. Whistle signals should not be used to direct emergency boat when other ships are in the vicinity because of conflict with passing signals.

Turn to starboard.....One (-)
Turn to port.....Two (--)
Dead ahead.....Three (---)
Towards ship.....Four (----)
Stand off, we are maneuvering (Danger Signal).....Five (-----)

7. Steering Casualty (▬▬▬--). One long and two short rings on the general alarm bells ("D"), announcement on the PA system in ships so equipped, one long and two short rings on the general alarm bells. When other ships are in the vicinity, international code flag hoist "D" and/or one long and two short blasts on the ship's whistle will be used to advise "Keep clear of me - I am maneuvering with difficulty."

8. Dismissal From any or All Drills (---). Three short blasts on the ship's whistle and the same signal on the general alarm bells, followed by PA announcement in ships so equipped.

9. Other Emergencies not Requiring All Hands. Announcement on the PA system in ships so equipped or pass the word.

J. Emergency Procedures. A plan of action for each specific emergency is outlined in detail in the emergency bills in Chapter 1.

1. General safety-at-sea instructions are given on station bills. These provide that:

a. All stations be manned in accordance with the station bill.

b. Repair parties report to damage control lockers and prepare to go to scene of casualty as directed.

c. Zone area personnel make closures, patrol assigned stations, report to zone area officers, and assist repair parties.

2. Procedures in general emergencies are as follows:

a. Fire: (See fire bill, Section 1.2).

(1) Investigate extent of fire and report to damage control central (the bridge) immediately, via the zone area officer in a general alarm.

(2) Confine and fight the fire.

(3) Protect personnel.

(4) Extinguish the fire.

(5) Repair damage.

b. Collision: (See collision bill, Section 1.3).

(1) Investigate damage and report.

(2) Make closures to confine flooding.

(3) Establish secondary flooding boundary.

(4) Unwater flooded compartments.

(5) Plug and patch as necessary.

(6) Shore weakened structures.

(7) Repair damage.

c. ABC Defense: (see ABC defense bill, Section 1.5)

(1) Ship will be maneuvered to evade danger areas.

(2) Secure all ventilation.

(3) Button-up all openings.

(4) Activate the washdown countermeasure.

(5) Get all personnel inside.

(6) Monitor for contamination afterward.

(7) Decontaminate as necessary.

d. Abandon ship. Stations and duties in abandon ship are provided in the station bill; procedures are spelled out in the Abandon Ship Bill, Section 1.4 and in the Lifeboat Training Guide, COMSTS INSTRUCTION 12410.1 (effective revision).

e. Other specific emergency procedures for engineering casualties, man overboard, darken ship, etc., are contained in additional emergency bills in Chapter 1.

K. Know Your Ship. All hands must know their ship, its built-in features, its equipment, and the MSTS marking system. This will:

1. Permit rapid movement to any part of the ship and will assure:

a. Manning of emergency stations quickly.

b. Buttoning-up the ship quickly.

c. Quick and safe handling of personnel casualties.

d. Orderly and rapid exit to abandon ship stations if necessary.

2. Permit use of alternate routes in event of damage.

3. Contribute to the ship's watertight integrity by:

a. Maintaining closures when set.

b. Preventing alteration of watertight fittings.

L. Conditions of Readiness. Two conditions of readiness are established in civil-service-manned ships. These are spelled out in the damage control bill in Section 1.1. These conditions of readiness assure full and effective use of ship's built-in damage control fittings.

1. Emergency (buttoned-up).

a. When set. "Emergency" condition is set when all hands are called to emergency stations or at any time danger to the ship is imminent.

b. How set. Under condition "emergency," all closures and systems shall be secured except those required for the operation of vital machinery or health of personnel. All watertight doors, fire-screen doors, portholes, and other closures are made. All ventilation is secured except that necessary for main propulsion and health of the engineroom watch. During drills, securing of ventilation may be simulated except in the zone in which the casualty is staged. All closures shall be properly made and checked by zone area officers. All hands shall be properly trained in establishing and maintaining watertight integrity.

2. Cruising.

a. When set. "Cruising" condition is set before getting underway, before and while entering or departing port. Setting this condition is particularly important when the ship is in confined or inland waters, in heavy traffic, heavy weather, low visibility, or in a combat zone.

b. How set. "Cruising" condition requires securing, except when actually in use, of manhole covers, sounding tubes, bilge and ballast drain systems, fueling stations, hatches, and watertight doors below the bulkhead deck (the uppermost deck to which transverse watertight bulkheads extend). These fittings are closed and kept closed while "cruising" condition is in effect. When opened for use or passage, they must be closed immediately afterward.

