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COMSC Instruction 12410.1C

LIFEBOAT TRAINING GUIDE

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COMSC INSTRUCTION 12410.1C

Subj: LIFEBOAT TRAINING GUIDE

1. Purpose. To define COMSC policy for crewing civil service manned ships with qualified lifeboatmen, provide a lifeboat training program and standardize and consolidate in one publication the afloat training procedures for handling lifeboats and all information necessary to qualify for U.S. Coast Guard certification as lifeboatmen.

2. Cancellation. COMSCINST 12410.1B.

3. Scope. This instruction relates to the handling of lifeboats and to lifeboat training of civilian marine personnel in MSC civil service manned ships. This guide will be useful to merchant marine crewmembers studying for USCG certification as lifeboatmen.

4. Revisions. Masters of MSC ships in service *(USNS) (civil service manned)* are urged to forward to COMSC, via their cognizant MSC Area or Subarea Commander, comments and recommendations for improvement of the Lifeboat Training Guide.

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Acting Deputy Commander

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FOREWORD

This Lifeboat Training Guide has been prepared to assist ships' training officers and boat commanders to instruct MSC civilian marine employees in the construction, maintenance, and use of lifesaving equipment - including the launching of lifeboats, handling of lifeboats afloat, and their recovery onboard. It is designed to standardize boat-handling procedures throughout MSC, and to bring ships' crews to such a state of proficiency that, in the event of emergency, no injury or loss of life will result from improper procedures or lack of training. Adequate training, drills and maintenance of lifesaving equipment also will ensure the readiness of MSC ships and their crews to aid in rescue and mercy missions which MSC ships are frequently called upon to perform. The time to prepare to lend such assistance, to recover a man overboard or to abandon ship, if necessary, is well in advance. There is no time to *"check the book"* during an emergency.

This Guide may be used either as an instructor's guide by ships' officers conducting lifeboat training or as a self-study manual by crewmembers. It contains all the information required to pass the USCG written examination for certification as lifeboatman. The skill and leadership necessary to pass the practical demonstration in handling boats can be acquired only during realistic drills and practice under supervision. Such drills are required, and related instruction and practice are encouraged in MSC ships.

USCG regulations for examination and demonstration of ability as lifeboatman require that all applicants for certification as lifeboatman be examined as lifeboat commanders in addition to qualifying as skilled boat crewmembers. The additional examination covering lifeboat commander is based upon a portion of the USCG able seaman examination, which has been clarified to reflect this. Since this Lifeboat Training Guide emphasizes the duties, responsibilities and leadership of lifeboat commanders, the additional requirement is adequately covered.

Appendix A to this instruction contains MSC policy for lifeboat training. Appendix B provides lesson plan and presentation outlines. Appendix C is the Military Sealift Command - U.S. Coast Guard Inspection and Certification Agreement. Many MSC ships have lifesaving equipment which meet the requirements of the technical bureaus of the Department of the Navy, Military specifications *(MILSPEC)*, federal specifications used for military purchases and National Military Establishment specifications *(NME)* and Appendix C authorizes the Coast Guard to accept alternative equivalent arrangements. Any reduction or modification of USCG regulations for the lifesaving equipment on a particular ship will be in accordance with Appendix C.

Comments, suggestions and recommendations for improvement of this Guide will be welcomed. They should be forwarded to COMSC via the MSC chain of command.

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CHAPTER 1

GENERAL

1.1 IMPORTANCE OF CERTIFICATION AS LIFEBOATMAN

a. In accordance with COMSC policy *(see Appendix A)*, preference in employment of MSC civilian marine personnel will be given to qualified seamen who hold U.S. Coast Guard certification as lifeboatman. Such certification also will be considered in effecting promotions and in the selection of employees for retention in the event of any reduction in force. This policy has been adopted in order to maintain operational readiness of ships and to assure that MSC ships are manned with lifeboatmen according to and in excess of the minimum USCG requirements.

b. Obtaining a USCG endorsement as lifeboatman is the personal responsibility of each seaman, although assistance will be given in preparing him for the USCG examination. Possession of endorsement as lifeboatman is stressed because such certification provides additional insurance for safety at sea. Many lives have been lost through inadequate knowledge of lifesaving equipment and lack of proficiency in the procedures of launching, handling, and recovery of lifeboats. Such knowledge and skill acquired through instruction and training, enable ships' crews to successfully abandon ship.

1.2 OBJECTIVE OF LIFEBOAT TRAINING

a. Successful handling of lifeboat equipment depends upon the speed, efficiency and safety with which it can be used. Only thorough instruction and training of the ship's crew during frequent drills can produce the teamwork and proficiency in which the members can be interchanged at will with no decrease in efficiency. Therefore, each seaman should know the assigned duties of other crewmembers as well as his own.

b. The ultimate objective of lifeboat training is the saving of lives in time of distress.

1.3 LIFEBOAT TRAINING PROGRAM

a. COMSC Policy. Appendix A outlines COMSC policy of manning ships with qualified lifeboatmen and the training program necessary to achieve the desired goal.

b. Lifeboat Officer. The First Officer, as ship's training officer, will select and assign a Lifeboat Officer whose responsibility will be for the maintenance of all lifeboats and to ensure that all CIVMAR personnel assigned to the ship are trained in lifeboat procedures.

c. Afloat Program for Certification of Lifeboatmen. This program includes instruction and practical training for crewmembers without lifeboat certificates. Lifeboat construction and nomenclature, use of launching and recovery gear, operation of boat equipment, rigging of sails and sailing, rowing, boat commands and the techniques of handling a lifeboat under oars, power and sail are covered. The instruction and training given should, in addition, cover all phases of USCG requirements for certification as lifeboatman and shall be given to all crewmembers having sufficient sea time to meet USCG requirements *(one year sea service in the deck department; two years in any other department).*

d. Afloat Program for Refresher Training of Crewmembers. In addition to the regular lifeboat drills and instruction, refresher training shall be provided periodically to certificated personnel. Subjects covered shall include lifeboat nomenclature, use of lifeboat equipment, operation of launching and recovery gear, boat commands, handling of lifeboats, etc., in order to ensure that a high standard of efficiency is maintained. This training shall be conducted as often as deemed advisable by the Master and shall be carried out by designated deck officers.

e. Ashore Lifeboat Training Program

(1) For Certification. Lifeboat training ashore for certification is authorized when recruitment, transfers and the afloat-training program fail to provide certificated lifeboatmen approximately 25 percent in excess of the minimum USCG manning requirements. Such training is limited to crewmembers with over three months' sea service, but with less than the one or two years normally required for certification. Training ashore is limited to not less than five days or more than ten days, conforming to USCG requirements for 30 hours of actual lifeboat handling, together with related instruction. Satisfactory completion of this course serves to reduce the sea service required for endorsement as lifeboatman from one or two years to three months. It also prepares applicants for the USCG written and practical examination for lifeboatman.

(2) To Support the Afloat Program. Short one-day lifeboat training courses may be conducted ashore to support the afloat program as follows:

(a) To provide a means of evaluating the proficiency of crewmembers prior to application for the USCG examination.

(b) For indoctrination of new employees.

(c) For safety training.

(3) Instructor. Use of the shore facilities and lifeboat equipment to provide practice in handling lifeboats shall be under the supervision of a lifeboat instructor, deck officer or boatswain.

1.4 HINTS TO INSTRUCTORS FOR EFFECTIVE PRESENTATION

a. Effective presentation of the course of instruction is imperative if the best results are to be obtained. Thorough understanding and retention result when the instructor explains to the students, patiently and in detail, what is expected of them. Establishment of friendly relations between instructor and trainee also is very important. When the duties and methods involved in handling boats are understood, frequent practice, drill, and application of the methods learned will result in proficiency. Review, coaching, and quiz should be a part of each lesson.

b. Shipboard lifeboat training must necessarily be subordinated to the ship's operation, requiring some ingenuity on the part of the instructor. Inspection of the following chapters of this training guide will indicate how the scheduling of instruction can be made to conform with the ship's operations whenever practicable. The entire lifeboat training program should be presented even if operational requirements require some changes in the sequence or lesson arrangement.

c. Effective presentation of the subject matter includes:

(1) Establishment of the scope of each lesson together with its relation to preceding lessons and the objectives desired.

(2) The creation and maintenance of interest in the subject by stressing the importance of the benefits to be gained. *(Here cite instances of the lack of proficient training in past marine disasters, such as the Titanic, Vestris, Morro Castle, Benevolence, etc., and compare these casualties with examples of good seamanship in rescues at sea.)* Interest can be sustained if the instructor talks on the level of the class, encourages class participation in discussions and repeats and emphasizes important points. He should not forget the scope of the lesson, and should reestablish it at the conclusion by summarizing all *"must know"* material.

(3) Use all training aids and facilities available in order to appeal too as many of the learning senses as possible *(sight, hearing and touch)* and muscular coordination. Actual equipment and other visual aids are valuable in presenting the instruction. Explain the equipment in proper terms and supply background information, where appropriate.

(4) Impress upon each crewmember that it is his responsibility to understand thoroughly all of the steps taken in launching, handling and recovering lifeboats. Point out that human lives may depend upon his knowledge and the proficiency he gains at this time.

d. For instruction purposes, the procedures of launching, handling and recovery of boats should be broken down into a number of small, related jobs. The instructor should endeavor to explain clearly the *"what," "why," "how," "where"* and *"when"* of each. He should, once the terms to be used have been explained, use that terminology exclusively in future sessions.

e. As the manner of presentation and the time required may vary with different groups, the capabilities of each group must be considered and evaluated by the instructor in preparing his presentation. He should make appropriate allowances for those who assimilate training and instruction more slowly than others.

f. The instructor is responsible for selecting the appropriate method of instruction. He should teach by *"telling"* to impart knowledge and use the *"showing"* or demonstration method for operations which are difficult to describe. Where demonstrations of physical skills are indicated, a job analysis showing what to do and when to do it should be prepared, with emphasis on the key points. This analysis should be used as the basis for preparing the presentation.

g. The *"teaching-by-doing"* method of teaching complex skills may be broken down into four steps as follows, for large groups:

(1) The instructor performs the operation slowly and tells what he is doing *(presentation phase).*

(2) Instructor repeats the operation at almost the normal rate.

(3) An average trainee selected from the group performs the operation and tells what they have seen and heard.

(4) All students practice under the instructor's supervision *(application and inspection part of presentation).*

h. To teach simple skills to large groups, the *"coach and pupil"* method is recommended.

(1) The instructor performs the operation slowly and tells what he is doing *(presentation phase).*

(2) Students pair off and one does the operation while the other checks and coaches.

(3) Pairs of students reverse positions and repeat the procedure.

(4) Instructor checks each pair.

i. Throughout his presentation, the instructor should endeavor to convey to boat commanders and lifeboatmen the extreme importance of effective leadership in providing for the safety of passengers and other crewmembers.

1.5 TRAINING AIDS

Knowledge of the availability of lifeboat training aids and facilities and understanding of their use are required of the instructor, and he should arrange training to make full use of these aids and facilities. Training aids for afloat training which may be obtained from the Training Division, Civilian Personnel Office, of the home port command, include training films, visual-aid charts prepared from illustrations in this guide, some articles of actual equipment, handouts on lessons from casualties and the following publications:

a. The Cornell Manual for Lifeboatmen, Able Seamen and Qualified Members of Engine Department *(QMED)* by Hayler, Keever and Seiler

b. Current COMSC and subordinate command directives

c. USCG Regulations:

(1) Tank Vessels - 46 CFR, Part 33

(2) Passenger Vessels - 46 CFR, Part 75

(3) Cargo and Miscellaneous Vessels - 46 CFR, Part 94

(4) Oceanographic Research Vessels - 46 CFR, Part 192

d. COMDTINST M16672.2, Navigation Rules - International - Inland

e. American Merchant Seaman's Manual by Cornell and Hoffman

f. The Coast Guardsman's Manual, U.S. Naval Institute

g. Bluejacket's Manual, U.S. Naval Institute

h. Film 24642DN, Life Preservers--Jacket Type *(5 minutes)*

i. Film 24599DN, Lifeboats--The CO2 Inflatable, Mark 3, *(17 minutes)*; 24600DN Inspection and Repair *(29 minutes)*

j. ***"Survival"*** distributed by C. J. Hendry Co. For Liferafts

References to sections in the publications listed above are not specified due to the possibility of future revisions.

1.6 LIAISON AND ASSISTANCE - TRAINING DIVISION

The Training Division will assist ships' training officers by providing appropriate training aids. Where lifeboat training facilities are available ashore, requests for the use of this equipment shall be made to the Training Division of the home port command. Upon completion of afloat training, the Training Division shall arrange for the use of shore facilities where available in order to evaluate the proficiency of crewmembers prior to application for USCG examination. The Training Division also will arrange for crewmen to take the USCG examination for certification as lifeboatmen.

1.7 FORMAT AND USE OF TRAINING GUIDE

a. This Training Guide has been prepared to serve as an instructor's guide for ships' training officers in conducting lifeboat training, and as a self-study manual for crewmembers. In the interest of brevity, only the presentation and summary parts of each lesson have been included; other parts of the lesson plan have been omitted--the objectives, material, introduction, test and assignment. However, with the lesson plans and presentation outlines in the Appendix, and the information on their preparation, ships' training officers should be able to prepare complete lesson plans adaptable to their individual presentation techniques. By omitting all repetition, the Training Guide will be more useful for individual self-study.

b. The objectives will be similar for all lessons--to familiarize crewmembers with lifeboats, their equipment, and proper terminology; to acquaint students with pertinent USCG regulations; to impress boat crews with the importance of proper handling of boats and equipment and to develop proficiency therein; to improve operational readiness of

MSC ships; and to prepare crewmembers for the USCG examination for lifeboatman. Training aids are listed in Article 1.5 and will be referred to in the text where desirable. The procedure for introducing each lesson will be identical and ships' training officers should therefore use the lesson plan and presentation outlines in the Appendix as a guide. Test questions have not been included in individual lessons since Chapters 14 and 15 cover all review and examination questions thoroughly. Generally, a brief oral question and answer period at the end of each lesson will suffice. Lessons from casualties should be discussed to emphasize the importance of preparation for emergencies. The instructor should draw upon his own and the group's experience for additional lessons from casualties.

c. Occasional deviations from previous practices and procedures will be observed in this guide. Such revisions are due to one or more of the following reasons:

(1) Changes in USCG regulations.

(2) USCG recommendations by notices, memoranda, general correspondence and comments on illustrations in previous lifeboat manuals.

(3) Verbal recommendations by USCG marine inspection officers.

(4) Developments within MSC Commands.

(5) The necessity for standardization of terminology and procedures.

CHAPTER 2

INTRODUCTION TO AND CONSTRUCTION OF LIFEBOATS
(Lesson No. One)

2.1 GENERAL TYPES OF LIFEBOATS

a. Type. Lifeboats are usually of *"double-ended"* construction.

(1) Boats of this type are best suited for general use; they are most seaworthy, less apt to broach to, easier to steer, etc.

(2) Boats may be constructed of steel, aluminum, fibrous glass reinforced plastic *(FRP)* or other approved material. All lifeboats are required to be of an approved type in accordance with USCG specifications.

(3) Propulsion

(a) They are propelled by oars and sail.

(b) Many are propelled by hand-propelling gear *(reciprocating hand levers which operate a propeller)*--no sails required.

(c) Some are motor-propelled--no sails required.

(4) Boats are fitted with sufficient air tanks or buoyancy units to keep the boat afloat if swamped or capsized.

b. Size and Capacity of Lifeboats for Ships in Ocean Service

(1) All lifeboats certified to carry 60 or more but not over 100 persons shall be either motor lifeboats or shall be fitted with an approved type of hand propelling gear. Lifeboats carrying more than 100 persons shall be motor lifeboats.

(2) Boats with a capacity of 59 persons or less may be propelled by motor, hand-propelling gear or by oars and sail.

(3) Lifeboats are at least 24 feet in length - except in special cases when approved by the Commandant, USCG. In no case, however, is a lifeboat less than 16 feet in length.

c. Emergency Boats

(1) One lifeboat on each side of passenger ships is of suitable size and design for performing emergency and rescue work at sea.

(2) Normally, such lifeboats are not over 28 feet in length.

2.2 LIFESAVING EQUIPMENT

a. USCG Requirements for Passenger Ships. Lifesaving equipment varies with the type of ship and is specified in USCG regulations. In general, passenger ships are required to be equipped with:

(1) Lifeboats - sufficient to accommodate all persons aboard - 100 percent.

(2) Liferafts - sufficient liferafts to accommodate 25 percent of the persons onboard and buoyant apparatus for 3 percent of the persons onboard.

(3) Life preservers - for all persons aboard plus 10 percent for children.

(4) Ring life buoys in accordance with a table based upon length of ship. A specified number have waterlights attached. Ships 400 to 600 feet long have 18 ring buoys, 9 with waterlights.

(5) Line-throwing equipment.

(6) Distress signals.

(7) Lifesaving equipment carried--refer to ship's Certificate of Inspection for general data.

b. Cargo Ships, Tank Vessels and Oceanographic Vessels

(1) Cargo Ships - International voyage and over 1,600 gross tons shall carry lifeboats on each side to accommodate all persons onboard, one of which shall be motor-propelled. *(46 CFR 94.10-10)*

(2) Tank vessels - International voyage and over 1,600 gross tons/350' shall carry lifeboats on each side to accommodate all persons onboard provided that tankships having superstructure amidships and propelling machinery aft shall be provided with at least four lifeboats, one on each side aft and one on each side amidship. On each side at least one lifeboat shall be a class 1 motor lifeboat. *(46 CFR 33.05-1)*

(3) Oceanographic Vessels - International voyage/over 1,600 gross tons shall carry lifeboats on each side to accommodate all persons onboard, one of which shall be motor-propelled. *(46 CFR 192.10-10)*

(4) Each vessel on an international voyage must carry liferafts of sufficient aggregate capacity to accommodate at least 50 percent of the persons onboard. Those vessels that have widely separated accommodations or working spaces must have at least one liferaft in each such location. The SOLAS, Chapter III, changes effective in 1986, require new ships begun after July 1, 1986 to carry liferafts for 100 percent of the persons onboard. Ships constructed before July 1, 1986 will be required to carry liferafts for 100 percent of the persons onboard effective July 1, 1991.

(5) Vessels not on an international voyage may substitute inflatable liferafts for lifeboats as specified in the regulation for each vessel type.

c. Exposure Suits - One must be carried for each person aboard plus one suit for each person normally working a watch or workstation away from their quarters and not readily accessible. The suits are not required to be carried on ships operating only in warm climates. *(See Chapter 12)*

d. Enclosed Lifeboats. Required on most ships constructed after July 1, 1986. Enclosed lifeboats must be capable of being loaded while still in the stowed position and then launched from within the lifeboat without requiring any crewmember to be left on the ship. *(See Chapter 11)*

e. Lifejackets. USCG requires that all ships have an approved lifejacket for each person carried plus two lifejackets in each lifeboat.

f. Work-Type Lifejackets. Work-type lifejackets are of unicellular plastic foam, much less bulky and cumbersome than regular lifejackets. They are used by ships' force in work where there is danger of falling overboard. Work-type lifejackets are not at present a USCG requirement but are permitted to be carried aboard. Work jackets are not authorized for use during UNREP operations. Standard Navy lifejackets will be used in accordance with NWP-14.

g. Other Lifesaving Equipment. Other lifesaving equipment is in conformance with USCG requirements.

h. Types of Lifeboats

(1) Only USCG-approved types may be carried in USCG-inspected ships. The double-ended whaleboat with fibrous glass reinforced plastic *(FRP)* hull is the usual type. All lifeboats aboard MSC ships are USCG-approved, of double-ended construction and subject to annual USCG inspection.

(2) Emergency boats are generally motor-propelled, 26-foot whaleboats.

i. Numbering and Marking of Boats

(1) Boats are designated by numbers, from forward to aft.

(a) Odd-numbered boats are on the starboard side; even-numbered boats are on the port side.

(b) Large, older ships may have 2 lifeboats stowed in the same davit. These are nested boats. The lifeboat under number 1 is 1-A. The lifeboat under number 2 is 2-A.

(2) The ship's name, port of registry and the boat's number are stenciled on the bow of each boat in letters and numbers not less than 3 inches high.

(3) The cubic capacity and number of persons allowed is marked on each bow in letters and numbers not less that 1 1/2 inches high.

(4) The number of persons allowed also appears on at least two thwarts in letters and numbers at least 3 inches high.

(5) The builder's plate shows measurements, cubic and passenger capacity and other information.

(6) Oars are conspicuously marked *(stenciled)* with the ship's name.

(7) Where releasing gear is used, USCG requires that the release lever be painted bright red on white background and have marked on it, in raised letters, **"DANGER-LEVER RELEASES HOOKS."** This warning is made even more pointed on the release lever in new boats, with the marking **"DANGER-LEVER DROPS BOAT."** In order to make the release lever stand out more sharply against the international orange interior of the lifeboat, the area in way of the red release lever, from the keel to the side bench, is

painted white, to provide a contrasting background for the lever. The band is approximately 12 inches wide. Failure to know the location, function and operation of this release lever has caused many a lifeboat casualty. Make sure you don't drop a lifeboat through ignorance of the release lever's location and function! Remember, the release lever's sole purpose is to release *(and drop)* the boat. Don't touch it except on order of the boat commander. It is operated only when the boat is waterborne; at any other time its operation will drop the boat - and you with it!

2.3 TYPES OF DAVITS AND MANROPES

Demonstrate on actual equipment or use visual-aid charts. USCG requires all davits to have two lifelines *(manropes)* fitted to a davit span. These manropes are long enough to reach the water at the lightest seagoing draft - even with a 15 degrees list. The davits for the emergency boats on passenger ships shall have four such manropes. MSC policy is to provide four manropes on all boats. Davits are arranged so that boats do not require lifting before being swung out.

a. Gravity Davit

(1) Lowers lifeboat by gravity when the gripes and stopper bars are removed and the brake handle is raised.

(2) One man can handle the lowering operation after the boat is cleared away.

(3) Tricing pendants bring the boat into the embarkation deck.

(4) Frapping lines hold the boat in position for embarkation of passengers after the tricing pendants are cast off.

b. Sheath-Screw Davit

(1) May be boom-type or crescent type *(show appearance of each)*.

(2) Requires cranking boat out over the side prior to lowering.

c. Quadrantal Davit. Requires cranking boat out over the side prior to lowering.

d. Radial or Round Bar Davit

(1) Fitted only in small ships operating in sheltered waters.

(2) The boat's bow and forward davit are swung out first, then the stern and the after davit and the davits are guyed in outbound position.

e. MIRANDA Gravity Davits

(1) Capable of being fully loaded from the stowed position.

(2) Capable of being lowered from within the lifeboat without the need to leave a crewmember behind to lower the boat.

(3) These davits are not normally fitted with tricing pendants since these pendants would interfere with the continuous launch of the boat from the stowed position. *(See Chapter 11)*

2.4 LIFEBOAT CONSTRUCTION

a. Lifeboats may be constructed of steel, aluminum, fibrous glass reinforced plastic *(FRP)*, or other approved material. Boats shall be readily maneuverable, have ample stability, sufficient freeboard when fully loaded, maintain positive stability when open to the sea and loaded, and have internal buoyancy. Enclosed lifeboats must be readily opened from both inside and outside and these openings must not impede rapid embarkation, disembarkation or the launching and handling of the boat.

b. Metal Construction

(1) Most lifeboats in MSC ships are of metal construction. Newer boats are of plastic construction.

(2) Plating consists of steel sheets riveted to keel and gunwale, and to each other.

2.5 PARTS OF A LIFEBOAT

a. The parts of a lifeboat are best taught with visual aids. Study the appropriate visual aids with the instructor explaining and leading a discussion of the function of each part.

(1) Point out on the visual-aid charts the keel, stem, sternpost, frames, gunwale, thwarts, thwart knees or braces, rowlocks, side benches, stanchions, footings, floor, limberholes, drain hole, lifelines, seine floats, rudder, tiller, pintle, gudgeon, mast clamp, releasing hooks, steering-oar rowlock, etc., and explain the use of each.

(2) Use figure 2-4 to locate and identify lifeboat nomenclature.

b. Reference to Chapter 13 of this guide, *Lifeboat Terms and Definitions*, should be made at this time. Encourage group to use Chapter 13 in conjunction with their studies.

2.6 FUNCTIONS OF AIR TANKS AND FLOTATION

A sufficient number of suitable capacity are required to keep the boat afloat when filled with water.

a. Show on visual-aid charts how located and secured.

b. Annual inspection - test for airtightness of tanks.

c. Fiberglass reinforced plastic *(FRP)* lifeboats have built-in foamed-in place flotation, making stripping and inspection of individual buoyancy units unnecessary.

2.7 USCG REGULATIONS AND GENERAL INFORMATION

a. Conduct discussion of USCG regulations, where found, and general information, using appropriate visual aids.

(1) The USCG regulations used to be found in the CG publications which were printed by the Coast Guard. Due to funding cutbacks, the USCG no longer prints the old familiar publications such as CG-256-*Rules and Regs for Passenger Vessels*, CG-257-*Rules and Regs for Cargo and Misc Vessels*, etc.

(2) Introduce the student to the Code of Federal Regulations as follows:

(a) 46 CFR Parts 70 to 89 *Passenger Vessels Regulations*

(b) 46 CFR Parts 30 to 40 *Tank Vessels Regulations*

(c) 46 CFR Parts 90 to 106 *Cargo and Misc Vessels Regulations*

(d) 46 CFR Parts 188 to 196 *Oceanographic Vessels Regulations*

(3) Explain to the student that even though each class of vessel has its own section within the Code of Federal Regulations, the regulations for lifesaving equipment between one class of vessel and the other are similar and in some cases identical. For the most part, passenger vessel regulations are more severe than for the other classes of vessels, the one exception being that, due to the stringent stability and subdivision requirements, fewer lifeboats are actually required on a passenger vessel for the total persons carried than would be required on other classes of vessels.

b. Take up points of general information not previously covered.

(1) Lifeline *(or grab line)* shall be festooned along lifeboat sides in bights not longer than 3 feet, with a seine float in each bight, hanging to within 12 inches of the water when boat is floating light. The float may be omitted if the lifeline is of buoyant material which absorbs little or no water.

(2) Boats shall be fitted with approved releasing gear, all to be of identical type in any particular ship. Most MSC lifeboats have Rottmer type releasing gear. Warn of the danger of dropping the boat through operation of the release lever before the boat is waterborne. The area in way of the red release lever from the keel to the side bench, is painted white, to provide a contrasting background for the lever.

(3) One lifeboat on each side of passenger ships shall be designated as emergency boat, and shall:

(a) Be rigged for immediate use while at sea.

(b) Have painters led out and passed forward along the ship.

(c) Be provided with at least four knotted lifelines or manropes secured to a span between davit heads. Note that MSC boats all have four manropes.

(4) Repairs or alterations shall not be made, except in emergency, to boat, rafts, releasing gear or any other appliance subject to inspection, without advance notice to the Officer in Charge Marine Inspection *(OCMI)* USCG.

(5) USCG regulations requires the inside of lifeboats to be international orange for better visibility.

(6) Each lifeboat shall be in the charge of a licensed deck officer or a certificated lifeboatman; a second in command shall be designated.

(7) Boats shall be stowed to provide:

(a) Suitable access to prepare them for launching without impeding handling of other lifesaving equipment.

(b) Rapid and orderly embarkation.

(c) Safe and rapid launching in the shortest possible time, far enough aft of the bow and forward of the stern to avoid bow or propeller wash, even under unfavorable conditions of list and trim.

(d) Swinging out without lifting boats from their chocks.

(e) Use of skates in some cases to facilitate launching against a 15 degrees list.

(f) Means outside the machinery space to prevent the overboard discharge of water into the boats while they are being lowered. This is accomplished by baffles to deflect the water down the ships' side, or by reach rods or other means to close the discharge openings.

(8) All lifesaving equipment is inspected or tested by the USCG at each annual inspection to ensure its good condition.

(a) Each lifeboat is lowered near to the water, loaded to its allowed capacity, and then lowered into the water and released.

(b) All lifeboat winch electrical controls are opened up and inspected.

(c) Gravity davits are tested to ensure that each boat can be swung out and lowered from any stopped position by merely releasing the brake on the boat winch. The use of force to start the davits or boats is not permitted.

(9) Storage covers serve to protect the boats and equipment and ensure their readiness for use, particularly during snow or freezing weather when the boat drains would otherwise become frozen shut and the boats iced up. Because of their size, covers on nested boats are cumbersome to handle and hamper crew maintenance in the lower boat. Storage covers may be taken off and left off in fair weather to facilitate handling of boats during drills, to permit proper maintenance and to ensure readiness for immediate use. Storage covers are not required by the USCG. Therefore, MSC policy limits the use of boat covers to ships operating in regions where freezing weather predominates, and boat covers are necessary to ensure the readiness of lifeboats for immediate use. This is not the same protecting cover required by USCG for each boat.

2.8 SUMMARY

Outline the information considered most important:

a. Types and number of boats carried in MSC ships.

b. Method of numbering boats.

c. Types of davits.

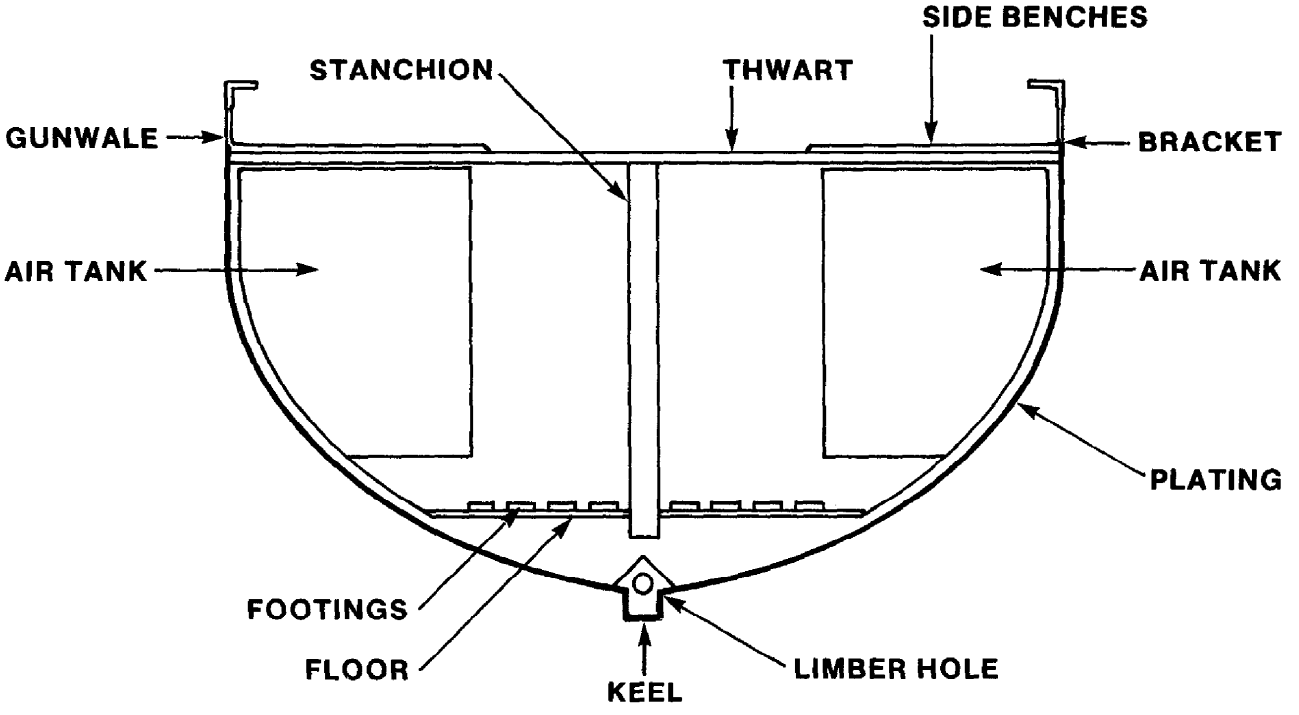
d. Kinds of boat construction.

e. Parts of a lifeboat.

f. Caution regarding operation of the lifeboat release lever.

g. Applicable USCG regulations. See that students have all necessary notes and handouts. Check their knowledge by means of an oral quiz, using applicable questions from Chapters 14 and 15 and advise of related study material and assignment for the next session.

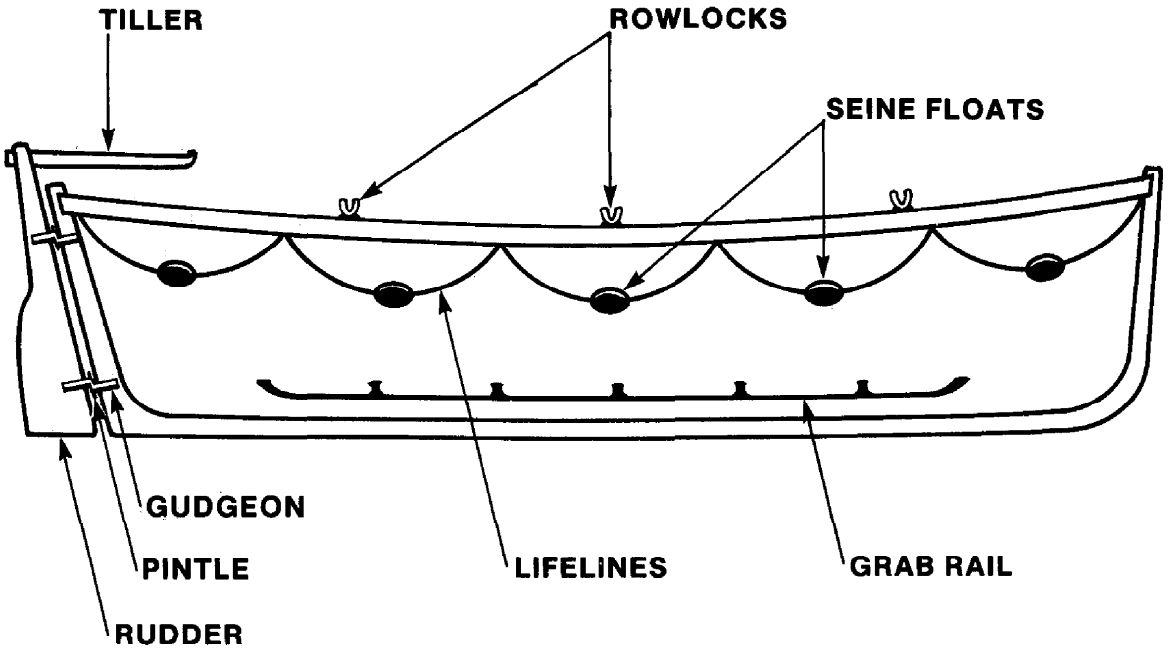
h. Discuss or distribute the following *"Lesson from Casualties"* and others which the instructor or the group may recall.



CONSTRUCTION, DRAINAGE AND BOUYANCY FEATURES

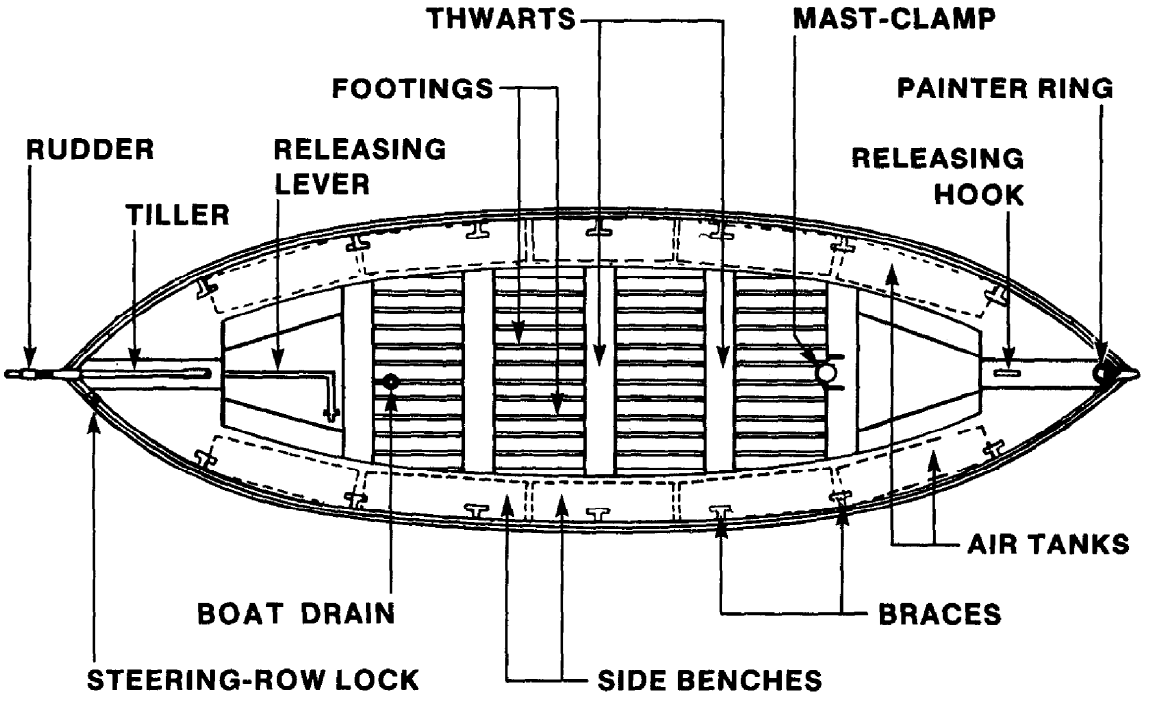
SECTION OF METALLIC LIFEBOAT

FIGURE 2-1



OUTBOARD FITTINGS - METALLIC LIFEBOAT

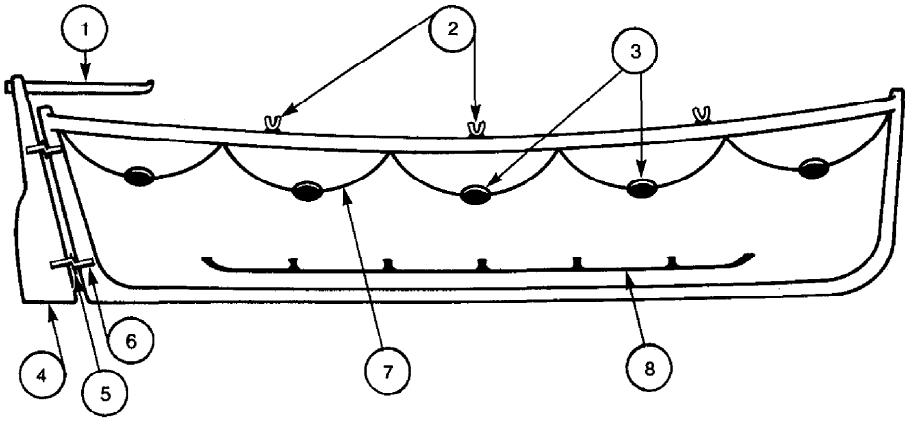
FIGURE 2-2



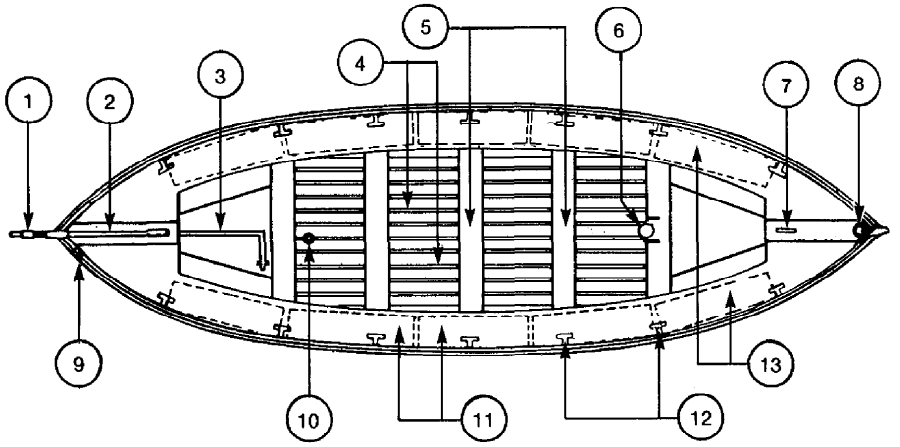
METALLIC LIFEBOAT (Nomenclature)

FIGURE 2-3

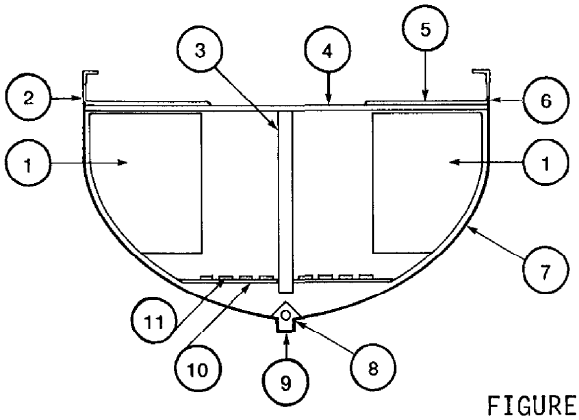
LIFEBOAT NOMENCLATURE



1	3	5	7
2	4	6	8



1	4	7	10
2	5	8	11
3	6	9	12
			13



1	7
2	8
3	9
4	10
5	11
6	

FIGURE 2-4

ABANDON SHIP

(Reprinted from Proceedings of the Merchant Marine Council, U.S. Coast Guard.)

The master of the SS "MYTHICAL" gave the order, *"Abandon ship, put lifeboat No. 1 in the water!"* Accordingly, No.1 was put in the water and loaded with her assigned crew. There was a gurgle and it sank.

The order rang out, *"Put No. 2 in the water!"* This was done. There was another gurgle and it also sank, leaving its crew floating.

Once again the order was given, *"Put No. 3 in the water!"* Once again, the familiar gurgle.

By this time, the ship had sunk and No. 4 had floated clear with the steward in command. *"Now,"* said the steward to his boat crew, *"we will row slowly among those bobbing heads and rescue only those who had no responsibility for lifeboat maintenance."*

About this time, boat No. 4 sank. There were no survivors to save the steward's parrot, which tells this story. All day long he sits on his perch shrieking, *"Abandon ship"* and gurgling. Enough to give a body the creeps.

-Courtesy Safety Bulletin Standard of California

CHAPTER 3

LIFEBOAT EQUIPMENT
(Lesson No. Two)

3.1 CURRENT LIST OF EQUIPMENT

This session should be held at a lifeboat so that stowage and use of each article can be readily shown. Appropriate training-aid charts also should be used. Refer to the current USCG Regulations in Title 46 -- *Shipping*, for the required lifeboat equipment for the vessel under review: Subpart 33.15 for Tank Vessels, Subpart 75.20 for Passenger Vessels, Subpart 94.20 for Cargo and Miscellaneous Vessels or Subpart 192.20 for Oceanographic Research Vessel. The MSC Allowance Equipage List *(AEL)* will provide a reference of equipment for the particular vessel type being studied.

a. General. Articles of equipment shall be of good quality, efficient for the purpose provided, and be kept in good condition.

(1) Boats shall be fully equipped before leaving port.

(2) Equipment shall not be removed from the boat during the voyage.

(3) Current MSC requirements may exceed those of the USCG.

(4) Articles other than those required shall not be placed in a boat unless properly stowed so as not to reduce seating capacity or adversely affect seaworthiness.

(5) Loose equipment shall be securely attached in the boat.

(6) Explain proper method of securing boat covers for protection of boats and equipment and to ensure easy and immediate removal of covers.

(7) Skates are required in some cases *(46 CFR Parts 70-89)*. Skates consist of a pair of metal straps which are secured to the gunwale and keel near each end of a lifeboat to enable it to slide easily *(or "ski")* over obstacles on the ship's side, thus permitting its launching from the high side of a heavily listed ship. Skates are required:

(a) when boat decks are more than 15 feet above the deepest seagoing draft and

(b) to facilitate launching against an adverse list of up to 15 degrees.

Skates, however, may be dispensed with if the USCG approves of the boat-launching arrangement.

b. Equipment. USCG approved equipment required in ocean and coastwise nonmotor-propelled lifeboats is listed as follows:

(1) Bailer - of sufficient size, with lanyard attached.

(2) Bilge pump.

(3) Boat hooks - two boat hooks of single-hook ballpoint type, with handles of clear-grained white ash or equivalent--8 feet x 1 1/2 inches for boats up to 23 feet; 10 feet x 1 3/4 inches for boats over 23 feet and less than 29 feet; and 12 feet x 2 inches for boats over 29 feet long. For examination purposes it is sufficient to state that sizes of boat hooks are specified by a table in USCG Regulations.

(4) Buckets - two galvanized iron buckets of at least two-gallon capacity, each with a 6 foot, 12-thread manila lanyard attached.

(5) Compass and mounting - one efficient liquid compass and mounting of USCG-approved type. The card shall be luminescent and not to be less than 3 3/4 inches in diameter.

(6) Ditty bag, canvas - containing sailmaker's palm, sail needles, sail twine, marline and marlinespike. Beeswax, while not specifically required, is usually included to facilitate sewing.

(7) Drinking cup - one enameled or plastic drinking cup with cotton lanyard, 1/8 inch diameter x 3 feet long.

(8) First aid kit - approved type in watertight case.

(9) Flashlight - approved type with three spare batteries and two spare bulbs. Batteries must not be used beyond the serviceable date appearing on them.

(10) Hatchets - two, attached to the boat by lanyards, one at the bow and one at the stern.

(11) Heaving lines - two buoyant heaving lines, each 1 inch in circumference by 10 fathoms long.

(12) Jackknife - fitted with a can opener and lanyard.

(13) Ladder, lifeboat gunwale - a 5/8 inch manila rope ladder with three flat wood steps, 12 inches apart, and cut out for handholds. The rope ends are tied inside the boat about amidships with the ladder stowed on the side benches ready for immediate use.

(14) Lantern - with sufficient oil to burn for at least nine hours and ready for immediate use.

(15) Lifeline - of a size and strength not less than 3/8" diameter manila each side, festooned in bights not longer than 3 feet, with a seine float in each bight. The seine floats may be omitted if the lifeline is of an inherently buoyant material and will absorb little or no water. The bights must hang to within 12 inches of water when the boat is light.

(16) Life preservers - two, of approved type.

(17) Locker - for the stowage of small items of equipment.

(18) Mast and sail - with galvanized wire rigging, not less than 3/16 inch diameter. Sails are colored indian orange, and sail and gear protected by a suitable cover. A mast and sail are required only in oar-propelled boats--not in motor or hand-propelled boats. Sizes as per table 46 CFR 75.20-15 (5).

(19) Matches, friction - two boxes in a watertight container.

(20) Milk, condensed *(sweetened)* - one pound per person.

(21) Mirrors, signaling - two.

(22) Oars and steering oar - number and size according to length of lifeboat and table in 46 CFR Parts 70-89. *(See Figure 7-4 for oar nomenclature.)*

(23) Oil, illuminating - one quart, in metal container.

(24) Oil, storm - one gallon vegetable, fish, or animal oil in a container which permits controlled distribution of oil on the water and attachment to the sea anchor. (See Figure 7-5.)

(25) Painters - two, of manila rope not less than 2 3/4 inches in circumference, length not less than three times the distance between the boat deck and the ship's light draft. One painter *(the sea painter)* has a long-eye splice and is attached to the forward thwart with a toggle to permit its quick release. *(See Figure 7-1.)* The other, for use in towing or securing the boat, is attached to the stem. The toggle for attaching the sea painter shall be attached to the forward thwart by a lanyard.

(26) Plugs *(boat drains)* - metal lifeboats have drain holes fitted with automatic plugs with caps attached by chains. *(See Figures 3-1 and 3-2.)*

(27) Provisions - two pounds per person, of hard bread or equivalent, in hermetically sealed cans. Food, condensed milk and water cans are stowed in the provision tanks installed in the lifeboats.

(28) Rowlocks - sufficient number for the complement of oars, attached by chains, plus two spare rowlocks.

(29) Rudder and tiller.

(30) Sea anchor *(see Figure 7-5)*.

(31) Signals, distress, floating, orange smoke - two, each in metal container.

(32) Signals, distress, red hand flare - 12 hand red-flare day and night distress signals in a watertight container.

(33) Signals, distress, red parachute flare - 12 parachute red-flare distress signals and means of projecting them *(Very's signal pistol)*, all in a portable watertight container.

(34) Water - three quarts per person, in sealed cans. One watertight nylon case is provided for each carton of water issued to MSC ships. Service life shall be 5 years from date of packing.

(35) Desalting kit - one or more approved desalting kits may be used as a substitute for 1/3 of the required amount of drinking water per person.

(36) Dye marker - not required by USCG but included in wartime issue.

(37) Fishing kit.

(38) Dry blankets (8) to be brought to each boat by crewmember so designated in station bill.

(39) Protective cover - of a highly visible color and capable of protecting the occupants against injury by exposure. The cover is spread over portable frames set in sockets along each side of the boat. This protective cover is not the same as the storage cover spread over the boat when it is in the davits on the ship.

(40) Table of lifesaving signals - printed on water resistant paper.

(41) Signaling whistle - of the ball-type, corrosion resistant, with a 3-foot lanyard.

3.2 ADDITIONAL MOTOR-LIFEBOAT EQUIPMENT

a. Motor lifeboats carry all equipment listed above for other lifeboats with the exception of the mast and sail.

b. In addition, motor lifeboats carry the following equipment:

(1) Motor - approved type, with sufficient fuel for 24 hours continuous running.

(2) Fire extinguishers - two approved hand-portable five-pound $C0_2$ or two two-pound dry chemical type *(without gage indicator)* fire extinguishers, one attached at each end of the boat.

(3) Radio - to comply with the requirements of the Federal Communications Commission. *(See Figure 3-3.)*

(4) Searchlight - with two spare bulbs.

(5) Bilge pump - one is normally required; two in motorboats certified for 100 or more persons. The additional bilge pump may be either hand or power-operated.

(6) Tool kit - The tool kit shall consist of at least the following tools in a suitable container:

(a) One 12-ounce ball pen hammer

(b) One screwdriver with 6-inch blade

(c) One pair 8-inch slip joint pliers

(d) One 8-inch adjustable end wrench

3.3 MSC ALLOWANCES

These are listed in MSC Allowance Equipage List *(AEL)* prepared for each MSC ship.

a. MSC requirements for lifeboat equipment generally agree with USCG requirements, and actually exceed them in some cases. Example: dye markers. USCG requires four manropes on emergency boat davit spans and two manropes on davit spans for all other boats. MSC policy is to equip all boat davit spans with four manropes.

b. Requirements for a few items and quantities have been modified by an MSC/ USCG agreement permitting substitution of Navy material and equipment for USCG-approved items. For example, while USCG limits service life of pyrotechnics to three years, they have agreed to a maximum service life rating of seven years for Navy pyrotechnics. This is based upon Navy standards and training usage for demonstrations and emergency drills.

3.4 USE OF EQUIPMENT

a. Instructor shall show, explain, and demonstrate use of all articles of equipment carried in lifeboats.

(1) Use actual articles of equipment where practicable.

(2) Use visual-aid charts and blackboard sketches to supplement explanations.

(3) Show how each article should be stowed in one of the ship's boats to facilitate its use and yet not occupy space required for the boat's operation.

(4) Describe and demonstrate in detail the rigging and use of the sea painter and the sea anchor. *(See Figures 7-1 and 7-5.)*

b. Additional equipment when boat is operated on ship's business.

(1) When operated in routine work, a lifeboat loses its emergency nature. It is then in the same category as other craft.

(2) Applicable requirements of the Rules of the Road as to lights, whistle, bell, etc., must be observed.

3.5 SUMMARY

a. Outline the items of lifeboat equipment, with emphasis on safe operation and USCG examination requirements for lifeboatman.

b. See that students have proper notes and descriptive handouts.

c. Refer to Chapters 14 and 15 for pertinent review questions.

d. Obtain copies of the following list of equipment from the Training and Safety Division or reproduce it aboard ship for distribution:

USCG Requirements for Lifeboat Equipment - Ocean and Coastwise

(1) Bailer - 1

(2) Bilge pump - 1, 2 for motorboats of over 100 persons

(3) Boathooks - 2

(4) Bucket - 2

(5) Compass and mounting - 1

(6) Cover, protecting

(7) Desalting kit *(optional equipment)*

(8) Ditty bag - 1

(9) Drinking cup - 1

(10) Fire extinguishers, motorboats only - 2

(11) Fishing kit - 1

(12) First aid kit - 1

(13) Flashlight - 1

(14) Hatchets - 2

(15) Heaving line - 2

(16) Jackknife - 1

(17) Ladder, lifeboat gunwale - 1, for boats of over 60 persons

(18) Lantern - 1

(19) Lifeline - 1

(20) Life preservers - 2

(21) Locker - 1

(22) Mast and sail *(oar-propelled lifeboats only)* - 1

(23) Matches *(boxes)* - 2

(24) Milk, condensed *(pounds per person)* - 1

(25) Mirrors, signaling - 2

(26) Oars - 1 unit

(27) Oil, illuminating *(quarts)* - 1

(28) Oil, storm *(gallons)* - 1

(29) Painter - 2

(30) Plugs - 1

(31) Provisions *(pounds per person)* - 2

(32) Radio installation - 1, motorboats only

(33) Rowlocks - 1 unit

(34) Rudder and tiller - 1

(35) Sea anchor - 1

(36) Searchlight - 1, motorboats only

(37) Signals, distress, floating, orange smoke - 2

(38) Signals, distress, red hand flare - 1 unit

(39) Signals, distress, red parachute flare - 1 unit

(40) Signals, lifesaving

(41) Tool kit *(motor-propelled lifeboats only)*

(42) Water *(quarts per person)* - 3

(43) Whistle, signaling

e. The safety of a ship demands that everything be shipshape. Safety of personnel demands that particular attention be given to those items provided for the better security of life. When an emergency develops, it is then usually too late to start preparations. The following questions should be used as a test to see how many can be answered with a *"yes."*

(1) Was lifeboat equipment thoroughly examined in port? Is it checked frequently at sea?

(2) Are the oars, boathooks, etc., in good condition and properly lashed in boats?

(3) Are the rowlocks properly secured and ready for slipping into the sockets?

(4) Does the rudder fit properly into the gudgeons, and is it properly attached to the boat with a lanyard to prevent loss?

(5) Are all the sails *(where required)* and attached gear in good condition? Are they dried out and set occasionally for training?

(6) Are the hermetically sealed cans containing fresh water in good condition?

(7) Are the hermetically sealed provision containers in good condition and watertight?

(8) Are the boat painters properly attached and in good condition, also of proper length?

(9) Are the strongbacks properly secured?

(10) Are frapping lines provided for lifeboat falls?

(11) Are the boat gripes properly secured and the falls moderately taut?

(12) Is there a hammer or bar ready at hand to be used for promptly releasing the pelican hooks on the gripes securing the boats?

(13) Are the crank handles for the davit arms in place and of proper fit?

(14) Is all excess water drained from boats and are the boat drains kept clear? Are rubber balls in all automatic boat drains and is the drain cap or plug attached by a chain?

(15) Are the turns of manila boat falls properly placed on the lowering bitts or the wire falls properly rove on the winch drum?

(16) Are the lifeboat fall reels or winches and fairleads clear for running?

(17) Has a little slack been left in the span between the davit heads to which the lifelines are attached?

(18) Has the motorboat engine been operated at the required intervals?

(19) Has the hand-propelling gear been operated and lubricated frequently *(if the boat is so fitted)*?

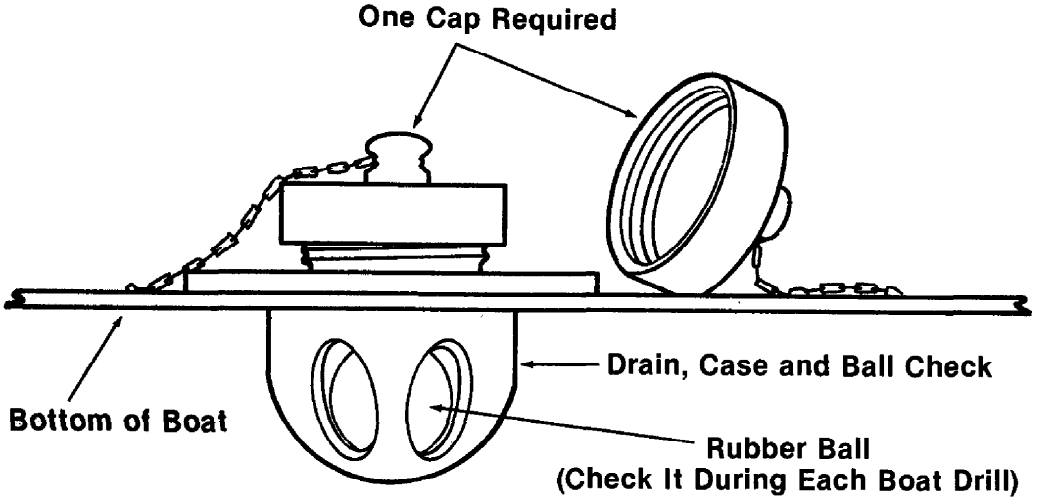
(20) Is miscellaneous gear on the boat deck kept clear of the lifeboats?

(21) Are the knotted lifelines *(manropes)* from the davit heads of proper lengths?

(22) Is the lifeboat release lever properly marked and secured and do the boat crew fully appreciate the dangers of its improper operation?

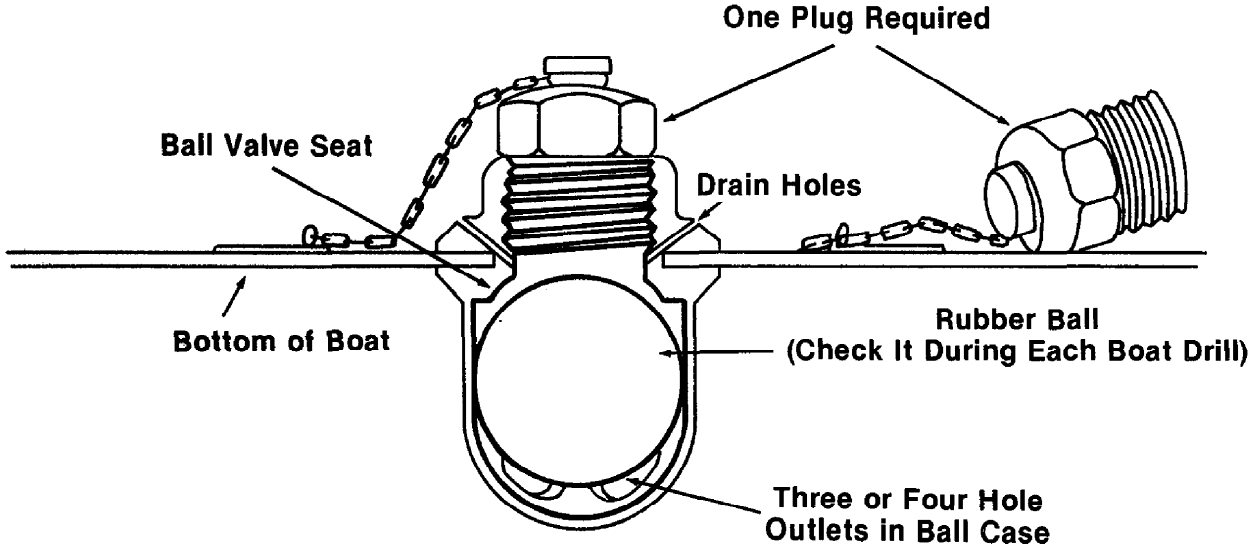
(23) Are the hatchets in good condition and in place.

f. Small items of lifeboat equipment are stowed in equipment locker(s) and in equipment and provision tanks. All equipment and provisions should be carefully stowed in these lockers and tanks by certificated lifeboatmen and all boat crewmembers should be familiar with the lifeboat equipment and its stowage. Lockers are stenciled **"Emergency Gear"** and provision tanks are stenciled **"Provisions."** Equipment which may be required in a hurry, such as signaling equipment, first aid kit and heaving line, should be stowed in the most readily accessible location within the equipment locker.



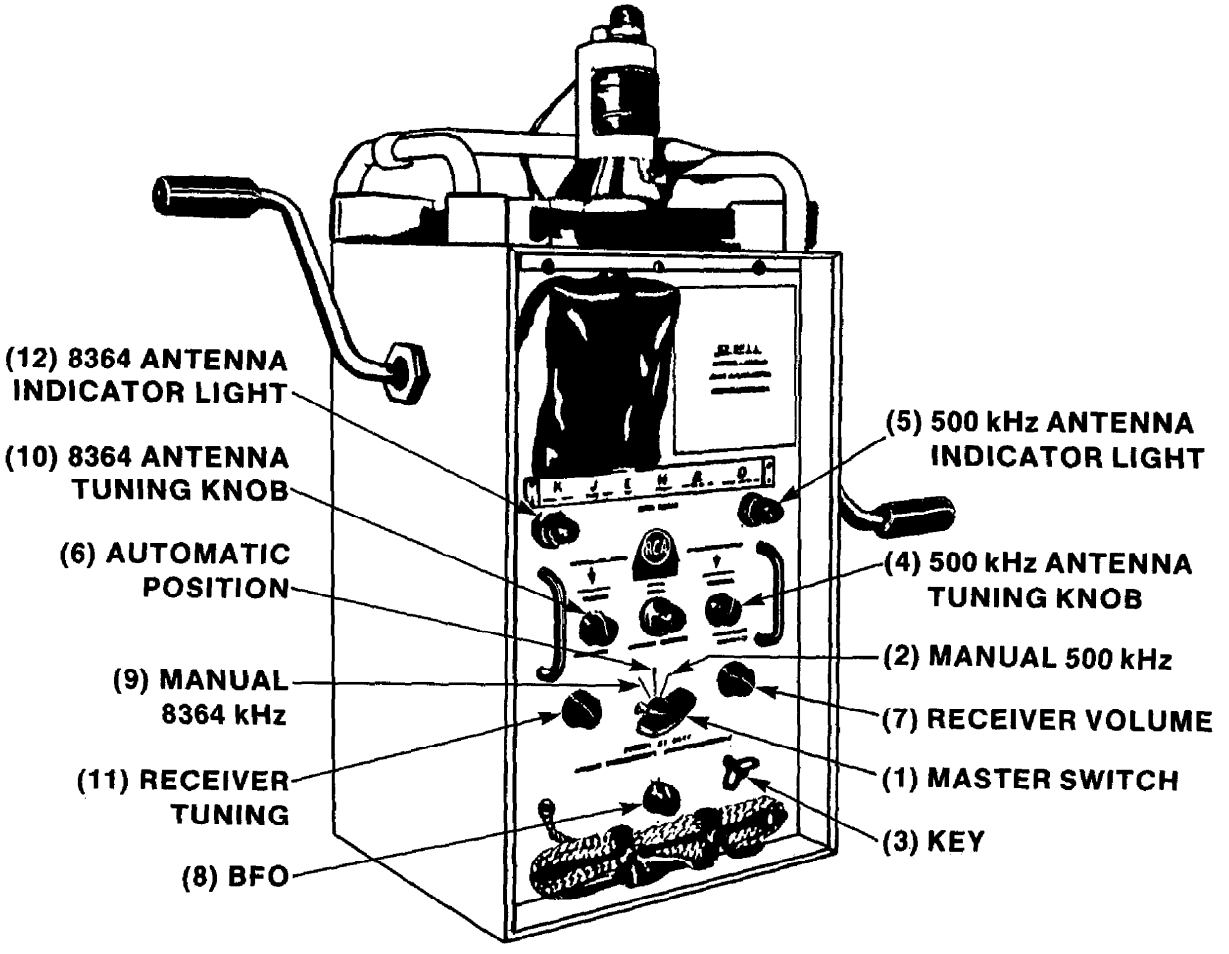
Automatic Lifeboat Drain

FIGURE 3-1



Metal Lifeboat Drain Plug (Automatic)

FIGURE 3-2



RCA RADIO

FIGURE 3-3

CHAPTER 4

DAVITS, CONSTRUCTION AND OPERATION
(Lesson No. Three)

4.1 RADIAL LIFEBOAT DAVITS

a. Explain construction and operation, using visual-aid chart *(Figure 4.1)*. Radial davits are the oldest type of davit; new ships are fitted with gravity or mechanical davits.

(1) The boat is carried on chocks resting on deck under the davits. A guy line is attached to each davit head and a span wire is attached between davit heads to properly space them over the boat, whether rigged inboard or outboard, when the guys are set up and secured.

(2) The boat's bow and forward davit is swung out first, then the stern and after davit, and the davits are secured in the outboard position by fore-and-aft guys, the davit head span wire providing proper spacing.

(3) The boat also may be carried swung outboard, suspended from the davits and griped into a boom, strongback, or the rail. One of the lifeboats on each side of ships fitted with radial davits is required to be carried in this manner while at sea, ready for immediate use.

b. Explain duties of boat crew with this type davit.

(1) Describe use of gripes to hold the boat in place as the ship rolls or pitches.

(2) Go through the steps in the operation of the davits.

(a) Clear the boat gripes.

(b) Remove the chocks.

(c) Slack and tend the guys. Point out that guys should be tended until secured with boat ready to lower.

(d) Swing boat aft.

(e) Swing bow and forward davit outboard.

(f) Swing both davits forward and the stern and after davit outboard.

(g) Swing davits aft until boat is in position for lowering.

(h) Haul the guys taut and secure them.

(i) Lower away boat by slacking the falls evenly.

c. It is more difficult to prepare a boat under radial davits for launching than it is with gravity or quadrantal davits. Therefore, at sea the emergency boats with this type are swung outboard and gripped into a boom, strongback or the rail, weather permitting, to ensure their readiness for immediate use.

d. Demonstrate with actual davits, if available.

4.2 QUADRANTAL DAVITS

a. Explain construction and operation, using visual-aid chart *(Figure 4.2).*

(1) Boats do not require lifting before being swung out.

(2) Lifeboat is carried in chocks on deck between the pair of davits.

(3) Davit arms, pivoted near their base, can be cranked outboard by turning cranks which operate a worm gear, thus swinging the boat out over the side to lowering position.

(4) Davits for boats of over 5000 lbs. weight fully equipped *(without persons)* must be of the gravity type.

b. Explain duties of crew with this type davit.

c. Demonstrate if this type davit is available.

4.3 SHEATH-SCREW DAVITS

a. Boom Type. Explain construction and operation using visual-aid chart *(Figure 4-3).*

(1) Boat is carried on chocks on deck under the davits.

(2) Davits are pivoted near their foot and are cranked to the outboard position by a hand crank and sheath-screw gear.

b. Crescent Type. Explain construction and operation from visual-aid chart *(Figure 4-4).*

(1) Boat cradled between the davits.

(2) Davit arms are pivoted near their foot, and are cranked to the outboard position by turning cranks which operate the sheath-screw gear.

c. Explain and demonstrate duties of crew.

4.4 GRAVITY DAVITS

a. General. Explain nomenclature, construction and operation, using visual-aid chart *(Figure 4-5).*

(1) Required for boats weighing over 5000 lbs., equipped and without persons.

(2) Permits launching, by gravity and without power, by one man after boats are cleared away.

(3) Lifeboats are carried cradled between two heavily constructed davit arms.

(4) The davit arms are each on two sets of rollers, mounted on tracks set at right angles to the ship's side. When released, the rollers permit the davits to roll down the trackways, carrying the boat, outboard to the lowering position. During each boat's lowering and recovery, the davit rollers will be checked to ensure that they roll free.

(5) Tricing pendants pull the boat in to the embarkation deck as it is lowered.

(6) Frapping lines hold the boat in position for embarkation of passengers after the tricing pendants are cast off. They also restrict the boat's swinging during lowering.

(7) Boat falls are led from winch drums through fairleads to the davit heads and blocks, with chain links for hooking onto the boat's release hooks.

(8) When hoisted inboard and secured, the weight of the boat is taken by the gripes, the stopper bars and the winch brake and by the floating-block locking hook, which is an integral part of the davit arm near the tip on its under side.

(9) Gripes prevent boats swinging in a seaway.

b. Discuss operation of the gravity davit, using visual-aid charts *(Figure 4-5)*.

(1) To clear boats away and free davits to roll down the trackways:

(a) Remove gripes and stopper bars.

(b) Caution: See that power is off the winch and that the trackways are clear. Gently lift the winch-brake lever and the boat and davit-arm assembly will roll down the trackways to the outboard lowering position.

(c) Ease the davits down to the outboard stoppers.

(d) Raise the brake lever to continue lowering.

(e) The tricing pendants will pull the boat in to the embarkation deck. Don't slack the falls entirely as this would put the boat's full weight on the tricing pendants.

(2) Describe the operation and nomenclature at the davits themselves.

c. Nested Boats

(1) When sufficient boats cannot be carried for passenger capacity, boats are nested, a smaller lifeboat being carried above the larger and resting on chocks or *"broken"* hinged thwarts in the lower boat.

(2) This permits an extra boat with each pair of davits. The one set of falls serves both boats. This arrangement is usually found on large, older ships.

(3) The upper boat is held in place by the top boat gripes when secured for sea.

(4) Boats shall be stowed in such manner that they are capable of being launched in the shortest possible time. Ten minutes is allowed by the USCG for launching all nested boats on either side of the ship.

(5) The top boat remains hung off on its suspension pendants while the bottom boat is being lowered.

(6) The falls recovered and used to lower the top boat.

(7) In recovering boats, the top boat is hove up and hung off on its suspension pendants. The falls are then overhauled to bring the bottom boat up to nest the top boat. The davits and boats are then hove up together and secured.

d. Gripes and Gripe Lever

(1) The lower main-boat gripe and the davit-stopper bar are held in place by a lever on each davit arm.

(2) To operate, lift the lever keeper, pull the lever out slightly and then down.

(a) This action drops the davit-stopper bar and also frees the outboard end of the main gripe at that davit.

(b) Lower the main gripes carefully to the deck with a lanyard.

(3) Gripes on enclosed lifeboats may be of a self-tending design. The gripes are designed in such a manner that they self release as the boat rides down the davit. This design is necessary to meet the USCG requirement that these boats be capable of being lowered from within the lifeboat without leaving anyone behind on the vessel.

e. Winch Controls

(1) Lifeboat winches and wire falls are required with gravity davits and when the boat deck is over 20 feet from the lightest seagoing draft. The winches are located near the rail so the winchman can observe the movement of the boat while lowering.

(2) Boat winches for gravity davits have grooved drums large enough so there is only one layer of wire on the drums. Winches for mechanical davits need not have grooved drums and may have more than one layer of wire.

(3) Winches for nested boats have a quick-return handwheel for rapidly recovering the falls by hand power in event of a power failure.

(4) Fabric covers must be provided for lifeboat winches where ice conditions are likely to be encountered.

(5) A winch hoists the boat onboard. Demonstrate the winch controls at the winch itself.

(a) It is fitted with a brake drum and brake to control the speed of lowering. Raising the brake lever lowers away by gravity without requiring power. A governor brake is installed in the winch to control the speed of lowering boats to not over 40 feet per minute *(light)* and not more than 120 feet per minute *(loaded)* even though the hand brake lever is released completely. However, the boat's lowering must be slowed by means of the hand-brake lever just before the davit arms reach the outboard stoppers and just before the boat reaches the water.

(b) Power to the winch *(for hoisting)* passes through and is controlled by an operating control. A spring returns the operating control to *"off"* position when the control is released *(see Figure 4-7)*.

(c) Before current reaches the operating control, it is led through an emergency disconnect switch. This is kept in the *"off"* position at all times except when actually hoisting the boat or recovering the falls.

(d) A quick-return handwheel can be placed on the winch shaft to recover the falls by hand in event of a power failure.

(e) A hand crank can be placed on the geared winch shaft. This hand crank is used to hoist the davits the last foot to their full stowed position. It is constructed so that, if power is accidentally applied while the crank is engaged, the crank will not turn.

(f) A small handwheel is used to pay out the falls to provide more slack, if necessary, when hooking on the falls to recover the boat.

(g) The purpose of the emergency disconnect switch is to prevent power being inadvertently applied when the quick-return handwheel or the hand crank is being used. This is an important safety precaution. It also serves as a secondary means of cutting power off the winch when hoisting in event of jamming of the operating control and limit switch.

(6) Describe the operation and nomenclature of the winch and its controls, using visual-aids and in practical demonstrations at the davits. Stress the importance of observing all safety precautions.

(a) Operate the winch only on orders of the boat commander.

(b) Keep the emergency disconnect switch *"off"* except when hoisting.

(c) Never apply power to the winch when using the handwheel or crank.

(d) Do not raise the brake lever while cranking the boat up with the geared hand crank.

(e) The winch for an enclosed lifeboat installation is designed in such a manner that a small drum is attached to the same shaft as the main winch drum. A stainless steel control cable is wound on this small drum and fairleaded to the winch brake handle and then up to the lifeboat. By pulling on this stainless steel control cable, the winch brake handle can be raised while the crewmember is in the lifeboat.

f. Limit Switch

(1) Explain the purpose and demonstrate the use of the limit switch using visual-aid *(Figure 4-6)* and by practical demonstration at the davits.

(a) A limit switch is located under each trackway about a foot from the upper stopper bar bracket. Two are installed on each set of davits, one on each trackway so that either switch will cut off the power even if the davits should come up unevenly.

(b) The purpose of the limit switch is to automatically shut off power to the winch before the davits are hoisted up too far. Failure to stop the davits in time will damage the davits and their hoisting equipment. Heaving the davits up hard against the stops may part the falls, allow the davits to run free down the trackways, and drop the boat into the water.

(c) The limit switch is a safeguard against mechanical and human failure. If not properly maintained, it may fail to serve this purpose. It must not be used as an automatic stopper.

(d) *"White witness marks"* are painted or placed on the davit trackways and davit arms as outlined in COMSC painting instructions. One excellent method of marking these witness marks is by plexiglass lettered vertically from the back with **"ST"** on the davit arm and **"OP"** on the trackway so that they form **"STOP"** when lined up *(see Figure 4-6)*. White luminous tape placed on the back of the plexiglass improves its visibility at night.

(e) When the witness marks line up, stop power hoisting. Then turn the emergency disconnect switch off before inserting the hand crank. The davits must be hand-cranked up the last foot until the davit stopper bar is up against the upper stopper bar bracket. Hoisting by hand is hard. However, there is no easy safe way.

(2) Operation of limit switch.

(a) The davit-arm striker rides up on the contact breaker. This is a wheel which is held up by a weight or by spring tension.

(b) The davit striker depresses the wheel. This throws the limit switch and shuts off power to the winch.

(c) Adjustment of the limit switch must not be changed.

(d) Repairs are made by authorized personnel only.

(e) Limit switches should be tested each time the boats are hoisted. This can be done by momentarily pulling down on each contact-breaker wheel while hoisting the boat *(while the boat is well clear of its stowed position)* to see that the power cuts off.

g. Tricing Pendants

(1) Explain use of the tricing pendants to trice boats in to the embarkation or boat decks, using visual-aid chart *(Figure 4-8)* and demonstrate its use on a lifeboat.

(a) They consist of wire pendants shackled to each davit arm and secured to each fall block by a trip hook called a tricing-pendant trip hook *(formerly called MacCluney hook)*.

(b) The tricing pendants must be kept secured to the boat's fall block, so that the boat is ready for immediate use. As the boat is swung out and lowered, the tricing pendants will automatically trice the boat in to the embarkation or boat deck, ready to be frapped in so that passengers can board.

(c) Tricing pendant trip hooks are fitted with a short tripping line, so arranged that the hook may be tripped from within the boat.

(2) Purpose of tricing pendants. Boats under gravity davits, when swung outboard, are suspended too far from the ship's side for safe embarkation of passengers. Therefore, gravity davits are equipped with tricing pendants to pull the boats in alongside. Frapping lines hold the boats in after the tricing pendants are tripped and while the rest of the boat crew and passengers embark.

(a) When lowering a boat, the tricing pendants automatically pull the boat in alongside the embarkation deck to facilitate embarkation of passengers. USCG requires the davits and equipment to be capable of launching the boats even under a 15 degrees

list. Ships constructed after July 1, 1986 require launching gear operation at up to a 20 degree list. Under such conditions, tricing pendants are particularly important since boats on the low side could not otherwise be snubbed in to the embarkation deck. The falls must not be slackened too much as this would put the boat's full weight on tricing pendants.

(b) Before embarking passengers, the frapping lines are passed and secured to hold the boat in to the ship's side during embarkation.

(c) The tricing pendants are let go by a pull on the short lanyard attached to each tricing pendant trip hook. A sharp downward pull on the trip line by a man in the boat will trip the hook and let go the tricing pendant. Tricing pendants must not be let go until the frapping lines have been passed and secured to hold the boat in.

(d) The tricing pendant trip hooks are tripped separately since the boat will swing when this is done. The bow and stern tenders must therefore be seated at the time. The only function of the tricing pendants is to bring the boats in to the embarkation deck so that the frapping lines can be secured to hold them there. The tricing pendants must be cast off before the boats can be lowered further. They are tripped before the embarkation of passengers to avoid frightening passengers when the boat jerks and also to avoid excessive swinging of the loaded boat.

(e) Enclosed lifeboat installations typically do not have a tricing pendant. These boats are not designed to be loaded at the embarkation deck and therefore there is no need to swing these boats into this deck after the davit arm has swung out. The enclosed lifeboats are designed to be lowered directly to the water from the stowed position.

h. Frapping Lines. Show frapping lines and explain their use and purpose from visual-aid chart *(Figure 4-8)* and at the davits.

(1) Manila frapping lines have been superseded in MSC ships by improved wire-strap frapping lines. Manila frapping lines had an eye splice in one end and were long enough to permit their use doubled. Even so, they would become badly frayed after use in one or two launchings. Therefore wire-strap frapping lines have been adopted for use in MSC ships.

(2) Frapping lines authorized for MSC ships will consist of wire strap secured to the falls by shackles, snap hooks or sister hooks *(twin hooks)* of adequate size and strength and with a manila hauling line spliced to the bight of the strap. Shackles will be used to secure the wire strap to the falls where the shackles can be left in place with the falls two-blocked and the boats stowed *(see Figure 4-8)*. Snap hooks or sister hooks will be used instead of shackles where the shackles cannot be left in place on the falls.

Frapping lines will be kept in the boat ready for use. Where sister hooks are used, they will be moused after they have been hooked onto the falls.

(3) After the boat has been lowered to the embarkation deck and brought into position alongside by the tricing pendants, the bow and stern tenders will assure that the wire-strap frapping lines are either shackled on or hooked on above the fall blocks, depending upon whether fitted with shackles or hooks. Sister hooks will be moused after being hooked onto the falls. Bow and stern tenders then pass the manila ends of the frapping lines to the frapping line tenders who heave taut and secure the frapping lines.

(4) The purpose of the frapping lines is to hold the boat in position at the rail for passengers to embark after the tricing pendants have been let go. While the boat is being lowered, the frapping lines keep it from swinging in a seaway.

(5) Enclosed lifeboat installations do not have provisions for frapping lines since these boats do not have to be swung into the embarkation deck.

i. Boat Falls

(1) Boat falls are of sufficient length to lower boats to the water at the ship's lightest draft, even while listed 15 degrees to either side.

(2) Blocks, falls and all fittings are designed for a minimum safety factor of six.

(3) When lifeboat winches are used, falls must be of wire rope.

(a) Not more than 2-part wire falls may be used, except in special cases.

(4) When lifeboat winches are not used, falls must be of manila rope or equivalent; wire rope may not be used.

(a) Ships over 1000 gross tons must have covered tubs, boxes or reels for stowage and protection of the falls, and cruciform bits for proper lowering of boats.

(5) Boats, davits, falls and gear are tested by lowering with a deadweight load equal to the number of persons allowed *(165 lbs. per person)* together with weight of equipment, plus 10 percent of the total weight of the boat.

j. Manropes. USCG requires that all davit installations have two lifelines *(manropes)* fitted to a davit span, except that emergency lifeboats have four manropes.

(1) Manropes are at least three inches in circumference, knotted every two feet, and must be long enough to reach the water at the ship's lightest seagoing draft, even with a 15 degrees list to either side.

(2) MSC policy is to provide four manropes on all boats.

4.5 OPERATING INSTRUCTIONS AND SAFETY PRECAUTIONS

a. Operating Instructions and Safety Precautions for Lifeboat Winch-Gravity Type-Single

(1) Safety precautions - before launching boat, lifeboat commander will make sure:

(a) Boat drains are closed.

(b) Sea painter must be led inboard of the falls and outboard of the ship and clear of all obstruction.

(c) Release hooks are in normal closed and locked position, fall block links engaged and release lever is secured **BEFORE** gripes and stopper bars are let go and cleared.

(d) Disconnect switch is **"OFF"** and hand crank is disengaged.

(e) All persons are clear of falls and davits.

(2) Operating instructions - *(winchman takes orders from lifeboat commander only).*

(a) To lower boat, raise weighted brake lever.

(b) To stop lowering, release brake lever.

(c) To hoist boat:

1. Turn disconnect switch to **"ON."**

2. Move operating control to **"HOIST"** position.

(d) To stop hoisting:

1. Release operating control - spring will return it to **"OFF."**

2. **STOP HOISTING** when white witness marks on davit and trackway line up.

3. Turn disconnect switch to **"OFF."**

4. Engage hand crank and hoist remaining distance by hand.

(3) Safety precautions - general.

(a) Never engage hand crank or quick return handwheel while power is turned on.

(b) Boat commander assures himself that release hooks are closed, fall block links engaged and release lever is closed and safety toggle pin is in place before permitting the release of the main gripes.

(c) Do not allow davits to hit outboard stops hard when lowering.

(d) When hooking on boats to retrieve, always keep brake lever in raised *(released)* position until both falls have been hooked on.

(e) Operate only on orders from, and as directed by, the BOAT COMMANDER.

(f) Never use limit switch as an automatic stop; it is an emergency safety device only.

b. Operating Instructions and Safety Precautions for Lifeboat Winch-Gravity Type-Twin Winch *(Victory Ships)*

(1) Safety precautions - before launching boat, lifeboat commander will make sure:

(a) Boat drains are closed.

(b) Sea painter is led forward and tended.

(c) Release hooks are in normal closed and locked position, all block links engaged, and release lever is secured **BEFORE** gripes and stopper bars are let go and cleared.

(d) Disconnect switch is **"OFF"** and hand crank is disengaged.

(e) Clutch is disengaged.

(f) All persons are clear of falls and davits.

(2) Operating instructions - *(winchman takes orders from lifeboat commander only).*

(a) To lower boat, raise weighted brake lever.

(b) To stop lowering, release brake lever.

(c) To hoist boat:

1. Engage clutch and turn disconnect switch to **"ON."**

2. Move operating control to **"HOIST"** position.

(d) To stop hoisting.

1. Release operating control - spring will return it to **"OFF."**

2. **STOP HOISTING** when white witness marks on davit and trackway line up.

3. Turn disconnect switch to **"OFF"** and disengage clutch.

4. Engage hand crank and hoist remaining distance by hand.

(3) Safety precautions - general.

(a) Never engage hand crank while power is turned on.

(b) Boat commander assures himself that release hooks are closed, fall block links engaged and release lever is closed and safety toggle pin is in place before permitting the release of the main gripes.

(c) Do not allow davits to hit outboard stops hard when lowering.

(d) When hooking on boats to retrieve, always keep brake lever in raised *(released)* position until both falls have been hooked on.

(e) Operate only on orders from, and as directed by, the Boat Commander.

(f) Never use limit switch as an automatic stop; it is an emergency device only.

c. Operating Instructions and Safety Precautions for Lifeboat Winch-Sheath - Screw Type

(1) Safety precautions - before launching boat, lifeboat commander will make sure:

(a) Boat drains are closed.

(b) Sea painter is lead forward and tended.

(c) Release hooks are in normal closed and locked position, fall block links engaged and release lever is secured **BEFORE** gripes are let go and cleared.

(d) Disconnect switch is **"OFF"** and hand crank is disengaged.

(e) All persons are clear of falls and davits.

(2) Operating Instructions - winchman takes orders from lifeboat commander only.

(a) To lower boat:

1. Crank davits by hand to extreme outboard position.

2. Raise weighted brake lever.

(b) To stop lowering, release brake lever.

(c) To hoist boat:

1. Turn disconnect switch to **"ON."**

2. Move operating control to **"HOIST"** position.

(d) To stop hoisting:

1. Release operating control - spring will return it to **"OFF."**

2. When boat is up, stop hoisting and turn disconnect switch to "**"OFF."**

3. Crank davits by hand to inboard position.

(3) Safety precaution - general.

(a) Never engage hand crank while power is turned on.

(b) Boat commander assures himself that release hooks are closed, fall block links engaged and release lever is closed and safety toggle pin is in place before permitting the release of the main gripes.

(c) When hoisting, approach upper position of travel slowly and carefully.

(d) When hooking on boat to retrieve, always keep brake lever in the raised, or released, position until both falls have been hooked on.

(e) Operate only on orders from, and as directed by, the Boat Commander.

4.6 SUMMARY AND LESSONS FROM CASUALTIES

a. Outline types of davits and review briefly nomenclature and operation of each:

(1) Radial or round bar

(2) Quadrantal

(3) Sheath screw

(a) Boom type

(b) Crescent type

(4) Gravity

b. Select appropriate review questions from Chapters 14 and 15 for an oral quiz.

c. See that students have all necessary notes or handout material.

d. Discuss or distribute the following *"Lessons from Casualties"* and others which the instructor or the group may recall to illustrate the importance of proper operation, maintenance of equipment and safety precautions.

- **A Traitor to Safety *(By-passing the limit switches)***
- **Proper Maintenance of Lifesaving Equipment**
- **Maintenance of Lifesaving Equipment**

A TRAITOR TO SAFETY
(By-passing the limit switches)

(Reproduced from Proceedings of the Merchant Marine Council, USCG.)

The vessel was tied up to a pier in an East Coast port. Efforts were made to prepare her for sea; the lifeboats had been swung out to test their operation.

As the chief electrician walked along the deck, he was approached by an A.B. The conversation was in effect as follows:

A.B.: *"Chief, would you give us a hand to crank up the lifeboat?"*

C.E.: *"Sure, fella - but wait a minute, I know enough about these limit switches so we don't have to strain our backs to get it up. Those switches are just a lot of bunk."*

Whereupon the chief electrician proceeded to try out his idea. He by-passed the limit switches by closing the circuit with the end of a screwdriver. This caused the electrical contacts to fuse, resulting in his inability to remove the screwdriver. The lifeboat was two-blocked, but the strain on the lines was so great that the falls parted and the lifeboat dropped to the water, a distance of approximately 25 feet.

Punitive action was taken, however, it will not compensate for the monetary damage sustained to the lifeboat and its equipment. It is hoped that any future aspirants to the art of by-passing limit switches remember the limit switch was put there for a specific purpose.

PROPER MAINTENANCE OF LIFESAVING EQUIPMENT

(Reproduced from Proceedings of the Merchant Marine Council, USCG.)

The proper maintenance of lifesaving equipment cannot be overemphasized. While no seaman ever wants to use the lifeboats, yet in an emergency it is good to know that they are available and ready for immediate use.

In a recent accident a seaman had his left leg broken while hoisting a lifeboat manually when someone started the motor of the winch which caused the crank to spin. The officers were conducting a fire and boat drill at sea. The crew was mustered at their respective stations and the officer in charge ordered No. 3 lifeboat lowered. The lifeboat was lowered to the rail and orders were given to hoist the boat to its secured position. Each time the boatswain turned the operating control *"on"* the electric motor to the winch

would not start. The chief mate then gave orders to have the switch placed in its **"off"** position and three seamen used the hand crank to raise the lifeboat. The boat was raised part way up on the davit tracks when the winch motor started and the crank began to spin.

Two of the seamen let go of the spinning crank and jumped out of the way, but the third was thrown over and the crank handle hit him on the left leg between the knee and the ankle and broke it. He also received injuries to his back. *(NOTE: Present equipment is constructed so that the geared hand crank should not spin if power is accidentally applied. However, this does not preclude the necessity for cutting all power off the winch before using the handwheel or crank.)*

The record shows that in this case two conditions existed which could contribute to an accident of this type.

The two panels for the motors controlling the lifeboat winches were located in the blower room, neither of which was properly marked or identified. Under such conditions a person could easily become confused and work on the No. 2 panel for winch motors on the port side while thinking he was working on the No. 1 panel controlling the winch motors on the starboard side, or vice versa. In this case it appears that the switches may have been by-passed at the control panel since other personnel were working on the electric control equipment in the blower room at the time of the accident.

With respect to proper identification, care must be exercised to see that identification name plates, labels or markings are not painted over, thereby making them illegible.

The record also indicated that failure to maintain *"good housekeeping practices"* may have contributed to the accident. The davit tracks were fouled by overpainting. The limit switches were also heavily painted and it is possible they would fail to function under emergency conditions.

It is essential that officers consider it their duty and of the utmost importance that the lifesaving equipment be kept in good condition and ready for immediate use at all times.

MAINTENANCE OF LIFESAVING EQUIPMENT

(Reproduced and condensed from Proceedings of the Merchant Marine Council, USCG.)

Who said, *"Something is going to carry away," "Look out - we're falling." "Watch that wire?"* Obviously, it wasn't Shakespeare or John Paul Jones, but it was someone you know. These are the words of merchant seamen launching lifesaving equipment during routine boat drills. Imagine what might happen and what they might say in time of

stress!!! Why these anguished words? Because something didn't perform properly. And why didn't it perform properly? Generally because of poor maintenance or none at all. Lifesaving gear aboard a merchant ship is not essential to its routine operation, it takes up space, earns nothing for the ship and provides no comfort for the crew. In short, it is superfluous and parasitic. No wonder it is often neglected. Contrast this with other gear. If a cargo winch is not working properly, the fact that it might break down in the next port and cost the ship some standby time will usually result in the winch receiving prompt and careful attention. Or even in the case of more trivial matters -if a bunk light is burned out or if a fan isn't working, the demands for repair are urgent and insistent. Lifesaving equipment on the other hand does not *"cry out"* for care and upkeep. It can await its turn for attention and it appears that in many cases its turn is far down the list. Yet - when it is needed, when there is not time for upkeep, adjustment or test, it must function immediately and efficiently. It becomes, without qualification, the most important item on the ship.

Admittedly, the care and upkeep of lifesaving equipment isn't easy. Since it must be readily accessible, it must be stowed on open decks, exposed to the elements. Even protective covers must be held to a minimum to insure rapid launching. These basic operating conditions make lifesaving gear especially vulnerable to the ravages of time and weather.

Not a simple problem. The solution of this problem of maintenance isn't simple. It involves more than an occasional turning to of the crew at greasing and painting, or writing up a *"catch-all"* item on the repair list for the shipyard. On the contrary, it is a bothersome and complicated process. As well as routine care, it entails the keeping of records, the conducting of operating tests and the making of periodic examinations and inspections.

At times even with supervision we have trouble because the man in charge of the work didn't consult the lubrication diagrams and technical information available to him. There is the case of a chief engineer on an oceangoing freight vessel who decided to improve on the lubrication system of one of his lifeboat winches. Without recourse to plans or technical data he proceeded to add a grease fitting where he thought one was needed. He was probably quite pleased with his modification because his fitting did take a lot of grease. Some time later, after a lifeboat had been lost over the side due to malfunction of this well-lubricated winch, it was opened for inspection. One of its inner chambers was found to be packed solid with grease. Unfortunately the chamber housed a brake mechanism. It seems that the chief's fitting communicated indirectly with this chamber and that most of the grease had by-passed the part he intended to lubricate and went on to make the braking device completely ineffective. It was determined that this contributed directly to the loss of the boat. Fortunately there were no injuries but there was considerable expense.

Paint with care. Now that we have established that adequate and intelligent supervision of maintenance is necessary let us delve into some of the details of maintenance, - painting for example. You have often heard the expression *"paint covers a multitude of sins."* Recently a lifeboat repair plant was overhauling a boat. All the air tanks were out and appeared to be in unusually good condition but they wouldn't hold air. On closer inspection it was discovered that the bottom corner was badly rusted and some enterprising soul had covered the rusted corner with wide adhesive tape. After a neat paint job it was almost impossible to discover this defect. Needless to say the repair plant lost money since their bid was based on no tank work.

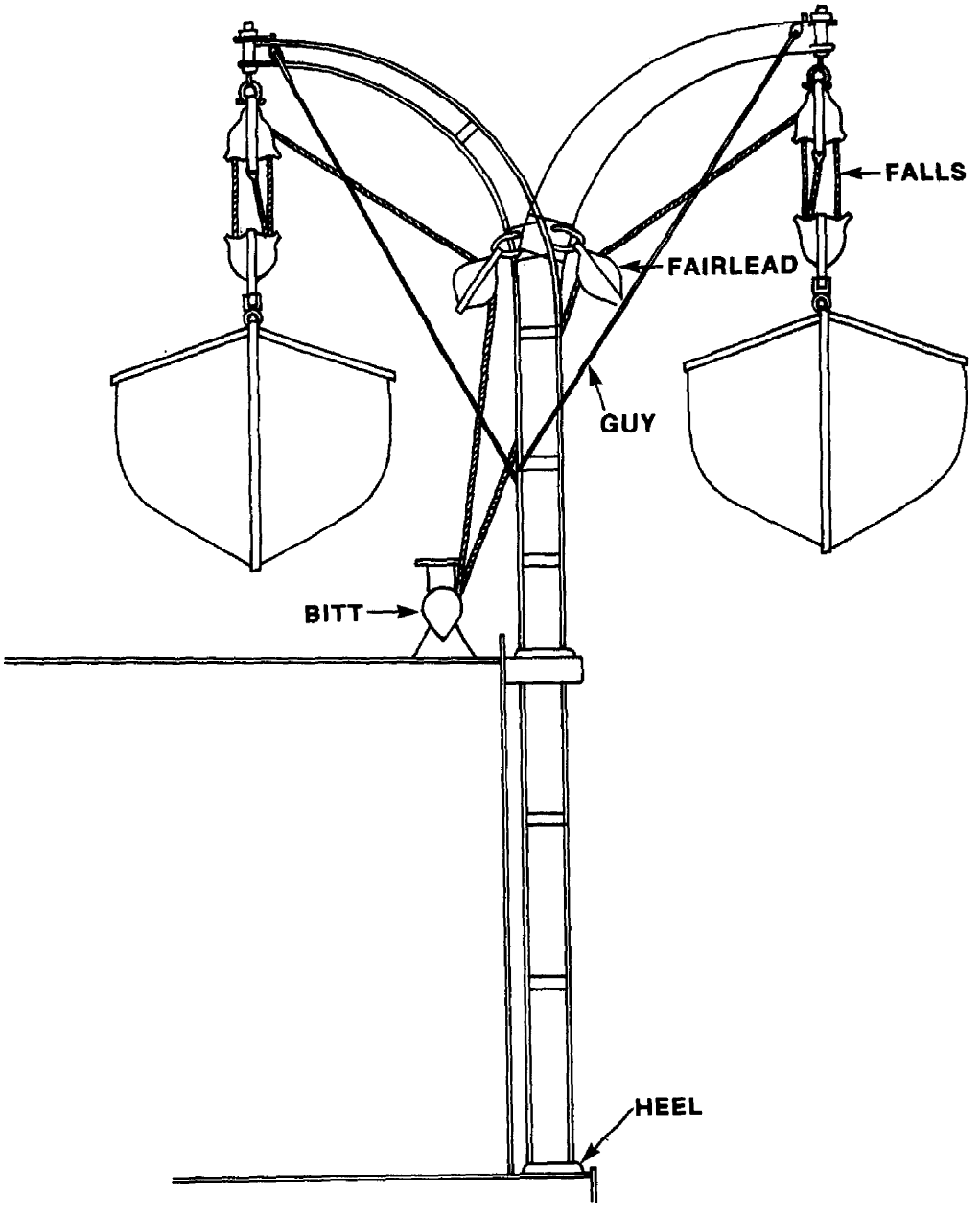
There is no need to go into the details of surface preparation and painting of lifeboats. There is, however, one inherent danger in painting the interior of lifeboats on shipboard. The boats are very often swung out so that the gunwale is level with the deck for easy access. Shorebased painters, not familiar with the purpose of the Rottmer gear released lever have, on occasion, raised the lever to paint under it, despite the fact that the lever is marked in large red letters **"DANGER - LEVER RELEASES HOOKS."** The result is a wild ride down with the boat to the water, or worse - to the dock. The moral of this story is to always lash the ends of the boats to the davit heads independent of the falls whenever maintenance work is done aboard ship.

A lifeboat builder was asked what was the outstanding defect in lifeboats being returned to his plant for repair. He stated that frozen hand propelling gear and releasing gear due to lack of lubrication or excess paint or both were the biggest offenders. There is no use belaboring the fact that grease fittings are put there to be used but there is some merit in discussing the painting situation. The seagoing branches of the armed forces come in for a bit of ribbing now and then because of that old cliché. *"If it doesn't move, paint it."* In general, this isn't a bad rule to follow but when lifesaving equipment is involved it should be amplified by *"if it is supposed to move, paint with care."* There are many cases of faulty operation due to excess painting, not only of hand propelling gear and releasing gear but even of davits and winches and their electrical components.

Check blocks and falls. Blocks and falls are items of lifesaving gear which seem to come in for a disproportionate amount of inattention. In a recent case a three-sheave steel block carried away and dropped the after end of a lifeboat. Upon examination it was found that the internals of the block had wasted away. The master had the presence of mind to have the other blocks checked over and five more were found to be in the same condition. Contrast this with the very same defect found on another ship. In this case the block was repaired but it never seemed to occur to anyone to check over the other blocks on the ship.

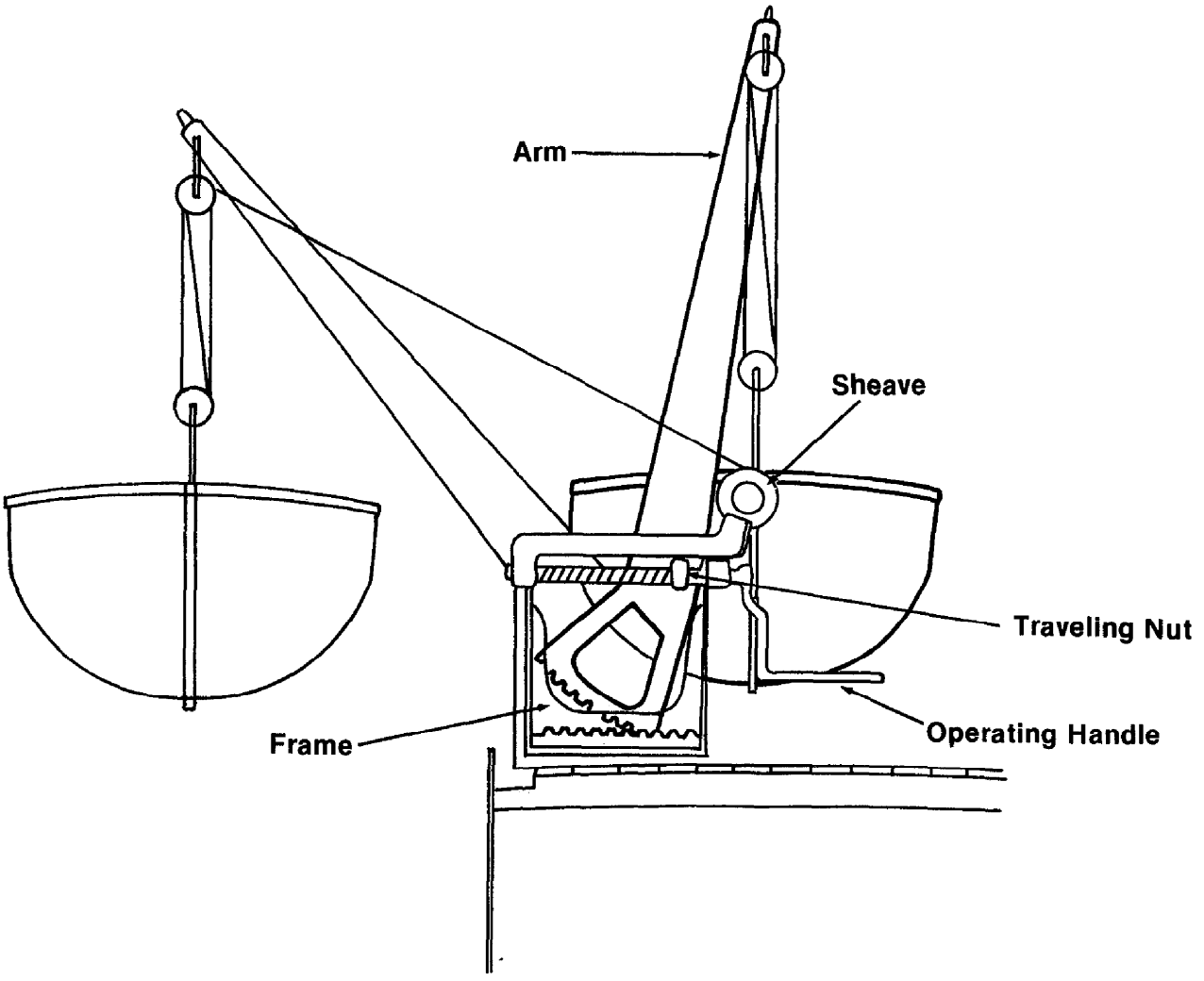
Lifeboat falls are perennial trouble makers despite the fact that they have a factor of safety of over six when new. USCG has publicized in the Proceedings of the Merchant Marine Council many cases of the failure of wire falls when the davit is *"two-blocked"* due to faulty electrical controls or careless operation, or both. This is not surprising when one considers the considerable horsepower used in present day winches. What may come as somewhat of a surprise is the number of failures of wire falls in the launching operation with only the weight of the empty boat on the falls. Although this could be caused by an inherent defect, or kinking in the original installation, most of the evidence points to a lack of lubrication. Installations on shipboard appear to be heavily greased, and they are - except in way of the fixed sheaves on the side of the davit and other hard-to-reach places. Most of the corrosion is then concentrated in this area resulting in early failure of the wire rope. The answer to this is obvious. Take the load off the falls and free the falls from these hidden corrosion pockets and lubricate thoroughly.