3. Modification of Conditions. After either "emergency"

or "cruising" condition is set, it may be changed or modified only by direction of the master, acting through the damage control officer. Modification of "cruising" condition, at the discretion of the master, may include:

a. Opening watertight doors to provide necessary ventilation and passage.

b. Opening shaft-alley watertight doors in cargo ships for which remote manual controls are installed.

c. Opening shaft-alley watertight doors in transports.

4. Other precautions. Whether at sea or moored, the master shall, in addition to the above requirements, take other precautions and require other closures as necessary for the safety of the ship. He shall insure maintenance of watertight integrity as may be dictated by local situations.

M. Damage Control Training. All civilian marine personnel receive training, afloat and ashore, in the damage control program spelled out in operating instructions and in CMPI 410. Training is in subjects appropriate for each man's rating.

1. The damage control program consists of four phases:

a. Phase I - Initial or refresher training on-voyage by damage control instructors.

b. Phase II - Continuing shipboard instruction and drills by ships' officers, using training material in this Manual and emergency drills specified in operating instructions.

c. Phase III - A one or more ~~two~~-days damage control cruise annually to check proficiency of crew and readiness of ship to cope with any emergency situation.

d. Phase IV - Practical fire fighting, damage control, and NBC defense training at Navy schools ashore.

N. Training Film.

1. Show training film MN-8387 "Damage Control Training, Civilian-Manned Ships." Refer to the instructor's film guide, Appendix B-1. Preview the film, introduce it by telling the group what to look for, and after showing it question the group on key points.

V. SUMMARY.

A. Authority for Damage Control Training. "3120.2C PART I CHAPTER 7 AND 8"

1. COMSTS INSTRUCTION ~~3120.2, Sections 18 and 19.~~

2. CMPI 410.

3. Damage Control Bill.

B. Organization for Damage Control.

1. Standard station bills.

2. Emergency bills.

C. Responsibilities.

1. Key personnel provide leadership.

2. All-hands must know:

a. Their stations and duties.

b. Their ship, equipment, and markings.

c. Emergency signals and instructions (station bill).

d. Initial action required (station bill and bunk card).

VI. TEST. Use these and additional questions as an oral quiz.

A. Q. What is damage control?

A. Damage control is the equipping of ships and organizing and training their crews to prevent,prepare for, and control casualties, to make emergency repairs, to safeguard personnel, and thus to insure safe voyages.

B. Q. What information is found in the station bill?

A. Emergency stations and assignments for each crew member, signals, safety-at-sea instructions, fire station and watertight door locations, in-port instructions, and the ship's division into zone areas.

C. Q. What responsibility does each crew member have for damage control?

A. Each crew member must know his ship, his emergency stations

and duties, emergency signals, and must be prepared to take proper action in any emergency.

D. Q. What is the signal for fire or other emergency?

A. Steady ringing of the general alarm bells and ~~rapid ringing of the ship's bell~~ "A CONTINUOUS BLAST ON THE SHIP'S WHISTLE" for at least ten seconds followed by appropriate announcement on the PA system.

E. Q. What are the three steps necessary to combat a fire?

A. Investigate, confine, extinguish.

F. Q. What are the conditions of readiness and how do they differ?

A. The two conditions of readiness are "emergency" and "cruising". In "emergency" condition all closures are made. In "cruising" condition, all watertight fittings below the bulkhead deck are secured.

G. Q. Where and to whom do you report when you go to your fire and emergency station?

A. Each crew member reports to his station as listed on the station bill and on his bunk card. He immediately begins to button-up his station, investigate his area, and only then reports to his zone area commander.

H. Q. Who is the damage control officer?

A. The first officer.

I. Q. If you are assigned to a repair party, where is your emergency station?

A. Report to the damage control locker for your repair party.

J. Q. How can you easily find damage control equipment and emergency station locations anywhere in the ship?

A. By its damage control marking, which consists of its deck, frame, and side number.

CHAPTER 2

BASIC DAMAGE CONTROL - For All Hands (Lesson Plans)

Section 2.2

WATERTIGHT INTEGRITY

I. OBJECTIVES.

A. To stress the importance of watertight integrity; how it is set and maintained.

B. To acquaint all-hands with the conditions of readiness and how they are set.

C. To stress the responsibilities for making and maintaining closures.

D. To show how closures are made.

II. MATERIAL.

A. Training aids.

1. Film MN-9537B, Damage Control, Maintenance of Watertight Integrity, 17 Minutes.

2. Inboard profile of ship (use chart of ship's plans).

3. Handout - "Danger--Beware Loose Dog!" (Mimeograph this

article as a handout if desired.)
4. FILM MN-10036, SEVEN SAILORS, 1963, 19 MIN, COLOR.