The above is nothing especially new. The problem is to get this message to those who are directly involved. Maintain adequate supervision - lubricate - paint but don't overdo it - watch for corrosion - when a particular item fails be sure to investigate similar items onboard - don't make changes to approved lifesaving gear - the life you save by proper maintenance may be your own.



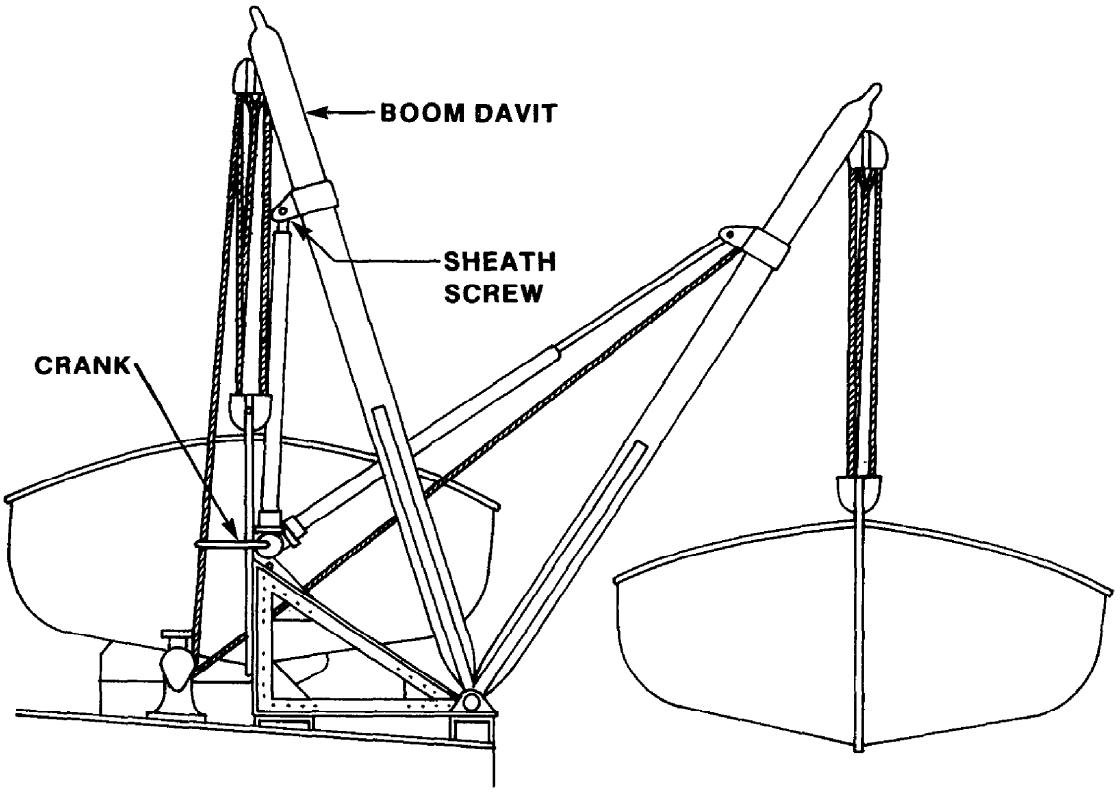
RADIAL OR ROUND BAR DAVIT

FIGURE 4-1



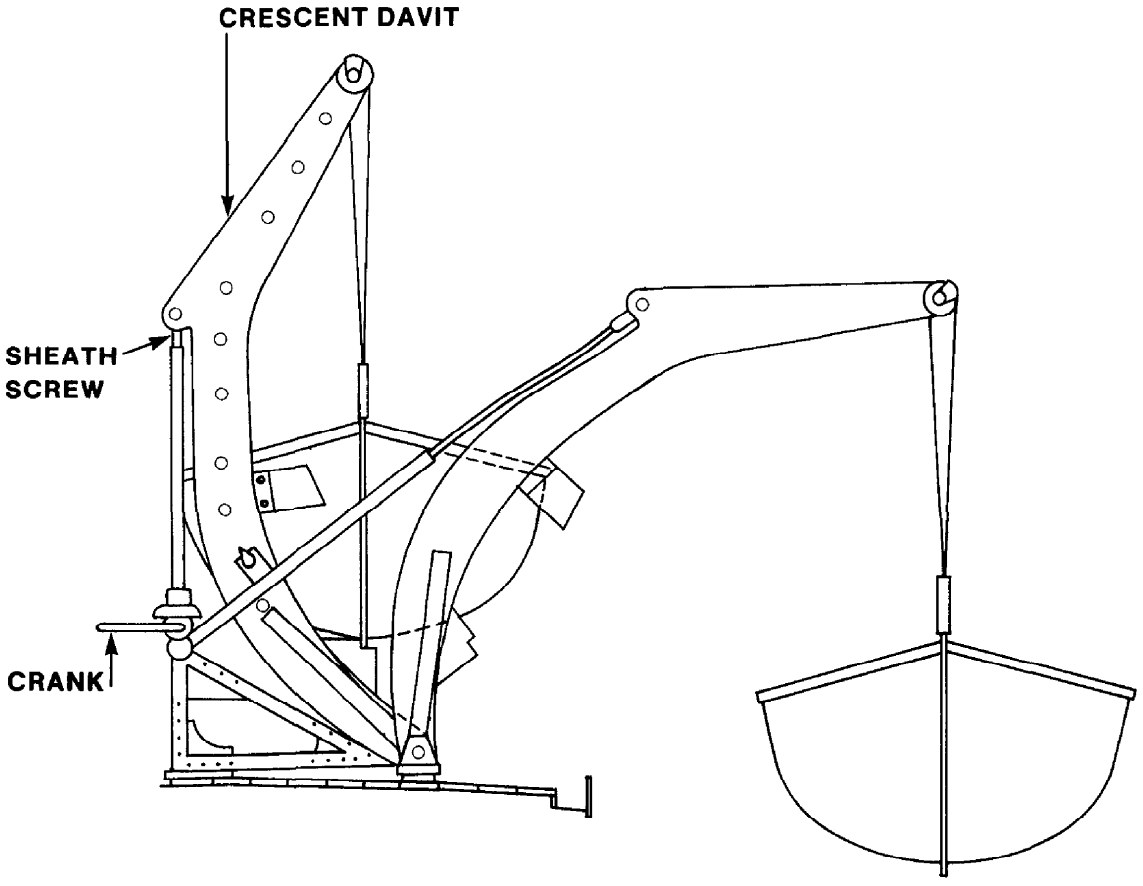
Quadrantal Davit

FIGURE 4-2



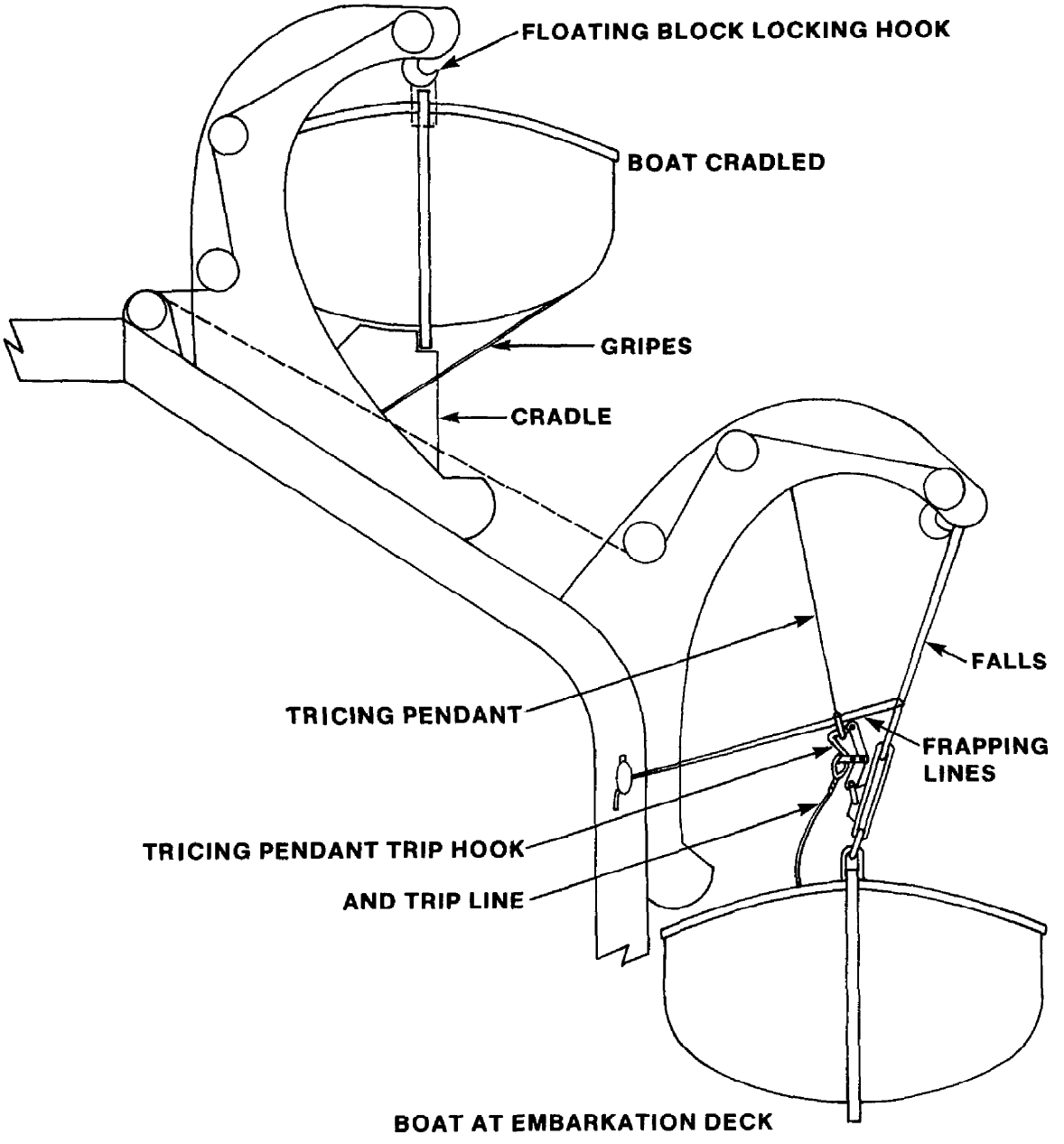
SHEATH SCREW BOOM TYPE DAVIT

FIGURE 4-3



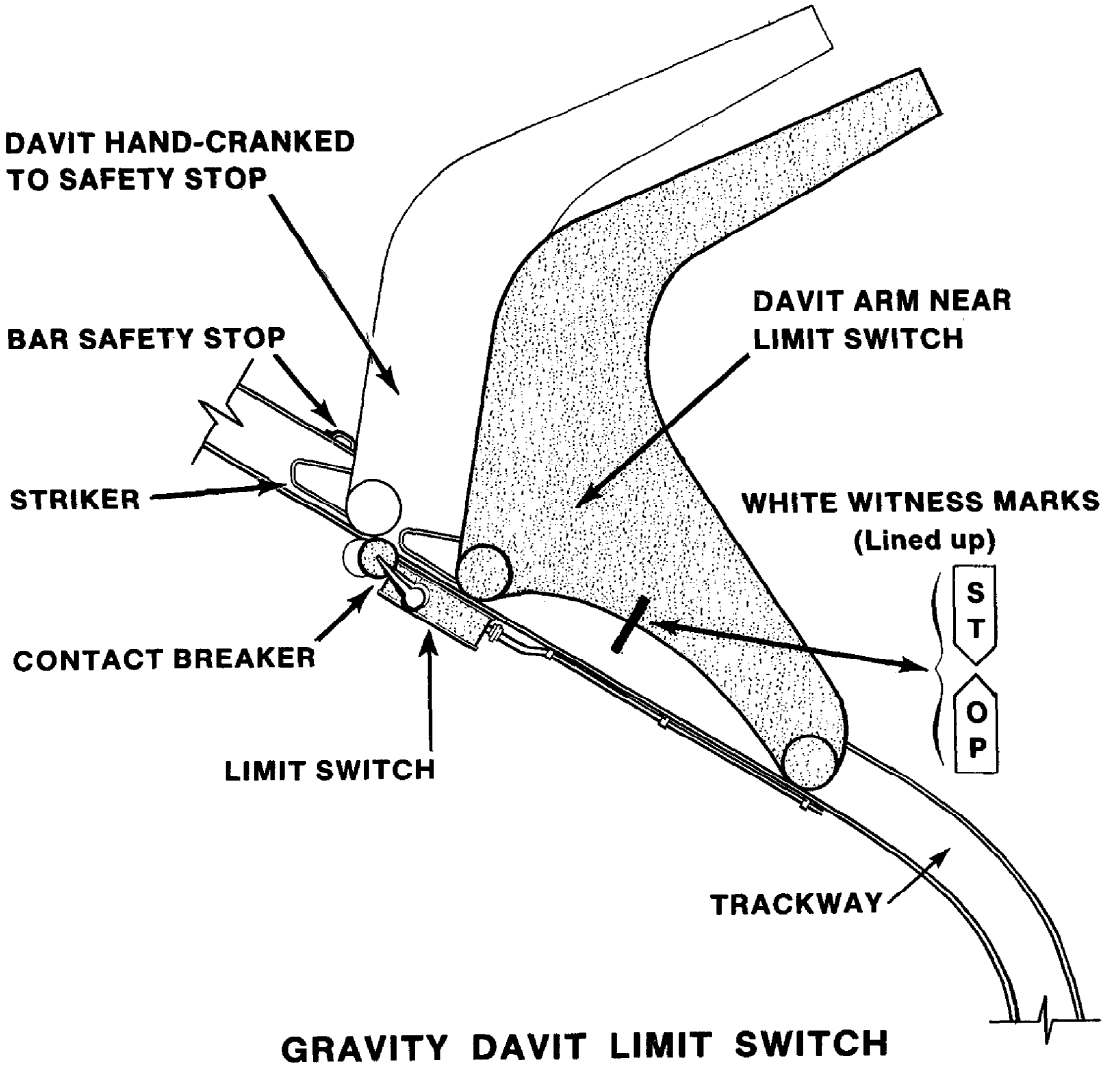
SHEATH SCREW CRESCENT DAVIT

FIGURE 4-4



GRAVITY DAVIT

FIGURE 4-5



GRAVITY DAVIT LIMIT SWITCH

FIGURE 4-6

Lifeboat Winch Controls

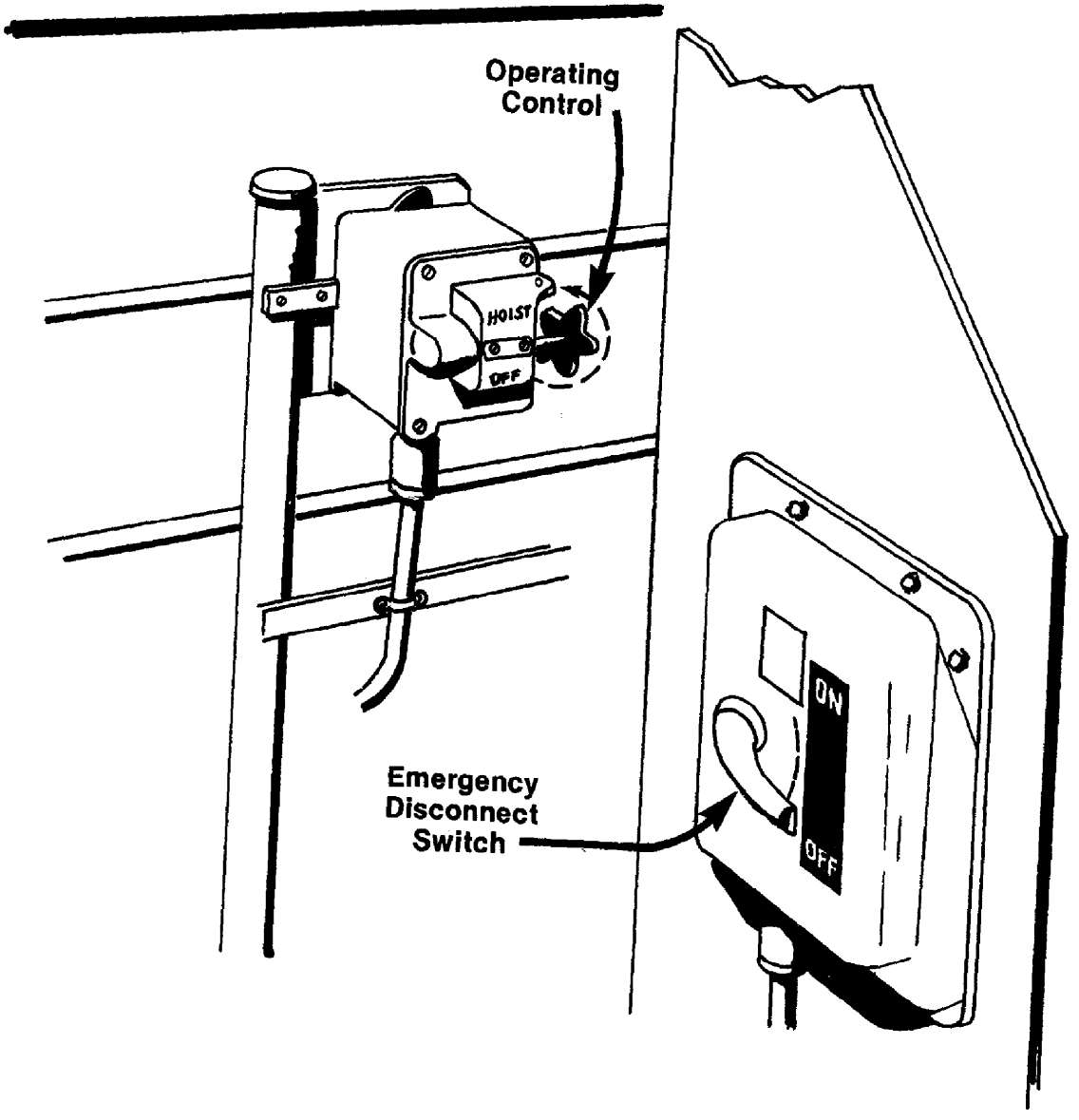
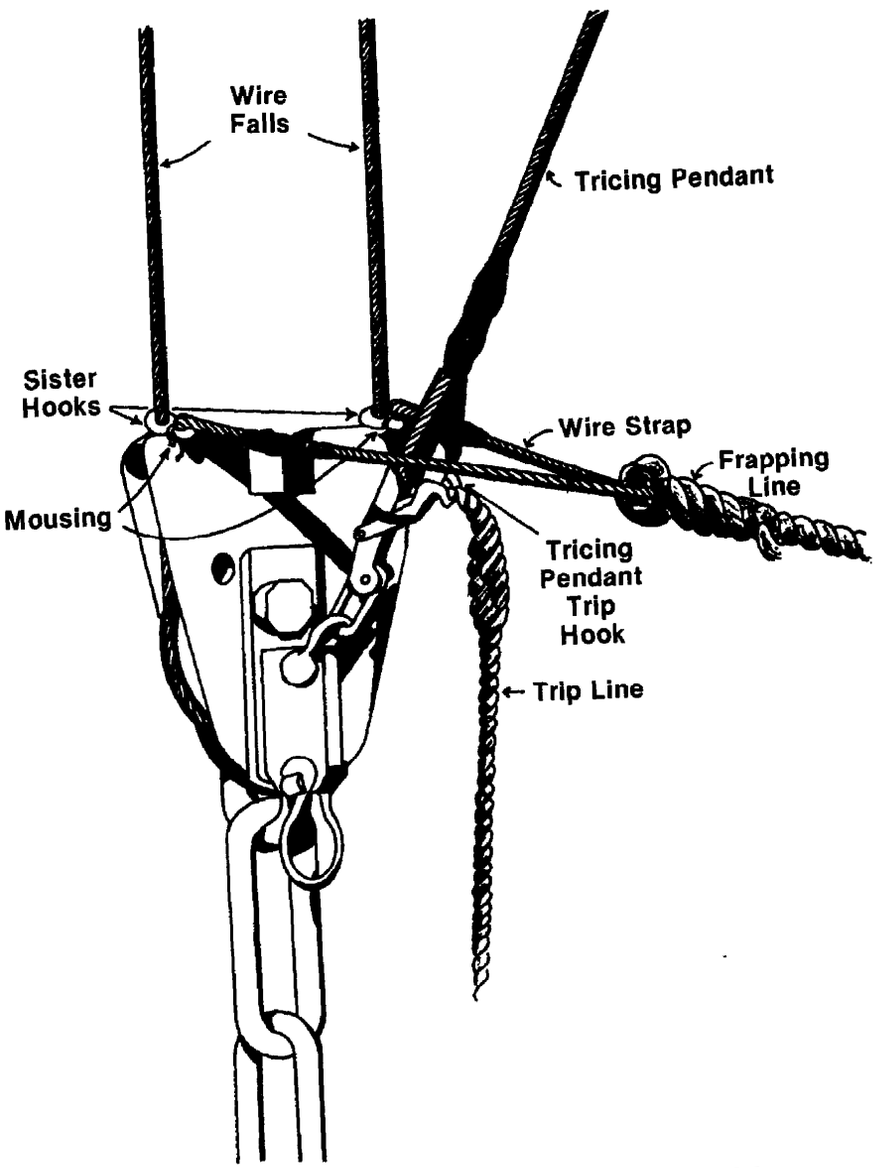


FIGURE 4-7



Tricing Pendant and Wire Strap Frapping Line (With Sister Hooks)

FIGURE 4-8

CHAPTER 5

RELEASING GEAR
(Lesson No. Four)

5.1 GENERAL

a. All lifeboats must be fitted with suitable approved disengaging apparatus consisting of fixed hooks in the boat or mechanical disengaging apparatus.

b. All lifeboats in ships over 3,000 gross tons must be fitted with mechanical disengaging apparatus arranged to permit the boats to be launched with their full complement of persons and equipment while the ship is underway or stopped, and for both ends of the boat to be released simultaneously, under tension or not, by one person. This is accomplished by a release lever which rotates a shaft extending to the release hooks.

c. All boats in any particular ship must be fitted with the same type of releasing gear.

d. The Rottmer hook-releasing gear is the type most prevalent in MSC ships. It releases both falls simultaneously when the release lever in the bottom of the boat is operated. It can be released under tension even though the boat is not waterborne.

e. Other types do not meet USCG requirements because they utilize a chain-pull instead of a continuous shaft for operation, because with some types the boats must be waterborne before the releasing gear will work, or because some types may not release both hooks simultaneously.

5.2 CONSTRUCTION

The Rottmer hook and releasing gear consists of releasing hooks at bow and stern connected by a rod or shaft along the boat bottom, through universal joints, to the release lever. *(See Figures 5-1 and 5-2.)*

a. The release lever in the bottom of the boat is held in its secured position by a safety toggle pin.

b. USCG requires that the release lever be painted bright red and have, in raised letters, either the words **"DANGER-LEVER DROPS BOAT"** on new boats or **"DANGER-LEVER RELEASES HOOKS"** on old boats. In order to make the release lever stand out more sharply against the international orange interior of the lifeboat, the area in way of the red release lever, from the keel to the side bench, is painted white, to provide a contrasting background for the lever. The band is approximately 12 inches wide.

c. When the release lever is secured, the boat-release hooks are held in their closed position by the hook lock. *(See Figure 5-1.)*

d. A preventer bar at the mouth of each release hook keeps the chain link engaged in the hook so that the link will not drop out when the falls are slackened. The preventer bars are hinged to permit freeing the chain link if the releasing gear is inoperable. The falls also can be hooked on, when recovering the boat, with the release lever in its secured position and without operating it.

e. The release hooks are hinged to permit their upsetting when the release lever is operated, causing the hook lock to open.

5.3 OPERATION

When the release lever is operated, the release hooks are capsized and both falls are released simultaneously. The releasing gear can be operated under tension and the boat dropped even though not waterborne.

a. A seaman is stationed at the release lever to guard it during lowering and thus ensure against tampering or accidental release.

b. The release lever is to be operated only on order of the Boat Commander.

c. It must be kept secured by its keeper-toggle pin at all times since the gear can be operated at any time regardless of whether the boat is waterborne or not. *(Point out the serious consequences if the release lever is operated at the wrong time.)*

d. The release lever should be operated with extreme caution, and only after the boat is waterborne or within not more than one foot of the water. To release, the keeper-toggle pin is removed and the lever is swung through 180 degrees, from the secured position side of the boat to the release position of the opposite side of the boat.

(1) In calm water, release the boat after it is waterborne.

(2) In a seaway, lowering is stopped before the boat is fully waterborne. The roll of the ship and the rise and fall of the seas must be taken into account and the release timed to drop the boat onto the crest of a swell.

e. The boat commander normally waits until the ship is stopped before releasing. With headway on, the sea painter must be taut so as to tow the boat in position directly under the davits since the davits are not designed for sideways strain.

5.4 PRECAUTIONS

a. As mentioned above under operation, but to be stressed again here, serious injury to personnel and damage to equipment has occurred when the release lever in lifeboats has been inadvertently operated during drills or while work was being performed on or in lifeboats suspended from their davits. Many such accidents have occurred through confusing the hand-operated propeller *(Fleming)* gear with the releasing gear. Uninformed seamen, instructed to operate the pulling handles, have swung the release lever and dropped the boat. This can be avoided by:

(1) Making sure that each man knows the difference between the two gears.

(2) Assigning one man to guard the release lever.

(3) Giving orders clearly so there can be no possible chance of misunderstanding.

(a) Referring to the hand-operated propelling gear as *"pulling handles"* -- never as *"levers."*

(b) Watching carefully to ensure that orders are properly carried out.

(c) Using the word "release" only in connection with the *"release lever."* Do not use *"release"* in any other order!

(4) A white stripe, 1/2 inch wide, will be painted vertically starting in the throat of the release hook and extending down the center of the hook and over the hook and lock to its base. This will provide a quick visual check that the release hooks are properly engaged before releasing the main gripes.

b. Cite examples of accidents which have occurred. Use the *"Lessons from Casualties"* in paragraph 5.5 to stimulate discussion on similar accidents, their causes and how they could have been avoided.

(1) Carefully explain that the release lever can be manually operated at any time. Under certain conditions it can be opened and then closed without having the hooks properly secured and locked. Therefore it is important to check the releasing gear carefully before each launching and to test it during each boat drill.

(2) Stress that the releasing gear will be operated only on order of the boat commander. This point should be emphasized.

(3) Consider the release lever as you would a loaded gun. Everyone is familiar with the phrase *"Don't point a gun at anything you don't want to shoot and kill!"* Similarly, crewmembers should be impressed with the fact that they must not tamper with or operate the release lever unless they want to drop the boat and themselves with it. Facetiously expressed, it might be said that any time a boat is dropped, it is only because someone in the boat meant to drop it, and themselves with it, and had to work hard to do it!

c. Before repair or maintenance work is conducted in lifeboats suspended from their davits when in port, the release lever shall be lashed in its secured position by qualified personnel designated by the First Officer. In addition, the boat shall be secured to the davit heads by adequate preventers. These should be similar to the suspension pendants for nested boats and secured independent of the boat's release hooks. This will prevent dropping of the boat and its occupants into the water or onto the docks or ships alongside if the release lever is inadvertently tripped. Precautions also should be taken, by means of stopper bars and lashings, to prevent movement of the davits and to prevent capsizing of the boat in its chocks. Lifeboats shall not be swung out over the side when underway at sea for the purpose of effecting repair or maintenance work. Such work shall be accomplished either in port or with the boats in the inboard or stowed position.

d. The releasing gear is intended to release both falls simultaneously. However, one fall may release before the other *(with the possibility of capsizing and attendant danger)* if release hooks become frozen due to improper maintenance *(lubrication)*, or if the boat is permitted to become fully waterborne with slack in the falls. Therefore it is important that the upper and lower guide bearings of the release hooks and other moving parts of the release gear be properly maintained and lubricated at regular intervals, and that the falls be released promptly as soon as the boat is partially waterborne with strain on the falls for a positive release.

5.5 SUMMARY AND LESSONS FROM CASUALTIES

a. Outline the material covered and stress the importance of fully understanding the proper use of the release gear.

b. See that students have all data required.

c. Use appropriate oral questions from Chapters 14 and 15 as a brief quiz.

d. Discuss or distribute the following *"Lessons from Casualties"* as handouts or other cases drawn from the instructor's or the group's experience:

- **Inadvertence and/or Stupidity**
- **Why Learn the Hard Way?**
- **Good to the Last Drop**
- **Check your Releasing Gear!**

INADVERTENCE AND/OR STUPIDITY

(Reproduced from Proceedings of the Merchant Marine Council, USCG.)

Inadvertence and/or stupidity on the part of a presently unknown person was the cause of another serious tragedy! How? By someone prematurely operating the manual lifeboat releasing gear when the boat was swung over the side during a presailing lifeboat drill. The results: One crewmember was killed while eight others aboard were seriously injured when the lifeboat dropped 40 feet into the water.

This particular tragedy occurred during the presailing boat drill held onboard a large passenger vessel at a port in the United States. When the time came for the hand-propelled lifeboat to be lowered into the water, 10 members of the 20-man lifeboat crew were present. The boatswain in charge left the embarkation deck to round up the stragglers, most of them in the steward's department. The other nine men, seven from the steward's department and three of whom were qualified as lifeboatmen, and two from the engine department, entered the lifeboat to prepare it for drill. Before the boatswain and the stragglers from the steward's department returned, the lifeboat suddenly dropped 40 feet from the embarkation deck to the water, seriously injuring the nine men aboard and crushing the bottom of the lifeboat. The lifeboat immediately filled with water, but remained afloat due to its buoyancy tanks. Crews of other lifeboats waterborne at the time removed the injured, who were in a severe state of shock, and they were immediately rushed to the hospital where one of them later died.

An examination of the damaged lifeboat immediately after the accident and while it was still in the water revealed that the releasing gear lever and mechanism were in the open position and that the mechanism was in good operating condition. The hooks of the lifeboat falls were hanging adjacent to the embarkation deck which indicated that the lifeboat had been released from that position. It was necessary to overhaul the boat falls by hand to lower them to the water. The damaged boat was then hooked on and hoisted to a position at the embarkation deck, where it was again thoroughly examined.

The handle of the releasing gear was found to be painted red, and when secured, was housed in a channel-shaped bracket which protected it from accidental release by a keeper pin, which had to be removed before the handle could be released to operate the releasing gear. On the side bench under the releasing handle when in closed position there was also stenciled in conspicuous red letters **"DANGER--RELEASING GEAR."** To release the falls holding the lifeboat, the releasing lever had to be manually operated through 180 degrees arc. Therefore, it would require several deliberate actions on the part of someone to operate the releasing gear.

The eight members of the lifeboat crew that survived the accident were questioned concerning the accident. Each one was asked what duty he was performing in the lifeboat, also whether or not he operated or saw anyone else operate the lifeboat releasing gear. Each man denied he operated the releasing gear. Each man also stated that he did not see anyone else operate the releasing gear. No other witnesses onboard the passenger vessel, who were questioned, could testify as to who operated the lifeboat releasing gear.

This fatal accident was apparently caused by reason of the inadvertence and/or stupidity on the part of one man, presently unknown, who operated the releasing gear without orders, thus releasing the gear and dropping the lifeboat. In summarizing this accident the following is pointed out.

(1) Certificated lifeboatmen must always be on the alert to prevent accidents.

(2) All members of a lifeboat crew must report immediately to their stations.

(3) *"Know-how"* and common sense are necessary and must be used to avoid accidents.

This tragedy points out the necessity for all crewmembers to know how to conduct themselves during abandon ship drill. Cornell Maritime Press has published *"The Cornell Manual for Lifeboatmen, Able Seamen and Qualified Members of the Engine Department,"* which may be obtained from Cornell Maritime Press, Centreville, MD 21617 and book stores that sell nautical publications. The manual is a handy guide for the ordinary seaman who is studying for the lifeboatman's or able seaman's exam. There are also many other commercial publications available on the same subject.

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WHY LEARN THE HARD WAY?

(Reproduced from Proceedings of the Merchant Marine Council, USCG.)

*"After we lowered our boat in the water and went to release it, one of the falls hung up. Had to cut the block away. It would not release. Only one hook came unhooked and almost caused the mast of the ship to sink the boat and kill the men. ***"*

*"The lifeboat--she jumped off the forward hook and was hanging by her after fall, and the stem piece and part of the keel was torn out of the lifeboat, and we had to cut her adrift. I would not have lost the No. 1 boat if we had a different kind of gear for hooking on her. If she had automatic releasing gear that would not have happened.***"*

*"No. 5 boat that was the first boat launched * * * must have been about 16 or 20 men aboard when they lowered the boat. The after tackle came unhooked, and the forward tackle--they didn't know where the release was, I think. The boat was swamped and everybody that was in the boat was swept out of the boat. That's why they lost their lives."*

"The passengers lowered No. 6 lifeboat into the water. But they were unable to release this boat. They didn't know anything about how to release it."

These are anguished words from the past. The voices of experience rising above the horror of war to guide you. Can you hear them? Can you grasp their message? World War II is over, but ships still sink, and men still scramble for survival. Others have heard their demand. New releasing gear has been designed in answer to their plaints. Do you know what it is; what it does; how it works? You should for your life may be at stake.

It is now possible to release both boat falls simultaneously. It is possible to do this safely and quickly. You no longer need fear being hauled to the ocean depths due to time-consuming releasing gear--if you know your releasing gear--that is, what it is; what it does; how it works.

What type of releasing gear incorporates features to correct past deficiencies? It's nothing brand new. Since 1944, all new installations of mechanical disengaging apparatus *(releasing gear)* in ocean and coastwise vessels have incorporated these safety features. You know it as Rottmer-type releasing gear.

How does it work? This gear consists essentially of a pivoted open hook whose foot reposes in an open cup-shaped device. To release the lifeboat, the cup is turned to an open position by means of shafting which is rotated with an operating handle located in the bottom of the boat. Thus, both ends of the boat are released simultaneously from the falls.

Why is it an improvement over wartime releasing gear? Because this arrangement allows both falls to be released simultaneously and quickly regardless of the tension on them. The ability of the Rottmer gear to release both falls simultaneously under tension is advantageous not only in rescue missions but also under abandon-ship conditions where the vessel may have some way on, causing considerable tension of the falls.

Is there any need for caution in using this type of releasing gear? Yes. This ability of the gear to release under tension requires that care be exercised when lowering a lifeboat to insure that the release gear lever is not thrown until the boat is waterborne. In the case of rescue missions under adverse weather conditions the gear may sometimes be tripped safely as the boat is about to become waterborne in order to take advantage of the most

favorable sea conditions, but in normal operations the boat should be lowered into the water before the release lever is thrown to the open position to release the falls. Similarly, the lever should not be touched when cleaning or painting a boat aboard ship.

Are there other safety features? Again, yes. The Rottmer releasing gear operating handle is required to be readily accessible and is held in position by a toggle pin which is connected to a permanent part of the lifeboat structure so that air tanks, footings, lifeboat equipment, etc., may be removed without distributing the handle. In addition, the release lever is required to be painted red and have, in raised letters, the words: **"DANGER--LEVER DROPS BOAT."** Another safety feature in the Rottmer gear is provided by preventer bars which act not only as an automatic mousing device but also permit the release of the falls when the lifeboat is waterborne in the event the gear is inoperable. This automatic feature is also desirable when retrieving a lifeboat since the link under the block can be thrust into the hook without fear of subsequent unhooking.

How much care is required to maintain this type of releasing gear? Routine maintenance. As is the case with most mechanical contrivances, the Rottmer releasing gear requires periodic lubrication to maintain the gear in a satisfactory operating condition. Grease fittings are provided in the upper and lower guide bearings for this purpose. In addition, other moving parts should be greased or oiled as found necessary, for proper maintenance is closely coupled to safe operation.

Now for the question, *"Who needs to know all this?"* Do you recall an earlier quotation? *"The passengers lowered No. 6 lifeboat into the water. But they were unable to release this boat. They didn't know anything about how to release it."* Who should know? You, you and **YOU**. Everyone sailing onboard a ship should know how to get a lifeboat away, whether deck officer or engineer, fireman or seaman, steward or what have you. The other fellow might not know either.

***

GOOD TO THE LAST DROP

(Reproduced from Proceedings of the Merchant Marine Council, USCG)

The problem of safely launching a lifeboat from a ship at sea has occupied the minds of mariners for centuries untold. While development and change in this particular field has been slow, the last half century or so has seen a remarkable evolution in lifeboat handling. With the advent of wire boat falls, lifeboat winches and gravity davits, safety in the use of lifeboats took a tremendous stride forward. These new devices, which permitted the uniform and smoothly controlled lowering of lifeboats under almost any conditions, also

made practical the use of automatic releasing gear to instantaneously and simultaneously release the hooks from the falls on both ends of a lifeboat. This device is extremely helpful to the boat commander, especially when the boat is rising and falling in a seaway. What seaman who has ever been lowered into a rough sea in a lifeboat with independent hooks will ever forget that hair-raising thrill when one end did not get unhooked, the other end fell deep in the trough between seas and the boat almost stood on its end? And, is there is a seaman who has experienced this treatment who cannot do without a repeat performance?

Rottmer-type lifeboat releasing gear, which is presently found in the majority of American ships with power lifeboat winches, is an efficient and dependable automatic apparatus that will provide the type of quick and positive release which is so valuable to a boat commander lowering to a rough sea. This gear is activated by a shaft running the length of the boat which, when rotated by moving a hand lever through an arc of approximately 180 degrees, revolves a sturdy metal sleeve around the movable shank of the boat hooks at each end. As the hand lever approaches the end of its 180 degrees arc, a notch of recess in the metal sleeve moves into place in front of the shank of the hook and the weight of the lifeboat causes the hook to tumble backward, the shank swinging up through the recess of the sleeve. A smooth and rapid activation of the hand lever then produces a positive and instantaneous release of the boat. When in its hooked-on and locked position, the lever lies in a metal channel on the bottom of the boat where it is locked in place by a metal pin which must be pulled out before the releasing gear can be operated. The hand lever is painted red and a warning: **"DANGER--LEVER RELEASES HOOKS"** is mounted in raised letters on the lever. *(New boats, **"DANGER--LEVER DROPS BOAT."**)*

Unfortunately, in spite of designed safety features, warning signs and colors and all other possible precautions which can be taken, there remains one element of danger in the use of this releasing gear which cannot be eliminated--the man who irresponsibly or stupidly releases the gear while the boat is still suspended high in the air, sending it crashing to the surface.

A casualty involving the accidental dropping of a lifeboat with the loss of one life occurred in a freighter in a southern port. The ship was undergoing annual inspection and No. 2 motor lifeboat was hanging from the falls, stripped of all provisions, air tanks and gear to permit cleaning, painting and inspection of the boat. Two carpenters from a shore repair gang entered the boat to restow the equipment and reinstall the floor boards. The foreman noticed that there were no wire gripes or preventer slings rigged from the davit heads under the boat to prevent an accidental drop. He left the scene to procure a wire gripe. While waiting for him to return, helpers on deck began to pass up floor boards to

the two carpenters in the boat to *"save time"* while waiting for the gripe. About five minutes after this job was started, the boat suddenly dropped from the falls, hit the chocks, and then slid overboard and dropped to the water, carrying both carpenters with it. One man was seriously injured in the crash and died three hours later in the hospital. The other man suffered no serious injuries.

The surviving carpenter testified that he and the other occupant had noticed the disengaging lever standing inclined at about a 45 degrees angle to the port side of the boat and that they had shouted a warning to each other and had started to climb out just before the boat dropped. This position of the lever was just about the exact point of release, as was later demonstrated. Although the lever had been lashed down in its locked position the previous afternoon after the first coat of paint had been applied to the interior, obviously someone had cast off the lashing and partially rotated the lever, not realizing the possible effects.

During boat drill in a passenger vessel, one boat was delayed at the embarkation deck when the other boats were almost down to the water. A man in the boat rotated the releasing gear handle apparently in the belief that this would expedite the lowering of his boat. It did--but nine persons were seriously injured and one died.

In a freighter holding boat drill in a foreign port, the disengaging apparatus in No. 3 lifeboat was tripped, sending the boat plummeting downward 24 feet and injuring three seamen but not seriously. One seaman admitted tripping the gear. He could not explain his action other than that he had become confused by the activity in lowering No. 4 lifeboat and felt that it was time to release No. 3.

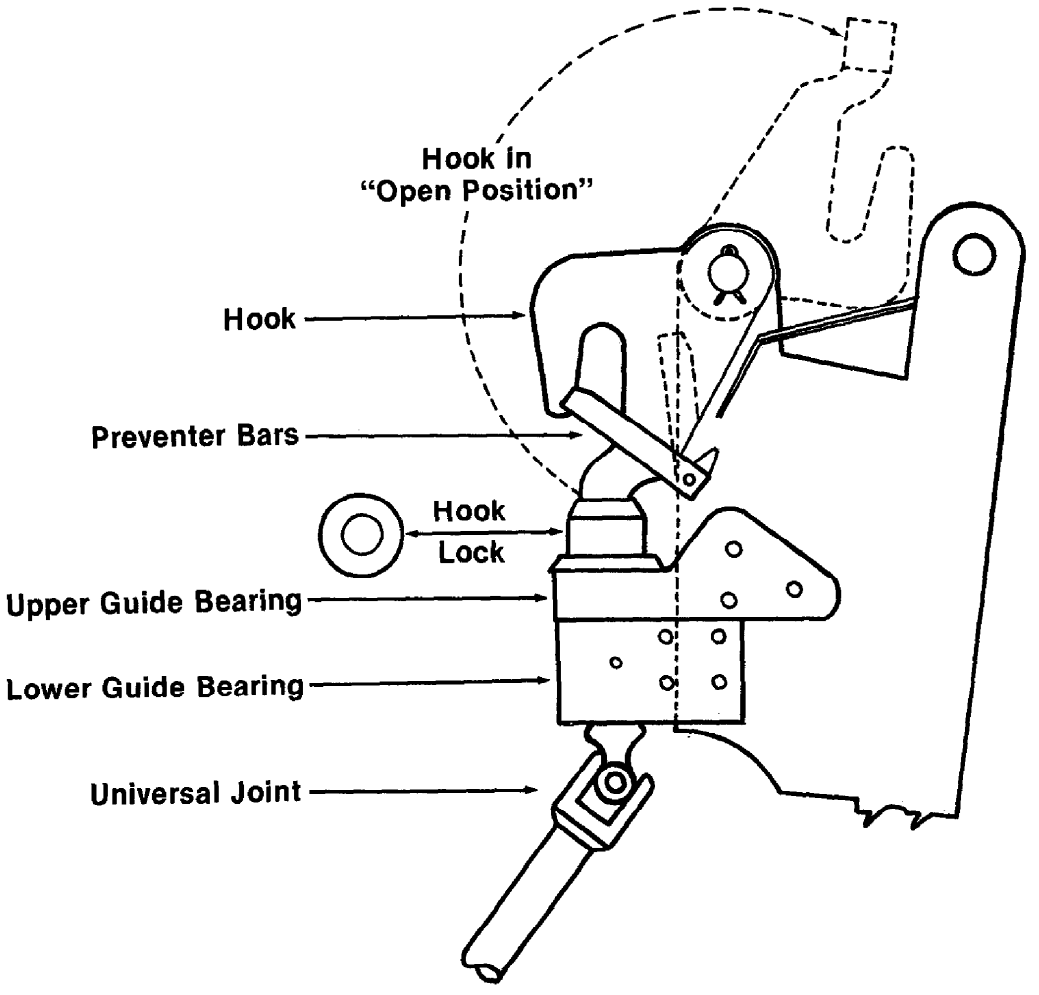
Another lifeboat accident from a similar cause occurred in a transport at a west coast port. A workman entered a lifeboat to paint the releasing gear handle red as a warning against operating it prematurely, then in the painting process, he lifted it and the boat dropped, landing on the gangway. Three men were seriously injured.

Perhaps as long as ships go to sea, there will be men aboard them who foolishly press buttons, open valves, pull handles and rotate lifeboat disengaging levers--either to see what will happen or because they don't know any better. But why?

***

CHECK YOUR RELEASING GEAR!

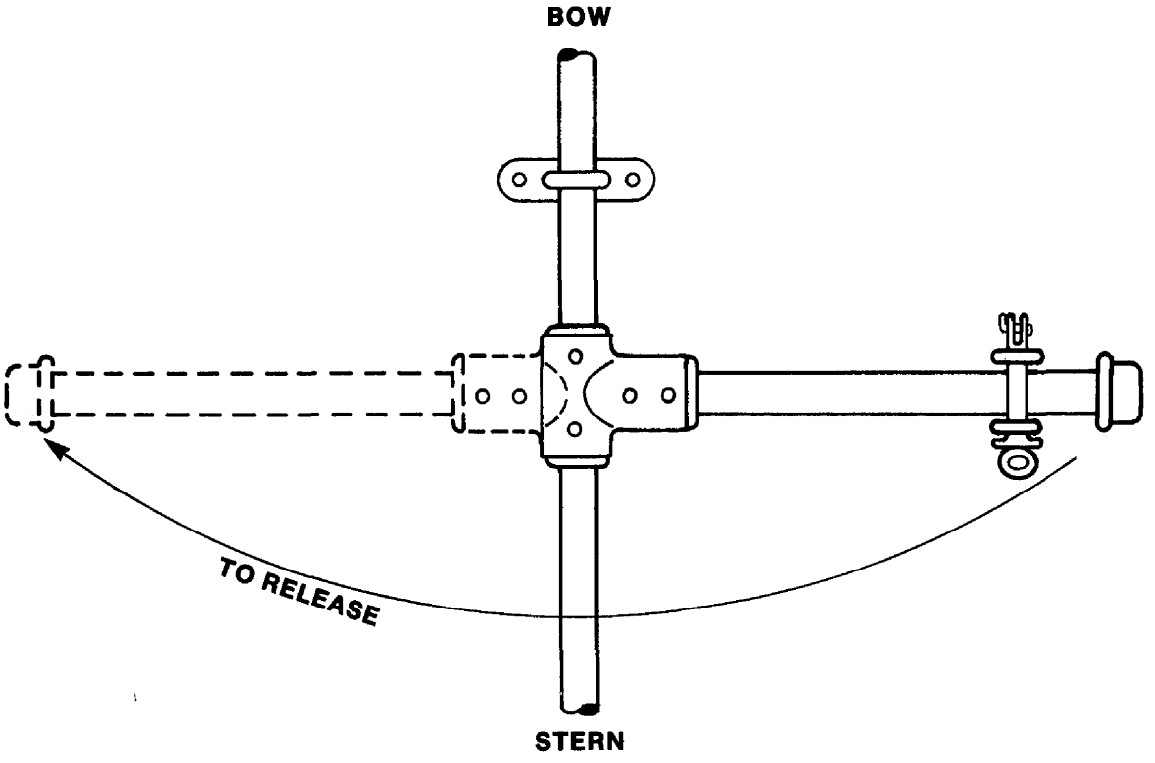
While lowering No. 3 lifeboat in an MSC ship, immediately after tricing pendants were tripped, the stern release hook opened, causing the stern of the boat to drop. This sudden strain caused bending and twisting of the forward davit and also warped the davit roller guide. A survey upon recovery of the boat disclosed that the guide bearing of the releasing hasp unit had cracked, permitting the hasp to open. Close scrutiny revealed that the guide bearing had been partially cracked prior to the casualty. This casualty emphasizes the importance of examining lifeboat releasing gear carefully each time before lowering of boats and of testing releasing gear during each boat drill.



Rottmer
Lifeboat Releasing Gear

FIGURE 5-1

THIS IS A LIFEBOAT RELEASE LEVER



ROTTMER RELEASING GEAR

TREAT IT AS THE TRIGGER OF A LOADED GUN

— IT CAN KILL YOU —

THIS LEVER IS OPERATED ONLY ON ORDERS OF LIFEBOAT COMMANDER

FIGURE 5-2

CHAPTER 6

LIFEBOAT LAUNCHING PROCEDURES
(Lesson No. Five)

6.1 STATION BILL AND DRILLS

a. The station bill provides for the organization and coordinated action of a ship's crew during drills and in actual emergencies, including fire and collision, CBR defense and abandon ship.

(1) Emergency signals are specified, with special safety-at-sea instructions to cover all emergencies.

(2) Each crewmember is assigned to emergency stations and duties in the order of his position code number and rating. Position code numbers also are used in manning scales, crew lists and for pay purposes. They are not necessarily listed in any order of position seniority.

(3) The station bill also lists the organization and duties of emergency boat crews, equipment to be provided by repair parties, location of fire stations and watertight doors, location of zone areas and port watch instructions.

b. Basic requirements for station bills are established by USCG, augmented by COMSC and Area Commanders through issuance of standard type station bills for each class of ship. These station bills, providing uniform assignments to stations and duties, are adapted to individual ships by the Area Commanders. They are posted in civil service manned ships with the approval of the Master. This practice provides considerable assistance to the ships and assures the standardization of bills throughout the fleet.

c. Station bills are signed by the ship's Master, who sees that they are posted in conspicuous places, such as:

(1) Crew quarters of each department and separate living areas.

(2) Public spaces, such as the salon mess, crew day rooms and officers' day rooms.

(3) A station bill is posted in the pilothouse to assist in the examination and verification of assignments.

6.2 SIGNALS

The station bill sets forth the various emergency signals used to initiate action in an emergency, safety-at-sea instructions regarding the ship's organization to cope with casualties and stations and duties of each crewmember for general emergency duties, CBR defense and abandon ship. The general emergency signals are specified by the USCG and have universal application. Under USCG regulations, the Master may establish additional emergency signals to provide that all officers, crew, and passengers will have notice of an existing emergency. The required emergency signals and those additional signals adopted for MSC use are listed below. The only ones which are in addition to those specified by the USCG are those for CBR defense, recalling boats, man overboard, steering casualty and directing the emergency boat. These are in general conformance with the international code of signals. The emergency signals below have been reviewed and are considered by the Commandant, U.S. Coast Guard to be adequate and in compliance with regulations. They shall be closely adhered to and no others shall be used. The general alarm or ship's whistle shall not be used to signal emergencies within the ship except as specified herein. Where installed, the PA system shall be used for supplementary announcements after the signal, and for emergencies not requiring all hands.

FIRE, COLLISION AND GENERAL EMERGENCY (_____)

For fire, collision and general emergencies steady ringing of the general alarm bells and a continuous blast of the ship's whistle for at least 10 seconds followed by appropriate announcement on the PA system.

CBR DEFENSE (_____. _____. _____. _____. _____)

For CBR *(formerly ABC and NBC)* 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.

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.

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")

MAN OVERBOARD (_____ _____ _____)

Three long rings on the general alarm bells (**"O"**), announcement on the PA system in ships so equipped, followed by three more long rings on general alarm bells *(international code signal "O").*

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 (- - - - -)

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 blast on the ship's whistle will be used to advise: - *"Keep clear of me - I am maneuvering with difficulty."*

DISMISSAL FROM ANY OR ALL DRILLS (___ ___ ___)

Three short blasts on the ship's whistle and the same signals on the general alarm bells, followed by PA announcement in ships so equipped.

OTHER EMERGENCIES NOT REQUIRING ALL HANDS

Announcement on the PA system in ships so equipped or pass the word.

6.3 MUSTERING

a. The mustering of boat crews requires training and drill. The Master is responsible for conducting such drills and instruction to ensure that all hands are familiar with their duties as specified in the station bill. The number of lifeboatmen per boat is specified in USCG regulations, five lifeboatmen in boats of 85 to 110 persons and six lifeboatmen in boats of over 110 persons. A first and second in command are appointed for each boat and raft. A man capable of working the motor is assigned to each motorboat and a radio operator is assigned to each boat carrying a radio and searchlight. Mustering, instruction and continuous drilling in handling boats are important since:

(1) Without understanding the purpose of what is done, incentive is lacking in the performance of duties.

(2) A good understanding of all duties permits better adaptability in exchanges of positions.

(3) Discipline is self-imposed by personnel who are conscientious about their emergency duties.

(4) Repetition develops confidence, ability and establishes the highest standards.

(5) Personnel transferring between ships can be quickly acquainted with their new positions and drilled in their duties.

b. Instruct crewmembers in mustering procedure at boat stations in accordance with their station bill and billet card assignments. Clothing adequate for the season and location should be worn at boat drills, including a cap or other head covering. Demonstrate and drill crewmembers in the proper method of donning life preservers.

(1) Show training film MN-24642DN, *"Life Preservers - Jacket Type,"* if available.

(2) Discuss the importance of properly adjusting life preservers in order to prevent injury and loss of jacket should it be necessary to jump overboard. Point out the feature of additional warmth it provides in cold weather. Impress on crewmembers the importance of wearing lifejackets when working where there is a chance of falling overboard, such as painting over the side, handling mooring lines at the pier's edge, working or rowing in small boats or entering lifeboats either afloat or hoisted for any purpose.

(3) Stress the need of a cap or other head covering where it may be necessary to endure long hours of severe exposure to sunlight in the tropics.

(4) Stress the importance of each crewman not only adjusting his own lifejacket properly, but being prepared to instruct passengers, if necessary.

(a) Slip into lifejacket like a vest.

(b) Pull tight and secure all ties. Newer type lifejackets do not have collars. Collars need not be tied during drills. They are properly secured by leading the collar ties down through the rings underneath the collar and then crossing and tying the ties. This keeps the collar down under the chin.

(c) The chest strap is adjusted and secured by means of its snap hook. It also serves as a lifting strap and may be used to fasten several persons together in the water or to a boat or raft.

(d) The leg straps are rolled up and kept in the pockets at the back of the lifejacket and need not be fastened during drills. They are designed primarily to keep the lifejacket from riding up on the wearer during prolonged periods in the water. The leg straps may be adjusted after the wearer has entered the water.

(5) No one should jump overboard wearing a lifejacket except as a last resort. Any other method should first be used to get into the water. Abandon ship in the lifeboats or, if necessary to get into the water, climb down the embarkation ladder or slide down a line or fire hose. If it is necessary to jump, fasten the leg straps, make sure there are no persons or debris in the water below. The jump should be made feet first, holding the lifejacket down and against the body by means of the elbows and one hand, while holding the nose with the other.

(6) Rotate crewmembers' boat stations to permit each man to practice and become familiar with each station, including that of boat commander.

c. Many ships used stenciled identification numbers on boat crews' lifejackets as a check on boat assignments. Identification numerals are stenciled on the left front and on the back of all crewmembers' lifejackets -- a large number indicating each man's boat number and a smaller number below it giving his position code number. This system, used with muster lists of boat crews, assures proper manning of boats during drills and in actual emergencies.

6.4 BOAT-LAUNCHING COMMANDS

a. Without a system of commands, crewmembers could not launch the boats. Should the signals become confused or misunderstood, the process of launching would be hindered.

b. Commands for launching a boat under gravity davits:

(1) *"Prepare for launching."* Bow and stern tenders board the boat, unlash and assist in removing the boat cover, let go the boat gripes, hand test release hooks by pulling on hooks to make sure they are engaged, check the release lever ensuring that it is secured by the keeper-toggle pin, free the manropes and close the boat drains. Bow and stern tenders will remain in the boat during lowering to the embarkation deck.

(2) *"Lead out the sea painter."* Bow tender passes the sea painter to the sea painter tender, who leads the painter well forward, outboard of everything except the boat falls, and secures it to a cleat.

(3) *"Swing out boat."*

(a) The boat commander orders his boat swung out and lowered to the embarkation deck when he is satisfied that the boat is cleared and ready for lowering. However, boats are not lowered below the embarkation deck until the Master gives the whistle signal of one short blast to lower when ready. During rough weather or other circumstances in which the Master considers it advisable to clear away and swing out boats, he will pass the word accordingly immediately after the abandon ship signal.

(b) The winchman slowly raises the brake lever to let the davits and boats roll down the trackways and ease up to the outboard stoppers. *(Refer to Figure 4-5)*

(c) Bow and stern tenders drop the manropes over the inboard side.

(4) *"Lower to embarkation deck."* The winchman again raises the brake lever to lower the boat to the embarkation deck. Bow and stern tenders tend the tricing pendants to keep them clear. Care is taken to halt the downward movement of the boat *("avast lowering")* when the tricing pendants have drawn the boat in to within a foot of the ship's side. Slacking the falls too much would put the boat's full weight on the tricing pendants.

(5) *"Frap'er in."* Bow and stern tenders assure that the wire frapping lines are either shackled or hooked on above the fall blocks, as the case may be, and that sister hooks, where used, are moused. They then pass the hauling lines to the frapping line tenders, who heave taut and secure them to the cleats to hold the boat in to the ship's side *(See Figure 4-8).*

(6) *"Trip tricing pendant."* Tricing-pendant trip hooks are tripped by the bow and stern tenders, who must be seated while they do this because the boat will swing. It has been noted that in some ships tripping lines have to be passed to frapping line tenders on deck because the tricing-pendant trip hooks are not properly attached to the falls blocks. *(See Figure 4-8 for proper hookup.)* The tricing-pendant trip hooks must be tripped from within the boat, one at a time.

(7) *"Boat crew, man your boat."* All men assigned to the boat go aboard and prepare it to receive passengers. They check the rudder, ship the steering oar and insert propeller gear pulling handles.

(8) *"Passengers embark."* Passengers embark from the embarkation station after the boat has been readied. They are assisted aboard, directed to their seats and advised to sit down promptly.

(9) *"Lower away."*

(a) The boats are not lowered beyond the embarkation deck until the Master sounds a single short blast on the ship's whistle to indicate *"lower boats into the water when ready."* This signal is given when it is apparent that passengers are embarked and boats are ready for lowering.

(b) The order *"lower away"* is given by the boat commander only after the Master's whistle signal and when all persons are seated in the boat, as far inboard as possible and all is in readiness for lowering.

(c) The winchman raises the brake lever to lower the boat to the water.

(d) The frapping lines restrict the boat's swinging--especially important when the ship is rolling.

(e) The sea painter tender keeps a strain on the sea painter until the boat is waterborne.

(f) Boat crewmembers at bow and stern fend the boat off from the ship's side with the butt end of boat hooks during lowering.

(g) The stern tender takes his station at the release lever to guard it against accidental release during lowering. If this lever is operated, the boat will drop. Therefore, the safety toggle pin must not be removed until the boat is within a few feet of the water *(see Figure 5-2)*.

(10) *"Release the falls."* As soon as the boat is waterborne in calm water or before fully waterborne in a seaway, the boat commander issues this order and the stern tender lifts the release lever and rotates it to the opposite side of the boat, releasing the fall blocks. Care is taken by crewmembers in the bow and stern to prevent the blocks from swinging.

(11) *"Cast off."*

(a) Bow tender fends boat away from the ship's side using the butt end of the boat hook.

(b) Boat commander uses the steering oar in getting boat clear of the ship's side.

(c) Bow tender casts off the sea painter.

c. In an actual emergency some of the commands may have to be given by hand signals.

(1) Noise interference may require signals, such as:

(a) A downward motion of the hand, palm down, to indicate *"lower away."*

(b) A tugging gesture to indicate *"frap'er in."*

(c) A downward, jerking gesture indicating *"trip the tricing pendants"* or *"trip suspension-pendant trip hooks."*

(d) A circular upward motion of the hand, index finger up, to indicate *"heave away."*

(e) A flat, horizontal motion of the hand for *"avast heaving"* or *"avast lowering."*

(2) Any manner of hand signals can be substituted for verbal commands and should supplement them. A well-trained crew can do this job effectively with no more than a few hand signals and without the necessity for shouting or confusion.

d. Pass out a sheet containing the commands and permit each trainee to take a turn as boat commander after he has studied the sequence of commands.

6.5 LOWERING AN ENCLOSED LIFEBOAT

a. The procedures for lowering an enclosed boat are divided into the following steps:

(1) Loading and preparing the boat.

(2) Lowering the boat.

(3) Releasing boat and getting underway.

b. Loading and preparing the boat.

(1) Place debarkation ladder over the side.

(2) Open the entrance hatch to the enclosed boat and order the entire boat complement to enter.

(3) Each member of the boat complement takes a seat in the boat and fastens the seat belt securely around himself.

(4) The boat commander positions himself in a seat by the brake control wire.

(5) The man assigned to the releasing lever positions himself in a seat over the release lever.

(6) A crewmember assigned to check the automatic drain plug places the cap over this drain.

(7) The bow tender positions himself in a seat at the bow.

(8) The stern tender positions himself in a seat at the stern of the boat.

c. Lowering the lifeboat.

(1) The boat commander grasps the brake control wire and pulls steadily on the wire until the boat begins to ride down the davit track.

(2) The boat commander continues to keep a constant pull on the wire in order for the boat to continue to lower.

(3) If at any time the boat commander wishes to stop the boat from lowering, he releases the control wire.

(4) At a short distance above the water, and while continuing to lower the boat commander may wish to start the boat engine in preparation for getting underway when the boat is waterborne.

d. Releasing boat and getting underway.

(1) When the boat settles in the water the boat commander may elect the release or he may elect to hold at this point if for some reason all crewmembers are not accounted for.

(2) To release the boat the boat commander gives the command *"Release the releasing gear"* at which point the seaman assigned to the release lever removes the safety pin and pulls the lever 180 degrees over to release the boat.

(3) Because the fall pendant is also the sea painter in this type of boat, it is not necessary to order the sea painter to be released. Once the releasing gear is released the boat is free from the ship.

(4) The boat commander may now engage the engine and get underway.

(5) Should the boat commander wish to hang on the ship while awaiting more personnel, he would not release the releasing lever. The fall pendant forward and aft will keep the boat alongside the ship until the releasing gear is released.

e. Explain to the class that there are no tricing pendants, frapping lines, sea painter, or gripe releases on this type of design and therefore many of the jobs previously assigned in a standard lifeboat are not necessary for the enclosed lifeboat. *(Refer to Chapter 11.)*

6.6 SUMMARY AND LESSONS FROM CASUALTIES

a. Outline the main points covered:

(1) The importance of each man knowing his emergency stations and duties.

(2) Emergency signals.

(3) Mustering to provide for effective organization and drilling for emergencies.

(4) Standardized boat launching commands so that each crewmember knows exactly what he must do at the right time--even under unfavorable conditions.

(5) Proper procedures for launching boats to ensure safe and rapid launching in emergencies.

b. See that the group has the instruction sheet below or thoroughly understands all required emergency signals, boat launching commands, action and key points.

INSTRUCTION SHEET FOR LAUNCHING LIFEBOATS UNDER GRAVITY DAVITS

Signal - More than six short blasts followed by 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.

LIFEBOAT LAUNCHING PROCEDURES
(OTHER THAN ENCLOSED LIFEBOATS)

Command	Action	Key Points
PA announcement: *"All hands report to boat stations. All passengers don lifejackets and report to their abandon ship stations."*	**Crew and passengers muster at abandon ship stations; boat commander inspects life-jackets and attire; a supply of eight blankets is delivered to each boat by steward department personnel.**	**Crewmembers muster at the location of their duties at assigned boat station, as at forward davit, frapping line tenders on embarkation deck, etc.**
"Prepare for launching"	**Bow and stern tenders board boats, remove boat covers and strongback, hand test release hooks by pulling on fall links, check release hooks and lever, check and clear suspension and tricing pendants and trip hooks, let go gripes, close boat drains, and free manropes**	**The release hooks and lever must be in their closed and locked position. Boat commander must assure himself that release hooks and lever are properly secured before letting go main gripes.**

Command	Action	Key Points
"Lead out the sea painter"	**Bow tender passes it to the sea painter tender, who leads it well forward and secures it.**	**It is led outboard of everything but the boat falls.**
"Swing out boats"	**Winchman slowly raises brake lever to let the davits and boats roll down the track- ways and ease up to the outboard stoppers in full outboard position. Bow and stern tenders drop manropes over inboard side.**	**The davits must not be permitted to hit the outboard stoppers but should be eased up to them and stopped momentarily.**
"Lower to embarkation deck"	**Winchman again raises brake lever to lower boat to embarkation deck. Bow and stern tenders clear and tend tricing pendants. Winchman follows boat commander's orders to stop the boat within a foot of the ship's side.**	**Slacking the falls too much would put the boat's full weight on the tricing pendants.**
"Frapper in"	**Bow and stern tenders assure that the wire frapping lines are shackled or hooked onto the falls, with sister hooks moused where used, and frapping line tenders haul taut and secure.**	**If not taut, boat will swing excessively.**
"Trip tricing pendants"	**Bow and stern tenders sit down and trip tricing pendant hooks one at a time.**	**Tricing pendant trip hooks must be arranged so they can be tripped from within the boat.**
"Close boat drains"	**If not previously closed, boat drains are now closed. In any event, they are checked.**	**This is done by bow and stern tenders.**
"Boat crew, man your boat"	**Boat is prepared for passengers. Steering oar is shipped, and propeller gear pulling handles inserted.**	
"Passengers embark"	**Passengers are assisted aboard and directed to seats.**	**All must sit down promptly.**

Signal - A short blast on the ship's whistle directs boat commanders to lower their boats when ready for launching.

Command	Action	Key Points
"Lower away"	**Boat is lowered to water. Winchman raises brake lever and follows boat commander's lowering instructions. Frapping lines are kept taut; a strain is kept on the sea painter, and crewmembers fend off.**	**Boats are lowered in order, according to a prearranged plan - generally with the after boats first then the boats next forward, etc. in order to avoid fouling. The stern tender guards the release lever to avoid accidental dropping of the boat.**
"Release the falls"	**Stern tender removes safety toggle pin, lifts releasing lever, and rotates it to the opposite side, releasing the fall blocks. Frapping line tenders haul falls in to ship's side quickly to avoid the blocks hitting persons in the boat.**	**This command is given as soon as the boat is waterborne in calm water or before fully waterborne in a seaway.**
"Cast off"	**The bow is shoved off, boat commander gives necessary oar commands to get underway, and uses steering oar to clear ship's side. The sea painter is cast off.**	**The boat is gotten clear of the ship's side as soon as possible. With way on, the sea painter is used to sheer off.**

Signals - Two short blasts on the ship's whistle - stop lowering boats.

A short, a long and a short blast of the ship's whistle *(international code signal "R")* - recall and recover boats.

Three short blasts of the ship's whistle and the same signal on the general alarm bells followed by PA announcement in ships so equipped - dismissal from any or all drills.

LIFEBOAT LAUNCHING PROCEDURES

SUMMARY OF COMMANDS BY BOAT COMMANDERS

(1) ***"Prepare for launching"***

(2) ***"Lead out the sea painter"***

(3) ***"Swing out boats"***

(4) ***"Lower to embarkation deck"***

(5) ***"Frapper in"***

(6) ***"Trip tricing pendant"***

(7) ***"Close boat drains"***

(8) ***"Boat crew, man your boat"***

(9) ***"Passengers embark"***

(10) ***"Lower away"***

(11) ***"Release the falls"***

(12) ***"Cast off"***

c. Use appropriate oral review questions from Chapters 14 and 15.

d. Discuss or distribute the following *"Lessons from Casualties"* or other cases drawn from the instructor's or the group's experience:

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TRIAL BY FIRE

(Reprinted from Proceedings of the Merchant Marine Council, USCG.)

A grim reminder of the terrible consequences of failing to have a crew trained to cope with emergencies occurred a few months ago when a foreign combination passenger-freight vessel burned at night in an American port. The deaths of eight passengers and three crewmembers were directly attributable to the breakdown of the smooth functioning of the crew when it was presented with a disastrous situation for which it had been poorly trained.

With the ship at anchor in an open harbor, the fire apparently started in a maze of wiring, distribution panels, and ventilating and heating ducts installed in a 14-inch void space between the ceiling and the deck above it in the midship passenger and crew berthing area. Smoke was detected issuing from the paneling; the Master was notified; but, no general fire alarm was rung or any positive action taken for several minutes. Consequently, dense smoke and darkness caused by the failure of several lighting circuits hampered subsequent firefighting efforts. Streams of water from the burning ship's fire hoses were played at the general overhead area. Passengers were aroused and directed to

assemble at the smoking lounge on the upper deck. When all the passengers had gathered in the lounge, and were accounted for, the Master returned to the scene of the fire. By this time dense clouds of smoke had engulfed the entire midship's area. Realizing that conditions were beyond control, the Master ordered abandon ship.

In lowering lifeboats No. 2 and No. 4, the after end of No. 4 was dropped, and the boat ended by hanging vertically with two crewmembers clinging to seats. When it was finally lowered, the boat was partially filled with water. Some passengers climbed down into this boat.

An attempt was made to lower a liferaft, but it was dropped and lost, and flames prevented any attempt to lower Nos. 1, 3, 5 and 6 lifeboats. However, the crewmembers did manage to lower and cast off two small dinghies near the stern.

The Chief Mate blew a distress signal on the ship's whistle. Fortunately, due to the nearby presence of service installations, this distress was heard and immediately answered. Within fifteen minutes a Navy fireboat and a Coast Guard picketboat were alongside searching for and picking up survivors. All those who were in sight in the water, on the burning ship, or in lifeboats or dinghies were safely delivered to the Coast Guard Depot. However, the count of survivors ashore revealed three crewmembers and eight passengers to be missing.

With the arrival of two Coast Guard Cutters on the scene, efforts to combat the fire and rescue the missing were intensified, but it was impossible to get into the areas below decks where the fire was raging. Several days later, when it was possible to enter the midship area, the eight passengers were found in a sitting position in the lounge, apparently asphyxiated by toxic gases and the three crewmembers were found burned to death in the crew quarters and in the promenade.

Investigation of this tragic casualty pointed up the deficiencies in the training of the vessel's crew to meet emergencies. Effective organization, instruction and drilling of the crew had not been established or carried out. Many of the crew had not been thoroughly acquainted with their duties for emergencies. There was no effective plan for the warning and safeguarding of all passengers. Abandon ship was a fiasco. Such organization as had existed seemed to vanish in the overwhelming holocaust of flame and smoke.

The three stark words **FIRE AT SEA** must ever remain indelibly imprinted on the subconscious minds of mariners, not as an omen of fear, but as a finger of warning. How would you have fared under similar circumstances?

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WITHOUT PANIC

An engineroom explosion, a ship gutted by fire, over 1500 passengers aboard including 294 women, children and invalid soldiers, yet only four persons lost! This unbelievable small loss of life *(and these four lives were lost in the initial explosion, not in the action that followed)* can be attributed to one main factor--preparation through organization, training, and drills. Abandon ship was accomplished calmly and without panic in spite of the raging flames, the threat of exploding boilers and the immediate loss of all power.

All women, children and invalids were embarked in the lifeboats first, then, as the remaining men began jumping overboard, chairs, benches and anything that would float when thrown overboard for them. This is the story of the loss of the 14,650-ton British troop transport EMPIRE WINDRUSH in the Mediterranean Sea, 50 miles northeast of Algiers, on the morning of 28 March 1954.

Although there were other factors--the calm sea, nearness of a major port and other ships in the vicinity--no amount of *"luck"* would have prevented a greater loss of lives if there had not been adequate preparation and training. The crew knew their duties well and the passengers followed directions promptly and orderly. One observer on the scene remarked, *"Everything went as though the passengers were going through a lifeboat drill."*

It is not yet known why some of the men had to jump overboard. Perhaps some of the boats were damaged by the explosion or the subsequent fire or some of the crew may have remained aboard to continue to fight the fire. In any event, it emphasizes the necessity for coping with each casualty according to the individual circumstances.

It is fortunate amid all the tragedies at sea to have this excellent example of what <u>can</u> be done in an emergency rather than the review of contributing errors.

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CHEAP INSURANCE

(Reprinted from Proceedings of the Merchant Marine Council, U.S. Coast Guard.)

There is an old adage *"A drowning man will grasp at a straw."* While this has not been demonstrated scientifically, a drowning man will certainly grasp at a life preserver or ring buoy, if he knows it is there. For years, marine safety organizations have preached the

doctrine of wearing life preserves whenever exposed to the likelihood of falling overboard. A recent casualty wherein a man was drowned in broad daylight alongside his ship moored in a quiet harbor, because there was nothing thicker than water for him to grasp, is a powerful argument for an additional safety precaution--having a ring buoy in the water.

It was early morning with the ship lying at the pier during fair and balmy weather. Two able seamen rigged a staging over the offshore side for the purpose of painting the ship's side. Rigging on the staging was adequate. It consisted of 2 watch tackles using 12-thread manila line with a double upper block and a single lower block, permitting the AB's to hoist or lower at will. Neither man wore a life preserver. After shifting the staging forward about 10 feet, one AB, age 55, climbed down to resume work while the other departed on a short errand. Upon returning about 5 minutes later, he heard a commotion and saw his partner floundering the water. He immediately threw a handy ring buoy overboard near the immersed man.

At this point two stevedores who were working on the ship reacted with highly commendable courage and initiative, dove overboard and swam to the rescue. They were able to float the struggling man to the offshore gangway, which had been lowered. One of the stevedores clung to the ring buoy while doing this and the ring buoy undoubtedly contributed largely to the rescue attempt.

The victim was quickly brought aboard and artificial respiration rendered. All attempts to revive the man were of no avail and a doctor who had been called aboard pronounced him dead; cause of death: *"Simple asphyxia due to drowning."*

After the accident the stage and rigging, all still in good condition, were found to be suspended by the forward tackle alone. The hauling part of the after tackle was loose. Under just what circumstances the deceased man had slipped, fallen, lost his grip on the hauling part or suffered some form of mental lapse resulting in his immersion, probably will never be known.

The moral of this tale is simple. Had the ring buoy been floating in the water on its heaving line before the painting started, instead of being hastily thrown overboard after the man fell, that man might be alive and well today. The principle that all men working in such an exposed position should wear a life preserver is unassailable. Since wearing a life preserver is admittedly somewhat awkward due to its bulk, many seamen seem to prefer taking the calculated risk to their lives by not wearing the lifejacket rather than bear the slight annoyance of wearing it. Therefore, providing some solid means of support, that little bit of buoyance which sometimes divides life from death, would be an

excellent precaution. Such use for one of the ring buoys, which are required equipment onboard, would be so simple yet so effective that this precaution would seem almost elementary. Even the floatation of a life preserver or any other buoyant material on a line alongside the ship when men are exposed to falling overboard could easily be the *"straw"* which would mean everything to the drowning man.

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LIFEBOAT LADDERS

(Reprinted from Proceedings of the Merchant Marine Council, USCG.)

The steel and wood chain-type embarkation-debarkation ladders approved for use onboard inspected merchant vessels of the United States are designed to furnish dependable and trouble-free service under all conditions of use. Nevertheless, as with most equipment, certain precautions must be observed in their use. The inherent hazard of any ladder whereby a man is exposed to the dangers of painful or fatal falls, is particularly pronounced in embarkation ladders where the height and sea and weather conditions may be especially dangerous.

Two recent accidents, one occurring on a passenger vessel in a southern port of the United States and involving the death of the injured man, and the other occurring in a foreign port involving injuries to two men, were both directly related to carelessness and improper use of the above-type ladders. In the first instance, a large vessel was moored at the dock and the crew were engaged in carrying out a presailing boat drill. After mustering at boat stations, the Chief Mate ordered the crew of No. 2 lifeboat to take over No. 4 lifeboat *(on the offshore side)* for launching and rowing exercise. Although the regulations require fire and boat drills to be conducted as if an actual emergency exists, lowering of this lifeboat with a full boat's crew in it was not attempted. Instead, davits were swung out and the boat was lowered to a point where its gunwales were level with the boat deck where the Third Mate, who was in charge of the boat, and two crewmembers embarked. The remainder of the boat's crew was then ordered to the embarkation deck on the next deck below the boat deck with the exception of the man who was operating the winch brake.

The boat was then lowered until, when about 4 feet below the embarkation deck, the ladder which was coiled between the second and third thwarts in the boat and was being payed out as the boat lowered, caught on either the bilge pump or the provision box or both. The Third Mate immediately shouted to stop lowering and the ladder was cleared. The lifeboat was then lowered to the water without further incident. At this time one

member of the boat crew, wearing ordinary cotton work gloves, climbed over the rail at the embarkation deck and stepped around and onto the ladder. There was a sudden movement of the ladder and he lost his grip and fell into the boat, injuries resulted in his death, one and a half hours later at the hospital.

The closest investigation and analysis of this accident could not ascertain exactly what caused the movement of the ladder at the moment after the injured man stepped onto it, but the possibilities were narrowed down to two most likely explanations. The first is that one or two segments of the ladder had remained on top of the boat deck in such a manner that the ladder had *"hung up"* with the ears of one step caught inside of the fish plate or coaming so that all of the ladder below this point was suspended by the *"hung up"* ears rather than by the shackles outboard of the fish plate, which are the proper suspension points. When the man's weight first came upon the ladder, it was sufficient to dislodge the ears, causing the ladder to fall abruptly a few feet until it fetched up with a jerk at the proper suspension point, causing the man to lose his grip and fall. However, although this was the most plausible explanation, it is not completely acceptable since two experienced observers were present on the boat deck at the time and did not recall any spare segments of the ladder lying on deck, and it would be almost certain that they would have noticed this condition had it existed.

The second most logical explanation was that one of the boat crewmembers standing on the embarkation deck had held the ladder against the rail at the point where the men would climb onto the ladder. This would be a distance of about 15 inches from the vertical line in which the ladder would normally hang. One of the crewmembers held the ladder in this manner but he claimed he had released it before any weight was placed on the ladder. If the deceased man's weight had come upon the ladder and the man holding the ladder in had then released it, the ladder would have *"snapped"* outward with somewhat of a jerk and with sufficient movement to easily break the grip of the man on the ladder.

The fall may well have been caused by the combination of both of the above circumstances, i.e., some of the ladder may have been caught above the coaming, and the ladder may have been held into the rail and released in such a manner that this slack *"ran"* over the coaming, the jerk at the end of the run throwing the man off the ladder. Kinking of the chain with subsequent abrupt straightening was discounted. The amount of chain between rungs is very small and minimizes kinking.

Regardless of which circumstances caused the fall from the ladder, it was due to lack of proper care and foresight by the personnel handling the gear and not by any fault of the equipment. There was no material failure. The principal error was the use of the embarkation ladder in this manner to carry out any part of emergency drills. It is the intent of the regulations that drills should be conducted as though a true emergency exists,

i.e., boats should be lowered at boat drills as though the crew were actually abandoning ship, with a full boat's crew aboard. Embarkation-debarkation ladders are intended for emergency use only when personnel cannot be lowered with a boat and must have some other means of safely reaching waterborne boats. They are not intended for the convenience of ship's personnel in descending to lifeboats during drills.

Another error was the failure to use any portable steps at the rail of the embarkation deck to assist in climbing over the rail. This is particularly important in the case of passenger ships where the aged or infirm would otherwise have considerable difficulty climbing into lifeboats. Still another error, and perhaps most important of all, was the practice of stowing the coiled flexible ladders in the boats, to pay out as the boats are lowered. This method is awkward and uncertain, as the ladder catches and fouls as it uncoils and the person in the boat tending the ladder as it pays out cannot check the ladder's condition at the top, or suspension point. These ladders should be stowed on deck or lashed to a rail or other object where they will not interfere with the operation of the davits or the lowering of the boats, and where they can run free, over and down the side. In this manner, men lowering the ladder from the boat deck can observe that its entire length is free of obstruction and also, that it is hanging properly from its suspension points.

In the second accident, two able seamen were ordered by the boatswain to rig the embarkation ladder for means of access to a lifeboat which was in the water. The ship was moored in a foreign port and the chief mate, to take advantage of available inport time, decided to test lifeboat releasing gear and examine and lubricate boat falls and running gear. After the first boat was waterborne, the two AB's lowered the steel ladder from its stowage position on the boat deck. It was customary on this vessel to stow the ladders in a coiled-up bundle lashed on the inside of the steel pipe guard rail installed between or adjacent to lifeboat launching positions. Both inboard ends of the ladder chains were shackled to padeyes installed on the boat deck outboard of the rail and the bulk of the ladder was brought in over the rail, coiled-up and lashed to the inboard side of the rail in such a manner that the lashing could be quickly cast off and the coil of the ladder pushed over the rail where it would spill down the side. Twelve-thread line was used as lashing.

In casting off the ladder, the two AB's removed all lashings except one strand. This held both sides of the ladder to the upper course of the pipe rail on the outboard side so that the bight of the ladder was actually supported at this point by the 12-thread line. Several trips were made up and down the ladder suspended in this manner, one man at a time while working on the releasing gear with the boat waterborne. When the two AB's were finally ordered out of the boat, the second man started climbing on the ladder before the first was off at the top so that their combined weights came onto the ladder. With a sudden snap, the 12-thread lashing at the rail on the boat deck parted and the ladder fell about 5 feet, or the amount of slack which had been retained by the lashing. The jerk at the end of this

fall was sufficient to dislodge both men, one falling about 3 feet into the boat and the higher man 10 feet or more into the boat. The latter seaman suffered a severely dislocated left shoulder and was incapacitated over three weeks, while the former suffered minor injuries only. There was no mechanical failure of the ladder itself.

Here again was the careless overlooking of important details by men working on ladders. It is unbelievable that these two experienced seamen intentionally left the ladder suspended by a piece of 12-thread when they knew they would be entrusting their own safety to the ladder. Undoubtedly the oversight of the lashing was not readily detectable. While the Chief Mate and Boatswain could be criticized for not checking the safe condition of the ladder before it was used, there was no reason for them to suspect that there was anything wrong with the ladder or that two experienced able seamen could not or would not perform so simple a task as rigging this ladder properly and thoroughly, especially when they were to use the ladder themselves. It is difficult to believe that people will be more careless with their own safety than with the safety of others, but the evidence all too often would indicate that this is true.

It would seem to be glaringly obvious that certain elementary precautions should be taken whenever it is necessary for crew or passengers to use this type ladder.

a. Before any weight is placed on the ladder, the entire suspended length of the ladder should be hanging from the proper suspension point.

b. If there is any obstruction in the path of the ladder which cannot be avoided or removed, make sure the ladder is not caught or *"hung up"* on such obstruction.

c. If possible, shake out the ladder to see if it is hung clear and lies straight.

d. If possible, the ladder should be located so that it hangs just aft of the lifeboat for which it is to be used and not abreast of any portion of the boat where it could be damaged or where it could damage the boat during or after lowering. If necessary, it is a simple matter to ease the boat slightly astern after lowering to make the bottom of the ladder more accessible.

e. It is advisable to keep these ladders stowed and ready for use in such a manner that they can be dropped with a run, uncoiling as the free end falls. Many ships have found it practicable to lash the coiled-up ladder just inboard of a rail or horizontal member so that the lashing can be slipped quickly and the ladder can be pushed over the side where it will fall to its intended position suspended from permanent padeyes or shackles. An advantage of this method of stowage is that the ladder will not clatter about under the

effects of heavy rolling or boarding seas. In addition, the strain imposed on the ladder by the jerk at the bottom of the drop is a simple test that it is properly secured and will not later slip or fail at the suspension points. Needless to say, the ladder should not be dropped in this manner if the lifeboat or any personnel are directly under it.

f. If possible, wear no loose or baggy clothing which could catch on the ladder or any other object when descending or ascending the ladder. A wise precaution is to remove gloves, unless the weather is so frigid that fingers would be numbed, as it is an indisputable fact that the bare hand can grasp better than one with a glove on.

g. When descending or ascending, it is wise to have one foot placed squarely on the next rung before the weight is removed from the foot on the preceding rung. Always step on the ends of the rungs. Breaks in rungs almost never occur near the ends, almost always near the center.

h. Never hold on to the ladder rungs when climbing up or down. It is not only dangerous but is harder work. The safest and easiest way is to grasp both sides of the ladder firmly and hold on to the sides as you climb up or down. *(MSC editorial addition.)*

CHAPTER 7

BOAT HANDLING
(Lesson No. Six)

7.1 USE OF SEA PAINTER *(See Figure 7-1)*

The sea painter is made fast, by means of its strop eye and toggle pin, on the forward thwart, off-center toward the ship's side, leading out over the gunwale on the side next to the ship.

a. When a boat is waterborne, the sea painter causes the boat's bow to sheer away if the ship is moving ahead.

(1) Another strop on the outboard side near the bow can be used in the boat to cause the boat to tow parallel to the ship.

(2) The sea painter may be fitted with a light retrieving line from the deck, spliced in about 1-1/2 fathoms from the eye splice. This is especially useful for the emergency boats.

(3) The steering oar should be used to hold the boat alongside in the position desired while towing on the sea painter.

(4) If the ship is dead in the water or has sternway, the sea painter will not sheer the boat away from the ship's side.

b. The length of the sea painter should be adjusted so that the boat drops back alongside the embarkation ladder and the boat is directly under the falls. Overall length of the sea painter is three times the distance from the boat deck to the lightest seagoing draft.

c. The wooden toggle pin is removed to cast off the sea painter only when directed by the boat commander. The toggle pin is secured by a lanyard or chain attached to the thwart, not to the sea painter.

d. After being cast off from the boat during drills or rescue operations, the sea painter should be tended from the ship by means of the retrieving line. If a retrieving line has not been attached, the sea painter should be hung in a bight forward of the davits to permit the boat to pick it up upon return to the ship.

e. An additional painter may be used from the boat's stern, a *"sternfast,"* when alongside, to keep the boat from surging forward.

7.2 HAND-OPERATED PROPELLER *(See Figure 7-2)*

a. The hand-operated propeller, previously referred to as Fleming gear, is required in all boats with a capacity of 60 or more persons. Power is transmitted by a shaft, through a gear box controlled by a clutch lever, with provision for forward and reverse positions.

b. Motive power is provided by inserting pulling handles in the sockets and moving them in a fore-and-aft direction. Passengers are able to operate the pulling handles without previous instruction.

c. The gear box and reverse lever are located aft, convenient to the coxswain. The only commands necessary for hand-operated propeller gear are *"stand by pulling handles," "give way together,"* and *"stop."* These are kept simple to assure understanding and cooperation by passengers.

7.3 OAR COMMANDS

a. Commands should be given in a clear, sharp tone.

(1) All oarsmen carry out the commands smartly and in unison.

(2) Feather oars on the recovery part of the stroke to reduce wind resistance and prevent *"catching a crab."*

(3) Oarsmen keep eyes in the boat; watch the back of the man in front and take stroke from him.

(4) Stroke oarsmen *(on aftermost thwart)* keep in stroke together if doublebanked and set the stroke as directed by the coxswain or boat commander.

(5) Give new commands at the start of a stroke rather than at the finish to permit oarsmen to complete the stroke and execute the new command in unison.

b. Standard commands and the action taken when handling a lifeboat under oars are as shown below. Although listed in the general order in which given when taking a boat out, maneuvering and returning, commands are used as required and according to the circumstances. Oar nomenclature consists of three parts *(see Figure 7-4)*.

(1) The *"handle"* - where the oar is gripped.

(2) The *"loom"* - the shaft of the oar. Around the loom is the *"leather"* fitted where the loom rests in the rowlock.

(3) The *"blade"* - the flattened part that bites the water.

Command	Action
Stand by your oars.	**Lift oars off thwarts, place bow oars with their blades flat on the forward gunwales, push other oars forward with their blades resting on the gunwales until their handles are over each oarsman's thwart; insert rowlocks.**
Shove off bow.	**Bow tender lets go boat rope or sea painter or hauls in boat painter. He shoves off bow using butt end of boat hook.**
Out oars.	**The oars are lifted together, swung out together and are dropped into the rowlocks together.**
Stand by to give way.	**A preparatory command. Rowers lean forward, arms extended, with the oar blades perpendicular to the water and the tips just touching the water, ready to start the stroke.**

Command	Action
Give way together.	**Blades or oars are lowered--dipped about two-thirds into water and the stroke started. Several short quick strokes may be taken to get underway quickly. At end of stroke, blades are feathered forward and another stroke made. The stroke should be taken with the feet braced, the arms straight, and the weight of the body thrown into a strong pull on the oar. Midway through the stroke, pull the handle to the chest and at the same time pull with the back. This is the end of the stroke. To prepare for the next stroke lift the blade from the water, drop the wrists to feather the blade, lean forward as far as possible and raise the wrists.**
Oars.	**Complete the stroke and level the oars with blades parallel to the water.**
Hold water all.	***(Given to check way.)*** **Complete the stroke and stop rowing. Dip the blades, held vertical and stationary, into the water directly abeam. *"Hold water all"* should always be followed by the command *"oars."***
Stern all or back water all.	**Row in astern motion, keeping stroke as in pulling ahead.**
Back starboard (or port).	**Designated oars are backed as for *"stern all."***
Back starboard, give way port (or vice versa).	**Designated oars row astern while other side pulls ahead to turn the boat without making head or sternway.**
Hold water starboard, give way port (or vice versa).	**Designated oars hold water while other side pulls ahead to turn the boat with slight headway.**
Trail oars.	***(Given to pass an obstacle.)*** **Complete the stroke and allow oars to trail in the water alongside the boat. Hold onto handles to avoid losing oars.**
Toss oars.	***(Given as a salute.)*** **Handles are pressed down inboard and oars raised vertically, with blades trimmed fore and aft.**
Let fall.	***(Given from "toss oars" position.)*** **Oars are dropped outboard into *"oars"* position.**
Point the oars.	***(Given to shove a grounded boat off.)*** **Crew stand facing aft and shove off together.**
In bows.	***(Given as a landing is approached.)*** **Bowmen complete stroke, unship and swing their oars forward and boat them with blades forward. They then stand by with boathooks or to receive the sea painter or boat rope.**

Command	Action
Boat yours oars.	***(Given from the position of "oars".)*** **Each man unships his oar and lays it in the boat, blade forward** ***(starting with forward man first).*** **Rowlocks are removed and oarsmen sit at attention.**
Way enough.	***(Given when crew is rowing.)*** **The stroke is completed and oars boated without further command** ***(same as "boat the oars".) "Out oars"*** **also may be given from this position if necessary to resume rowing.**

7.4 USE OF STEERING OAR AND RUDDER

a. The purpose of each is to steer the boat.

(1) The steering oar is more effective than the rudder and the boat can be maneuvered with no way on by pulling the stern around. With way on, the coxswain can exercise control much faster than with the rudder. In a seaway, the rudder will be out of the water part of the time while a steering oar can be dipped deeper to maintain control.

(2) When the rudder is used, course cannot be changed until steerageway *(enough speed for steering)* has been reached.

(3) The steering oar should be used to clear the ship's side. The rudder is used later as the steering oar is too tiring to use over a long period of time.

(4) All men are required to demonstrate their ability to handle the steering oar for certification as lifeboatman.

b. To pick up a man in the water:

(1) Time and conditions permitting, it is generally advisable to approach from the man's lee side, or downwind from him, in order to avoid having the boat drift down on him. However, judgment regarding a down or upwind approach will depend upon the wind and sea and the necessity for speed.

(2) Order *"in bows"* and have bow men stand by with boat hooks.

(3) When close to the man, stop rowing and boat enough of the oars to enable the man to be taken aboard amidships.

(4) Apply artificial respiration immediately if necessary and wrap the man in a blanket to dry and warm him. *(See Man Overboard Bill in MSC Damage Control Manual.)*

7.5 LIFEBOAT SAILS *(Refer to Figure 7-3)*

Mast and sail are required for oar-propelled lifeboats only. The standing lug rig is specified in USCG regulations. Details of this rigging are similar to the dipping lug rig. Dipping lug rig with jib is shown as it is frequently found in lifeboats; men taught to rig this type will have no trouble with the standing lug rig. The principal difference between the standing and dipping lug rigs is that the tack and yard *(or gaff)* of the mainsail in a dipping lug rig must be *"dipped"* around abaft the mast when changing course to a new tack. Sails are colored indian orange for increased visibility and spotting by rescue craft. The sail and gear are protected by a suitable canvas cover.

7.6 RIGGING SAILS

Remove mast, yard, sail and rigging from cover and place on thwarts amidships, mast foot forward near the step.

a. See that rigging is separated and all parts identified. See that halyards are clear and rove through their sheaves.

b. Ship the boat's rudder. If the boat is equipped with a centerboard, as some USCG boats are, lower the centerboard.

c. Step the mast, keeping the shrouds and stays clear; close and lock the mast clamp.

d. Set up the forestay and make it fast at the bow.

e. Set up the shrouds equally taut and make them fast.

f. If a jib is provided, bend it on ready for hoisting and secure jib tack in the bow. If no forestay is provided, hoist the jib and carry the jib halyard to the stem where it will act as a forestay. Lead the jib sheets aft and tend them.

g. Bend the main halyard onto the yard about one-third of the distance from the forward end, or to a strop or bridle if provided. Secure the tack and then hoist the mainsail after stationing one man aft to tend the main sheet. If no shrouds are provided, carry the main halyard to the windward side and make it fast, tending slightly aft of the mast to help support the mast. Do not make the main or jib sheet fast! A cardinal rule of all sailors is **"NEVER BELAY A SHEET."**

7.7 HANDLING BOATS UNDER SAILS

a. A boat proceeding under sails is completely dependent upon the wind. The following points should be carefully brought out and explained, using appropriate visual-aid charts or by use of the blackboard.

(1) Wind direction is the direction from which the wind blows. In addition to stating wind direction by compass or relative bearings, two other terms are used to describe wind direction.

(a) To windward is toward the wind. That side of a boat toward the wind is called the windward or weather side.

(b) To leeward is the side opposite the wind. The side of a boat away from the wind is called the lee side.

(2) A boat cannot sail directly into the wind but must steer, depending upon type of boat and rig, at an angle of about six points off the wind.

(3) To sail up into or against the wind, a zigzag course must be followed. This process is called *"beating to windward."* A boat is said to be sailing *"close-hauled"* when heading as close to the wind as possible and still making way.

(4) When sailing with the wind coming over the starboard side, a boat is said to be on the starboard tack; with the wind over the port side it is on the port tack.

(5) When sailing with the wind on either side but not close-hauled, the boat is said to be *"reaching"* or *"running free."*

(a) When reaching or running free with the wind forward of the beam, the boat is on a *"close reach;"* with the wind abaft the beam the boat is on a *"broad reach"* or *"free reach."*

(b) If the wind is coming from within two points on either quarter, the boat is *"running before the wind."*

(6) To *"tack"* the boat is to bring it about on the opposite tack with the boat's head passing through the direction from which the wind comes.

(7) To *"wear"* consists of changing from one tack to the other with the boat's stern passing across the wind.

(a) During the procedure of wearing, sails are trimmed flat as the wind changes aft and the sail is carefully allowed to swing over to the opposite side of the boat. This process is called *"gybing,"* and must be carefully done to prevent capsizing the boat or damaging mast or sail. It should never be attempted in a strong wind. Either *"come about"* by tacking or, if circumstances prevent that, lower the sail and turn the stern through the wind by using the oars.

(b) All hands must be alert during tacking or gybing because of the danger of being hit by the boom as it swings from one side to the other.

b. Shortening sail

(1) *"Reefing"* means to reduce the exposed sail area; *"shortening sail"* is accomplished by reefing.

(a) This becomes necessary when the wind is of such strength that the boat ships water or is in danger of capsizing. It may be best to lower the sail completely, called *"dousing sail,"* and put over the sea anchor.

(b) During the process of reefing, all hands should remain seated; halyards are slacked and the sail is lowered sufficiently to permit passing the reef points under the foot of the sail and securing them with square or reef, knots. Haul in the main sheet to permit gathering in the foot. The tack line and sheet are shifted to new reef cringles. The sail is then reefed and hoisted.

(c) During the reefing the main sheet must be continually tended and the boat kept under control.

(d) With more than one sail, the sails are reefed one at a time.

(e) It may be necessary to alter course closer to the wind and frequently spill some wind from the sails by *"luffing"* in order to keep steerageway on the boat.

(2) *"Luffing"* consists of permitting the luff or forward edge of the sail to flutter, thus spilling wind from the sail and easing the strain while still retaining control of the boat. Luffing can be accomplished either by slacking the main sheet when close-hauled or on a close reach, or by changing course up into the wind or by a combination of both.

c. Approaching a landing or ship.

(1) When approaching a ship or dock, it is usually best to douse the sails and approach under oars. If approaching under sail, keep slightly to leeward, then douse the sail or slack the sheets and come alongside with sails flapping.

(2) When unrigging, do not unship the rudder or raise the centerboard until after the mast and sails have been lowered.

7.8 LIFEBOAT NAVIGATION

Most of the seagoing ships of all nations are equipped with the latest in radio direction finders and radar. In the event of an abandon ship emergency, the probability of early rescue is greatly enhanced by the search capability of this equipment. Therefore, all lifeboats and rafts should remain in the vicinity of the abandoned ship and stay as close together as possible to increase the radar reflection signal. This, of course, would not apply if the emergency occurred within reach of approachable land.

a. Usually the best procedure when abandoning ship is to get clear of the ship's side quickly, then lay off and wait for help since rescue ships normally head for the scene of the casualty.

(1) Motorboats will handle rescue work, get boats grouped together, and will take them in tow, if necessary.

(2) Boats are equipped with adequate provisions and water.

(3) By conserving energy, the amount of food and water required by boat crews is greatly reduced.

b. If land is close by and its direction is known, or rescue will be long delayed, it may be best to head for land. Boats should stay together; motorboats can tow the other boats.

(1) Boosting morale may compensate for additional energy expended.

(2) By using sails for power, not much extra energy is expended.

c. The boat compass indicates magnetic North; the compass error *(combined variation of the locality and deviation of the compass)* can be determined to within a few degrees and courses set by observation of the North Star if in the Northern Hemisphere. The North Star, Polaris, is located midway between a line extended through the pointer of the Big Dipper and the open side of Cassiopeia's Chair.

(1) Since the North Star is not visible in the Southern Hemisphere, the Southern Cross may be used there. An imaginary line extended through the long axis of the Southern or True Cross points toward the South Pole. There is no star above the South Pole to correspond to Polaris, in fact, this point is so dark in comparison with the rest of the sky that it is known as the *"coal sack"* or *"dark pocket."* The True Cross should not be confused with a larger cross nearby known as the False Cross. The False Cross has stars more widely spaced, is less bright, and has a fifth star in the center, while the True Cross has only four stars but much brighter ones.

(2) The belt of Orion also may be used to set courses or determine compass error in either hemisphere. Since the northernmost of the three stars in the belt of Orion has a declination of zero, it bears true East at rising and true West at setting regardless of the observer's location.

(3) Before checking for compass error, remove all metallic objects from the vicinity of the compass and then note the compass error for the different courses which the boat may have to steer. This is done by simply steadying the boat on each desired course and noting the difference between the compass bearing of the star and its true bearing, and then allowing for this compass error in setting the course. Or, to set a desired true course, head the boat so that the relative bearing between the boat's head and the star is the same as the difference between the desired true course and the star's true bearing. For example, to steer a true course of west, the boat should be headed so that the North Star bears 90 degrees to starboard.

(4) Always keep the compass in the same place when in use, near the centerline aft and with the lubbers line parallel to the keel. Always stow metal objects which cannot be kept clear of the area in the same place while the compass is in use.

(5) If the wind blows continually from the same direction, as in the trades, considerable leeway must be allowed for as such winds usually generate ocean currents.