B. References.

1. "Damage Control" by Thomas J. Kelly, Chapter VI.

2. Damage Controlman 3 & 2, NAVPERS 10571-C, Chapter 14.

3. CG 256, Rules and Regulations for Passenger Vessels, Parts 73 & 78.

4. CG 115, Marine Engineering Regulations and Material Specifications, Part 55.10.

III. INTRODUCTION.

A. Introduce self and subject, Watertight Integrity.

B. Establish scope of session and state objectives.

C. Arouse interest.

1. It is apparent that a ship's outer hull and bottom must be watertight.

2. It is less apparent that its inner bulkheads and decks not in contact with the sea must also be watertight to restrict flooding in event of damage. Unless all watertight bulkheads and decks are maintained properly, the ship is in grave danger from progressive flooding. This is the successive flooding of one main watertight compartment after another until the ship sinks.

a. A hole one inch in diameter ten feet below the waterline admits approximately one ton of water every 4 minutes.

b. A hole two inches in diameter ten feet below the waterline admits about one ton per minute.

3. Therefore, it is essential that all watertight fittings in a ship be kept watertight at all times.

4. This lesson will show how watertight integrity is maintained.

IV. PRESENTATION.

A. Definitions.

1. Watertight integrity is the maintenance of the watertightness of those parts of the ship designed to prevent the passage of water.

2. Watertight joints and connections.

a. Bulkhead and deck boundaries.

b. Seams in bulkhead and deck plating.

c. Doublers around openings.

3. Watertight closures and fittings.

a. Doors and hatches.

b. Quick-closing doors and scuttles.

c. Manholes.

d. Piping systems.

e. Vent ducts.

f. Electric wiring tubes.

g. Remote operating gear (reach rods).

4. Bulkhead deck is the uppermost deck to which the transverse watertight bulkheads extend.

5. Reserve buoyancy is the volume of the ship between its waterline and the bulkhead deck, or the watertight volume of the vessel above the waterline.

B. Watertight Features. Use inboard profile of your ship to highlight the following:

1. Boundaries of watertight compartments.

a. Bulkhead deck (non-watertight).

(1) Continuous.

(2) Stepped.

b. Hull Bottom.

(1) Outer bottom.

(2) Inner bottom.

c. Ships' sides between inner bottom and bulkhead deck.

d. Watertight bulkheads.

(1) Collision bulkhead.

(2) All other WT bulkheads.

2. Openings in watertight boundaries below the bulkhead deck.

a. WT doors.

(1) Hinged WT doors. These are installed only above a deck which is at least 7 feet above the deepest loadline. They may have individually operated dogs or a quick-acting hand wheel. SOME SHIPS ALSO HAVE HINGED WTD'S AT THE SHAFT ALLEY.

(2) Sliding WT doors are operated by power and hand gear, where sills are below the level of the deepest loadline. Sliding WT doors operated by hand gear only are installed in some ships.

b. Manholes.

(1) In bulkheads.

(a) Permit access to tanks and voids extending above the inner bottom.

(b) Permitted in machinery spaces only.

2) In inner bottoms.

(a) Minimum number permitted where necessary for access.

c. Portholes or portlights may be of the opening or non-opening type, installed in accordance with rigid shipbuilding specifications. The opening type may be opened only with the consent of the master. Deadlight covers are required on all portholes below the bulkhead deck.

d. Sideports. Their lowest point must be above the deepest loadline.

e. ~~Overhead~~ OVERBOARD discharges are fitted with either two check valves or with one check valve and a positive remote control operated from above the bulkhead deck, and suitably marked.

(1) Rubbish chutes must have covers on their inboard opening. The cover must be watertight if the chute is below the bulkhead deck.

C. Setting Conditions of Readiness.

1. "Emergency (Buttoned-up)" Condition.

a. When set.

(1) When all hands are called to emergency stations.

(2) Any time danger to ship is imminent.

b. How set.