(6) A knowledge of ocean currents, such as a pilot chart indicates, would be of great assistance in determining the boat's position and the course and distance made good. Such knowledge is of value also in determining what land to head for.

d. For more detailed information on lifeboat navigation if desired, refer to the Coast Guardsman's Manual, Appendix A, *"Navigation Without Instruments"* or the American Practical Navigator by Bowditch.

e. For emergency bills and rescue and survival at sea see the MSC Damage Control Manual.

7.9 CARE OF PASSENGERS

a. The primary responsibility of a boat crew is the care of passengers.

(1) Place women and children amidships where they will be clear of oarsmen, if rowing, and of the boat's sail, protected from wind and spray. See that weight is distributed fore and aft and that the boat is trimmed on an even keel.

(2) Passengers may assist where practicable.

b. Safe delivery of passengers to the shore or rescue craft is of primary importance.

7.10 HANDLING BOATS IN A HEAVY SEA

Heavy seas require additional care and skill in handling a boat.

a. Select heading at which the boat rides best, usually with the sea slightly on the bow or quarter.

b. Hoisting sail will often help to steady the boat in a seaway.

c. Spreading storm oil is of great assistance as it will prevent seas from combing or breaking.

d. Riding to the sea anchor will hold the bow *(or stern if desired)* into the sea.

e. It may be necessary to use the sweep oar to hold a course since in a heavy sea the rudder would be out of the water a great deal.

7.11 USE OF SEA ANCHOR AND STORM OIL *(See Figure 7-5)*

a. The sea anchor is of great value in riding out a heavy sea or to permit the boat crew to rest.

(1) If no drag line is provided, secure the boat painter to the bridle of the sea anchor, bend the tripping line onto the small end of the sea anchor and stream the sea anchor from the bow or stern as desired. The boat will fall away rapidly to leeward until the drag line becomes taut and then will ride head or stern to the sea anchor, which acts as a drag and prevents rapid drifting.

(2) The tripping line is secured to a grommet at the small end of sea anchor; it facilitates recovery of the sea anchor. The tripping line is lighter than the drag line and about two fathoms longer than the drag line to provide slack.

(3) The length of drag line to be let out depends upon the size and type of seas.

(4) Canvas or other chafing gear should be wrapped around the drag line to prevent chafing where the line passes over the gunwale.

(5) It also may be necessary to use oars or the steering oar, or both, when riding to the sea anchor.

b. With heavily breaking seas, storm oil should be spread from the oil container in the sea anchor.

(1) Oil does not reduce the size of the seas but will prevent them from combing and breaking.

(2) The sea anchor is provided with two lanyards at the small end for securing the oil container in place.

(3) Petcocks at each end of the oil container permit oil to seep out; they should both be opened slightly.

c. If the sea anchor has been lost, boat equipment can be used to construct a drag or jury-rig sea anchor. Oars can be lashed and weighted; a boat bucket can be used slung from an oar; an air tank filled with water will make a good drag, etc.

d. Use regular storm oil, if available.

(1) Vegetable oils are best in warm weather but congeal in cold.

(2) Coconut, fish, or whale oil require some thinning for all-weather use.

(3) Fuel or lubricating oils are not recommended because high surface tension prevents their rapid spreading.

e. A sea anchor or drag is also useful in beaching a boat in the surf.

7.12 BEACHING A BOAT

Certain precautions should be observed and preparations made when approaching a beach.

a. If the surf is too bad, do not try to land unless necessary; continue along the coast and look for a good place or wait until the sea subsides.

b. Select the best place to land.

c. Place women and children amidships.

d. Determine whether to go in bow first or stern first.

(1) With no passengers and an experienced crew, go in bow first.

(a) With heavy surf, before reaching the outer line of breakers, stream the sea anchor from the stern and row for the beach; spread oil.

(b) At the inner line of surf, trip the sea anchor and pull ahead hard to run the boat up on the beach.

(2) With passengers onboard or with an inexperienced crew, if the surf is bad, turn the boat around outside the breakers with its stern to the beach; stream the sea anchor over the bow, spreading oil and back the boat into the beach, keeping it heading into the seas.

e. Use the sweep oar in all cases of beaching a boat.

7.13 SUMMARY

a. Outline the most important points covered, with special emphasis on those which the USCG examination for lifeboatman covers.

b. Prepare in advance appropriate oral questions from Chapters 14 and 15 to check the effectiveness of the presentation.

c. When practicable, exercise the crew in a lifeboat, performing as many as possible of the operations described. Let them take turns in assuming command while getting underway, rowing, hoisting sail, coming alongside, etc.

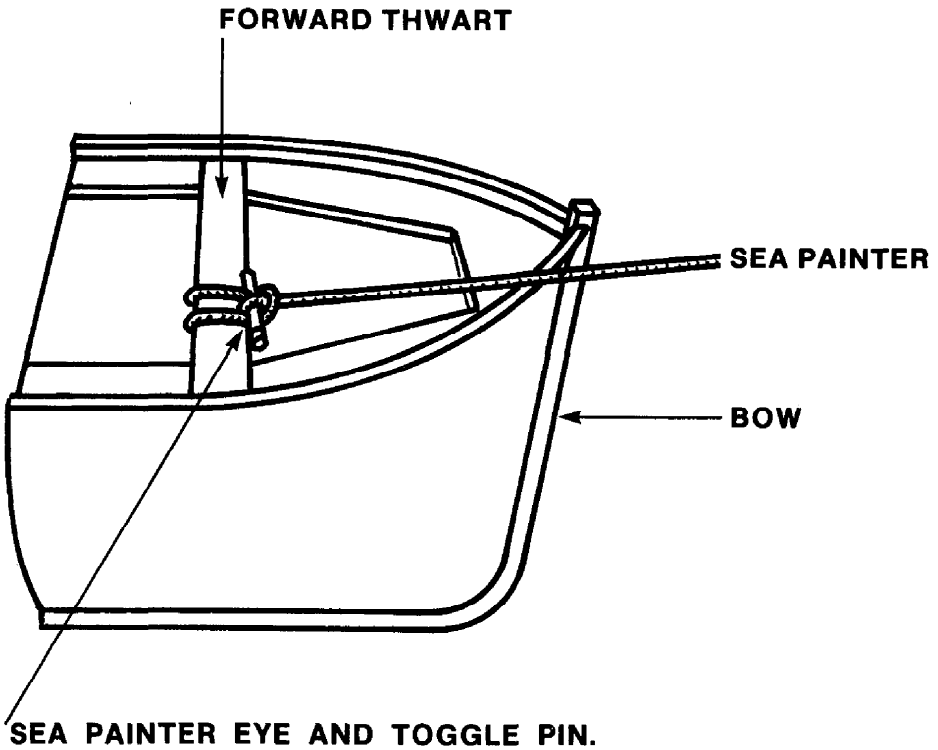
d. Assign appropriate parts of Cornell Manual for Lifeboatmen, AB & QMED for further study.

e. The procedures of starting and operating engines in emergency boats have not been covered since this training is best accomplished at the engine in the assigned boat. The need for having more than one member of the motor lifeboat crew familiar with the starting and operation of the lifeboat engine under emergency conditions is obvious. Therefore, Masters shall ensure that the following personnel assigned to motor lifeboats are instructed in the starting and operation of the engines in their respective boats: Lifeboat commander, second-in-command, engineman, bow tender and stern tender.

f. The Navy Standard Bell Code will be used by boat commanders of motor lifeboats to signal engine orders. It was adopted by all Area Commands to eliminate the possibility of misunderstanding of voice signals due to wind or sea conditions and engine noise. Either a bell or a mouth whistle can be used by boat commanders to signal engine orders. The Standard Bell Code comes on a 5-3/8" x 8" label plate with the following signals:

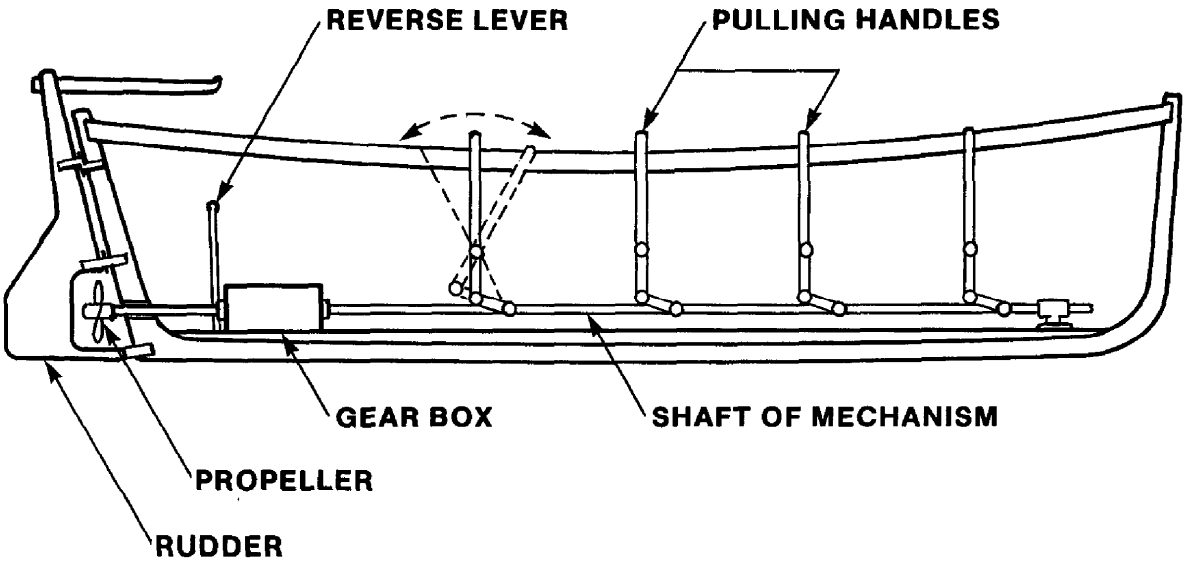
STANDARD BELL CODE

ONE BELL---------- AHEAD
TWO BELLS ---------- STOP
THREE BELLS ---------- BACK
FOUR BELLS---------- FULL SPEED
(In direction propeller is rotating)



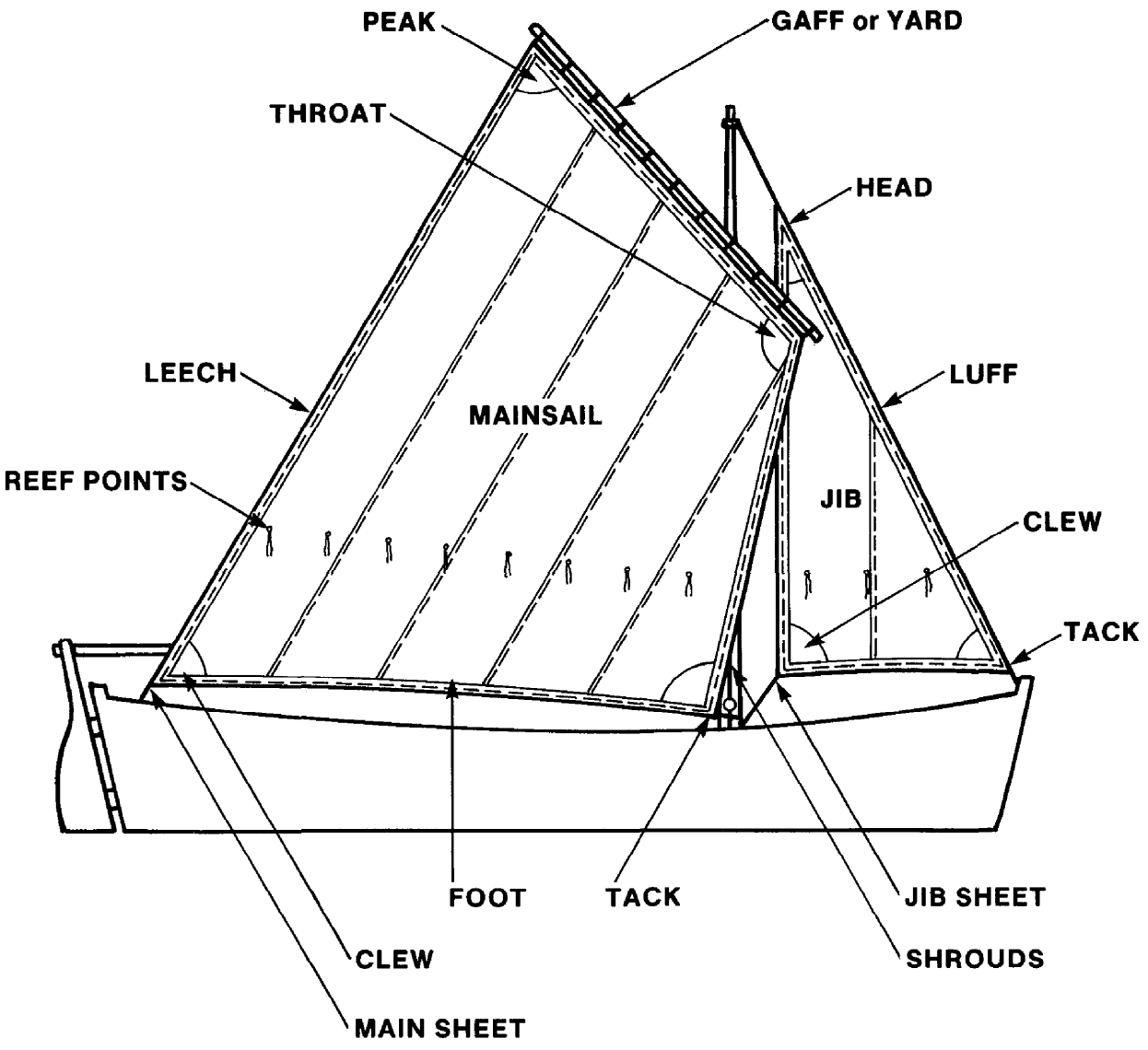
SEA PAINTER RIG

FIGURE 7-1



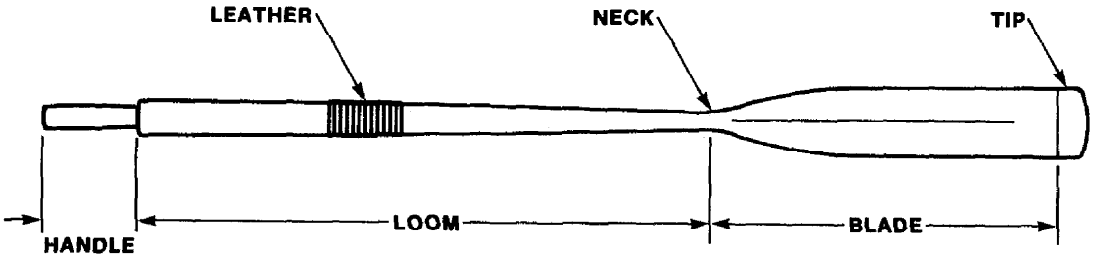
HAND-OPERATED PROPELLER (FLEMING GEAR)

FIGURE 7-2



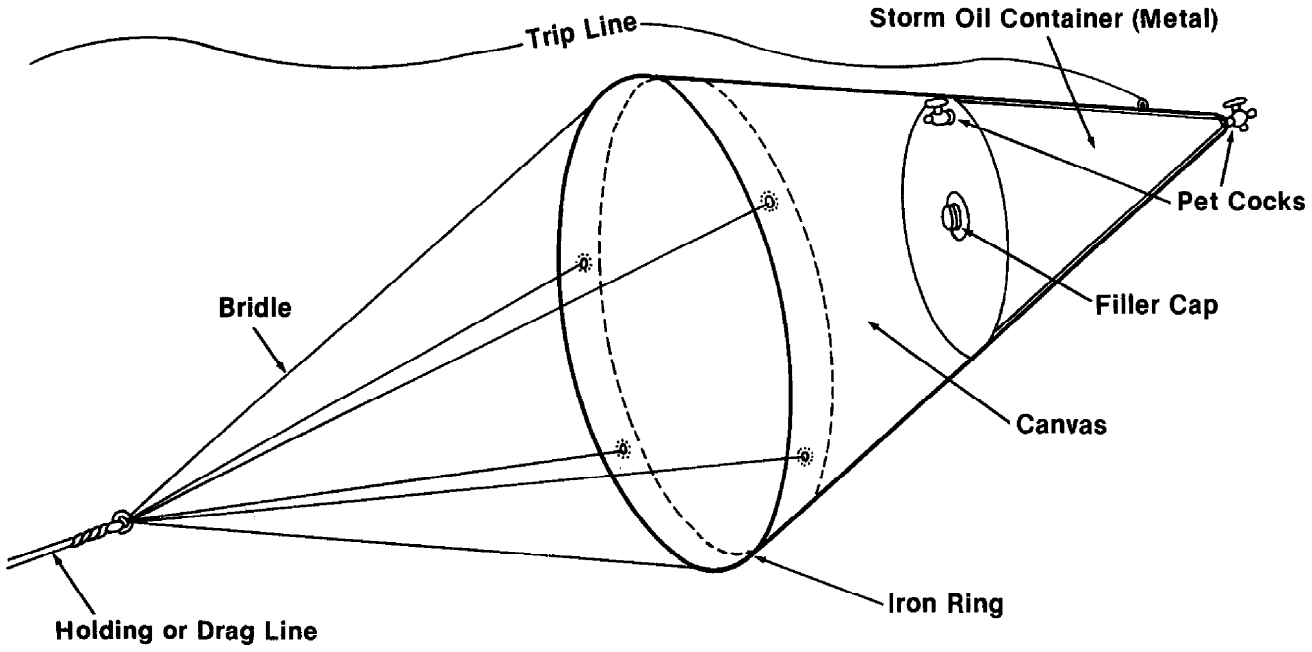
TYPICAL LIFEBOAT RIG

FIGURE 7-3



OAR NOMENCLATURE

FIGURE 7-4



Sea Anchor

FIGURE 7-5

CHAPTER 8

RECOVERING LIFEBOATS
(Lesson No. Seven)

8.1 COMING ALONGSIDE

Proper handling of a boat coming alongside is a measure of good seamanship and will avoid damage to the boat. All lifeboatmen should take pride in their ability to bring a boat alongside smartly and safely even in a seaway.

a. Come in at an angle of about 45 degrees to the ship's side, heading for the boat's station and allowing for wind or current.

b. Boat commander reduces speed by:

(1) Cutting or slowing down motor.

(2) Reducing the number of crew operating pulling handles.

(3) Commanding *"in bows"* if rowing.

c. Boat commander maintains careful steering, preferably with steering oar, and checks the boat's way as he draws close to the falls hanging outboard his boat station by:

(1) stopping the motor, or

(2) giving the order *"stop"* to crew operating propelling gear handles, or

(3) giving the command *"oars,"* followed by *"boat your oars"* if rowing. In rowing, it may be necessary to slow or stop the boat with the command *"hold water all,"* or *"stern all"* before giving the command *"oars."* With manual propulsion, it may be necessary to shift the clutch to reverse gear to reduce the boat's way.

d. Bow tender stands by with boat hook and fends bow off as boat commander steers or sweeps the boat parallel to the ship's side.

e. Another bowman picks up the sea painter or boat rope and secures it.

f. Crewmembers grasp the falls blocks to prevent them from endangering other personnel in the boat as they bring the boat into position by pulling on the manropes.

g. Drawing the boat into position sometimes requires additional steadying assistance from boat ropes, sea painter and stern fast, if conditions require.

8.2 DEBARKATION FROM BOATS

Debarking procedures have been under gradual revision. The original procedure was to have all but the boat tenders climb up the embarkation ladders to board the ship before hoisting the boats. Climbing long embarkation ladders with lifejackets on is difficult and slow. Therefore, debarking procedures were revised to permit Masters to use their discretion. In special circumstances, they could authorize hoisting of boats without debarking crews or could permit crewmen in addition to the tenders to ride the boat up to the embarkation or boat deck. Now Masters may use either method as a routine procedure. They may either direct crewmen to climb aboard ship via embarkation ladders before hoisting the boats or they may permit boat crews to ride the boats up. Both methods will be described here; either may be used, according to the circumstances and as directed by the Master.

a. Using embarkation ladders

(1) Crewmen pull the boat in close to the ship's side so that the embarkation ladder is centered, fending off as necessary with boat hooks.

(2) The bottom of the embarkation ladder is pulled into the boat *(if a single boat or the bottom boat of nested boats)* and all hands, except two in the top boat and four in the bottom boat or in a single boat, ascend the ladder. One of the men remaining in the boat steadies the ladder. The bow and stern tenders remain in the boat and, if a single boat or in the bottom boat of nested boats, the rail and ladder tenders also remain.

(3) The reason for emptying the boat in this fashion is for safety of crewmen, to lighten the boat's draft in order to engage the falls easily, to lighten the boat if heavily loaded with passengers or water, and to provide working space in the boat. Hardhats are provided as emergency boat equipment to avoid injury from swinging blocks.

(4) The safest and easiest way to climb up *(or down)* an embarkation ladder is by grasping both sides of the ladder. Do not place your hands on the ladder rungs as this is dangerous. Grasp both sides of the ladder firmly and hold on to the sides as you climb up *(or down)*.

(5) In rough weather, landing nets are used and men aboard the ship may use heaving lines to assist passengers.

b. Riding the boat up. Unless the boat is heavily loaded, this method will generally be found the simplest and quickest.

(1) If heavily loaded with passengers or water, the boat should generally be lightened before hoisting. Davits and falls are designed to handle a normal load; they must not be overloaded.

(2) In rough weather, there is the added hazard of damage to the boat or injury to its occupants while hanging on the sea painter in order to lighten up. Obviously the circumstances will have to be considered. In rough weather rescue and mercy missions, the boat should be hooked on and hoisted clear of the water without delay.

(3) Seamen who have difficulty climbing embarkation ladders should in all cases be permitted to ride the boat up.

(4) The boat is stopped at the embarkation or boat deck and all men must get out.

8.3 HOOKING ON THE FALLS

a. The release lever is checked to ensure that it is in its secured position and fastened by the safety toggle pin. The release hooks are checked to see that they are closed and locked.

b. After unneeded personnel are debarked *(if sending them up the embarkation ladder)* and the steering oar is stowed, bow and stern tenders take the turns out of the falls and get ready to hook them onto the boat.

c. Sometimes, in spite of reducing the boat's draft, the falls have to be slacked. This is accomplished by lowering the falls, using the small handwheel on the winch, while the men in the boat pull down on the falls to overhaul them. The winchman must keep the brake off until the fall blocks are hooked on.

d. The bow and stern tenders secure the lower chain link of each fall block to the boat hooks. The keeper bar permits each fall to be engaged separately with the hook in the locked position and also keeps the chain link from disengaging if the falls are slack. Since the falls may be engaged onto the hooks separately, the forward falls should always be secured first unless the ship is making sternway. Securing of falls may be made with only the bow and stern tenders in the boat.

e. With other releasing gear such as that used in some cargo ships, it may first be necessary to open the hooks with the release lever, engage the falls and then close and secure the release lever.

8.4 HOISTING THE BOAT

a. The Master may have most of the crew board the ship via the embarkation ladder or he may permit all of the crew to ride the boat up to the boat deck. In rough weather the boat should be hoisted without delay, without waiting to debark the crew.

b. Men in the boat steady the boat and prevent it from swinging and the boat commander signals the winchman to *"hoist away."* The winchman throws the emergency disconnect switch to **"ON"** and turns the operating control to **"HOIST."** *(See Figure 4.7.)*

c. As the boat is hoisted, men should seat themselves and grasp the manropes while the rail and ladder tenders stow the ladder as boat ascends.

d. One man checks and opens the boat drains as the boat is hoisted clear of the water.

e. It is not necessary for the boat commander to ride up with the boat; he should, however, ensure that the boat is ready for hoisting before leaving it to take charge of hoisting.

f. Frapping lines are used to keep the boat from swinging during hoisting in rough weather just as they are used in launching.

g. The boat commander orders *"Avast heaving"* when the boat reaches the boat deck, where the crew debarks; the ladder is removed and stowed and the rail section is replaced.

h. The bow and stern tenders attach the tricing pendants to the fall blocks to ready the boat for its next launching and the equipment is stowed and secured. If the ship is rolling, this may be done after the boat is hove inboard.

i. All men must leave the boat before it is hoisted inboard.

j. The boat commander then signals the winchman to *"Heave 'er in."*

k. The limit switches should be tested each time the boat is hoisted inboard, after all men have gotten out. This is done by having a man pull down on the limit switch arm to ensure that it cuts off power to the winch while the boat is being hoisted inboard.

l. On the order *"Avast heaving,"* the boat is stopped within about a foot of the stowed position, or when the white witness marks on the davit arms and trackways line up. Power is removed from the winch, the hand crank is inserted and the boat is brought to the full stowed position.

m. Power must never be applied or the brake raised while the crank is inserted.

n. The crew can now get back in and secure the boat.

8.5 SECURING THE BOAT

a. Tricing Pendant. The bow and stern tenders engage the tricing pendants to the tricing-pendant trip hooks on the fall blocks if not attached before the boat was hove inboard.

b. Gripes

(1) The bow and stern tenders pass the gripes over the gunwales and center them properly.

(2) The inboard end of each gripe is placed into position over the upper gripe link keeper.

(3) The davits are then cranked up the trackway the last few inches until the davit bracket pin on the davit cradle meets the upper gripe link keeper, securing the upper gripe link.

(4) The davit men place the hinged trackway stopper bar in position.

(5) The outboard end of each gripe is lowered and passed through the guide hole on the trackway. Additional slack may be provided by lengthening the gripe turnbuckle.

(6) The gripe and stopper-bar clearing lever is then lifted and secured, locking the gripe and stopper bar in place. **NOTE:** Be certain that the boat's keel is aligned with the cradle or chock before locking and tightening the gripes.

(7) The weight of the boat when secured will be on the gripes, the falls and winch brake and the trackway stopper bar.

c. Manropes. Bow and stern tenders fake the manropes over the davit span in bights and secure them with a small line tied with a slip knot to permit quick clearing.

d. Covers. Boats need not be kept covered in good weather. If the boat requires covering, all hands install the strongbacks and battens, place and adjust the canvas boat cover, lace the ends and secure it around the boat with slip knots.

8.6 SUMMARY AND LESSONS FROM CASUALTIES

a. Review and emphasize the following points:

(1) The boat release hooks must be locked and the release lever in its closed and secured position before hoisting.

(2) Boat drains are opened as the boat is hoisted clear of the water. Check rubber balls in automatic boat drains.

(3) The falls are overhauled by backing them out, using the handwheel or the quick-return gear.

(4) Always remove the handwheel before turning power back on the winch.

(5) Tricing pendants are attached to the boat to ready it for next launching.

(6) All men must get out of the boats before they are hoisted inboard.

(7) The davits must be stopped when the white witness marks on the davit arm and trackway line up, about one foot short of their stowed position. The limit switch must not be used as an automatic stop.

(8) Power must be removed from the winch before inserting the hand crank. The brake lever must never be raised while the handcrank is being used.

b. Review orally appropriate questions from Chapters 14 and 15.

c. Distribute or discuss the following lessons or other similar experiences drawn from the instructor's or the group's knowledge:

- **Double Death**

- **Lifeboat Davit Crank Accidents**

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DOUBLE DEATH

(Reproduced from Proceedings of the Merchant Marine Council, USCG.)

Recently a casualty occurred during a boat drill which resulted in the death of two seamen and serious damage to a lifeboat.

The vessel concerned was underway at sea and the lifeboats has been lowered to the embarkation deck during the course of a routine boat drill. There were three men in the boat during the time it was being lowered--one in the forward end on the outboard side, and the other two in the after end. After the drill, instead of leaving at the embarkation deck before the boat was hoisted home, as prudence would have dictated, these seamen decided to ride it up to its stowed position. The boat came up smoothly and evenly and just before the carriage reached the limit switches, the officer in charge called out *"Stop the boat."* The seaman who was stationed at the rail control switch removed his finger from the spring-actuated hoisting switch, but due to faulty maintenance the boat failed to stop. The officer then shouted *"Pull the emergency switch,"* but before the man stationed at the rail could open the emergency switch, the davit crashed against the stops, the falls parted, and the boat dropped into the sea. One man managed to extricate himself from the boat as it was falling, but the other two seamen fell with the boat and were so badly injured that they died before they could be picked up from the water.

An intensive examination of the davits, switches, etc., revealed several instances of improper maintenance and poor upkeep. Examples of improper maintenance found during the examination were (a) incorrect coil-retainer replacement which short-circuited the master-control switch; and (b) a rearrangement of the controller wiring which rendered operation of the limit switches useless. As a result of these conditions at the time of the accident, the only way power could have been removed from the hoisting motor was by opening the emergency disconnect switch. Improper maintenance was, therefore, the primary cause of this casualty. While having no direct connection with the casualty, several instances of poor upkeep were uncovered by the investigators. Among these were rail switches so gummed by paint that the springs which normally returned them to the open position were unable to operate them; wheels on the limit switch arms frozen with paint and rust and rollers on davit cradles frozen with rust. In addition, the lettering on the various switches showing **ON** and **OFF** positions was obliterated by paint. These conditions indicated a general laxness in connection with the upkeep of the lifesaving equipment which the Coast Guard strongly condemns.

The complicated chain of circumstances which led to the failure of the boat to stop before reaching its stowed position gives added point to the Coast Guard's previous warnings in regard to the taking of chances when hoisting lifeboats.

It is strongly urged, whenever a lifeboat is being hoisted home, that it be stopped while level with the rail or at some distance from the final stowed position and all persons in the lifeboat be then required to get out. In the case cited above, if this procedure had been followed, there would have been time to open the emergency disconnect switch when it was found that the regular control switches had been made inoperative, and it is probable that the two men concerned would not have lost their lives.

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LIFEBOAT DAVIT CRANK ACCIDENTS

(Reproduced from Proceedings of the Merchant Marine Council, USCG.)

Probably, one of the most recurring types of accidents onboard ships today are those which involve the crank handles on lifeboat gravity-type davits. Many schemes for minimizing the recurring nature of this type of accident have been devised. Much has been written and said about the proper operation of these gravity davits insofar as the use of the davit winches and the use of the handcrank is concerned; yet, we in States Marine are convinced that, although education and training in the proper use of this equipment is required, even if we reach the condition where all those engaged in its use and operation understand thoroughly and perfectly the proper procedures, we will still have these accidents--accidents resulting from poor judgment and human failure, such as lack of alertness and the like.

We have recently suffered two of these accidents which we think are worthy of note.

In one instance, when the deck gang was working one of these boats, a complaint was made to the chief electrician that they could not get power from the davit winch. The deck gang had been working the boat and davit with the handcrank. The electrician came up to the boat deck and immediately noted that the mate, who was trying to work the winch control switch, was absent-mindedly turning it the wrong way. We say *"absent-mindedly"* because he had operated the same switch properly many times before. The electrician told the mate to turn the switch the other way. This was done with neither man being alert enough to note that the crank handle was still in place. Of course, when the motor went on, the crank handle suddenly turned around and hospitalized the electrician who was not standing clear.

Another instance, which ultimately resulted in a very large settlement for the injured party, came about during the hoisting of a boat on gravity davits after rerigging of the falls. In the course of the operation, the power failed. The deck gang then commenced hoisting by the handcrank. The chief electrician, who was standing by, suggested that power could be obtained on the davit winch through the main board in the engine room, in lieu of working the switch on the davit. This entailed a long chain of men for the purpose of relaying commands to the electrician in the engine room. Everything went along fine until the boat was about 12 inches from the stops. The order was given to the electrician to stop hoisting and to shut off the power. The crank was engaged to bring the boat the rest of the way manually.

After the crank was engaged, the power came back on suddenly. We still have not been able to determine how it happened that the power came back on but the consequences, of course, are obvious. The crank handle turned around and caught one of the men, who was standing at the crank in order to operate same, in a trouser leg. It lifted him into the air and threw him over the crank onto the forward part of the boat deck. Needless to say, his left ankle and foot, right knee and leg were seriously injured. Additionally, he suffered head injuries.

It is definitely agreed that the prudent course in this instance would have been to crank that boat all the way up by hand--time not permitting determining why the switch involved would not work. A chain of command, such as that which was used, is never particularly dependable where all the men involved are obviously not thoroughly trained in what they are doing. Nevertheless, just as in all work, it is human nature to look for the easiest and fastest way to accomplish a job and to use that way unless it is obviously suicide.

Looking into accidents of this type, we made our minds up that they were due more to the arrangement of the manual feature of the davits than human failure. Therefore, to supplement our efforts to train members of the crew in the operation of these davits, we have moved to eliminate the old-fashioned L-shaped crank by substituting a large wheel crank for same. Wheel cranks being used are 42 inches in diameter and have proved most satisfactory to date. In addition to not having had accidents with this type of crank on gravity davits, we have noted incidents where, had we had the old-type L-shaped crank, we most certainly would have had serious personal injuries to members of the crew. As a matter of fact, we have found the operation of these davits, manually, with the wheel crank, far simpler and easier as well as safer than with the old type crank. True, recent amendment of USCG requirements as to switches on gravity davits will eliminate the

occurrence of power failure circumstances such as were occasioned in the latter of the foregoing accidents. Even so, we feel the use of wheel cranks to be a definite safe advantage over the old L-shaped crank as, with the new switch arrangements, accidents of this type can still occur when the power switch is suddenly turned to an **"ON"** position when the davits are being operated manually.

NOTE: MSC ships are fitted with quick-return handwheels. The L-shaped geared handcranks are equipped with a ratchet which should keep them from turning if power is accidentally turned on. However, they will turn backward if the brake handle is raised!

CHAPTER 9

RAFTS AND FLOATS
(Lesson No. Eight)

9.1 INFLATABLE LIFERAFTS

a. Introduction

(1) Inflatable liferafts came into widespread use in the maritime community after World War II, when large ships began carrying them to provide a spare survival craft -- the inflatable liferafts could automatically float free of a sinking ship, inflate and be ready for use in case the lifeboats could not be used. Carriage of the liferafts as a spare survival craft became mandatory for both cargo and passenger ships with the 1960 revision of SOLAS.

(2) The inflatable liferaft is as important a lifesaving device as the lifeboat. Drills with liferafts are not conducted, because the raft container is sealed until ready for automatic or manual launching. Therefore, it is important to learn about the current design of rafts and keep abreast of future design progress. Inflatable liferafts are inspected at 12-month intervals. The inspection is done at a Coast Guard approved service facility.

b. Liferaft Stowage

(1) Liferafts are in a cradle, on an open deck. This is done so they can float free if the ship sinks before you can manually launch the raft.

(2) The liferaft container is strong, weather tight and tamper proof.

(3) The raft container has small holes on the bottom for condensation drainage and air circulation. The container must be stowed with the words **"This Side Up"** on top to be sure the holes are on the bottom.

(4) Most containers are made of fiberglass.

(5) The container is usually held together with retaining bands, which break when the raft is inflated.

(6) A watertight gasket seals the halves of the container together.

(7) The container rests in a cradle that is permanently secured to the ship's deck.

(8) The container may be secured to the cradle with a tie down strap.

(9) The tie down strap has a securing device called a hydrostatic release. A cleat near the cradle secures the painter/operating cord when launching manually. *(See Figure 9-1.)*

c. Automatic Launching *(See Figure 9-2.)*

(1) The hydrostatic release is triggered by water pressure. It releases the container as it sinks 10 to 15 feet deep.

(2) The container will float free toward the surface of the water.

(3) The 100 foot long painter/operating cord is attached to the deck or cradle with a weak link. The other end of the operating cord is attached to the raft inflation tank and the raft's towing bridle.

(4) As the ship sinks below 100 feet, most of the operating cord is pulled out of the container. It activates the raft's inflation system. The raft will inflate.

(5) The raft's buoyancy causes the weak link to break allowing the raft to float free of the ship.

(6) Some liferaft containers may not use a tie down strap and hydrostatic release. Four securing poles may be used to allow the container to float free as it sinks.

d. Manual Launching. It is not necessary to wait for the ship to sink for the raft to be launched. To manually launch the rafts:

(1) Kick the hydrostatic release plunger or pull its lever outboard to release the tie down straps.

(2) Take the container to the lee side of the ship.

(3) Tie the painter/operating cord to a strong part of the ship and throw the entire container overboard.

(4) Pull the cord out its full length *(100 feet)* and pull it sharply. This starts the raft's inflation system.

(5) The cord also acts as a painter to hold the raft alongside the ship until it can be boarded. The painter is cut from the raft after all persons have boarded. *(See Figure 9-3.)*

e. Davit Launching. Some inflatable liferafts are davit launched from the ship's deck. The passengers and crew can board from the deck and be lowered to the water. This makes it possible for the passengers to board the raft dry. Davit launched rafts are sturdier than ordinary rafts, so they will hold the raft's full load while suspended from a davit. *(See Figure 9-4.)*

f. Design

(1) Inflatable liferafts may be round, oval, octagonal *(8 sided)* or boat shaped. Design may vary among manufacturers.

(2) Liferafts on ships that make international voyages hold 6 to 25 people.

(3) The number of persons the liferaft will hold is marked on the container and the raft itself. The manufacturer's name is also shown on the container. An inflatable liferaft complete with case and equipment does not weigh more than 400 pounds. *(See Figure 9-5.)*

(4) Buoyancy Tubes. Buoyancy tubes are on the outer edge of the raft. They are made of thick, nylon reinforced rubber. Buoyancy tubes make the raft float. They are divided into at least two compartments. The raft will carry its rated number of persons even when half the compartments in the buoyancy tubes are deflated.

(5) Carbon Dioxide. Carbon Dioxide *(CO_2)* is usually used to inflate the raft. The CO_2 cylinder is on the bottom of the raft.

(a) It is activated by a sharp tug on the 100 foot painter/operating cord.

(b) The tug pulls the CO_2 tripping lanyard out of the CO_2 cylinder head. This allows CO_2 to enter the buoyancy tubes.

(c) CO_2 can escape through leaks in the tubes. The gas is odorless, tasteless and colorless, so you must watch for leaks.

(d) If you breath air with a large amount of CO_2, you can suffocate; always leave the curtains open if you know the tubes are leaking. Fix the leak as soon as possible.

(e) Inflation time is approximately 30 seconds.

(6) Pressure Relief Valves. Pressure relief valves are in rafts.

(a) They are fitted in the tubes, so extra gas can automatically escape. It is normal for gas to escape right after the raft is inflated.

(b) You can tell it is escaping by a hissing sound coming from the valve. The sound will probably stop in a few minutes.

(c) Cap valves soon after inflation to stop loss of gas from waves acting on the tubes.

(d) During the day, temperature rises may cause the gas to expand enough to activate the valves.

(e) At night, when temperature drops, you might have to pump up the tubes with the inflation pumps because the air in the tubes might contract.

(f) Sometimes, pressure relief valves do not work correctly. If gas continues to escape from the pressure relief valve, you can fix it with a safety valve plug from the repair kit. Then pump the tube back up.

(7) Inflation and Deflation. The raft's floor is inflatable.

(a) Inflate the floor with the inflating pump in cold climates to insulate occupants from cold sea water.

(b) Leave the floor deflated in warm climates to allow cooler sea water to cool the inside of the raft.

(8) Boarding Ladder

(a) A boarding ladder and towing bridle are at each end of the raft. The two are usually combined. In addition to boarding and towing the raft, the raft can be hoisted aboard a ship by hooking onto one or both towing bridles.

(b) Lifelines are inside and outside the raft for survivors to steady themselves. *(See figure 9-6.)*

(9) Lights

(a) Two lights are on the canopy. They automatically activate when the raft inflates. They are powered by dry cells or water activated batteries and can operate for at least 12 hours. The external recognition light can be seen from two miles away. The other light is inside the canopy.

(b) Putting out the lights in the day by unscrewing the bulbs or by a pull-apart plug does not extend battery life. Remove the cells from the water and shake water out of them. This prolongs their use if the cells can be reached under the raft.

(10) Insulation. The canopy has two layers to insulate the inside from extreme temperatures. The canopy pops up automatically as the arch tubes inflate. The canopy has tubes to collect rainwater. The canopy is colored Indian orange or some other bright color which will stand out on a whitecapped sea.

(11) Water Pockets. Water pockets are under the floor. They have holes to allow sea water to fill them when the raft is launched. This slow the raft's drifting and makes it more stable.

g. Liferaft Equipment. All inflatable liferafts shall be equipped as required by Title 46, CFR, Subchapter Q, Equipment, Construction and Materials: Specifications and Approval, Subpart 160.051. Liferafts are provided with equipment to handle the raft, survive at sea and alert rescuers. The following list is for liferafts on ocean service ships.

(1) **Heaving Line**: A buoyant 100 foot heaving line, with a buoyant quoit *(small floating ring)* at one end is provided. The other end is attached to the raft near the after entrance.

(2) **Instruction/Survival Manual**: A booklet printed on water-resistant material should be hanging in a clear envelope from one of the canopy arch tubes. The manual describes how to use the raft's equipment. It also contains internationally recognized distress signals and survival information.

(3) **Instruction Card**: A plastic card hangs from the inside canopy. The card shows immediate steps to be taken by survivors upon entering the raft.

(4) **Jackknife**: One jackknife is provided on rafts for up to 12 persons. Two are on larger rafts. The knife has a can opener. One knife, in a pocket near the forward entrance, can be used to cut the painter. If the raft has a floating sheath knife, it can replace the jackknife.

(5) **Paddles**: Two 4-foot long paddles are included.

(6) **Inflation/Dewatering Pump**: A pump is provided, so survivors can keep the raft inflated. It also can be used to pump water out of the raft by switching the hose.

(7) **Sea Anchors**: Two sea anchors are provided. One attaches to the outside of the raft and streams automatically when the raft is inflated. The other is a spare. Each sea anchor has 50 feet of nylon line attached.

(8) **Bailers**: Two flexible bailers are provided on rafts carrying 13 or more people. One bailer is carried on smaller rafts.

(9) **Sponges**: Two cellulose sponges are provided.

(10) **First Aid Kit**: A kit containing first aid supplies is provided.

(11) **Flashlight**: A Coast Guard approved flashlight with three spare batteries and two spare bulbs is provided. It is waterproof and has a blinker button for signaling.

(12) **Signal Mirror and Whistle**: A mirror and whistle for signaling rescue units is provided.

(13) **Red Rocket Parachute Flares**: Two red rocket parachute flares are provided. They are approved for three years of service.

(14) **Hand-held Red Flares**: Six hand-held red flares are provided. They are approved for three years of service.

(15) **Provisions**: One pound of hard bread or its approved nutritional equivalent is provided for each person. The food is packed in sealed cans.

(16) **Water**: One and one-half quarts of water are provided for each person. The water comes in sealed packets or cans.

(17) **Can Openers**: Three can openers are provided.

(18) **Drinking Cup**: A flexible drinking cup marked in ounces is provided.

(19) **Fishing Tackle Kit**: A kit containing fishing tackle is provided.

(20) **Anti-seasickness Tablets**: Six anti-seasickness tablets are provided for each person.

(21) **Repair Kit**: A repair kit for repairing the buoyancy tubes is provided. The kit contains: a roughing tool, five rubber tube patches *(2-inch diameter)* and cement. The cement is flammable. No smoking while making repairs. These are used for patching small holes. They can only be used if the area around the hole can be kept dry while you are patching the hole.

9.2 NAVY MARK 6 INFLATABLE LIFEBOATS

a. Introduction

(1) Some ships of the Military Sealift Command are fitted with the Navy Mark 6 inflatable lifeboat. The inspection agreement MSC has with the U.S. Coast Guard authorizes lifesaving equipment on MSC inspected and certificated ships that meets the requirements of military specifications *(MILSPECs).*

(2) The Navy Mark 6 inflatable lifeboat will be found on MSC ships inspected by the Coast Guard and INSURV inspected ships. The decision to place Navy Mark 6 boats on MSC ships after years of using only U.S.C.G. approved inflatable liferafts was based upon the lower servicing cost for a Navy raft and the need to standardize the cradle size. Commercial raft containers do not have a standard shape and it was often necessary to replace the cradle each time rafts were exchanged for servicing or replacement.

b. Inflatable Lifeboat Stowage

(1) GENSPEC and MILSPEC use the term inflatable *"lifeboat"* vice the commercial term of inflatable liferaft. The Navy Mark 6 is referred to as an inflatable lifeboat throughout this section.

(2) The mark 6 inflatable lifeboat is designed for compact stowage aboard ships and for quick inflation in an emergency.

(3) It can accommodate 25 persons when it becomes necessary to abandon ship.

(4) The boat is stored in a rigid fiberglass container to protect it from damage and tampering and to insure that it will be ready for use in case of emergency.

(5) The boat in its container is stowed on a specially designed cradle and is held in the cradle with a stowage securing cable connected to the automatic releasing device.

(6) Release devices provide for both hydrostatic and manual release of the lifeboats. The manual release push button shall face outboard away from traffic to prevent inadvertent release. *(GENSPEC 583f)*

(7) Stowages shall be kept clear of overhanging structure or other obstructions which might prevent the boats from floating free of the ship upon hydrostatic release.

(8) Stowages shall permit ready manual launching into the water without hitting any obstruction at zero-degree list. For adverse list conditions up to 15 degrees, provisions shall be made to prevent boats being launched from falling into passageways and other obstruction which will prevent them from floating to the surface.

(9) They shall not be installed in areas where leaking oil, hydraulic fluid or flammable liquids can create a hazard which will impair launching.

(10) The lifeboat is provided with a 100-foot long sea painter. The end of the painter shall be secured to the stowage cradle and be accessible from the deck.

(11) The painter is 5/32" braided nylon with a breaking strength of 540 pounds. Selection of this size painter insures that the raft will not be pulled down with a sinking ship.

c. Characteristics

(1) Weight of boat, container & gear 515 lbs

(2) Inflated dimensions	20' 11" overall length 8' 10 ½" overall width
(3) Container dimensions	56" length 27" diameter

d. Design

(1) The inflatable lifeboat is constructed of neoprene coated nylon fabric and consists essentially of a lower inflation tube *(hull)* 13 1/4" in diameter surmounted with an upper *(gunwale)* tube also 13 1/4" in diameter.

(2) The hull inflation tube is connected by an inflatable cross tube which acts as a stiffener to prevent the lifeboat from collapsing across the beam, and which inflates automatically with inflation of the hull tube.

(3) Connected to the hull tube, at the stern, is an inflatable boarding ramp with a 9" diameter tube around its periphery that also inflates automatically.

(4) Connected to the upper gunwale tube are three canopy support tubes which are made in ten sections and which form irregular arcs set at approximately right angles above the gunwale tube.

(5) The canopy *(weather shield)* is a highly visible international orange neoprene coated fabric covering that envelopes the entire top half of the boat. It consists of an inner and outer layer with an air space to afford insulation. It is also constructed so the openings located at each end of the boat may be closed weather tight when desired. The canopy is automatically erected when the boat is inflated and will provide protection for survivors from sun, wind, rain, ice, snow and extreme temperatures - both hot and cold.

(6) Each of the two main inflation tubes is divided into two compartments by means of an internal bulkhead, creating a forward and aft section in each tube. A puncture of either compartment will not allow complete deflation. There is another bulkhead at the uppermost midpoint of the center canopy riser, dividing the 3 canopy risers and the boat into forward and aft sections.

(7) Laps and seams in the upper and lower tubes are secured by vulcanizing in a steam or air pressure autoclave.

(8) A fabric bottom is attached to the bottom of the lower tube and supports the manually inflatable and removable floors. These floors are equipped with hand lines so that they can be used as emergency flotation equipment.

(9) The floor is inflated by means of a hand pump.

(10) The boat is designed to provide a buoyant force of twice the rated capacity of 25 persons.

(11) The survival gear is packed in the lifeboat and is immediately available when the lifeboat is inflated.

e. Inflation

(1) Inflation of the lifeboat in case of emergency is attained by the release of air cylinders charged to 5000 psi. Two 455 cubic inch cylinders inflate the boat; one for the lower tube and one for the upper tube and the canopy bows.

(2) The compressed air cylinder under high pressure ensures rapid *(20 to 30 seconds)* inflation at temperatures as low as minus 20 degrees Fahrenheit. At high ambient temperatures the compressed air system creates a somewhat higher than normal pressure in the hull tubes. This pressure is relieved by the pressure relief valves installed in each of the tube compartments. These valves relieve at 3.5 psig and close automatically at 2.6 psig.

(3) The boat, after initial inflation, will be quite firm. Cooler air temperatures will cause the boat tubes to soften. This is normal. As the temperatures rise during daylight, the tubes will form up again.

(4) The inflatable floors should be inflated by means of the hand pumps as soon as possible after you board the lifeboat, as they provide insulation against the colder water temperature.

(5) The compressed air cylinders rest in pockets located outboard of the port and starboard manifolds.

f. Operation

(1) Automatic launching occurs in the event of a catastrophe causing loss of the ship before the boats can be launched manually. As the ship sinks, the pressure at 15 to 20 feet actuates the hydrostatic release mechanism, thereby freeing the boat from its stowage. The container is inherently buoyant and floats to the surface. As the ship continues down, the painter will pay out to its full length creating a pulling force on the cylinder valve activating cables, releasing the compressed air into the buoyant chambers of the boat, and inflating it automatically. The painter has a predetermined breaking strength less than the buoyancy of the boat allowing it to break once the lifeboat has surfaced.

(2) Manual release launch occurs when there is sufficient time before ship abandonment. The hydrostatic release may be tripped manually by hitting its release button with the heel of the hand. Upon clearing the stowage cables the boat can be

pushed or rolled overboard. The painter is then pulled. When 90 feet of line has been pulled, a hard pull actuates the cylinder valves and inflating the boat. The painter is secured to a *"dee"* ring on the boat and at the lifeboat stowage cradle onboard the ship, preventing the boat from drifting away.

g. Inspection and Repair

(1) Inflatable lifeboats and lifeboat stowages aboard ship shall have periodic Planned Maintenance *(PMS)* in accordance with the appropriate Maintenance Index Page *(MIP)* and Maintenance Requirement Card *(MRC).*

NOTE: The maximum PMS interval of 48 months is based on service date, not the date of shipboard installation. *(USCG approved inflatable liferafts are serviced every 12 months.)*

(2) Repair facility inspections and tests will occur with the periodicity stated in the MIP.

(3) Certified lifeboat repair facilities include:

Philadelphia Naval Shipyard
Norfolk Naval Shipyard
Mare Island Naval Shipyard
Puget Sound Naval Shipyard
Shore Intermediate Maintenance Activity, San Diego
Shore Intermediate Maintenance Activity, Mayport
Naval Repair Facility, Yokosuka
Naval Repair Facility, Subic Bay
Pearl Harbor Naval Shipyard
Long Beach Naval Shipyard
B.F. Goodrich, Fenwick, WVA.