(1) All closures and systems are secured except those required for operation of vital machinery or health of personnel. Closures made are:

(a) WT doors.

(b) Firescreen doors.

(c) Portholes.

(d) All other fittings such as hatches, manholes, sideports, etc.

(e) Ventilation system.

1. Except ventilation necessary for main propulsion and for the health of the engine room watch.

2. Securing ventilation is simulated during drills, except for the zone in which the casualty is staged.

(2) All closures must be properly made and checked by zone area officers.

(3) All closures must be maintained when set.

2. "Cruising " Condition.

a. When set.

(1) Before getting underway.

(2) While entering or departing port.

(3) Setting "cruising" condition is particularly important:

(a) In confined or inland waters.

(b) In heavy traffic.

(c) In heavy weather.

(d) In low visibility.

(e) In a combat or danger zone.

b. How set.

(1) In "cruising" condition, secure except when actually in use:

(a) Manhole covers.

(b) Sounding tubes.

(c) Bilge and ballast drain systems.

(d) Fueling stations.

(e) Hatches and WT doors below the bulkhead deck.

(2) These fittings must be closed immediately after use or passage.

3. Modification of Conditions.

a. "Emergency" or "cruising" condition may be changed or modified only by direction of the master acting through the damage control officer.

b. Modification of "cruising" condition may include:

(1) Opening WT doors for ventilation and passage.

(2) Opening shaft alley WT doors in cargo ships if manual remote controls are installed.

(3) Opening shaft alley WT doors in passenger ships.

D. Closure Responsibilities.

1. In "Emergency" Condition:

a. The senior deck watch officer will sound the appropriate emergency signal and close WT doors by electrical remote control.

b. Zone area personnel make assigned closures upon sounding of the emergency signal and then inspect and maintain assigned closures while patrolling their stations.

c. Zone area officers:

(1) Direct the securing of their zone areas.

(2) Inspect their zone areas to insure that all closures are properly made and maintained.

(3) Report to damage control central by sound-powered phone.

2. In "Cruising" Condition. Closures will be made as directed by the master. The master-at-arms, room stewards and other crew members will make closures, as instructed. The damage control officer will check to assure that closures are properly made.

3. Under All Conditions:

a. All hands must assist in setting and maintaining closures by:

(1) Properly making and checking required closures.

(2) Moving about ship without passing through closed watertight doors.

b. All hands must report when closures cannot be made properly because they cannot be closed or cannot be closed securely.

E. Inspections. All fittings must be maintained in good operating condition. To insure readiness for use and proper closures, the following inspections will be made:

1. Weekly at Sea. Check the following fittings:

a. Watertight doors and their mechanisms, remote controls, and indicators.

b. Remote controls and indicators for valves and closures.

c. Valves and closures (if accessible).

2. Ready-for-Sea Inspection. Before leaving sheltered waters, check to insure proper closure of:

a. Hinged WT doors between cargo spaces.

b. Manholes in WT bulkheads.

c. Side ports.

HINGED WATERTIGHT DOOR DOGGED DOWN

d. Portholes, portlights and deadlights near the waterline, particularly those not accessible during navigation.

F. Tests. Fittings will be tested for proper operation and tightness as follows:

1. Before Leaving Port.

a. Watertight doors will be operated.

b. Valves and closures will be operated including:

(1) Portlights and deadlights. Those near the waterline will be secured as directed by the master.

(2) Scupper closures.

(3) Rubbish chutes.

2. Weekly, At Sea. Valves and closures will be operated.

3. Daily. Watertight doors will be operated.

G. Construction and Operation of Watertight Fittings.

1. Watertight Doors.

a. Hinged Wt doors have a gasket which fits snug against a steel knife-edge and steel wedges against which the dogs set up tight. Hinged WT doors may have individual dogs or a quick-acting wheel.