(4) The hydrostatic release must not be painted. In the event the release is painted, remove and replace.

h. Equipment

(1) The following equipment is supplied with each boat.

(2) Rescue line (1) -- buoyant plastic ring with 75 feet of 1/8" nylon line which is contained in a clearly marked pocket near the stern opening of the canopy.

(3) This rescue line is used in rescuing anyone who drifts away from the boat or is beyond reach of the boat while in the water.

(4) Sea anchor (2) - One sea anchor is attached to a D ring located in a pocket between the upper and lower tubes so as to allow it to fall into the water upon inflation of the boat.

(5) The spare sea anchor is stowed in a pocket inside the boat.

(6) Floatable Knife (1) - The floatable knife is stowed in a pocket on the outside of the canopy near the bow opening.

(7) Hand Pump (2) - The hand pumps are stowed in clearly marked pockets at each end of the boat.

(8) The hand pumps are used to inflate the inflatable floors and to *"Top Off"* the boat should any decrease in tube pressure occur after the initial air inflation.

(9) Sealing Clamps *(emergency repair) (2 sets)* Six sealing clamps, sizes 3", 5" and 7-1/2" along with instructions are provided for making emergency repairs, such as, punctures or tears. These clamps are stowed in a clearly marked pocket amidships.

(10) Operation and Maintenance Manual (2) One manual is stowed in the same pocket as the sealing clamps, while the other is attached to the outside of the fiberglass container.

(11) Oars (2) - Two sectionalized oars are provided and stowed in a bag attached to the inside of the boat. The oars are provided for navigating the craft in rescue operations or to get away from a sinking vessel.

(12) Boarding Ramp or Station (1) - One inflatable ramp connected to the lower *(hull)* tube and simultaneously inflated, shall be provided to assist survivors in boarding the boat from the water. This ramp is located on the stern end of the boat.

(13) Boarding Ladder (1) - A boarding ladder constructed of nylon webbing with horizontal neoprene rubber rungs is provided on the bow end of the boat. This ladder is designed to assist survivors in boarding the boat from the water.

(14) Ballast Bags (4) - Each boat includes four specially designed pockets attached to the bottom surface of the boat for trapping water. This trapped water, or ballast, aids in the stability of the boat.

(15) Righting Line (1) - Three 15 foot lengths of knotted nylon rope are attached to Dee rings on the outside of the boat for the purpose of righting the boat should it become

inverted. Three survivors can accomplish this by climbing aboard the capsized boat, grasping the knotted righting lines and walking backwards to the edge of the boat. The three persons should then throw their whole weight backwards, pulling the boat with them. The changing of the center of gravity by the persons righting the boat will then allow the boat to assume upright position.

(16) Towing Connections (6) - Six Dee Rings with suitable patches are attached to the bottom tube for the purpose of towing the boat *(two at the bow plus two amidships and two at the stern).*

(17) Lifeline - A 1/4" nylon rope lifeline is draped around the boat from suitable patches. This lifeline will provide a grip for survivors to hold onto until they can board the boat. A similar line is provided inside the boat for survivors to hold onto in rough seas.

(18) Lights - The boat is fitted with three water activated battery powered lights. One light is located on the top of the boat at the boarding station. Two lights are located inside the boat. The water activated batteries are capable of lighting the bulbs for twelve hours and are to be changed at times of boat overhaul. The lights are essentially used to assist survivors in locating the boat at night and to give rescue ships its position.

(19) Rain Catchers - (2) Tubular sleeves with tie-off facilities for catching rain water are installed in the canopy. These tubes will retain water until it may be put in storage containers. Plastic storage containers may be found in the equipment container.

(20) Relief Valves - (4) Relief Valves are installed in the upper and lower tubes for the purpose of relieving excess air.

(21) Topping Up/Inflation Valves - (6) Valves are installed in the boat tubes and inflatable floor for the purpose of adjusting the pressure as required. Instructions for doing this are printed near the valves.

(22) Inflatable Floors (2) - An inflatable floor is provided in each end of the boat for the purpose of insulation from cold water.

(23) Equipment Container - The following survival gear is packed in the equipment container which is secured to the inside of the boat.

Item	Quantity
Food Packets	125
Water, Canned, 10 Ounce Cans	75
Openers, beer can type	6
Desalter Kits, Type II	5
Storage Bag, Drinking Water, Size A	2
Flashlight, Type II	1
Battery, Mallory part No. AR 13D PA	4
Sea Marker, Fluorescein Canister Type	1
Mirror, signaling emergency, Type II	1
Sponge, Cellulose Type 1, Size 10	2
Knife, Pocket	1
Whistle, signaling plastic Type II	1
Measuring cup, plastic, 8 ounce	2
Motion sickness tablets Dramamine, 50 milligram	250
Bailer, plastic, 2 quart capacity	1
Kit, First Aid	1
Kit, signaling MK 13 Mod (O) (12 Flares)	1
Fishing Kit, Survival	1
Flashlight	4

9.3 LIFEFLOATS AND BUOYANT APPARATUS

a. Passenger Vessels

(1) In addition to the lifeboat and liferaft capacity for every person carried, ocean passenger vessels have lifefloats or buoyant apparatus for emergency use by the passengers onboard.

(2) The equipment shall be capable of being put in the water safely and rapidly even under unfavorable conditions of list or trim.

(3) When stowed one above the other, the tiers can not be over four high. The separate units must be kept apart by spacers.

(4) Unless skids are provided, lifefloats and buoyant apparatus must weigh less than 400 pounds each to make launching easy, without lifting.

b. Lifefloats

(1) USCG approved lifefloats are flotation equipment designed to support partially immersed persons on the peripheral body of the lifefloat.

(2) Lifefloats must have a platform designed to drop through the center of the float, whichever way the lifefloat is floating.

(3) Lifefloats are equipped with a boat hook, paddles, lifelines, painter and those rated for more than 24 persons, a water light. Loose equipment is securely attached to the lifefloat.

c. Buoyant Apparatus

(1) USCG approved buoyant apparatus are flotation equipment designed to support a specified number of persons in the water. They must be capable of being handled without the use of mechanical appliances and its weight must not exceed 400 pounds.

(2) Buoyant apparatus are equipped with lifelines, festooned in bights not longer than 3 feet, and pendants 12 feet in length fitted every 18 inches.

d. Stowage

(1) Lifefloats and buoyant apparatus are secured to the vessel by a painter and lashings which can be easily released or by a hydraulic *(hydrostatic)* release unit *(HRU)*.

(2) Each lifefloat and buoyant apparatus is secured to the vessel by a painter and float-free link.

e. Markings

(1) Lifefloats and buoyant apparatus, together with their paddles, are conspicuously marked with the vessel's name. For vessels on an international voyage, the vessel's port of registry is similarly marked.

(2) The number of persons allowed on each lifefloat or buoyant apparatus is to be marked or painted thereon in letters and numbers at least 1 1/2 inches high.

f. Maintenance. All lifefloats and buoyant apparatus are to be cleaned and thoroughly overhauled at least once in every year.

9.4 SUMMARY AND LESSON FROM CASUALTY

a. Summary

(1) Outline briefly the requirements for liferafts, floats and buoyant apparatus.

(2) See that students have all required information, particularly the list of equipment.

(3) Use applicable review questions from Chapters 14 and 15 as an oral quiz.

(4) Review 46 CFR 160.051.

b. Lesson from Casualty

WHAT'S IN THERE?

(From Proceedings of the Merchant Marine Council, USCG.)

The answer to the question is, of course, an INFLATABLE liferaft. Unfortunately, the fact that this question is asked poses an important problem. The design of the inflatable liferaft, as approved by the U.S. Coast Guard, is such that little knowledge of the raft, its operation, or contents needs to be known by the user in order for the raft to fulfill its function of saving life. The intention is that in the unfortunate event of a disaster at sea, floating nearby is a liferaft completely ready for use. All that should be necessary is for the survivor to climb aboard. The failure to take, or not to take, certain precautions beforehand, however, can easily thwart the design of the raft. We here provide a little beforehand knowledge that may save your life.

General Description -- The inflatable liferaft is a fine piece of lifesaving gear, having many desirable features. It requires no maintenance on the part of the ship's crew and, once properly installed onboard, should remain untouched until routine servicing by qualified personnel ashore. It is designed to operate both manually and, if the vessel sinks, automatically. A full equipment pack is provided inside the raft, not accessible to pilferage, and adequately protected against damage. Food, water and other essentials are provided as well as such *"extras"* as seasick tablets. Annual servicing ashore relieves the Chief Mate of a routine burden, assures a full and properly dated equipment pack, and ensures proper operation of the raft when necessary.

The raft has a highly visible orange cover and an insulated, eye-soothing, blue interior *(depending on manufacturer).* In addition to being easy to spot at sea, the cover provides exposure protection, provides for collection of drinkable rainwater, and, by securing gusseted covers over the access areas, completely encloses the occupants from the elements. Further insulation is given by a secondary inflated floor as well as the buoyancy tubes. Riding stability is given to the raft by four water-stabilizing pockets and the use of a sea anchor. In the event of damage to the raft, a repair kit is provided together with a hand-operated air pump to inflate the repaired section. A survivor's manual also is provided to give the rudiments of survival at sea. Thus, hopefully, the survivors are furnished with all the equipment necessary to satisfactorily sustain life at sea until rescue arrives.

Installation -- To obtain satisfactory operation the raft must be installed properly. The installation will vary somewhat with each vessel but the basic guidelines are the same. The raft itself comes in a container, sealed, and strapped with retaining bands, similar to steel shipping bands. These are not shipping bands, but form an integral part of the raft containment. The bands generally have holes cut in them to form a weak link, allowing the bands to break as the raft inflates. The raft, in its container, must be installed in an open, readily accessible area, where it may both float free of the vessel and be readily launched. Thus, it should not be under an overhang, ladder, bridge wing or other obstruction. Preferably, it should be clear of present boat-lowering areas since the usual confusion in lowering a boat in an emergency would be compounded by the addition of the raft. The result of a 400-pound raft dropped 40 to 60 feet onto a boat is not hard to visualize. The raft container usually rests in a cradlelike frame permanently attached to the vessel.

A line extends from one end of the raft container and is securely attached to the vessel. This most important line, the operating lanyard, activates the mechanism which inflates the raft.

Operation -- The raft is released from storage by one of two methods. First, if the vessel sinks with the raft onboard, it will float free. The raft is still attached to the vessel by the operating lanyard which pays out of the container as it rises. Second, if it is desired to use the raft with the vessel afloat, the container may be picked up and thrown overboard. The operating lanyard should not be disconnected from the vessel but should be allowed to pay out as the raft goes over the side.

At this point the 100-foot-long operating lanyard must be pulled completely out of the raft container, by a person on deck, manually by a swimmer in the water, or by the sinking ship itself. The pulling of the lanyard activates the inflation system which releases the contained gases into the raft causing it to literally burst out of its container as it inflates. The raft is boardable after about 8 seconds for an 8-person raft, to about 30 seconds for the large 25-person raft. The raft is usually fully inflated in less than 2 minutes, depending on the raft size.

The raft, after inflation, remains connected to the vessel by the operating lanyard. The operating lanyard has a *"weak link"* which, when strongly tensioned, breaks the basic connection. The lanyard remains connected to the raft by the sea anchor, and with further tension deploys the sea anchor and then parts, freeing the raft with the sea anchor deployed. If insufficient tension occurs, the raft would be manually cut free using a knife provided at the raft access area and the sea anchor manually deployed.

Testing and Servicing -- As are all items of manufacture carrying the USCG approval, inflatable liferafts are thoroughly tested to provide the greatest degree of reliability possible. Each manufacturer must pass rigid specifications and testing of his product before he is given an approval. Each servicing organization must likewise demonstrate its competence, prior to approval. In addition to the manufacturer's quality control team, the Coast Guard details inspectors to examine the rafts from the first stage of manufacture to pressure test and visually inspect each raft. After passing these tests the rafts are finally inflation-tested in individual lots to continually prove the packing methods and the inflation system. At yearly intervals in service, the rafts are removed from each vessel and retested and serviced at a factory-trained-and-authorized service facility and observed by USCG inspectors.

Points to Remember - The following is a summary and should be remembered:

a. Install the raft where it may both float free and be readily thrown overboard.

b. Do not tamper with the installation once in place.

c. Do not remove the steel, or other containment bands.

d. Do not permanently secure or lash the raft container to the vessel.

e. Do secure the operating lanyard to a good solid part of the vessel.

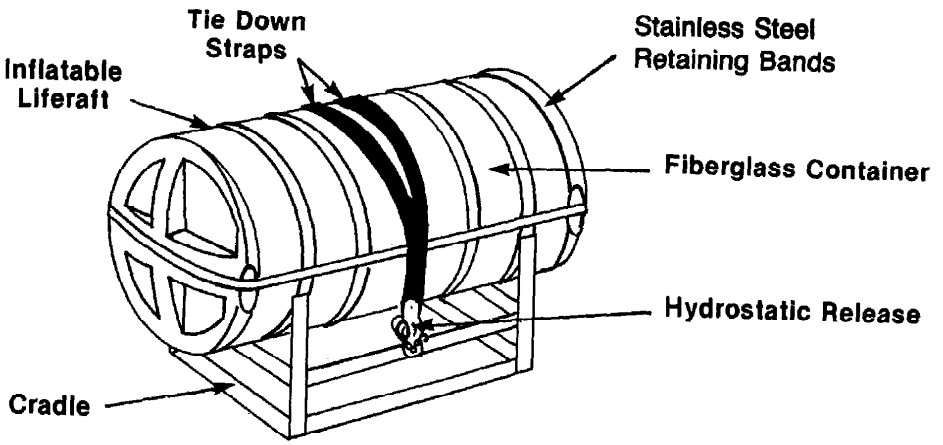
f. To use the raft, simply lift it from its cradle and throw it overboard. If the vessel has sunk, the raft will automatically float free.

g. Pull the line at one end of the liferaft to inflate.

h. Board the raft and see that the sea anchor has deployed and the operating lanyard parted. If they have not, carefully cut free the operating lanyard, and deploy the sea anchor.

The sincere hope is that you never find the need to use this information. If you do, however, rest assured that a great deal has been done to help you. The remainder is up to you. We hope this *"beforehand knowledge"* might serve you well.

Liferaft in Container



Liferaft in Stowed Position Aboard Ship

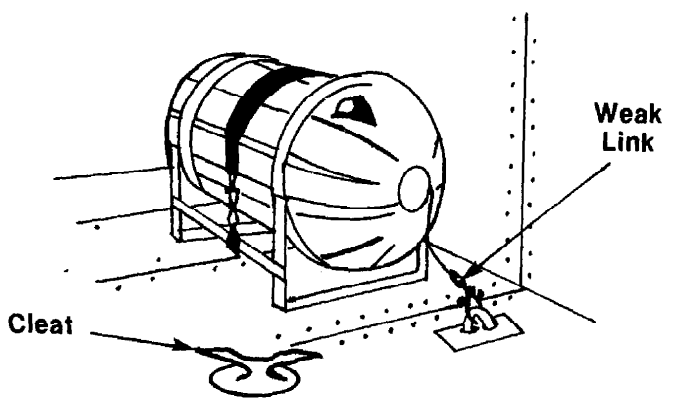
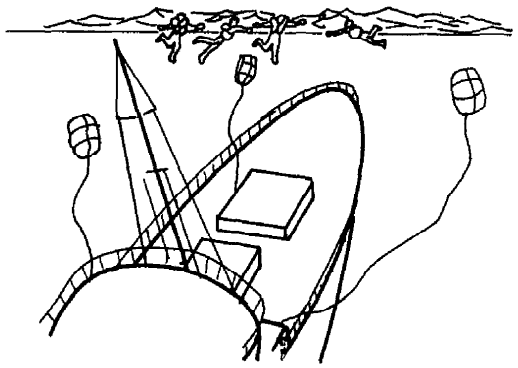
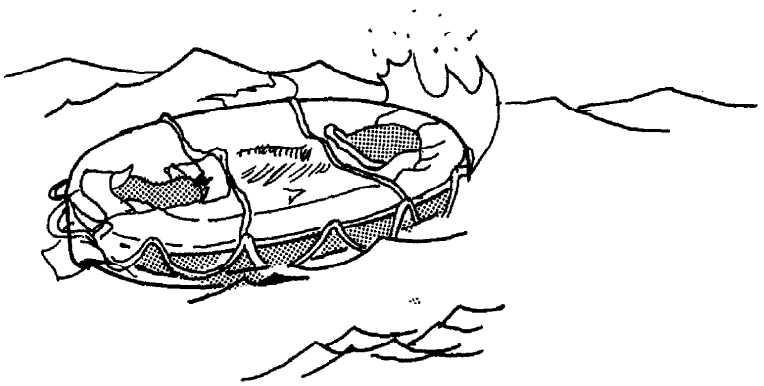


FIGURE 9-1

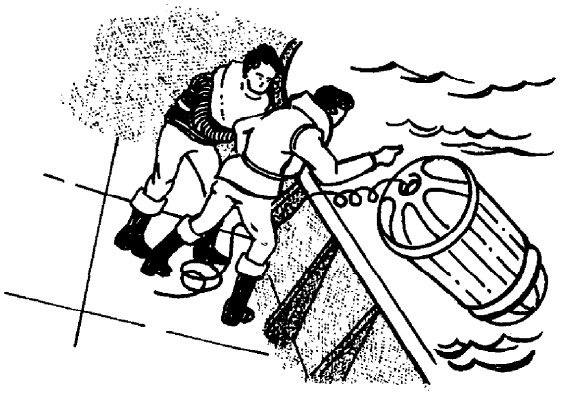


Liferafts Launched Automatically From Ship



Partially Inflated Liferaft Surfaces After Automatic Launch

FIGURE 9-2

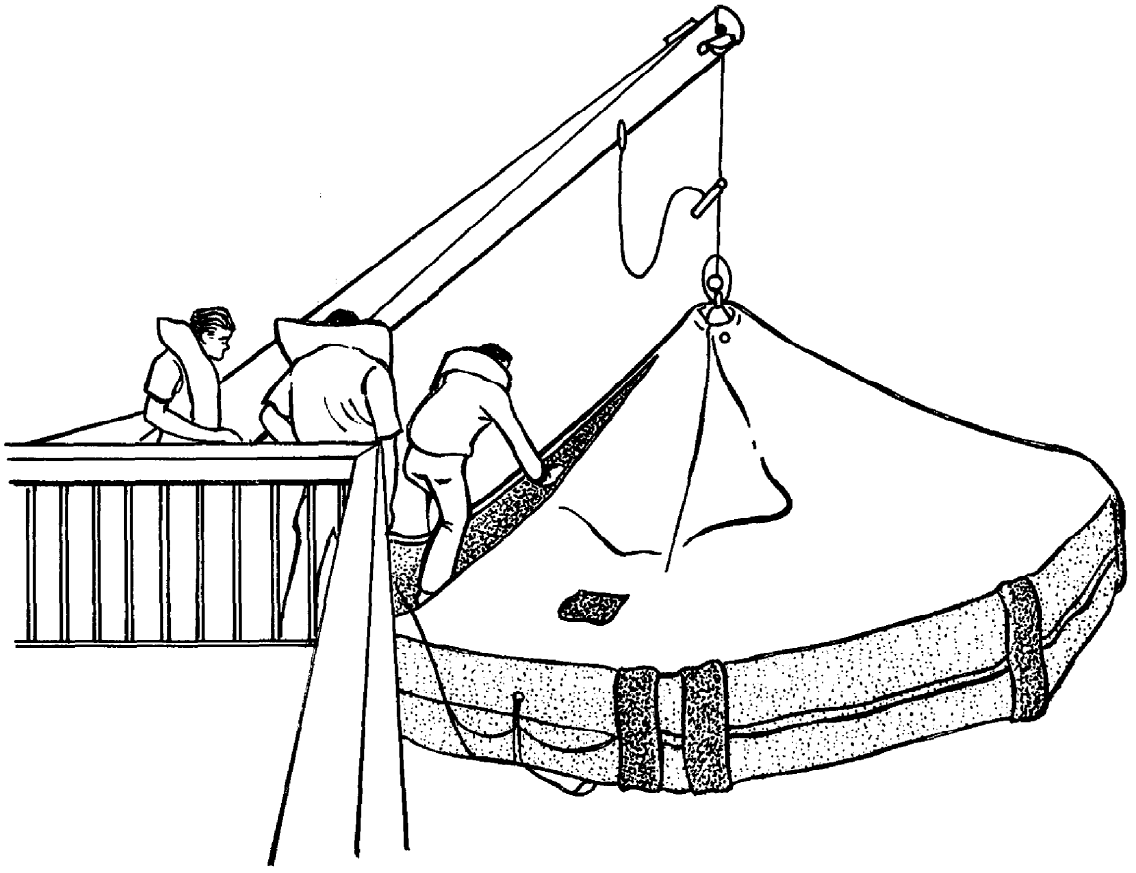


Manual Launching
Raft Tossed Overboard;
Painter Secured to Pad Eye

Manual Launching
Painter Fully Extended;
Sharp Pull Activates Inflation Device

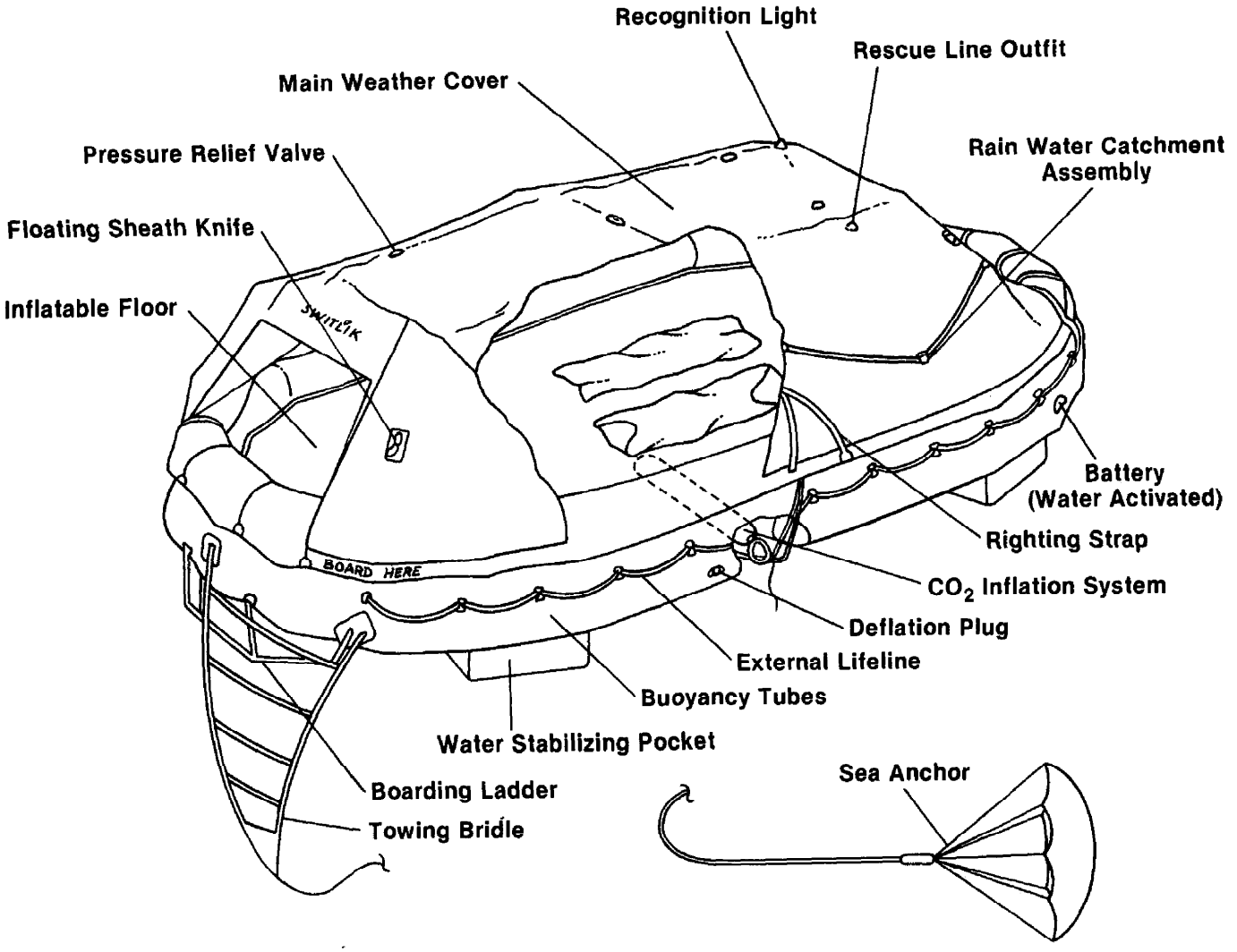
FIGURE 9-3

Some inflatable liferafts are davit launched from the ship's deck. The passengers and crew can board from the deck and be lowered to the water. This makes it possible for the passengers to board the raft dry. Davit launched rafts are sturdier than ordinary rafts, so they will hold the raft's full load while suspended from a davit.



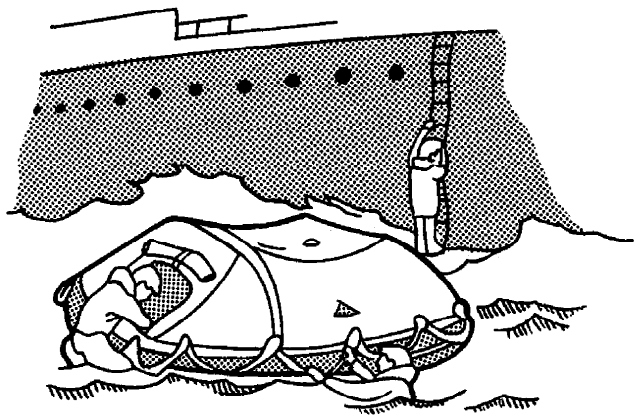
Davit Launched Raft

FIGURE 9-4



Switlik Inflated Liferaft

FIGURE 9-5



Boarding a Liferaft From the Sea

FIGURE 9-6

CHAPTER 10

SIGNALS AND LIFESAVING
(Lesson No. Nine)

10.1 EMERGENCY SIGNALS

Review Article 6.2 and one of the ship's station bills for the standard emergency signals adopted for all MSC civil service manned ships.

10.2 MAN OVERBOARD

Steps to be taken:

a. The bridge should be hailed, phoned or otherwise immediately notified of *"man overboard,"* indicating which side he fell over.

b. A ring buoy should be thrown over the side as soon as possible; at night it should be one with a water light attached.

c. The Deck Officer on watch, upon notification of man overboard, shall:

(1) Order the wheel put *"hard over"* towards the side that the man fell over.

(2) Stop the engines.

(3) Drop ring buoys over the side *(at least one with a water light, if at night).*

(4) Drop man-overboard signal marker. All MSC ships have one installed on each bridge wing. The man-overboard signal marker can be used during day or night since it is a smoke and a light signal. Other orange smoke distress signals and/or sea-dye markers also may be used during daylight.

(5) Illuminate the area and use searchlight at night.

(6) Station lookouts to keep the man in sight.

d. The *"man overboard"* signal shall be given--three long rings on the general alarm bells, announcement on the PA system in ships so equipped, followed by three more long rings on the general alarm bells *(international code signal **"O")***.

e. The emergency boat crew shall assemble at the emergency boat announced on the PA and appropriate lights should be turned on, if at night.

f. The First Officer takes charge of the launching of the emergency boat, usually #1 or #2 boat, while the Master, who has been called, takes charge on the bridge. Both emergency boats are readied for launching.

g. When the Master is certain that the ship is well clear of the man overboard, he shall utilize the appropriate methods of returning to the man in the water by:

(1) Backing to stop headway and lowering the emergency boat.

(2) Circling with engines full ahead to return and lower boat.

(3) Using the engines full ahead to gain way for the Williamson turn, returning on reciprocal course and slowing down as the ring buoy is approached and lowering boat. *(See COMSCINST 3120.2D for execution of the Williamson turn.)*

(4) Consideration must be given to the time interval between the casualty and the dropping of a ring buoy. A ship making 13.5 knots will travel a nautical mile in 4½ minutes. Therefore, the Master will want to proceed cautiously for a short time at a speed not too excessive to permit launching within seconds of the time the victim is sighted. The searchlight will be sweeping the area continuously at night and additional lookouts should be posted.

h. When the victim is sighted, the boat should be launched upon the order of the Master who is maneuvering into a position most advantageous to the boat crew but not close enough to the victim to endanger him.

i. During the period of maneuvering, the boat launching crew should have swung out the emergency boat, the boat should be manned and lowered to a safe distance above the sea ready for immediate launching.

j. The boat is directed to the man in the water by means of the radio whenever possible. Otherwise, the following whistle, blinker or flag signals are used:

(1) Turn to starboard - one

(2) Turn to port - two

(3) Dead ahead - three

(4) Towards ship - four

(5) Stand off, we are maneuvering - five or more blasts *(danger signal)*

k. If there is heavy sea, great care and experience is required in releasing the boat, and the boat commander must approach the victim cautiously so as to put him on the windward side of the boat for the rescue. If victim is on the lee side of the boat, there is a grave possibility that the boat will drift down on him.

l. When rescued, the victim should be wrapped in blankets to dry and warm him in order to avoid shock. Artificial respiration should be started immediately if the victim is unconscious.

m. Refer, also, to the Man Overboard Bill in the MSC Damage Control Manual.

10.3 DISTRESS SIGNALS *(See Figure 10-1)*

a. The following signals, used or exhibited either together or separately, indicate distress and need of assistance. The signals listed are specified in Annex IV, International Regulations for Preventing Collisions at Sea, 1972.

(1) A gun or other explosive signal fired at intervals of about a minute.

(2) A continuous sounding with any fog-signaling apparatus.

(3) Rockets or shells, throwing red stars fired one at a time at short intervals.

(4) A signal made by radiotelegraphy or by any other signaling method consisting of the group ... --- ... *(SOS)* in Morse Code.

(5) A signal sent by radiotelephony consisting of the spoken word **"Mayday."**

(6) The International Code Signal of distress indicated by **N.C.**

(7) A signal consisting of a square flag having above or below it a ball or anything resembling a ball.

(8) Flames on the vessel *(as from a burning tar barrel, oil barrel, etc.).*

(9) A rocket parachute flare or a hand flare showing a red light.

(10) A smoke signal giving off orange-colored smoke.

(11) Slowly and repeatedly raising and lowering arms outstretched to each side.

(12) The radiotelegraph alarm signal.

(13) The radiotelephone alarm signal.

(14) Signals transmitted by emergency position-indicating radio beacons.

(15) A piece of orange-colored canvas with either a black square and circle or other appropriate symbol *(for identification from the air).*

(16) A dye marker.

b. Although not listed, the national ensign flown inverted is another recognized distress signal.

c. In addition to distress signals given by a ship, the following lifeboat equipment may be used in the event that the ship was abandoned:

(1) Dye or sea marker is used to attract the attention of aircraft by spreading the brightly colored dye over the sea surface.

(2) Flashlights stowed in lifeboat can be used for short range blinker signaling.

(3) The lantern has sufficient oil for nine hours' service and may assist in attracting attention if the boats are close to a shipping lane.

(4) Signaling mirrors are used as a day signal to aircraft by reflecting the rays of sun towards the craft.

(5) Hand distress signals or flares are used to attract attention by their brilliant red lights.

(6) Orange-smoke signals, when ignited, throw a quick, orange-colored smoke which may attract the attention of passing aircraft or sea traffic in daytime.

(7) One of the best night signals is the parachute flare which is projected by a pistol to an altitude of about 300 feet.

(8) One or more of the emergency boats will have a radio installation or a battery radio by which SOS or other understood distress signals may be transmitted.

(9) Orange-colored sails assist in attracting attention in daylight.

(10) Motor lifeboats have a searchlight which is very effective in attracting attention at night.

(11) Hoisting a metallic object aloft, such as a bucket, will aid in earlier detection by radar-equipped vessels.

10.4 INTERNATIONAL LIFESAVING SIGNALS

International lifesaving signals are used by USCG and other lifesaving stations and maritime rescue units when communicating with ships or persons in distress and by ships or persons in distress when communicating with lifesaving stations and maritime rescue units. *(If in distress and not discovered immediately by the beach patrol, continue to make the distress signals specified in Article 10.3a.)* The international lifesaving signals will be found on Form CG 811, *"Lifesaving Signals, Helicopter Recovery Procedures, and Breeches Buoy Instructions,"* which prior to July 1988 was required to be posted in the pilothouse, engine room and crew's quarters of vessels. The new rule requires that Form CG 811 be readily available to the deck officer of the watch. *(Refer to Figures 10-2 through 10-6.)*

10.5 BREECHES BUOY *(See Figure 10-5)*

a. Use. The breeches buoy is used to rescue personnel from a ship which is grounded close enough to the shore to permit a shot line to be fired across it and a tailblock and hawser rigged in cases where the surf is too high to permit use of boats. It also may be used in rescue operations between two ships. In case of stranding on a shore where the surf is high, it is best to remain by the wreck until assistance arrives from a lifesaving station ashore, as long as possible.

b. Rigging

(1) A shot with a small line attached will be fired across the stranded ship. The line should be taken hold of as soon as possible, the end made fast and the line hauled onboard until a tailblock with a whip or endless line rove through it is reached. The tailblock should be hauled onboard as quickly as possible to prevent the line drifting off with the sea or fouling in wreckage.

(2) Attached to the tailblock will be a tally board with the following directions in English on one side and French on the other: *"Make the tail of the block fast to the lower mast, well up, or if the masts are gone, to the best place you can find. Cast off the small shot line, see that the line in the block runs free and show signal to the shore."*

(3) As soon as this signal is seen, a three-inch hawser will be bent onto the whip and hauled off to the ship by the lifesaving crew. If circumstances permit, the lifesaving crew should be assisted by manning that part of the whip to which the hawser is bent and hauling with them.

(4) When the end of the hawser is received onboard, a tally board will be found attached, bearing the following directions in English and French: *"Make this hawser fast about two feet above the tailblock, see that all is clear and that the line in the block runs free and show signal to the shore. Make sure that there are no turns of the whip line around the hawser before making the hawser fast."*

(5) When the hawser is made fast, the whip cast off from the hawser and the signal is seen by the lifesaving crew, they will haul the hawser taut and by means of the whip will haul off to the vessel a breeches buoy suspended from a traveler block running on the hawser.

c. Operation

(1) One person should get into the breeches buoy immediately, thrusting his legs through the breeches. Women, children and invalids should be sent ashore first.

(2) In signaling as directed in the foregoing instructions, if in the daytime, one man should separate himself from the rest and make a vertical motion with his arms or a white flag. At night, a vertical motion of a white light or flare.

(3) The empty buoy will be hauled back to the ship and the operation repeated until all personnel are off.

(4) The chances of success in landing all personnel safely will greatly depend upon coolness and attention to these instructions.

(5) The above procedure is similar to that employed in transferring personnel between two ships by the highline method.

d. Highline Transfer. MSC ships are equipped and crews are trained to conduct mercy and rescue missions using the highline transfer. Refer to the MSC Damage Control Manual for further information on the highline transfer.

10.6 EMERGENCY POSITION INDICATING RADIO BEACONS

a. In addition to the portable radio, each self-propelled vessel in ocean and coastwise service must have an approved Class A emergency position indicating radio beacon *(EPIRB)*.

b. There are different makes of EPIRBs. They all have the following in common:

(1) EPIRBs float. They are stowed outside, so they will float free if the ship sinks.

(2) They are small, approximately 6" thick and 1' - 3' long.

(3) They are easy to use.

(4) EPIRBs work on one-way automatic operation and cannot be used for two-way communications.

(5) They transmit a continuous two-tone *(HI/LO)* signal.

(6) If an EPIRB is floating nearby, try to catch it and tie it to the survival craft so it won't drift away.

c. EPIRBs are vital in distress situations where radio communications have not been or can not be established. Using the EPIRB is a simple, effective way to bring the Coast Guard to your aid during disasters at sea. Waiting until a vessel is reported *"overdue"* usually results in long, fruitless, frustrating and expensive searches. The number of *"saves"* and the marked reduction in search time clearly indicates the value of EPIRBs.

d. No emergency rescue/survival equipment is foolproof, and EPIRBs are no exception. Activating an EPIRB may not result in an immediate rescue. Much of survival and rescue depends on good judgment and using good quality and well-maintained equipment. Accidental activation must be avoided to assure availability of rescue forces and a fully charged battery for real distresses.

e. Just as visual distress signals must be seen, EPIRBs must be heard. There have been many rescues involving the use of EPIRBs. Commercial and private aircraft are not required to monitor Class "A" and "B" EPIRBs. Many do if they have a spare receiver, but around busy airports they generally monitor traffic control and/or company channels. Normally U.S. military and Coast Guard aircraft monitor, but their receiving range is limited by antenna height.

f. Distress frequencies used in Class "A" and "B" EPIRBs also are monitored by satellite *(SARSAT or COSPAS/SARSAT)* which greatly enhances the chances of rescue by providing an accurate location of the distress. The extreme altitude of the satellite also provides a broad area of coverage but due to its track path on the earth, it could be hours before the satellite receives the distress signal and relays information to search and rescue authorities. Class "C" EPIRBs <u>will not</u> be picked up by SARSAT; they operate alternately on channels 15 and 16 in the FM marine band and are intended for use within 20 miles of the coast.

g. There are three types or classes of EPIRBs. Class "A" and "B" EPIRBs transmit a swept tone signal on both aviation distress frequencies, 121.5 and 243.0 MHz.

(1) They are required to operate at least 48 hours in freezing water, and will operate much longer in warmer water, up to seven days in water of 70 degrees F.

(2)T heir signal is transmitted *"line of sight,"* will not follow the curvature of the earth, and can be interrupted by waves, hills and the like.

(3) Reception range to an aircraft under ideal conditions is about 200 miles at about 40,000 feet, and decreases as the height of the receiving antenna decreases.

(4) They are intended for use on vessels operating 20 or more miles offshore.

(5) They can be detected and located by the SARSAT satellite which will relay their positions to the appropriate Rescue Coordination Center.

(6) Class "A" EPIRBs are designed to float off the sinking vessel and automatically activate.

(7) Class "B" EPIRBs must be manually removed from their mounting bracket and manually activated.

h. Class "C" EPIRBs transmit a brief alerting signal on VHF-FM Channel 16 and then alternately a homing signal on Channel 15.

(1) Their range is about 20 miles depending on the height of the receiving antenna.

(2) The signals can be received by other vessels, Coast Guard stations and SAR units.

(3) These EPIRBs must be manually activated and transmit for 24 hours and then automatically shut off. They can be manually reactivated for additional transmissions.

(4) Class "C" EPIRBs are intended for use on coastal waters *(not more than 20 miles from shore)* and on inland waters.

i. Recommendations on operating EPIRBs:

(1) EPIRBs should be turned on and left on when used. A continuous transmission provides the best means for alerting, determining position and homing.

(2) Class A EPIRBs are provided with lanyards as required by Federal Communications Commission regulations. Some operators are incorrectly attaching these lanyards to the vessel.

(3) The lanyards on Class A EPIRBs are intended to be used to secure the EPIRB to a lifeboat, liferaft or person in the water after a casualty. Under no circumstances is the lanyard to be attached to the vessel. This can defeat the float-free operation of the EPIRB.

(4) EPIRBs operate best when floating with the top out of the water and the antenna vertical.

(5) In rough conditions, it is recommended that the EPIRB be operated inside the liferaft, even though this may reduce the range of the signal. Hold it upright, clear of the raft and do not touch the antenna. CAUTION: EPIRBs with water-activated switches must be kept in the water.

(6) When rescue units are near, use your visual distress signals, *(found in Rule 37 and Annex IV of the Navigation Rules)* so your position can be pinpointed. *(See Figure 10-1.)*

j. To test a Class "A" *(automatic)* or Class "B" *(manual)* EPIRB you will need the EPIRB, a small FM broadcast receiver *(small commercial radio)*, a bucket with enough water to activate the water activated switch if the EPIRB is so equipped, and a watch:

(1) Operate the battery test switch. Turn on the FM radio and tune it to 99.5 MHz. - Check the time. The full-power test can be made only during the International Distress Frequency test period *(00 to 05 the first five minutes of any hour)*.

(2) Before placing the EPIRB in the water, visually examine the sealing gasket. If the gasket is missing, torn or lose, do not conduct the emersion test because the EPIRB could fail.

(3) When the time is right, dunk the bottom of the class "A" *(automatic)* EPIRB into the water. For a class "B" *(manual)* EPIRB, just turn it on. Watch the indicator lamp and listen to the radio. **NOTE:** You cannot hear the EPIRB operating unless the radio is tuned to 99.5 MHz.

(4) If the EPIRB is operating properly, the indicator lamp will light and you will hear the EPIRB signal - an oscillating tone - on the radio. Pull the EPIRB out of the water - turn it off as soon as you hear the signal. This full power test must not last longer than one second or three audio sweeps.

(5) If you do not hear the signal on the radio, the EPIRB needs service. Perform this test each month and log the results in the ship's deck log.

10.7 PORTABLE RADIOS

a. The portable radio is a very important survival aid. Your chance of speedy rescue can be increased by knowing how to use a portable radio. All vessels on an international voyage have a portable radio set. The set is approved by the Federal Communications Commission.

b. Storage. The portable radio is kept in the chart room, radio room or other location, so it can be quickly moved to any lifeboat in an emergency.

c. Instructions. There are step by step instructions attached to the portable radio.

(1) You do not have to be a radio operator to transmit one-way, automatic signals.

(2) A person who knows Morse code can have two-way communications. You cannot use voice to communicate on the radio.

(3) Rig the radio antenna according to the instructions. A collapsible antenna is mounted on the top of the radio.

(4) The ground wire must be trailed in the water according to the instruction or the radio will not transmit.

(5) Most portable radios are powered by a hand-cranked generator inside the radio.

d. Signals Transmitted Automatically. When the radio is operating automatically, it will send out distress signals on 500 and 8364 kilohertz.

(1) Twelve four second dashes followed by 3 SOS groups are transmitted on 500 Khz.

(2) The twelve four second dashes are known as the auto alarm signal.

(3) They set off an alarm on a ship within range, if the radio operator on that ship has the auto alarm circuit working.

(4) The radio operator should have that circuit working if not on watch.

(5) The alarm tells the ship's crew that there is an emergency signal to listen to.

e. Silent Periods. Radio operators on ships will not transmit routine signals during the silent periods.

(1) Silent periods are observed on 500 Khz from 15 to 18 and 45 to 48 minutes past every hour.

(2) They will listen for distress signals. Make sure your portable radio is transmitting during these periods.

f. 8364 Khz. Three SOS groups and a 30 second long dash are transmitted on 8364 Khz. The 30 second long dash will help ships home in on the radio signal.

10.8 SUMMARY

Briefly summarize the above signals and procedures and review by means of appropriate oral review questions from Chapters 14 and 15. Note that lifesaving procedures are constantly being improved and that planes and helicopters are now playing an important role in rescue and mercy missions. Refer to the Mercy and Rescue Bill in the MSC Damage Control Manual.

DISTRESS SIGNALS
72 COLREGS

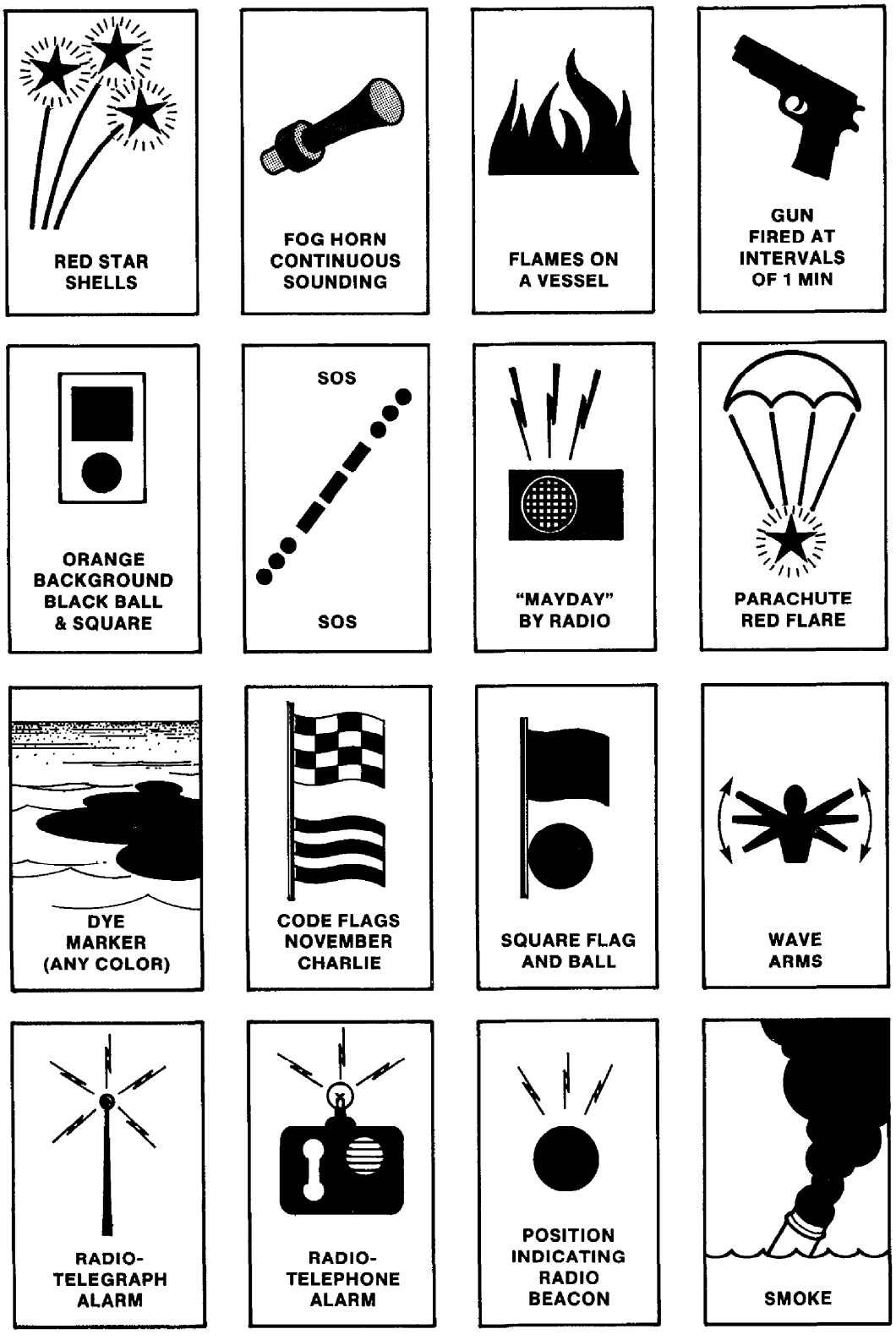


FIGURE 10-1

CHAPTER 11

ENCLOSED LIFEBOATS
(Lesson No. Ten)

11.1 GENERAL

a. The enclosed lifeboat has been a common lifesaving appliance aboard Scandinavian and Soviet merchant vessels for many years, but was unknown in the U.S. merchant marine until recently. In 1976, Military Sealift Command made U.S. flag history by obtaining a temporary approval from the Commandant, U.S. Coast Guard, to install four of these boats aboard the **USNS ARNOLD** for test and evaluation. Those tests proved satisfactory and the installation subsequently received U.S.C.G approval. The **ARNOLD** has since been deactivated and her lifeboats have been placed aboard the **USNS REDSTONE**.

b. The regulations for enclosed lifeboats require that they must be readily opened from both inside and outside, do not impede rapid embarkation or disembarkation or the launching or handling of the lifeboat. They must have embarkation arrangements that allow each lifeboat to be fully boarded in the stowage position, and be launched by gravity davit and winch systems, each of which is operated from the lifeboat, and which does not require any crew to remain onboard the vessel.

c. SOLAS CHAPTER III, 1983 Amendments -- In 1983, the Maritime Safety Committee of the International Maritime Organization *(IMO)* approved a complete revision of Chapter III of the International Convention for the Safety of Life at Sea *(SOLAS), "Lifesaving Appliances and Arrangements."*

d. The major changes for lifeboats on new ships begun on or after July 1, 1986 are summarized below:

(1) The enclosed lifeboat will give increased hypothermia protection to its occupants. Lifeboats on cargo vessels must be totally enclosed and be self-righting when unflooded. If capsized in a flooded or damaged condition, enclosed lifeboats must attain a position that gives an above water escape for their occupants.

(2) Lifeboats on passengers ships must be either totally enclosed or partially enclosed with rigid covers over bow and stern and a quickly deployable flexible cover in between. This compromise in the rules allowing partially enclosed lifeboats recognizes that totally enclosed boats can take longer to enter by untrained passengers.

(3) Lifeboats on ships carrying toxic cargoes must have a self-contained air supply system for the engine and crew.

(4) Lifeboats on ships carrying flammable cargoes must have a self-contained air supply system for the engine and crew and an external sprinkler system to permit the boat to proceed through the water during a fire.

(5) Lifeboats are required to have a release mechanism that unlocks when the boat enters the water but that can also be released before the boat is waterborne by activating a protected safety lock.

(6) All lifeboats must be motor lifeboats.

11.2 CONSTRUCTION *(See Figure 11-1)*

a. The general construction requirements for enclosed lifeboats are the same as for open lifeboats. Previous chapters of this **LIFEBOAT TRAINING GUIDE** provide the details for hull materials, releasing gear and other required equipment.

b. Davits for enclosed lifeboats provide for lowering from within the lifeboat. Many enclosed lifeboats are lowered by gravity-pivot or trackway davits. The Miranda davit is described in section 11.3 of this chapter.

c. External fire protection is achieved by means of a water pump driven off the main engine furnishing water to the hull, cover and dome via water jets strategically placed to give water coverage to the cover, dome and exposed portion of the hull. The sprinkler system can be activated once the lifeboat motor is started and the boat is waterborne. The operating control for the sprinkler pump is located at the helmsman's position. This system is required for lifeboats on new ships begun on or after 1 July 1986 which carry flammable cargoes.

d. A compressed air system is provided to supply air for the passengers and diesel engine when the boat is operating through fire or poisonous gas environment. A regulator is provided to control the rate of discharge of air into the boat such that more air is released than is used by the engine to prevent ingress of noxious fumes, smoke, etc. This system is required for lifeboats on new ships begun on or after 1 July 1986 which carry toxic or flammable cargoes.

e. Each person in the boat is provided with seat belts and must be securely strapped in at each seat position.

f. For an enclosed lifeboat launched by a Miranda davit, the bow and stern launching pendants that support the boat in the cradle act as a bow and stern painters when the boat is in the water and before it has been released. There is a painter stowed inside the bow of the boat but it is not required during the launch sequence. When the boat returns to the ship for recovery, the bow and stern recovery pendants act as bow and stern painters while the boat is afloat prior to hoisting.

g. In the event of motor failure, openings have been provided in the rigid enclosure so that oars may be inserted from the outside. When these openings are not being used for oars they may be left open or an adapter plate may be inserted to seal them closed as might be required during rough weather or launching into a burning oil seaway. When not in use the oars for the boat are tied to the top of the rigid house.

h. An antenna mounting plate has been provided on the top of the rigid house so that the emergency lifeboat radio antenna can be rigged when necessary.

i. A fall-away boat gripe has been designed for the Miranda davit so that it does not have to be manually released before lowering the boat. The gripe normally maintains tension and holds the boat firmly to the ship when the boat is in the stowed position. A hook is mounted on the keel amidship and the gripe ring is positioned over this hook. When in the stowed position the gripe pulls the keel inboard tightly. When the loaded boat begins descent from the stowed position the gripe falls off and releases the boat to run freely down the track. This is an important design feature which holds the boat securely in place during loading.

j. The propulsion unit is a marine diesel engine. It is approved by the USCG for hand cranking; hydraulic or electric starting is provided for convenience. The engine is cooled by a closed circuit keel cooler which allows the engine to be started and run out of the water while hanging in the davits. The fully loaded speed is approximately 6.5 knots.

11.3 MIRANDA BOAT DAVIT SYSTEM *(See Figure 11-2)*

a. In October 1975 leading manufacturers of lifesaving equipment, in conjunction with the British Department of Trade, carried out extensive and successful sea trials of a prototype launch/recovery system aboard the fishery support ship MIRANDA.

b. The MIRANDA davit, named after that fishery support vessel, is the result of years of experience in the development of davit systems. The MIRANDA system comprises fixed davit arms and trackways, winch, motor and a survival craft in its own

launch/recovery cradle rather than the more traditional moving davit arm. The lifeboat is attached to the cradle by launching pendants of wire rope at the bow and stern. Two single wire boat falls lead from the boat winch to the forward and aft boat cradle arms instead of the doubled fall traveling block assembly more common to the open lifeboat. The craft is stowed at the embarkation deck position in its cradle. It is this cradle which is lowered down the trackways, down the side of the parent vessel and finally separating from the lifeboat when it becomes waterborne. The cradle with its rollers thus provides protection for the boat when it is being lowered, rendering it unnecessary to turn the craft out clear of the ship's side. This eliminates the need for a davit which turns from the inboard to the outboard position and all the maintenance which comes with that type of equipment. Once the cradle lowers past the boat deck it continues to protect the boat as it passes down the side of the ship.

c. The wire falls fairlead over the rounded knuckle at the deck edge. The resultant angle of the fall tends to pull the lifeboat into the side of the vessel during lowering especially under small angles of listing by the parent vessel. This feature has the effect of reducing or eliminating the tendency of the boat swing away from the ship when the ship is working in a seaway. This is a distinct advantage over the old open boat system where the boat could always be counted on to swing wildly and hit the side of the ship unless bow and stern tenders were positioned to dampen the impact.

d. In addition to the protection it affords the survival craft during launch and recovery, the MIRANDA system has the following advantages:

(1) The craft can be launched with the parent vessel in a 30 degree high or low side list accompanied by 15 degree trim either fore or aft. This exceeds international maritime regulations for new ships begun on or after July 1, 1986 which require that a davit work with a 20 degree list.

(2) The cradle allows personnel to be loaded while the boat is in a fully stowed position. The launching is controlled by the boat commander from within the craft. The brake control wire for lowering the boat leads from the boat via the fixed davit arm down to the brake handle of the winch on deck. A small drum attached to the shaft of the main winch drum adjusts the length of the brake control wire so that it is always in reach of the personnel in the lifeboat regardless of the position of the boat during the lowering cycle. A downward pull on the brake control wire has the effect of raising the winch arm on the davit winch thereby relaxing the winch brake. Releasing the brake control wire lowers the winch brake thus stopping the descent.

(3) Other than the rollers on the cradle, the MIRANDA system has very few moving parts. The rollers enable the cradle, with the craft mounted in it, to move down the trackways, over the side of the ship and into the water.

(4) The boat's gripe automatically disengages as the boat moves down the trackways. *(See figure 11.3.)*

(5) The boat is disengaged from the cradle and launching pendants by actuating the release lever inside the boat. The lever releases both ends simultaneously whether or not there is a load on the hooks. Release gears conforming to 1983 SOLAS amendments have a hydrostatic interlock preventing operation before becoming waterborne. In the unlikely event of the hydrostatic interlock not working, an overriding lever is incorporated into the mechanism, which, when activated allows the lifting hooks to be opened.

(6) Because of the reduced number of moving parts, the maintenance required to keep these systems in first-class working order is less than that needed for conventional davit systems.

(7) Since the craft is protected by the cradle, the lifeboats can be launched while the parent vessel still has some way on, before coming to a complete stop. Launching thus does not require the vessel to be dead in the water.

(8) Recovery of the craft is simple and quick *(3 minutes or less, depending on the condition of the seas)*. Hook-up is made by engaging a lightweight snap hook on the recovery pendant to the falls above the cradle; the other end of the pendant is placed into the release hooks. The recovery crew on the ship insures that the boat cradle has been lowered enough so that it is hanging well below the surface of the sea and the hull of the lifeboat. When the lifeboat comes along side the ship the bow and stern tenders snap the safety hook on the recovery pendants to the boat falls. The lifeboat is now ready for hoisting. *(See figure 11-5.)*

(9) On hoisting, the snap hooks slide down the fall and become fixed on the head of the cradle. The boat is thus guided back into the cradle, and hoisting back to the embarkation deck is achieved. The transfer of the boat from the recovery pendants back to the launching pendants on the ends of the cradle is made at the davit head in a quick and simple procedure. A hanging off jib and pendant is provided on the forward and aft fixed davit. The hanging off pendant is first attached to the release gear assembly at each end of the lifeboat and the boat is then lowered slightly until both hanging off pendants are supporting the weight of the boat. The recovery pendant is then removed from each end of the boat and the regular launching pendant is reattached from the cradle. The boat is then raised to its final position and proper tension is applied to the gripes. The hanging off pendants are then removed and restowed inside the bow and stern of the lifeboat.

(10) The launch/recovery winch includes a centrifugal brake to maintain a constant lowering speed on 120 feet per minute when the craft is fully laden. *(This speed can be increased to accommodate changes in regulations.)* The main *"fail safe"* holding brake, which is operated from within the craft, can be used to stop descent of the craft at any point; simply release the brake control wire. Lowering is resumed when the wire is again pulled. This feature enables the release of the craft at the most opportune moment in the prevailing sea conditions and immediately steer away from the danger area at maximum speed.

(11) For shipyards, the big advantage is the ease of installation of the simple MIRANDA davit.

e. One of the most important features of the new davit is the fact that a MIRANDA operation does not require that any crewmembers remain on deck, descending later to the boat via a ladder or manrope. In an emergency, all personnel can exit the ship in the lifeboat together.

11.4 OPERATIONS

a. Lowering

(1) Once the crew has mustered and the order to abandon ship has been given, the debarkation ladder should be lowered over the side and the boat should be boarded. The boat is loaded from the stowed position.

(2) As each person enters the boat a seat is selected and the seat belt is securely fastened.

(3) The boat commander selects the seat that allows control of the brake control wire.

(4) If the ship is on fire or if fuel is burning in the water the entry doors to the lifeboat should be tightly closed and the compressed air supply activated.

(5) Boat lowering occurs when the boat commander pulls down on the brake control wire. The boat gripe is designed to fall away as the boat travels downward. No crewmember remains on deck to operate the winch since boat lowering is controlled from inside the boat being lowered. During drills, the lifeboat winch is manned during recovery. Once descent begins, lowering may be stopped by releasing the brake control wire. Pulling on the brake control wire resumes lowering. *(See figure 11-4.)*

(6) As the boat descends down the trackways the lifeboat motor should be started. The engine is equipped with a closed circuit keel cooler that provides cooling water to the engine at all times. When the boat is in the water the circulation of water through the keel cooler dissipates the heat to the sea water flowing past the cooling coils affixed to the boat hull. It takes approximately five minutes for the fresh water in the keel cooler to come up to operating temperature.

(7) When the boat is waterborne the boat commander continues lowering the cradle until the top of the cradle is even with the lifeboat deck. The bow and stern fall pendants functions as sea painters until such time as the cradle separates from the lifeboat.

(8) If external fire protection is needed, the sprinkler system should be activated at the helmsman's position. The engine driven water pump will take suction and provide water from jets strategically placed to give water to the cover, dome and exposed portion of the hull.

(9) When ready to get underway, the boat commander orders the release lever inside the boat operated. The action of the lever opens the release gear hooks which will release each end of the boat simultaneously whether or not there is load on the hooks. The boat is now free to maneuver away from the side of the ship.

(10) In the event of engine failure, oars are provided for propulsion. The oars are unlashed and fitted into the openings along the gunwale of the enclosed lifeboat.

b. Recovery *(See figure 11-5.)*

(1) Lifeboat recovery requires a winchman on deck.

(2) In preparation for recovery, the boat commander orders the release lever inside the boat to its secured position and fastened by the safety toggle pin. The release gear hooks are checked to see that they are closed and locked.

(3) The bow and stern tenders are directed to break out the recovery pendants and latch the long link end of the recovery pendant to the release gear hook, bow and stern. A preventer bar at the mouth of each release hook keeps the long link engaged in the hook so that the link will not drop out when the recovery pendants are slack.

(4) The bow and stern tenders hold the snap hook end of the pendants in preparation for hooking onto the wire rope fall.

(5) With the cradle below water level the boat commander directs the boat into position. The bow and stern tenders now secure the free snap hook end of the recovery

pendants onto the wire rope fall above the cradle. The recovery pendants slide up and down the wire rope fall without the sudden jolt common to recovery with other davits when the swell drops and the release hooks assume the load of the boat.

(6) Hoisting commences when the lifeboat winch is engaged by the winchman on deck. As the cradle raises out of the water the recovery pendant snap hook bears down against the head of the cradle. The boat is thus guided back into the cradle, and hoisting back to the embarkation deck is achieved.

(7) Personnel are disembarked as soon as the boat reaches deck level. Hoisting an empty boat from the deck to the stowed position is the safest method of recovery. Hoisting is continued until the limit marks on the davit trackway line up with the limit marks on the boat cradle.

c. Restowing the Boat

(1) The bow and stern tenders are directed to attach the hanging off pendants to the release gear assembly and insert the securing pins. *(See Figure 11.6.)*

(2) The boat is then lowered until the weight of the boat is suspended on the hanging off pendants.

(3) The recovery pendants are then removed at each end of the lifeboat.

(4) The launching pendants leading from the boat cradle are now attached to the releasing gear hooks at each end of the lifeboat.

(5) The boat is hoisted upward to transfer the weight of the boat to the launching pendant and slacken the hanging off pendant. The hanging off pendants are removed from the release gear assembly and the hanging off jib is secured in the upright position.

(6) The boat is moved up or down as necessary to return it to the final stowed position with the proper tension on the keel gripes.

(7) The stowed boat is ready for launching.

11.5 PRECAUTIONS

a. The ship's crew must not modify the lifeboat or davit systems. The U.S.C.G. approval applies to the specific configuration as delivered from the manufacturer. As with any new system, there is a tendency to handle the new equipment in a manner common to a former system. The installation of boat gripes typical to open boats or the use of tricing pendants is neither practical or safe.

b. The boat is designed to be loaded in the stowed position. Do not attempt to lower the boat to the main deck level for embarkation as is required for open lifeboat systems.

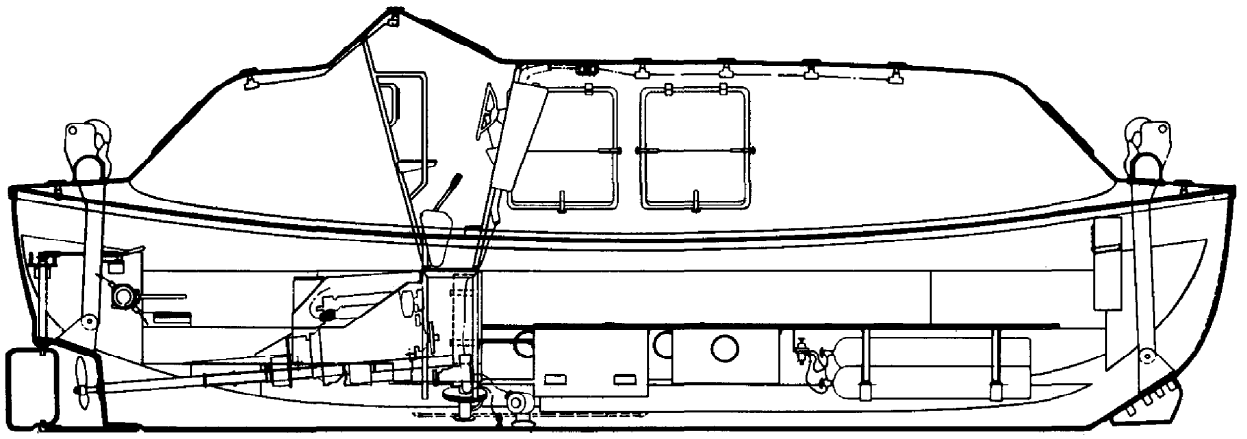
c. All persons in an enclosed lifeboat must remain seated with their seat belts securely fastened during launch and operation of the boat. An attempt to *"hang on"* rather than having the belts fastened risks possible injury and creates instability should a roll cause the passenger load to shift. The boat is designed to be self-righting but in at least three marine casualties, totally enclosed lifeboats have capsized.

d. As the descending lifeboat crosses the rounded knuckle at the deck edge of the vessel, the lifeboat will rock. Persons not familiar with the Miranda davit should be cautioned that the motion of the boat over the knuckle is normal and not to be alarmed.

e. The MIRANDA davit system should be exercised frequently. Periodic lowering of the boat insures that the winch and fairlead rollers are free and ready for actual use. A regular maintenance schedule should be followed for the grease fittings on the cradle rollers, winch and fairleads to keep the system in optimum condition.

f. The USCG regulation that requires lifeboats to be lowered to the water at least once in each 3 months is the same for fully enclosed lifeboats as it is for open lifeboats. The crew should be exercised in handling the boats under oars as often as possible to maintain proficiency in what may be a new procedure to many.

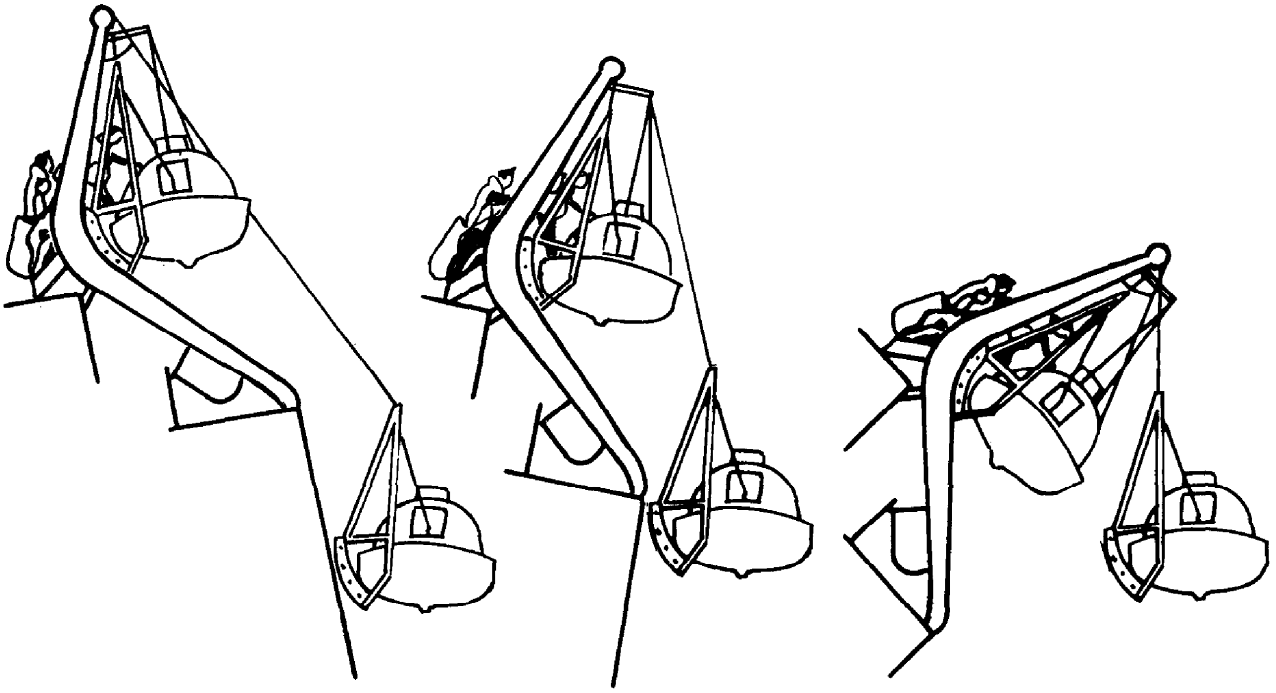
g. MSC enclosed lifeboats installed prior to 1986 are fitted with standard Rottmer type releasing gear. Many enclosed lifeboats constructed prior to 1986 were fitted with Viking on-load releasing gear. The Viking on-load release gear consists of an upsetting hook which releases the falls in a manner similar to the Rottmer gear. However, unlike the Rottmer gear which uses a rotating collar to hold the foot of the hook in place until release, the Viking gear hook is held in place by stainless steel cables that run through a series of cable guides inside the boat to release the control mechanism. A complete visual examination of the Viking on-load release gears must be conducted as part of the annual stripping, cleaning and overhaul of the lifeboat. Refer to U.S. Coast Guard Navigation and Vessel Inspection Circular Number 1-80 for complete details on the extent of the examination. *(See Figure 11-7.)*



INTERIOR LAYOUT OF A TOTALLY ENCLOSED LIFEBOAT

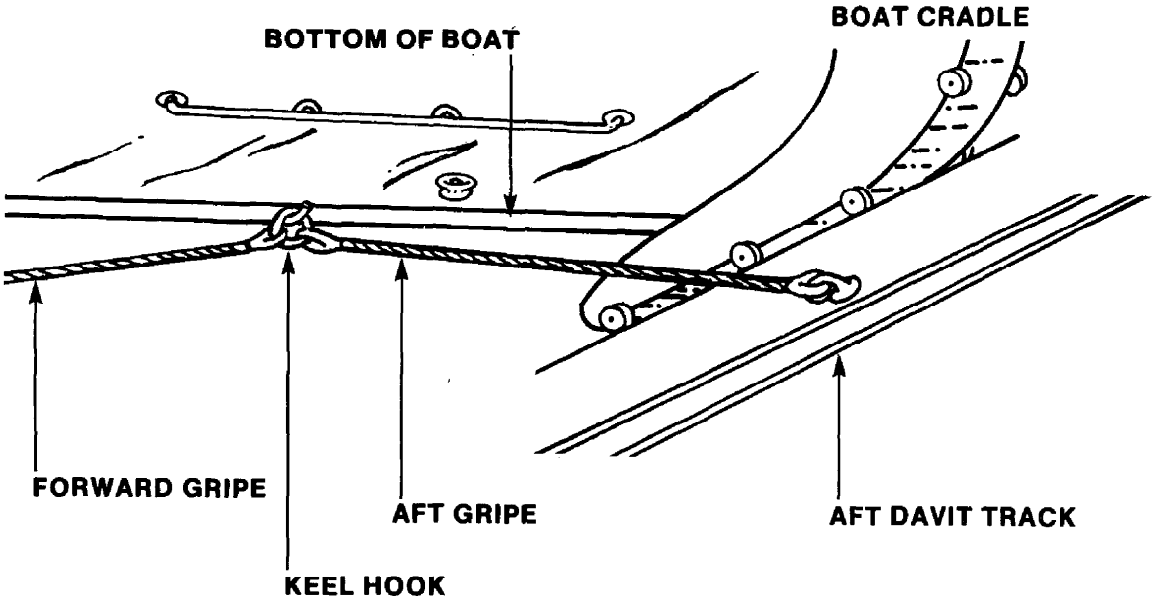
(Compliments of Watercraft America, Inc.)

FIGURE 11-1



EMBARKATION AND LAUNCH

FIGURE 11-2

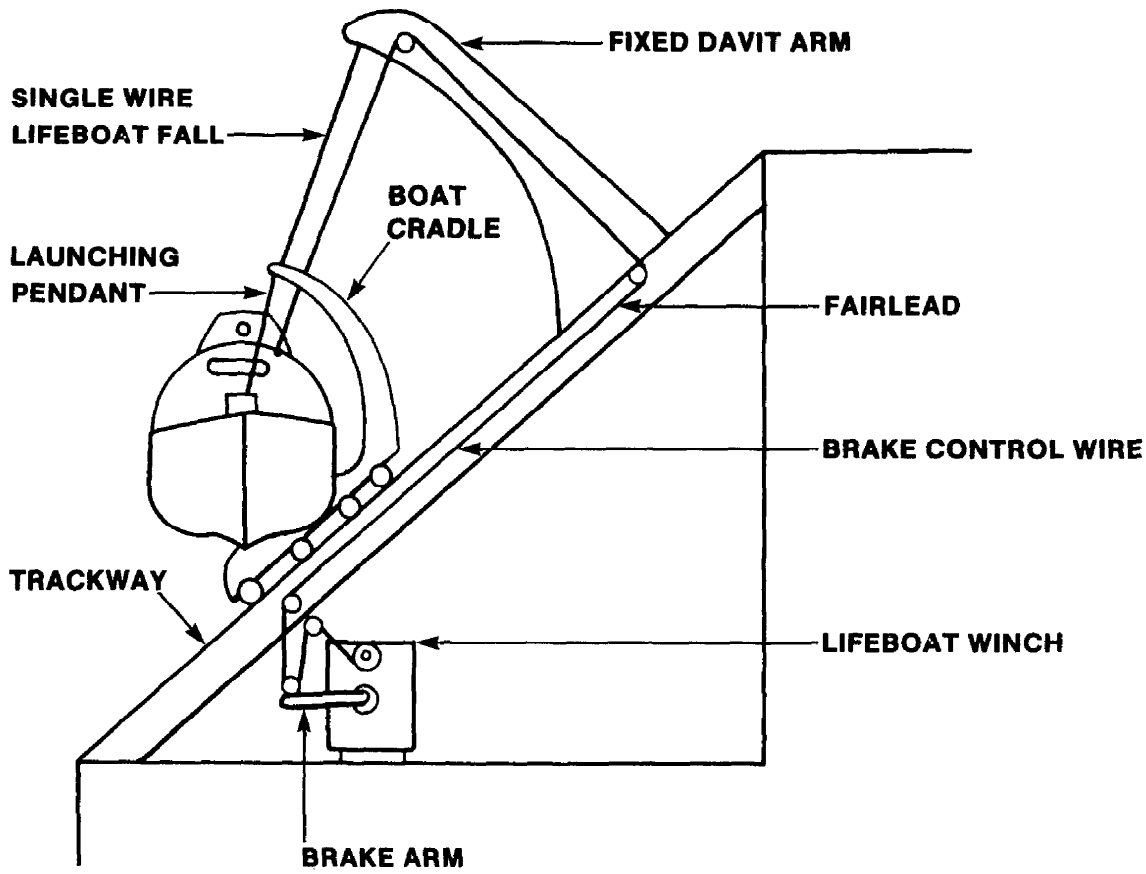


DETAILS OF FALL-AWAY BOAT GRIPE SYSTEM

(LOOKING OUTBOARD)

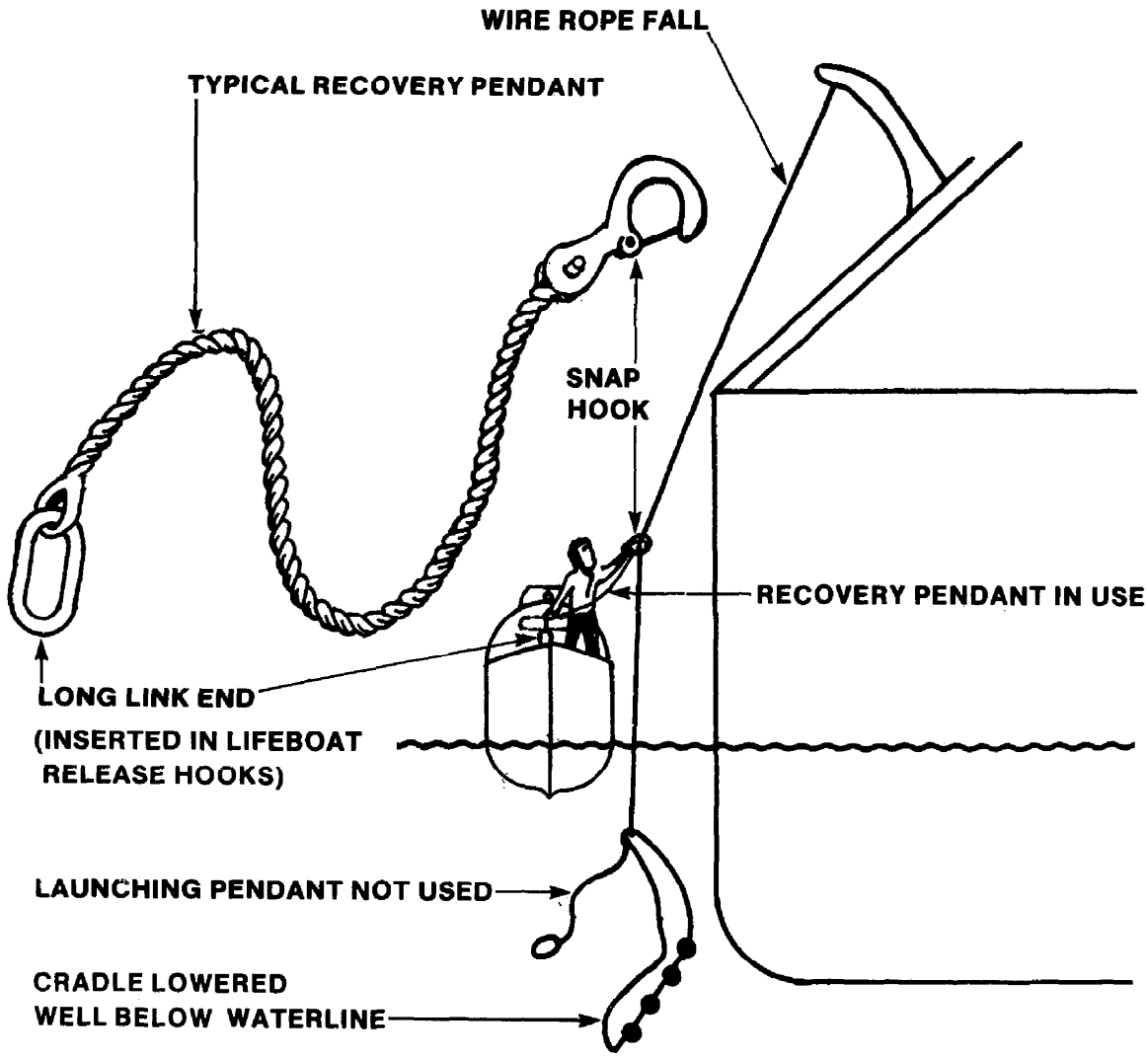
The picture above shows the boat snugged in tightly while in the stowed position. As the boat starts to run down the davit track the gripe ring will fall off of the keel hook automatically.

FIGURE 11-3



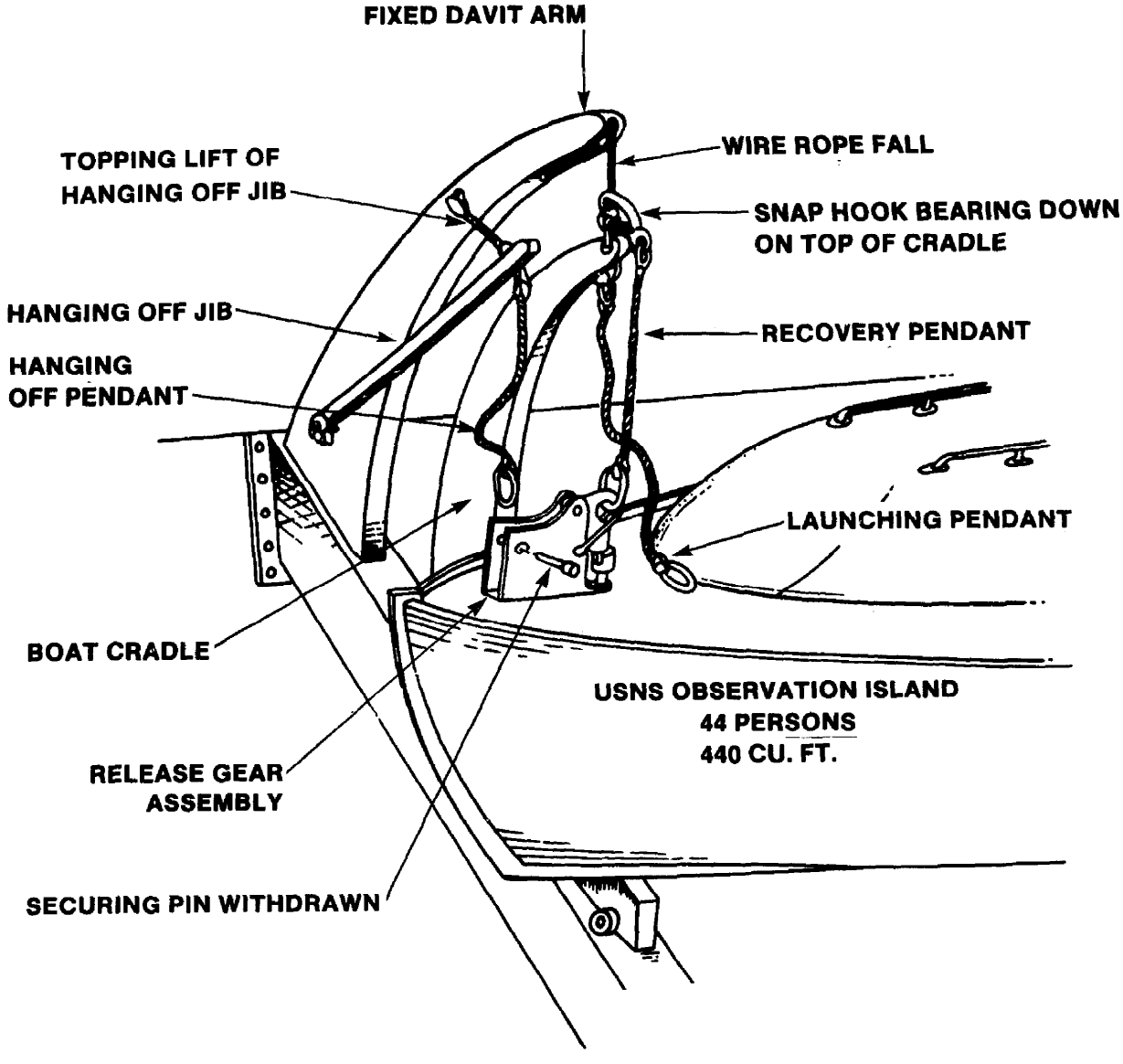
TYPICAL ARRANGEMENT FOR LIFEBOAT WITH LAUNCHING PENDANT

FIGURE 11-4



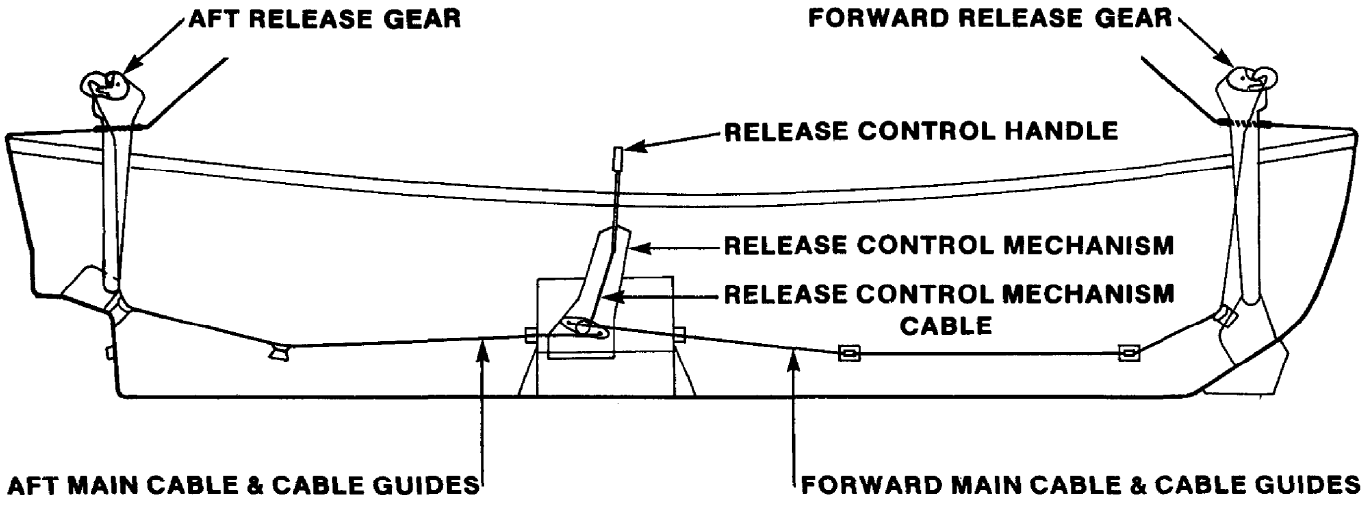
USING THE RECOVERY PENDANT DURING HOOK-ON

FIGURE 11-5



THE HANGING OFF PENDANT

FIGURE 11-6



VIKING ON-LOAD RELEASE GEAR

TYPICAL INSTALLATION IN ENCLOSED LIFEBOAT

FIGURE 11-7

CHAPTER 12

EXPOSURE *(SURVIVAL)* SUITS
(Lesson No. Eleven)

12.1 OVERVIEW

a. History. The complex nature of the sea has been a subject of human pondering since the dawn of civilization. Years of experience and volumes written do not fully portray the behavior and challenges that are the sea.

b. Early in the 20th century lifeboats were used on ships to reduce the number of lives lost at sea. Each subsequent maritime tragedy has yielded conclusions that identify new or expanded safety regulations, the result being a safer environment for those who sail on ships.

c. We have recognized of late that people are not simply *"lost"* at sea. Nor do people simply drown at sea. Many who, perhaps through great strife, manage to get off a sinking ship in good personal shape do not survive. Many lifeless seafarers are found still buoyant in their lifejackets.

d. Many of these men died from a condition call hypothermia. Hypothermia is a condition in which the main and auxiliary systems of one's body are cooled to the point of death. Its onset is rapid and results uniform to the unprotected, in cold water. In the chilly waters found off much of the commercial trade routes of the world, survival times are often estimated in terms of minutes.

e. Official sources have identified and hypothesized that at least some or probably many of the following recent marine disaster deaths were caused by hypothermia:

(1) **M/V MARYLAND**	12/81/81	6 Lost	1 survivor
(2) **M/V COMET**	05/19/83	4 Missing	11 survivors

(3) **S/T CHESTER A. POLING**	01/10/77	1 Lost	6 survivors
(4) **SS EDMOND FITZGERALD**	11/10/79	29 Lost	
(5) Drill Rig **OCEAN RANGER**	02/15/82	84 Lost	
(6) **SS MARINE ELECTRIC**	02/12/83	31 Lost	3 survivors

The purpose of exposure suits is to prevent hypothermia through the use of closed-cell foam insulation and watertight integrity of the suit.

12.2 U.S. COAST GUARD REQUIREMENTS

a. U.S. Coast Guard approved exposure suits, unlike some foreign models of *"immersion suits,"* are intended to be worn instead of a life preserver. The suits provide flotation as well as warmth. In spite of this, some vessel personnel have the mistaken impression that a life preserver should be worn over the exposure suit. This is not practical.

b. Before the adoption of the latest amendments to the International Convention for Safety of Life at Sea *(SOLAS 74)*, several nations were developing separate philosophies for garments variously referred to as *"survival suits," "immersion suits,"* and *"exposure suits."* Some of these suits were merely dry suits with no insulation or flotation, intended to enhance the value of warm clothing worn underneath, and requiring a life preserver to provide flotation. Some were insulated but did not provide enough flotation. Some provided flotation but not insulation. The United States took the position that seamen should have a single garment which, in one piece, would provide all the protection needed. The extra time required to don layers of clothing or ancillary devices to complete the outfit could well cost a life.

c. As a result, the SOLAS amendments effective in 1986 speak of *"immersion suits"* which may be insulated and/or non-buoyant. This was a compromise in the treaty to accommodate the suits already approved in other countries for use onboard their vessels. The United States approves only insulated, buoyant immersion suits as the exposure suits for use on our vessels and mobile offshore drilling units. The USCG requirements for exposure suits applies to ocean going ships except those operating between 32 degrees North and 32 degrees South latitude in the Atlantic Ocean or 35 degrees North and 35 degrees South latitude in all other waters.

d. Present designs of exposure suits will not turn an unconscious wearer face up in the water because the arms, being buoyant, act as out riggers to make the suit equally stable either face up or face down. The suits are tested to ensure that a conscious wearer

can turn from a face-down to a face-up position within five seconds. The foam material which provides insulation in the arms also is buoyant, so it will be difficult to design a suit which will right an unconscious wearer. Until some manufacturer solves this design problem, the SOLAS Convention will continue to require that traditional life preservers be carried in addition to exposure suits.

e. Except for operations in tropical waters, crewmembers should get into the habit of wearing exposure suits routinely for abandon ship drills. Any time the water is below 60 degrees F, you will be in grave danger if you find yourself in the water without an exposure suit. On some warm day, call the engine room and ask the engineer on watch what the sea water temperature is, according to the temperature gauge on one of the sea chest intakes. You may be surprised.

f. There may be emergency situations, such as firefighting, in which the exposure suit hampers your mobility too much. This is a judgment call you will have to make based on the circumstances and your experience with exposure suits. Bringing an exposure suit to the scene to change into if the damage control situation deteriorates into abandonment is a good idea, but it has some drawbacks. Once you make the decision to abandon ship, you may not have time or a safe place in which to remove the life preserver and put on the exposure suit. One solution to this problem is the thermal protective aids required in the lifeboat as a result of the revised SOLAS Chapter III. Between 1986 and 1991 the regulations pertaining to lifesaving equipment will be revised to require thermal protective aids in lifeboats, inflatable liferafts and rescue boats. These devices can be donned over a life jacket in the cramped quarters of the lifeboat and will provide insulation only. Most of the crew, wearing exposure suits, could proceed to the lifeboats while the emergency squad fights the fire or performs other damage control. When and if the emergency squad gives up the ship, they can join the rest of the crew in the lifeboat and don a thermal protective aid.

g. Another common misconception is that exposure suits are fireproof. The flame exposure approval test for suits manufactured after July 1, 1986 involves suspending the suit over a pan of burning gasoline for 2 seconds, then remove the suit from the fire. The suit must prevent sustained burning or continued melting after it is totally enveloped in fire. Suits manufactured before July 1, 1986 were not designed to self-extinguish when exposed to fire and may continue to melt and burn slowly until totally consumed. For this reason, the suit should not be worn as part of the *"fireman's outfit."*

12.3 STANDARDIZATION CONSIDERATIONS

a. Review of the U.S. Coast Guard regulation *(46 CFR 160.171)* reveals considerable latitude in the design and manufacture of exposure suits. Each manufacturer offers features only found on suits from their company. Some of the differences in the many suit types are:

(1) Some suits have detachable gloves.

(2) Some suits have *"buddy lines"* to help keep crewmembers together.

(3) Some suits have lifting harnesses.

(4) Some suits have ankle tighteners to help fit the suit to the body for better mobility.

(5) Some suits have detachable flotation collars.

b. Regardless of the manufacture, all suits will be approved by the U.S. Coast Guard and periodically undergo inspection during the USCG vessel inspection.

c. It is MSC policy to have one type of suit on each ship. When purchasing replacement or additional suits, the new suits should match the suits already onboard. Uniformity of equipment provides standardization for training and familiarity with the suit.

12.4 CONSTRUCTION AND PERFORMANCE OF THE SUITS

a. Basic Features

(1) Sizing Considerations. The suits come in three sizes: Adult Universal, Child, and Oversize Adult. The child size suit also is appropriate for small adults up to 110 lbs. and 59 inches tall, including women in this range. Oversize Adult suits fit persons more than 330 lbs or 75 in. tall. Ships are required to have enough suits of the proper size to fit all persons onboard.

(2) Flame Retardancy. Suits manufactured prior to 1986 will melt and burn slowly until consumed. It does not self extinguish. It is not built to be impervious to fire. On July 1, 1986, the SOLAS requirement for self-extinguishment entered into force and the USCG regulations reflect the new standard.

(3) Righting. Current designs of suits will not turn an unconscious wearer face up in the water. The suits are tested to ensure that a conscious wearer can turn from a face-down to a face-up position within five seconds.

(4) Thermal Protection. Your suit is built to hold body heat loss to 2^{o}C in a period of six hours in water of 0^{o}C.

(5) Ease of Donning. Your USCG approved suit must be capable of being put on within one minute.

(6) Means of Attracting Attention. Your suit will be colored international orange with retroreflective material on the head and shoulder areas and be provided with a whistle and light.

(7) User Visibility. When properly clothed in your suit, you will be able to see 60^{o} on each side of straight ahead. You also will be able to see a spot overhead and your feet.

(8) Buoyancy. The point to remember here is that the suit's material is inherently buoyant. Even if your suit becomes filled with water it will support you. So don't worry if you somehow rip the suit during abandonment.

(9) Digital Dexterity. The mitten or glove *(they vary)* arrangement of your suit is designed to permit the wearer to pick up a standard-sized pencil while clothed in the suit and write legibly with it. While we can't think of what one would want to write at such a time, it is important to know that a suit-wearer could handle other tasks requiring less dexterity - such as releasing the gripes, passing the sea painter and eventually tripping the releasing gear.

(10) Splash Protection. Each suit will afford protection from splashes of water getting into the wearer's mouth.

(11) Leg Construction. Each suit must be designed to prevent air from becoming trapped in its legs when the wearer enters the water headfirst.

(12) Foot Construction. Each leg of a suit must have a foot that has a hard sole or enough room for a work shoe to be worn inside.

(13) Non-Skid Soles. Your suit's soles will be non-skid.

(14) Detachable Flotation Device. Most suits are fitted with detachable flotation devices. They are designed to be inflated manually by the wearer. They are not factored into the buoyancy requirements.

(15) Marking. Each suit shall be marked with the vessel's name.

(16) Holes and Tears. These should be patched in accordance with the manufacturer's instruction manual.

(17) Abrasions. The exterior coating of a suit should not be so worn that it exposes the inner foam insulation. The manufacturer's instructions should be followed for repair.

(18) Shoes or Not? The vast majority of survival suits on today's market are designed to be worn with shoes. Some, however, are not. In order to address the requirement that *"a means be provided to prevent air from becoming trapped in the suit's legs when the wearer enters the water headfirst,"* most manufacturers provide pressure relief valves near the ankle level. Some however, provide a more narrow leg structure with a narrow boot. This alternative method and structure meets the above requirement although it also means that shoes cannot be worn in that particular suit.

(19) Zippers and Snaps. Ease of operation should be verified each time the suit is removed from the protective bag. Wax or another lubricant should be added, as required. Follow the care and maintenance instructions provided by the manufacturer.

(20) Talon Zippers. Most exposure suits manufactured prior to 1986 were fitted with Talon zippers. Talon zipper failure has occurred in Stearns, Harvey's and Imperial suits. Talon zippers have the word *"Talon"* on the zipper pull. Suits with defective zippers are to be replaced. The problem is suspected to be related to folding the suits for restowage in the protective bag.

12.5 LOCATION OF THE SUITS

a. Method of Stowage. Suits are to be stowed in a container which can't be locked. Therefore, no suits are to be stowed in a closet or a locker.

b. Individual Crewmember's Issue. Each crewmember will be provided with one suit. Keep the suit loose in your cabin outside of any locker. *(Your cabin is not considered a "container" by the USCG; the intent of this rule is to preclude the possibility of suits being stowed in closets or centrally located lockers.)* Any supercargo, Technician, MILDET personnel, repairman or passenger onboard also will be provided with one suit.

c. Watch or Work Stations. In the case where a person's watch or work station is located so as to render his cabin not readily accessible, an additional survival suit is to be provided at the watch or work station. There is a difference in wording between the *"work stations"* requirement for exposure suits and the *"persons or watch"* requirement

for life preservers. The older language for life preservers ignores the possibility that people may be on watch or at work in locations away from their quarters other than in the pilothouse, engineroom or the bow lookout station. On a typical merchant ship, the only other *"work stations"* are the radio room, the galley and possibly a ship's office. The radio officer's stateroom normally adjoins the radio room. The stewards' department quarters are usually as close as possible to the galley. The ship's office is usually really a day room adjoining the quarters of the officer who uses it. Thus, for this *"typical"* situation, the number of exposure suits required will in fact be equal to the number of life preservers. If the deck officers all lived on the bridge deck, the number of exposure suits might be reduced. If the stewards' department did not have quarters adjacent to the galley, the number might have to be increased; likewise, for any other *"work station"* not adjacent to the living quarters of the person or persons who man it. For nontypical vessels, such as an oceanographic research vessel with onboard laboratories, or a service vessel with shop facilities, each *"work station"* must be evaluated to determine the number of exposure suits required for persons who work there, but do not live in adjacent quarters. We have spent some time on the question of just where the extra engineroom suits should be stowed. Our conclusion at this point is that they should be stowed near the throttle platform or Control Room. Stowing them at or near exits is interesting to consider but thought to be impossible to effectively implement given the number of exits and the possibility that any given exit or area may be inaccessible for some reason connected with the abandonment.

12.6 DRILLING WITH SUIT

a. Exposure Suit Drills

(1) Introduction. 46 CFR 97.15-37, et al., requires the Master of a vessel carrying exposure suits shall make sure that each crew either:

(a) wears an exposure suit in at least one boat drill per month unless it is impracticable due to warm weather; or

(b) participates in at least one exposure suit drill per month that includes donning an exposure suit and being instructed in its use.

(2) In each fire and boat drill, each passenger onboard is instructed in the use of exposure suits.

(3) Each passenger is told at the beginning of the voyage where exposure suits are stowed onboard and is encouraged to read the instructions for donning and use of the exposure suits.

b. Shipboard Training Program. Previous discussion of location and donning considerations should indicate that each ship and individual should practice with the suits. This practice should include:

(1) Donning - In dark environment
At workstations
In cabin
On outside deck

(2) Moving - From place of donning to boats

(3) Working - Actually conducting Abandon Ship Drill in the suits.

Perhaps such training will indicate that escape from the engineroom with a suit on is not as burdensome a process as expected. Whatever the case, you will never know if you don't drill with the suits.

c. Abandonment Procedures

(1) Muster at Boats or Rafts. To the extent possible, all hands should muster at the boats clothed in their survival suits.

(2) Put Suits on Before Readying Boats or Rafts. Your suit is a mini-lifeboat. Make sure it is on before you start readying the boat for launch. The reasons are obvious.

Remember, the **ORDER OF PRIORITY** during abandonment is:

GET OUT OF CONFINED SPACES
GET SUIT ON
MUSTER AT BOATS
READY AND LAUNCH BOATS

d. Those personnel on the bridge and the bow lookout should don their suits prior to leaving their work station.

e. Personnel in the engine room should don their suits **AFTER** exiting the engine room. The steeper angle of ladders coupled with their tendency to be a bit slippery could make escape a difficult chore when encapsulated in a survival suit.

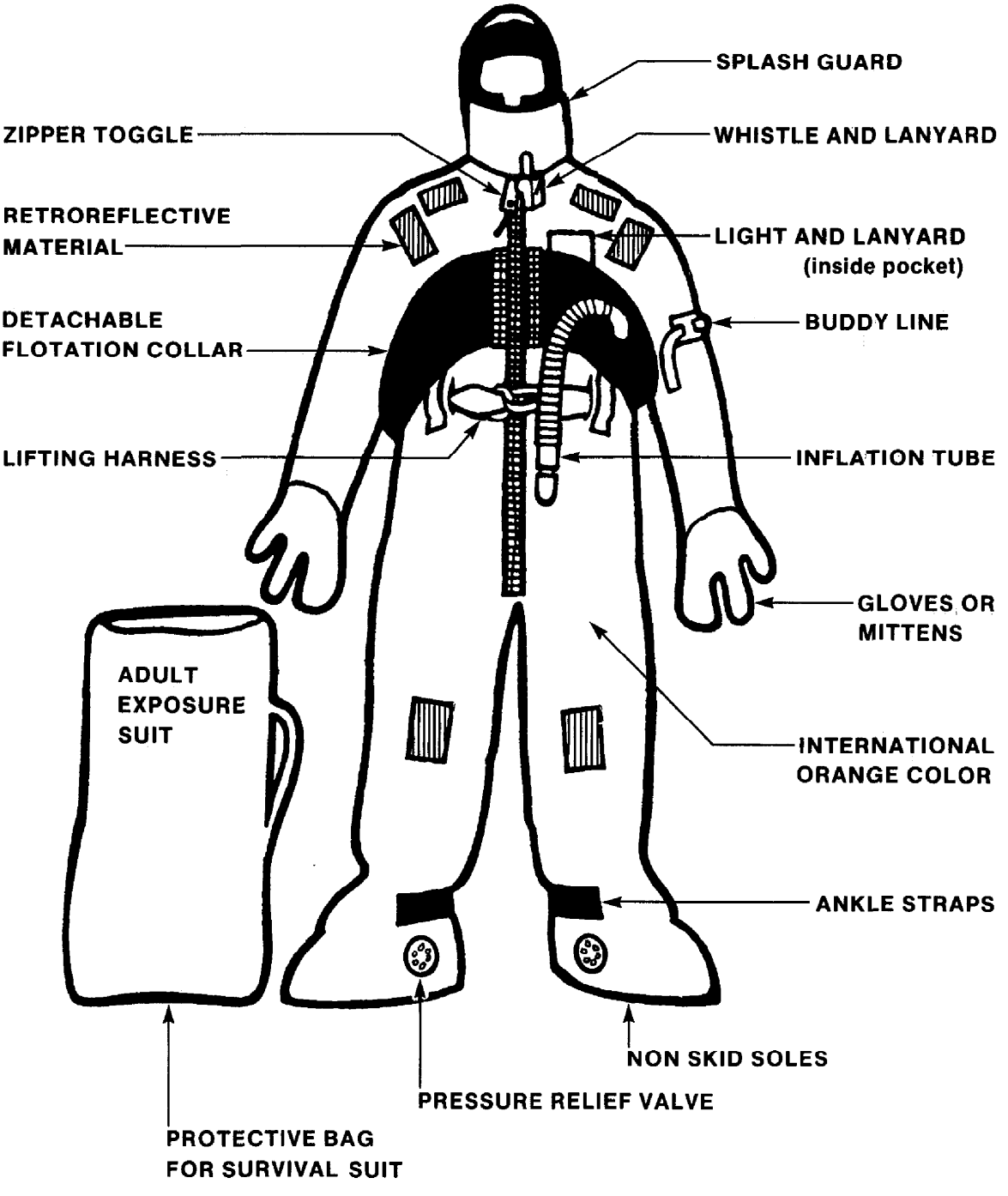
f. Personnel Quarters. If your cabin is a deck or two below the escape level to the open deck or lifeboat embarkation area, or if you are in any doubt as to the expected short term seaworthiness of your ship, regardless of where your cabin is located, you should

FIRST grab your survival suit and REPORT to the lifeboat embarkation area or the open decks. THEN don the suit. Remember, no matter where your cabin is, donning the suit will probably take you at least 30 seconds. Delaying your chance to abandon by 30 seconds could, in some cases cost you your life.