(1) The individual dog type is closed as follows:

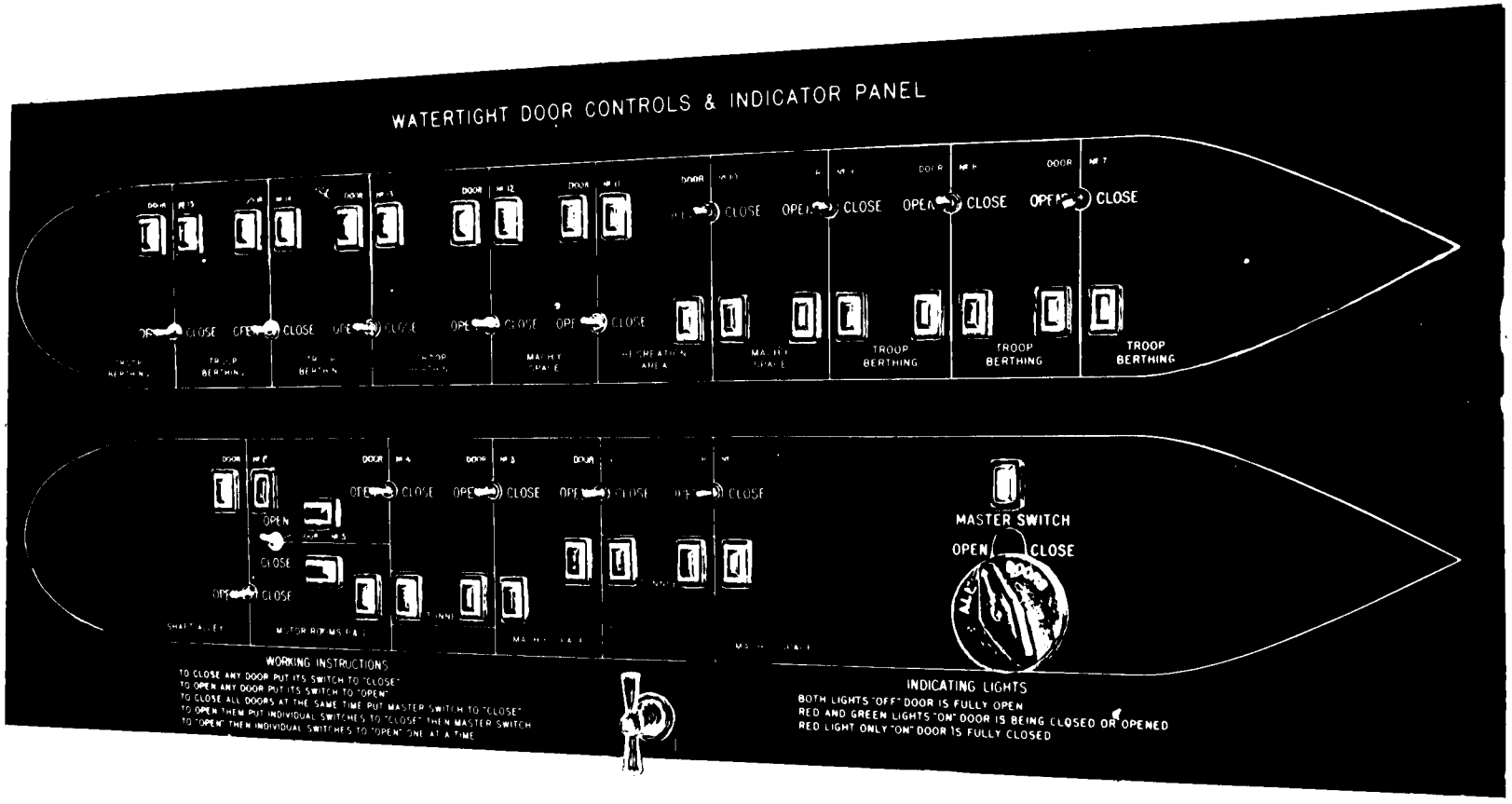
(a) One dog on the side opposite the door's hinges is partially set up to hold the door closed.

(b) All other dogs are partially set up.

(c) Set up all dogs tightly and evenly, a little at a time to dog down the door securely and evenly on all sides.

(d) To open the door, loosen the dogs nearest the hinges first. This keeps the door from springing and makes it easier to open the other dogs.

(2) The quick-acting handwheel WT door has a handwheel mounted on both sides of the door which works all the dogs at the same time by means of gears and levers. It is closed by pulling it tight and turning the handwheel to set up all dogs securely. It should



WTD CONTROLS

work easily and must not be forced or the gears or levers may be damaged.

b. Sliding WT doors have smooth machined surfaces on the door and frame so that the door slides closed to make a tight fit. They are operated by a hand wheel on each side or by remote control from the bridge. An alarm sounds when the door is power-operated.

2. Portholes and Portlights.

a. Have a gasket for watertightness.

b. Portlights have two knife edges, one on the inner rim for sealing against the ship's side and one on the outer rim against which the deadlight gasket seals.

c. Dogs secure the portlight and deadlight cover.

d. Deadlight covers back up and secure the portlight in heavy weather. They have a gasket to provide a tight seal.

e. Method of closing. Demonstrate proper securing of portlight and deadlight covers. Set up evenly on all dogs to avoid cracking the glass.

3. Other Fittings.

a. Manholes have threaded studs, a gasket, a cover, and are secured by tightening down evenly on all nuts.

b. Overboard discharges are closed by means of their remote-controlled valves above the bulkhead deck. These are suitably marked. Overboard discharges which have no remote-controlled valve are fitted with two check valves.

4. Maintenance of Fittings. Fittings must be maintained in good condition, ready for use.

a. Gaskets must fit properly with no gaps or lumps, must be kept free of paint and grease, and must be replaced when hard, brittle or cracked.

b. Knife edges must be kept clean, sharp and true, free of paint, grease or rust. Nicks or burrs may be polished off with emery cloth.

c. Dogs. WT door dogs must not have loose spindles which would permit leaking. They require occasional cleaning. Dogs on portlights must turn easily, threads should be kept clean, and they should have adequate lock nuts where required.

H. Temporary Repairs. In emergencies, temporary repairs may be made to fittings which have been damaged and do not close properly.

1. WT doors may be shored to seat gasket on knife edge.

2. Cracks may be plugged where doors do not seat properly.

3. Damaged doors may be replaced with mattress and shoring.

4. Portholes and hatches may be temporarily repaired in the same manner.

V. SUMMARY. Review the following key points:

A. Watertight subdivision of your ship.

B. Types and locations of watertight fittings.

C. Progressive flooding through an open watertight fitting may cost a ship and lives.

D. Conditions of readiness and how they are set.

E. The importance of maintaining watertight integrity and maintenance of WT fittings.

F. Stress the importance of keeping WT fittings free of dirt, rust and excess paint and in good working condition.

* G. USCG, in Navigation and Vessel Inspection Circular No. 2-62, stressed the need for maintenance of integrity of watertight bulkheads as follows:

"Within the last 18 months, two tankers were lost as a consequence of failures in the propelling plant installation resulting in machinery space flooding. In both of these cases, eventual loss was apparently caused by extension of initial flooding through relatively minor openings in bulkheads which were otherwise watertight. Although there was no loss of life in either of these instances, the fact that such loss might have occurred under more unfavorable circumstances cannot be disregarded. When it is realized that in many cases such losses can be prevented by simple inexpensive measures without any adverse effect on the vessel's operation, the wastefulness of not taking such measures becomes apparent."

VI. TEST AND APPLICATION.

A. Test. Use these and additional questions as an oral quiz to check comprehension. Explain questionable items.

1. Q. Name the boundaries of a watertight compartment of your ship.

A. Sides, fore and aft bulkheads, inner bottom, and bulkhead deck.

2. Q. What is the bulkhead deck?

A. The uppermost deck to which the transverse watertight bulkheads extend.

3. Q. What are the conditions of readiness?

A. Condition " emergency" and condition "cruising".

4. Q. What is the difference between setting condition "emergency" and setting condition "cruising"?

A. Under condition "cruising", all watertight fittings below the bulkhead deck are secured except when actually in use and these must be closed immediately after use or passage. Under condition "emergency", all closures and systems are secured except those required for operation of vital machinery or health of personnel.

5. Q. Describe the method of securing a watertight door with individually operated dogs.

A. First hold door closed with a dog on the side opposite the hinges. Then set up on all dogs evenly, a little at a time.

6. Q. How would you open a WT door fitted with individual dogs?

A. Loosen the dogs nearest the hinges first, then the others.

7. Q. What responsibility do all-hands have for watertight closures?

A. All-hands are responsible for checking watertight closures, making watertight closures if not already made, and maintaining watertight closures when once made.

8. Q. What is watertight integrity?

A. The maintenance of the watertightness of those parts of the ship designed to prevent the passage of water--keeping water out of compartments and maintaining the ship's buoyancy.

9. Q. What condition must a watertight door gasket be kept in?

A. Free of paint and grease, with no gaps or lumps and pliable--not hard and brittle.

10. Q. What portlights require deadlight covers?

A. All those below the bulkhead deck.

B. Application. Tour the ship, pointing out WT features and fittings and have members of the group demonstrate proper WT closures of:

1. Hinged WT doors.

2. Sliding WT doors, including remote controls.

3. Portlights and deadlights.

WT INTEGRITY