12.7 SUMMARY COMMENTS

a. However difficult it may be to write in clinical terms about escape and abandonment it is much more difficult to notify next of kin of a tragedy.

b. We wish to emphasize the importance of training. We expect the Ship's Safety Committee to record various data gained from such training and pass it along to all hands and all subsequent hands.



TYPICAL EXPOSURE SUIT

FIGURE 12-1

CHAPTER 13

TERMS AND DEFINITIONS USED IN LIFEBOAT TRAINING
(Lesson No. Twelve)

ABACK ..... **Condition in which wind pressure against the square or lug sail causes the boat to make sternway.**

ABAFT ..... **Behind, or farther aft, astern or toward the stern.**

ABEAM ..... **At right angles to the centerline of the boat and outside of it.**

ABOARD ..... **In the boat. Close aboard means near the boat.**

ABOUT ..... **Used in the sailing command *"Come about"* or *"Bring about,"* meaning to change boat from one tack to the other.**

ABREAST ..... **An object in line with the beam.**

ADRIFT ..... **A floating object, uncontrolled and unmoored, loose from moorings or out of place.**

AFT ..... **In, near, or toward the stern of the boat.**

AGROUND ..... **Resting on or touching the ground or bottom.**

AHEAD ..... **Forward of the bow.**

AHOY ..... **Term used to hail a boat or ship, as *"Boat ahoy!"***

ALEE ..... **To leeward.**

ALL HANDS ..... **In boat training, all personnel assigned to the boat.**

ALONGSIDE ..... **Beside a pier or ship.**

AMIDSHIPS ..... **The middle portion of the boat; also anywhere along the line of the keel.**

ASTERN ..... **Toward the stern; an object or boat that is abaft another object or boat.**

ATHWART, ATHWARTSHIPS ..... **At right angles to the fore-and-aft centerline of a ship or boat.**

AVAST ..... **An order to stop or cease hauling.**

AWASH ..... **So low that water is washing over the gunwales.**

AWEIGH ..... **Refers to anchor when just off the bottom.**

BACK ..... **To reverse motion from headway; to go astern.**

BACKSTAY ..... **A stay supporting a mast from aft.**

BACK WATER ..... **To back oars; to row in reverse motion.**

BAIL ..... **To empty water from the bottom of a boat with a scoop or bucket; to turn the crank on an installed bailer.**

BATTEN ..... **A thin strip of wood or metal used to provide strengthening or fastening support.**

BEAM ..... **Width or breadth of the boat at the widest section, measured athwartships.**

BEAR ..... **To lie in a certain direction from the observer.**

BEARING ..... **Direction of an object in degrees or points of a compass.**

BEATING TO WINDWARD ..... **To make headway against the wind through a series of close-hauled tacks.**

BEAUFORT SCALE ..... **A scale for rating wind velocity.**

BECALMED ..... **Unable to make way under sail due to lack of wind.**

BECKET ..... **A rope grommet used in place of a rowlock; a rope eye for the hook of a block.**

BELAY ..... **To make fast or to stop; to cancel an order.**

BEND, BEND ON ..... **To make fast; to affix one object to another, such as bending one line to another.**

BLADE ..... **The flat, outboard part of an oar.**

BIGHT ..... **A bend or loop of rope or wire; the part between the end and the standing part.**

BILLET CARD ..... **A card containing a seaman's position or rating, his berthing, and emergency stations and duties.**

BITT ..... **A strong post of wood or steel used to fasten lines.**

BITTER END ..... **The inboard end of line; sometimes used to indicate free ends of the line.**

BLINKER ..... **A lamp triggered to a telegraph key, used for sending flashing light signals; in lifeboats, a flashlight with a de-energizing button on a spring to permit flashing of light signals.**

BLOCK ..... **A hauling device consisting of one or more grooved pulleys encased in a shell through which lines or ropes are led in order to acquire more hauling purchase.**

BOAT ..... **A small open craft propelled by oars, motor, propelling gear, or sails. A boat is distinguished from a ship or a vessel in that boats are carried aboard ships.**

BOAT CHOCKS ..... **A cradle on which a boat rests; it usually fits snug about the keel and may be on deck, on davits, or on the ground.**

BOAT COVER ..... **Protecting cover - of a highly visible color and capable of protecting the occupants against injury by exposure. The cover is spread over portable frames set in sockets along each side of the boat.**

Storage cover protects the boat and equipment to ensure readiness, especially during snow and freezing weather.

BOAT DAVIT ..... **A movable, projecting steel girder used to suspend, lower, and hoist boats.**

BOAT DECK ..... **The uppermost deck on which lifeboats are secured.**

BOAT FALLS ..... **Wire rope or manila line with which the boats are lowered or hoisted. One end is engaged at the winch *(or reel and cleat)* while the other end is attached to the boat; sometimes called *"davit falls"* or *"boat tackle."***

BOAT GRIPES ..... **Lashings used to hold the boats secure in their stowed position.**

BOATHOOK ..... **A wooden staff with a metal hook on one end; 1½ inches in diameter and more than 8 feet long; used to fend off or hold on.**

BOAT PAINTER ..... **A moderate length of line attached to the ringbolt at the stem of the boat, used for mooring or towing the boat. It is not to be confused with the longer sea painter.**

BOAT PLUG (BOAT DRAIN) ..... **Steel cap or wooden stop used to plug the drain holes at the bottom of boats. Metal boats have automatic plugs with caps attached by chains; wooden boats may have wooden plugs.**

BOAT RECALL ..... **A signal used to indicate to boat commanders that they are to return to the ship or landing; in MSC operation the international code sound signal "R" (.-.) is given on the ship's whistle.**

BOAT STATIONS ..... **Locations near boat equipment where assigned personnel stand in preparation for performing their abandon ship or boat drill duties.**

BOLT ROPE ..... **A rope sewed to the edge of a sail to give the sail additional strength and prevent ripping of the fabric.**

BOOM ..... **In sailing: a projecting spar or pole to which the foot or lower edge of the sail is made fast, used as an outreach or to spread sails. A spar projecting from a ship's side to which boats are moored.**

BOSS PLATE ..... **A plate fitted around the propeller shaft where the shaft emerges from the hull.**

BOW ..... **The forward part of a boat or ship.**

BREAK OUT ..... **To remove from stowage or prepare for use.**

BREAST HOOK ..... **A horizontal knee set in the bow of a boat or ship.**

BREECHES BUOY ..... **A device used to transfer personnel from stranded ships after a line is fired aboard by means of the line-throwing gun. It consists of a buoy which has a pair of canvas breeches to hold and support the rider's legs. The buoy is suspended from a traveler block which rides along a hawser.**

BRIDLE ..... **A span of line, wire, or chain with ends secured.**

BROACH TO ..... **To turn broadside to surf or sea.**

BROAD ON THE BEAM ..... **Directly abeam.**

BROAD ON THE BOW ..... **Four points or 45 degrees from dead ahead.**

BROAD ON THE QUARTER ..... **Four points or 45 degrees from dead astern.**

BROKEN WATER ..... **A area of rips and eddies in otherwise calm water.**

BUOYANT APPARATUS ..... **Flotation equipment designed to support a specified number of persons in the water. It must be capable of being handled without the use of mechanical appliances, and its weight must not exceed 400 lb.**

BY THE WIND ..... **Sailing close to the wind but keeping the sails filled; sailing close-hauled.**

CAMEL ..... **A heavy float, usually made of chained or bolted logs, used as a fender to keep ships off a pier.**

CAPPING ..... **Top stripping of gunwales. It is used to provide additional strength, appearance and to prevent chafing and wearing of other structural members.**

CAPSIZE ..... **To turn over.**

CAST ..... **To throw the bow of the boat in one direction or another when getting underway; heaving the lead to ascertain depth of water.**

CAST OFF ..... **To let go moorings.**

CAULKING ..... **Filling and tamping cotton, oakum, felt and white lead, rubber or similar materials into seams between strakes and decking to prevent leakage.**

CENTERLINE ..... **A line, marked or imaginary, running from bow to stern.**

CHECK ..... **To slack off slowly; to ease off a rope a little; to stop a boat's way gradually.**

CHOCK ..... **A wood or metal fitting which serves as a fairlead for mooring lines; a fitting on which a boat's keel rests when stowed.**

CLAP ON ..... **To catch hold for the purpose of hauling *(as a rope)*; to put on; to put on more sail.**

CLEAR ..... **To untangle, release, or disengage.**

CLEAT ..... **A fitting of wood or metal with horns for securing lines.**

CLEW ..... **The after, lower corner of a fore-and-aft sail.**

CLINKER PLATING ..... **A system of fitting overlapping strakes, similar to the slates of a roof.**

CLOSE ABOARD ..... **Near the ship or in proximity to something.**

CLOSE-HAULED ..... **Sailing approximately five points into the wind. *"Close-hauled on the port tack"* is used to indicate that the wind is over the port bow. *"Close-hauled on the starboard tack"* indicates that the wind is over the starboard bow.**

COAMING ..... **Raised framework about deck openings and cockpits of open boats, installed to prevent the entry of water.**

COMPASS ..... **An instrument used to indicate geographic directions.**

COSTON SIGNALS ..... **Colored-hand pyrotechnic flares used for signaling, as red distress signals.**

COURSE ..... **The direction steered by a boat, expressed in degrees or points of the compass.**

CRADLE ..... **A stowage rest for a ship's boat.**

CUTWATER ..... **The forward edge of the stem at the waterline.**

DAVIT ..... **Small boom-like cranes that can be swung out over the ship's side for lowering, hoisting and cradling of the boats.**

DEAD AHEAD ..... **Directly ahead of the bow in line with the centerline.**

DEAD IN THE WATER ..... **Said of a boat when floating motionless; with no way on.**

DEAD WOOD ..... **Triangular fittings connecting the stem or stern post with the keel.**

DOUBLE BANKED ..... **Boat with two men on a thwart or two men on an oar.**

DOWSE (OR DOUSE) ..... **To take in or lower a sail; to put out a light; to saturate with water.**

DRAFT ..... **Distance from the keel of a boat to the waterline.**

DRIFT ..... **Distance or angle from a set course due to the influence of wind and/or current; leeway.**

DRAW ..... **Said of sail when filled with wind enough to give the boat forward way; *"to draw water"* is said of the draft; i.e., *"the boat draws three feet."***

DROGUE ..... **A floating anchor usually made of spars and canvas. It can be used as a jury-rig, in the event that the sea anchor is lost, to keep the boat's head to the wind, lessen leeway, or to check headway.**

EASE HER ..... **A command to reduce the amount of rudder or helm.**

EASE OFF ..... **To slack a line slowly.**

EASY ..... **A command to slack, lower, heave in or hoist.**

EEBD ..... **Emergency escape breathing device.**

EMBARK ..... **A board a boat or ship.**

EPIRB ..... **Emergency position indicating radio beacon.**

EYEBOLT ..... **To bolt terminating with an eye, used for securing.**

FAIR LEAD ..... **An eye, block, or fitting furnishing a clear lead for a line.**

FAKE DOWN ..... **To coil a line by lapping the bights over each other so as to leave the line clear for running out.**

FALL ..... **The entire length of rope in a tackle; the standing part is secured to one of the blocks, the hauling part runs freely through the tackle. Falls are used to lower and hoist boats on the davits.**

FAST ..... **Said of a line that is secured; a line, chain, or wire by which a boat or ship is made fast in a berth.**

FATHOM ..... **Six feet.**

FEATHER ..... **To turn the blade of an oar horizontally at the completion of a stroke to reduce resistance against it of wind or sea.**

Failure to feather properly will sometimes cause the oar to be wrenched from the oarsman's control, known as crabbing."

FENDER ..... **Canvas, wood, rope, or other pliable gear used over the side to prevent chafing of the boat while alongside a ship, float or dock.**

FEND OFF ..... **To push a boat off in coming alongside or in leaving a pier or ship.**

FETCH ..... **To make good a mark to windward without having to change tack.**

FID ..... **Marline spike made of wood.**

FILL AWAY ..... **Said of sails when they fill with wind after coming about on a new tack.**

FISH-TAIL ..... **To scull; to cause forward way by sweeping the steering oar back and forth in a figure 8 motion at the stern of the boat.**

FLARE ..... **A pyrotechnic device used for signaling.**

FLATTEN IN ..... **To trim the sail when closed-hauled due to slight changes of wind or to obtain more advantage.**

FOOT ..... **The lower edge of a sail.**

FORE-AND-AFT ..... **Running in the direction of the keel from stem to stern.**

FOREMAST ..... **The first mast of a ship or boat abaft the bow.**

FORESTAY ..... **A stay giving support to a mast from forward of the mast.**

FORWARD ..... **Toward the bow.**

FOUL ..... **Tangled or jammed; not clear.**

FRAME ..... **Ribs of a boat that strengthen and support the plating.**

FRAPPING LINES ..... **A wire strap with shackles or sisterhooks *(twin hooks)* at each end and a manila hauling line spliced to the bight. Wire frapping lines are either shackled or hooked on above the fall blocks, as the case may be, to hold the boat in at the embarkation deck while it is being manned. The frapping lines are kept taut as the is lowered in order to prevent excessive swinging.**

FREE ..... **The condition of sailing a desired course without being close-hauled; running before the wind with the wind from any direction abaft five or six points from ahead.**

FREEBOARD ..... **Height of a boat from the waterline to the gunwale.**

FULL AND BY ..... **Sailing close-hauled with sails full and drawing.**

FURL ..... **To gather up and secure a sail.**

GAFF ..... **The spar to which the head of a fore-and-aft sail is secured.**

GARBOARD STRAKE ..... **The strake or plating next to the keel.**

GATHER WAY ..... **To increase speed in either direction.**

GEAR ..... **Term used for block and tackle, lines, ropes, etc.**

GIMBALS ..... **A pair of rings, one within the other, used to support the compass and compensate for roll and pitch.**

GO ABOUT ..... **Said of a sailboat when tack is changed.**

GOOSENECK ..... **A swivel fitting on a boom which, when secured to a mast, permits the boom to be maneuvered into any position.**

GRAB RAILS ..... **Metal bars on the outside of the lifeboat, near the turn of the bilges, that people can hold onto if the boat turns over in the water.**

GRIPE HOOK ..... **A large, open hook attached to a davit track of older type gravity davits which can be engaged to a stud on the davit arm to secure the boat after it is in its stowed position.**

GRIPES ..... **Metal fastenings of wire or chain used to secure a boat in its chocks or cradle or to the ship's rail.**

GROMMET ..... **A ring of rope.**

GUDGEON ..... **The rudder supports attached to the stern-post eyes through which the rudder pintles are inserted.**

GUNWALE ..... **Upper edge or rail of a boat's side.**

GUY ..... **A line used to steady and support a spar in a horizontal or inclined position.**

GYBE ..... **A sail is said to be gybed when the sail is shifted suddenly from one side to the other while the wind is well astern.**

HALYARD ..... **The line used for hoisting sail.**

HAUL ..... **To pull or take up on a line.**

HAULING PART ..... **Part of line used for hauling; the part of the fall of a tackle upon which power is applied; the rope or line that is not a standing part.**

HEAD ..... **The upper edge of a fore-and-aft sail.**

HEADWAY ..... **Forward motion of a boat.**

HEAVE ..... **The command to haul on something; to throw; the motion of a ship at sea.**

HEAVE TO ..... **To bring the ship's head into the wind or sea and hold her there with only enough way on for steerage.**

HEEL ..... **To list over; a boat is said to heel when it is not on even keel.**

HEEL OF MAST ..... **The bottom section of the mast which fits into the mast step.**

HELM ..... **The tiller; sometimes used to indicate the rudder.**

HITCH ..... **A temporary knot with which one object is fastened to another.**

HOIST ..... **To raise or pull up; display of signal flags at the yardarm.**

HOISTING PAD ..... **A metal piece bolted to the boat's keel; it has an eye for use in hoisting.**

HOISTING ROD ..... **A metal rod bolted to the hoisting pad on one end and attached to hoisting gear on the other.**

HOUSE ..... **To stow or secure in a dry or protected place.**

HOVE TAUT ..... **Pulled tight.**

HULL ..... **The framework and plating of the boat and all structural members, excluding equipment.**

INBOARD ..... **Toward the centerline of the boat.**

IN IRONS ..... **Said of a sailboat caught in such a position in relation to the wind that she cannot be turned in any direction.**

IRISH PENNANT ..... **Untidy loose end of a line.**

JACOB'S LADDER ..... **A rope ladder with metal or wooden rings; used over the side as an embarkation ladder.**

JIB ..... **A head sail set forward of the foremast.**

JURY RIG ..... **A makeshift rig of mast, sail or other gear, as jury rudder, jury sea anchor, etc. It is used to substitute for an original piece of equipment which has been lost or damaged.**

KAPOK ..... **A fibrous, water-resistant material packed into life preservers to make them buoyant. New type life preservers utilize fibrous glass.**

KEEL ..... **The backbone of the boat, extending along the bottom from stem to sternpost.**

KEELSON ..... **Timber or steel fabrications bolted on top of a keel to strengthen it.**

KNOT ..... **One nautical mile per hour.**

LADDER ..... **A stairway of rope, wood, or metal.**

LANYARD ..... **A line of small stuff made fast to an article for securing it, as a bailer lanyard; or a line used for setting up rigging.**

LASH ..... **To tie or secure.**

LEAD AND LINE ..... **The weight and marked line used for soundings, that is, for measuring the depth of water.**

LEE ..... **Side of boat away from the direction of the wind.**

LEECH ..... **The after side of a fore-and-aft sail.**

LEEWARD ..... **Direction away from the wind.**

LIE TO ..... **Said of a boat hove to with no way upon it.**

LIFEBOAT ..... **A boat particularly adapted for abandon ship or rescue use at sea.**

LIFEFLOAT ..... **Flotation equipment designed to support partially immersed persons supported by the peripheral body of the life float.**

LIFELINE ..... **The series of bights with seine floats that are placed along the hull of a lifeboat or float; knotted lines or manropes secured to the span between davits for use of the crew when lowering and hoisting; line secured along the deck to lay hold of in heavy weather; or the line thrown aboard a wreck by a lifesaving crew.**

LIMBER HOLES ..... **Holes in frames at keelson to permit water to seek the lowest level in order to drain.**

LIMIT SWITCH ..... **A safety device used to cut power from a lifeboat winch, designed to function automatically with the hoisting of the boat as it approaches its stowed position.**

LINE ..... **A term to indicate rope; sometimes used to refer to certain cable. NOTE: The word rope is rarely used except as in such terms as *"manropes."***

LIST ..... **Inclination of a boat to one side or the other due to excess weight, flooded compartments or shifted gear; keeled.**

LOAD RELIEF HOOK ..... **More descriptively called *"suspension-pendant trip hook"* in MSC. A trip hook attached to the suspension pendant in the upper of nested boats. It is used to transfer the weight of the upper boat from the suspension pendants to the falls even in event of loss of power.**

LOCKER ..... **A wood or metal box or compartment used for stowage.**

LOG ..... **An instrument for measuring speed through water; also logbook.**

LOOM ..... **The shaft of an oar excepting the blade, leather and handle.**

LUFF ..... **The forward side of a fore-and-aft sail; to bring the boat up into the wind in order to spill some of the wind from the sails and avoid excessive heeling or possible capsizing.**

LYLE GUN ..... **A small, muzzle-loading cannon used in lifesaving to shoot lifelines to a stranded vessel. Now obsolete and being replaced by rocket line-throwing appliances.**

MACCLUNEY HOOK ..... **More descriptively called *"tricing-pendant trip hook"* in MSC. A trip hook secured to the falls block and connected to the tricing pendants after the frapping lines have been passed and secured.**

MANROPES ..... **Knotted manila lines attached to the span between the davits, used to descend into the boat in an emergency and to provide safety hand holds while working in the boat.**

MARLINSPIKE ..... **A pointed, steel tool for splicing wire; also generally useful as in loosening shackles, etc.**

MARRY ..... **To temporarily fasten two lines together by sewing, with rope yarn, etc. to permit reeving through a block.**

MAST ..... **A fixed vertical spar used to support various types of rigging.**

MASTHEAD ..... **The top of a mast.**

MAST STEP ..... **An indentation in a keelson which provides bottom support for the mast.**

MESSENGER ..... **A light line used for hauling over a heavier line or wire.**

MISS STAYS ..... **A sailing term used to indicate that the boat has failed to come about.**

MOORING ..... **Securing a boat or ship to a pier, buoy, or float. Also, anchoring with two anchors, or a place for a boat to moor.**

MOUSING ..... **Small stuff seized across a hook to prevent it from unhooking.**

MUSTER ..... **To assemble the crew.**

NESTED ..... **Boat stowage in which a smaller boat is stowed inside another.**

NOSING ..... **A strip of wood along the gunwale for strengthening and protection; also called capping.**

OAKUM ..... **A tarred hemp rope fiber used for caulking.**

OAR COMMANDS ..... **See Article 7.3.**

OARLOCK ..... **A U-shaped device with a pin that is inserted in the gunwale for the purpose of holding an oar; also called rowlock.**

OIL BAG ..... **A bag filled with oil and oakum, hung over the side to make a slick in rough seas.**

ON THE BOW ..... **In a forward direction, but not dead ahead, generally on either side of the bow within 45 degrees.**

ON THE QUARTER ..... **A bearing from astern to four points on either side.**

OUTBOARD ..... **Toward the side or outside the boat entirely.**

OVERHAUL ..... **To separate the blocks of tackle; to overtake another boat; to lower boat falls by hauling them down without the boat attached; to clear rigging for use.**

PAD EYE ..... **A metal eye permanently installed on a deck or bulkhead.**

PAINTER ..... **A line attached at the bow of a boat for the purpose of towing or making the boat fast.**

PALM AND NEEDLE ..... **A sailor's thimble made of leather, and a special needle; used together for sewing canvas.**

PARCELING ..... **Wrapping a line spirally with long strips of canvas, following the lay of the line and overlapping. Its purpose is to provide additional protection from weather and wear.**

PART ..... **To break, as a line.**

PASS A LINE ..... To carry a line to, or around, something or to reeve it through.

PASS THE WORD ..... To repeat an order or information to the crew.

PAY OFF ..... To slack off or ease off a line.

PEAK ..... Upper, after corner of a fore-and-aft sail.

PELICAN HOOK ..... A hinged hook held in place by a ring. When the ring is knocked clear of the hook, the hook swings open.

PENDANT ..... A length of line or wire with a thimble or block on the end.

PINTLES ..... Pivot pins attached to the rudder on which the rudder turns.

PLUG ..... A round wood wedge, threaded cap, or metal threaded plug used to prevent water from coming into the bottom of the boat through the drain holes or boat drains. These are left open during stowage to drain the boat and must be closed before the boat is lowered.

PREVENTER ..... A line used for safety as an additional stay to lessen the strain on gear or rigging and to prevent loss of gear in case of accident.

PROW ..... The part of the bow above the water; old term for bow.

PULLING AN OAR ..... Rowing a boat.

PURCHASE ..... Applies to the mechanical arrangement of blocks and tackle to increase the force applied by a combination of pulleys.

PYROTECHNICS ..... Chemicals, ammunition or fireworks which produce smoke or lights of various colors or types; used in signaling and rescue work.

QUARTER ..... The part of the boat's side near the stern.

QUARTERING SEA ..... A stern sea running from the direction of the quarter.

RAKE ..... Angle of a mast from the vertical.

REACH ..... A course sailed between two points on a single tack.

REEF ..... To reduce the area of sail by lowering and securing surplus sail along the boom by reef points.

REEF BAND ..... A strip of canvas sewed to a sail, at which reef points are secured.

REEF CRINGLE ..... A rope grommet worked around a thimble in the leech and luff of a sail at the ends of the reef band.

REEF POINTS ..... **Short lines secured to the reef band for the purpose of reefing.**

REEVE ..... **To pass a line around or through a fair-lead or block.**

RIBS ..... **Frames of a boat or ship to which the sides are secured.**

RIG ..... **The type of sails; to set up mast and sails for use.**

RIGGING ..... **Gear used to support and operate masts, booms and sails. Standing rigging provides support and ordinarily does not move while running rigging moves in hoisting, operating and lowering sails, yard, etc.**

ROWLOCK ..... **See oarlock.**

RUDDER ..... **The vertical, movable structure attached to a boat's stern which is operated by the tiller to steer the boat.**

RUNNER ..... **A line fastened at one end to a fixed object and rove through a single block.**

RUNNING BEFORE THE WIND ..... **Sailing with the wind well abaft the beam; running free.**

SAILING THWART ..... **The midship, fore-and-aft plank used to support the mast.**

SAIL TWINE ..... **Small cordage used for sewing canvas.**

SCULL ..... **Sweeping an oar back and forth over the stern in a fish tail or figure 8 motion to propel a boat.**

SEA ANCHOR ..... **A conical-shaped, canvas bag which serves as a drag or boat anchor by providing resistance against the water in order to hold the boat's head up into the wind and sea and reduce leeway.**

SEA MARKER ..... **A bright-colored dye used in coloring the water to assist search and rescue craft.**

SEA PAINTER ..... **A line secured inboard on the forward thwart of a boat and rigged with a strop eye and toggle for quick releasing. The upper end is made fast on the ship well forward. When the boat is waterborne, the sea painter tends to sheer the boat's bow away from a ship with way on and, together with the steering oar, can be used to hold the boat in position at the embarkation ladder.**

SECURE ..... **To make fast or tie; a command given to indicate completion of a drill or exercise.**

SEIZE ..... **To bind ends of lines or wire rope with sail twine, marlin, rope yarn or wire, to prevent unraveling.**

SERVING ..... **Additional protection over parceling, consisting of continuous round turns of marlin or other serving.**

SET ..... **The direction of leeway made by a boat or ship; direction of the current.**

SET TAUT ..... **A command to take up all slack.**

SHACKLE ..... **A U-shaped piece of iron or steel with eyes in the ends to permit the insertion of a closing pin.**

SHEAVE ..... **The wheel of a block over which a line or wire runs.**

SHEER OFF ..... **To turn suddenly away.**

SHEER STRAKE ..... **The planking or strake at the top of the boat hull.**

SHEET ..... **A line or tackle attached to the clew of a sail for control purposes.**

SHIP ..... **The act of setting a stowed or detached piece of apparatus in operating position, as to ship a rudder.**

SHORT BLAST ..... **The sounding of a ship's whistle, fog horn or siren for about one second.**

SHORTEN SAIL ..... **To reef or reduce sail.**

SHOVE OFF ..... **A command used to initiate departure from ship's side or dock.**

SHROUD ..... **A side stay of line or wire used to support a mast.**

SIDE BENCH ..... **Benches installed on the outboard sides of a boat. They are used to stow masts, sails, oars and spare equipment as well as provide additional seats for passengers.**

SINGLE BANK ..... **Boats rigged to permit only one oarsman to each thwart.**

SLACK ..... **The part of a line, chain, or wire hanging loose; to ease off on a line.**

SMALL STUFF ..... **Small cordage designated by number of threads or by special names, as marline, ratline staff, etc.**

SNUB ..... **To check suddenly.**

SOLAS ..... **International Convention for the Safety of Life at Sea.**

SPAR ..... **A pole serving as a mast, pole, or gaff.**

SPLICE ..... **To join two lines or wires by tucking the strands of each into the other.**

STANCHION ..... **Wood or metal upright used for support.**

STATION BILL ..... **A listing of emergency signals, special instructions, emergency stations and duties of each crewmember, and the locations of certain built-in damage control features.**

STAY ..... **Rigging of line or wire used to support masts and spars.**

STAYSAIL ..... **A jib-shaped sail supported at the forward edge by a stay.**

STEERAGE WAY ..... **Slowest speed at which a boat can be steered.**

STEM ..... **An upright post at the bow of a boat or ship.**

STEP ..... **See mast step; to raise the mast and place its heel in the mast step.**

STERN ..... **After part of boat.**

STERN FAST ..... **A line or wire attached to the stern of a boat to prevent forward motion; used in conjunction with frapping lines and the painter to keep the boat from swinging and pitching when launching or recovering it in a seaway.**

STERN SHEETS ..... **Section of boat abaft the after thwart.**

STERNWAY ..... **Moving astern.**

STOPPER ..... **A short piece of line or chain used temporarily to secure manila falls or lines bearing a heavy strain until they can be properly secured or made fast.**

STOPPER BAR ..... **A flat, iron bar used to prevent a gravity davit from slipping down the trackway.**

STOW ..... **To put away; to secure in a safe, proper place.**

STRAKE ..... **A line of plates or planks installed throughout the length of a boat.**

STRIKE ..... **To dowse or shorten sail.**

STRONGBACK ..... **A beam or spar lashed between davits as a brace for secure stowage of lifeboat at sea; a fore-and-aft spreader which serves as a support for the boat cover.**

SUSPENSION PENDANT ..... **A wire connected to the davit arms near he top; used to hang off the top boats while lowering the bottom boats and recovering the falls of nested boats.**

SWAMP ..... **When a boat fills with water and floats awash.**

TACK ..... **A reach sailed with the wind on one side of the boat; the forward lower corner of a sail.**

TACKLE ..... **An arrangement of blocks and lines or wire to give mechanical advantage or purchase.**

TAKE A TURN ..... **To pass one turn of a line or wire around a cleat, chock, or bitt and hold on.**

TAUT ..... **Tight; with no slack.**

TEND ..... **To care for; to man a line; the direction a cable leads when at anchor.**

THAT'S HIGH ..... **A command to stop hoisting; *"avast heaving"* is more generally used.**

THIMBLE ..... **An iron ring grooved on the outside for a rope grommet. It is used to prevent chafing and tearing of the line around it.**

THOLE PIN ..... **A pin fitting into the gunwale of a boat, with a rope grommet for use as a rowlock.**

THROAT ..... **The upper, forward corner of a fore-and-aft sail.**

THWART ..... **A cross piece used as a seat in a boat.**

THWARTSHIPS ..... **At right angles to the fore-and-aft line.**

TILLER ..... **A short piece of iron or wood fitted to the head of rudder and used to turn the rudder.**

TIP ..... **Outer end of the oar blade.**

TOGGLE ..... **A wood or metal pin used to slip through a strop eye or becket for securing purposes where quick easy release is desired.**

TRICE ..... **To haul up *(a boat);* to lower a boat until the tautness of the tricing gear pulls the boat close in to the embarkation level.**

TRICING PENDANT ..... **A line or wire used for tricing, attached to the davit head and the lower boat falls block.**

TRIP ..... **To let go.**

TRIPPING LINE ..... **A short piece of line used to capsize the sea anchor; also, a short piece of line that is used to let go the tricing-pendant trip hooks. NOTE: This new application is employed to avoid using the term *"release"* for any boat-launching equipment other than the boat-releasing lever and gear.**

TROUGH ..... **The hollow between two waves.**

TURNBUCKLE ..... **A metal device with threads and screws capable of being set taut or slacked off. It is used mainly with boat gripes and standing rigging.**

TURN TO..... An order to begin work.

TWO-BLOCKED ..... Two blocks hoisted until they are as close together as possible.

UNBEND..... To untie or cast adrift.

UNDERWAY ..... Not moored, anchored or aground.

UNITED STATES COAST GUARD..... A part of the Armed Forces and principal agency for maritime law enforcement and marine safety.

VERY's PISTOL ..... A pistol used to fire parachute red flare distress signals and other pyrotechnic signal flares.

WEAK LINK..... *"Float free"* weak links are designed to be broken by the buoyant force of the inflatable liferaft, life float or buoyant apparatus so the equipment breaks free of a vessel that sinks in water deeper than the length of the painter. The end of the painter, fitted with the weak link, is made fast to the vessel.

WEARING..... A maneuver by which a boat under sail is brought on the other tack by going around with the stern passing through the wind.

WHALEBOAT..... A sharp-ended lifeboat, pulled by oars or fitted with sails; when equipped with an engine it is a motor whaleboat.

WHIPPING..... Turns of twine around ends of a line or wire to prevent unraveling.

WINCH..... An engine with drums used for hoisting and lowering heavy objects.

WINDWARD ..... In the direction from which the wind comes.

WORMING..... Filling the lays of a line before parceling and serving.

YAW..... To zig-zag back and forth across an intended course; to steer badly. Usually occurs in a following or quartering sea.

YOKE..... A cross piece fitting across the head of a small boat rudder, to the ends of which steering lines are attached. Tillers are used instead in lifeboats.

CHAPTER 14

REVIEW AND PRACTICAL DEMONSTRATION
(Lesson No. Thirteen)

14.1 REVIEW OF SECTIONS COVERED

a. Conduct brief review of Chapter 2, Introduction to and Construction of Lifeboats.

(1) General types of lifeboats.

(2) Number and types of lifesaving equipment in MSC ships.

(3) Types of davits.

(4) Types of lifeboat construction.

(5) Parts of a lifeboat.

(6) USCG regulations and general information.

(7) Conduct quiz from questions in paragraph 14.2a.

b. Brief review of Chapter 3, Lifeboat Equipment.

(1) Current list of lifeboat equipment.

(2) Additional motor lifeboat equipment.

(3) Use of equipment.

(4) Conduct quiz from questions in paragraph 14.2b.

c. Brief review of Chapter 4, Davits, Construction and Operation.

(1) Types of davits and their operation, with special emphasis on gravity type davits and equipment.

(2) Conduct quiz from questions in paragraph 14.2c.

d. Brief review of Chapter 5, Releasing Gear.

(1) USCG requirements for releasing gear.

(2) Construction of releasing gear *(Rottmer).*

(3) Operation of releasing gear.

(4) Emphasize safety precautions to be observed.

(5) Conduct quiz from questions in paragraph 14.2d.

e. Brief review of Chapter 6, Lifeboat Launching Procedures *(demonstrate at boat)*.

(1) Station bill and drills.

(2) Emergency signals.

(3) Mustering procedures and individual duties.

(4) Boat launching commands and how they are carried out.

(5) Procedures for lowering boats.

(a) Preparation for launching.

(b) Lowering to embarkation deck.

(c) Embarking crew and passengers.

(d) Lowering to water.

(e) Releasing *(calm sea)* and clearing ship's side.

(f) Releasing *(rough sea)* and clearing ship's side.

(6) Conduct quiz from questions in paragraph 14.2e.

f. Brief review of Chapter 7, Boat Handling *(use boat if practicable).*

(1) Use of boat equipment in handling boats.

(2) Oar commands and rowing; use of the steering oar.

(3) Lifeboat sails and rigging; handling boat under sail.

(4) Lifeboat navigation.

(5) Care of passengers.

(6) Handling boats in a heavy sea; use of sea anchor and storm oil.

(7) Beaching a boat.

(8) Conduct quiz from paragraph 14.2f.

g. Brief review of Chapter 8, Recovering Lifeboats.

(1) Coming alongside.

(2) Debarking from boats.

(3) Hooking on the falls.

(4) Hoisting boats.

(5) Securing boats for sea.

(6) Safety precautions in hoisting.

(7) Conduct quiz from paragraph 14.2g.

h. Brief review of Chapter 9, Rafts and Floats.

(1) Construction, marking and equipment of liferafts.

(2) Construction, marking and equipment of life floats and buoyant apparatus.

(3) Conduct quiz from paragraph 14.2h.

i. Brief review of Chapter 10, Signals and Lifesaving.

(1) Emergency signals *(see paragraph 6.2 and ship's station bill).*

(2) Man overboard procedure.

(3) Distress signals.

(4) USCG lifesaving signals.

(5) The breeches buoy.

(6) Emergency Position Indicating Radio Beacons.

(7) Portable radios.

(8) Conduct quiz from paragraph 14.2i.

j. Brief review of Chapter 11, Enclosed Lifeboats

(1) Review the procedure that allows launch control from inside the boat.

(2) Study the occupant protection features of the boat.

(3) Fall-away boat gripe.

(4) Miranda davit system.

(5) Recovery pendant hook-on.

(6) The *"Hang-off"* pendant.

(7) Conduct quiz from paragraph 14.2j.

k. Brief review of Chapter 12, Exposure *(Survival)* Suits

(1) USCG requirements for exposure suits.

(2) Construction and performance standards.

(3) Drilling with the suit.

(4) Conduct quiz from paragraph 14.2k.

14.2 REVIEW QUESTIONS AND ANSWERS

Occasional questions not fully covered in the text appear in this section to ensure full coverage.

a. For use with Lesson No. One *(Chapter 2)*, Introduction and Construction of Lifeboats.

(1) *Q: How is it known how many persons a lifeboat is allowed to carry?*

A: The number of persons allowed is stated on the builder's plate; it is painted on each bow of the boat and it also appears on at least two of the thwarts. Letters and numbers are at least three inches high.

(2) *Q: Where can one find the list of equipment to be carried in a vessel?*

A: On the vessel's Certificate of Inspection.

(3) *Q: How are lifeboats numbered onboard ship:*

A: The boats are numbered from forward toward the stern of the ship, odd-numbered boats on the starboard side *(1, 3, 5, 7, etc., in order)* and even-numbered boats on the port side *(2, 4, 6, 8, etc., in order).* If the boats are nested, No. 1-A is carried under No. 1, No. 2-A under No. 2 etc.

(4) *Q: What are limber holes and what are they for?*

A: Openings in frames near the keelson to permit water in the boat to run aft or forward to the drain hole when the boat is being drained.

(5) *Q: Why are lifeboats usually "double-enders?"*

A: *"Double-end"* boats are more seaworthy. They are less likely to ship water over the stern and less likely to broach to. They are easier to steer in a following sea, easier to handle alongside a vessel and much easier to handle in a surf.

(6) *Q: What boats are always kept ready for immediate launching?*

A: The emergency boats. These boats are of suitable size, built for emergency use under all conditions of wind and sea, such as rescue of a man overboard, rescue of persons from a wreck, carrying out lines, etc. Generally they are of the whaleboat type with finer lines than the ordinary lifeboat. At sea, the sea painter in these boats is rigged ready for immediate launching.

(7) Q: How often must lifeboats be stripped, cleaned, thoroughly overhauled and painted?

A: At least once each year.

(8) *Q: How can temporary repairs to a large hole in a steel or aluminum lifeboat's side or bottom be made?*

A: Temporary repairs can be made as follows:

(1) Straighten and smooth the jagged edges around the hole.

(2) Place canvas, which has first been soaked in linseed oil and then painted with heavy red or white lead, about the hole, both inside and outside the shell, so as to cover an area of a foot or so about the hole.

(3) Place a white- or red-leaded piece of wood, big enough to cover the canvas, on the inside of the boat.

(4) Place a white- or red-leaded sheet of lead or tin, big enough to cover the canvas, on the outside of the lifeboat shell.

(5) Nail the lead or tin sheet through the shell plating, canvas and wood, spacing the nails close together and clinching them on the inside.

(9) *Q: May repairs or alterations be made to lifeboats aboard ocean passenger vessels? Explain.*

A: No repairs or alterations, except in an emergency, are allowed to be made to any lifesaving or fire-detecting or extinguishing equipment without advance notice to the Officer in Charge, Marine Inspection, USCG. When emergency repairs or alterations have been made, notice must be given to the Officer in Charge, Marine Inspection, USCG, as soon as practical.

(10) *Q: Who must be assigned as boat commander in a lifeboat?*

A: A licensed deck officer or a certificated lifeboatman.

(11) *Q: How many air tanks are required in a lifeboat*:

A: A sufficient number of suitable size, appropriately placed, to keep it afloat when filled with water.

(12) *Q: How can the air tanks of a lifeboat be tested for tightness?*

A: The air tanks of a lifeboat may be tested for tightness by removing the cap for the test plug on each tank and applying one pound or less air pressure. Leaks may be determined by the failure of the tank to maintain the pressure. If the source of the leak is not apparent, soapy water brushed over the tank will assist in determining the origin. Tanks also may be tested on a warm day when the temperature will have caused the air in the tank to expand. Air will be blown out the test plug when the cap is removed until it equalizes with the atmospheric pressure.

(13) *Q: How may lifeboats be propelled?*

A: By motor, manual propelling gear, oars and sails.

(14) *Q: When must a lifeboat be propelled by motor or manual propelling gear?*

A: When the boat's capacity is 60 or more persons.

(15) *Q: What type and size boats are usually designated as emergency boats?*

A: Normally, motor whaleboats not over 26 feet long.

(16) *Q: How many emergency boats are carried in passenger ships?*

A: One on each side.

(17) *Q: How many lifeboats are required, by USCG regulations, in passenger ships? In cargo ships?*

A: In passenger ships, a sufficient number to accommodate all onboard *(100 percent)*. In cargo ships, a sufficient number on each side to accommodate all onboard *(200 percent)*.

(18) *Q: Where does the ship's name appear in a lifeboat?*

A: On each bow; also stenciled on each oar.

(19) *Q: What two important facts are found on the builder's plate?*

A: Cubic capacity of the lifeboat and the number of passengers the boat may carry.

(20) *Q: Name four types of davits.*

A: (1) Gravity davit.
(2) Sheath screw davit.
(3) Quadrantal davit.
(4) Radial, or round bar, davit.

(21) *Q: Name the four types of metallic lifeboat construction.*

A: (1) Riveted.
(2) Welded.
(3) Crimped.
(4) Pressed.

(22) *Q: How are the lifelines (grab lines) rigged on a lifeboat?*

A: Lifelines are festooned in bights not longer than three feet along each side, with a seine float in each bight, which hangs to within 12 inches of the water when the boat is floating light. The seine floats may be omitted if the lifelines are of an inherently buoyant material and will absorb little or no water. The lifeline shall be of a size and strength not less than 3/8 inch manila. Grab lines, or grab rails, are fitted from gunwale to gunwale under the keel to enable persons to cling to and climb upon an upturned boat. If lines, three are required, of ½-inch diameter manila, with figure-eight knots 18 inches apart.

(23) *Q: Where are manropes or knotted lifelines required?*

A: Two must be secured to a guy or span between the davit heads for all boats. *(MSC policy requires four.)*

(24) *Q: Except in an emergency, who may authorize repairs or alterations to lifeboats or releasing gear?*

A: The Officer in Charge, Marine Inspection, USCG.

b. For use with Lesson No. Two *(Chapter 3),* Lifeboat Equipment.

(1) *Q: How are the oars stowed in a lifeboat?*

A: Flat on the thwarts, blades forward; steering oar with blade aft.

(2) Q: In what part of the boat are the hatchets kept?

A: One is kept at the bow and one at the stern of the boat.

(3) *Q: What is a sea painter? Describe its use.*

A: A painter of manila line not less than 2-3/4 inches in circumference and in length three times the distance from the boat deck to the light waterline. One end is secured to the forward thwart of the lifeboat with a strop eye and toggle so that it may readily be released from within the boat, and the other end is led well forward outboard of everything but inboard of the forward falls and made fast on the ship in such a position as to allow the lifeboat to ride to the sea painter directly under the davits. To retain better control of the boat, many ships have fitted a strop of manila near the stem which can be used to pass over the sea painter with the free end passed under the thwart. When the boat is cast off, the strop is pulled taut in order to tow the boat parallel with the ship's side. When the boat commander is ready to clear the side, the strop can be quickly released, the end thrown free, the boat then sheering away when the strain comes directly on the sea painter at the point where it is fast to the forward thwart. The sea painter toggle is secured to the boat with a lanyard or chain, not to the sea painter.

(4) *Q: Describe a sea anchor.*

A: A sea anchor is a cone-shaped canvas bag, the larger end held open by a metal ring. A bridle is attached to the ring at the larger end of the sea anchor and a drag line is made fast to the bridle. A light tripping line at least two fathoms longer than the drag line is made fast to the smaller end. A conical storm-oil container may be inserted in the sea anchor.

(5) *Q: How is a sea anchor used?*

A: A sea anchor is used as a drag to keep the boat's head *(or stern if desired)* into the wind and sea and to prevent rapid drifting. When held by the drag line, with trip line slack, it is wide open and drags through the water with considerable resistance. A container of storm oil, having small openings for the continuous discharge of oil, may be secured in the sea anchor.

(6) *Q: What may be used in lieu of a sea anchor?*

A: If no sea anchor is available, a substitute may be constructed from usable boat equipment, such as the boat bucket properly slung, an air tank filled with water or a combination of oars and canvas weighted and properly bridled.

(7) *Q: How is a sea anchor hauled in?*

A: A sea anchor is hauled in by its tripping line, which upsets it so that it is brought in small end first with greatly reduced resistance to its passage through the water.

(8) *Q: Name the parts of an oar.*

A: The parts of an oar are the handle or grip, leather, loom, blade and tip.

(9) *Q: Of what wood are oars usually made?*

A: Ash, but any wood of equal length of grain and strength may be used, such as beech, birch, etc.

(10) *Q: Describe the operation and use of water lights.*

A: The self-igniting water lights attached to ring buoys, rigid liferafts and buoyant apparatus must be of an approved automatic electric type. The electric water light consists of a tube containing dry cell batteries. It is mounted in an inverted position, so that when it is thrown overboard together with a ring buoy, it will be automatically righted on contact with the water by a weight in the bottom. A mercury or gravity switch closes the circuit and turns the lamp on. The batteries supply a continuous source of light for a period of not less than 15 hours.

(11) *Q: What lights should be displayed in a lifeboat at night?*

A: From sunset to sunrise, the boat's lantern hoisted as high as possible on the mast or on a spare oar.

(12) *Q: When using one of a ship's motor lifeboats as a means of transportation in the conduct of ship's business, what additional equipment is required in order to comply with the Rules of the Road?*

A: When a lifeboat is used as a means of routine transportation, it loses its emergency nature and comes into the same category as any other motorboat. As such, and during such employment, a motor lifeboat is subject to the applicable provisions of the Motorboat Act in United States waters, and of the International Rules elsewhere. Therefore, applicable requirements as to LIGHTS, WHISTLES and BELLS should be complied with. The fact that these are not part of the required equipment as a lifesaving measure does not exempt a boat from the necessity of possessing them if such lifeboats are used for any other purpose than emergency services.

(13) *Q: Why may lifeboat skates be required?*

A: To facilitate launching a boat from the high side of a listing ship.

(14) *Q: May articles not required be stowed in a lifeboat?*

A: Yes, if kept in good condition, ready for use and properly stowed so as not to reduce seating capacity or adversely affect seaworthiness.

(15) *Q: What lifeboats must be equipped with an additional bilge pump?*

A: Motor-propelled lifeboats of 100 persons or more capacity.

(16) *Q: When are mast and sails required equipment in a lifeboat?*

A: When the boat is propelled by oars.

(17) *Q: What care should be given sails and other canvas aboard ship?*

A: Sails and other canvas should be aired in fine weather to prevent mildew and rot.

(18) *Q: May MSC requirements for lifeboat equipment differ from those of the USCG?*

A: Yes, MSC requires some additional equipment. An MSC/USCG agreement permits substitution of Navy equipment for some USCG-approved items and in some cases a National Defense Waiver allows an equipment reduction.

(19) *Q: How is the sea painter toggle secured?*

A: By a lanyard or chain to the boat, not to the sea painter.

(20) *Q: What is the minimum length of lifeboat falls?*

A: The falls should be of such length that the lifeboat may be lowered to the water with the vessel at its lightest draft and listed 15 degrees.

(21) *Q: How often must motors in motor-propelled lifeboats be operated?*

A: Where motor-propelled lifeboats are carried, the motor of each lifeboat must be operated in the ahead and astern position for a period of not less than five minutes at least once in each week *(during drills)*.

(22) *Q: What equipment must be provided in gasoline-powered lifeboat motors to prevent fire caused by carburetor backfire or gasoline dripping into the bilge?*

A: Carburetors must be fitted with backfire flame arrestors and if not of the downdraft type, then carburetor drip pans covered with flame-arresting wire screens must be placed under the carburetor to prevent drippage into the bilge.

(23) *Q How are motor-lifeboat gasoline tanks vented, i.e., what means are provided to prevent the gasoline becoming "airbound" in the tank and not flowing to the fuel line?*

A: Gasoline tanks are vented by a very small diameter hole, usually in the filling caps. Care must be taken, particularly when boats are being painted, to see that this hole is not plugged.

c. Questions and answers for use with Lesson No. Three *(Chapter 4)*, Davits, Construction and Operation.

(1) *Q: Name and describe how to operate three types of lifeboat davits.*

A: (1) <u>Radial or round bar type</u>. The boat rests in chocks on deck under the davits. Hoist boat off chocks, slack and tend guys, swing boat aft and push bow outboard; swing boat forward and push stern outboard; center boat under the falls and set up the guys.

(2) <u>Sheath screw boom or crescent type</u>. Davit arms operated by an endless screw. The boat rests in chocks on deck under the davits. Remove outboard side of chocks, insert crank handles and crank the davit arms and boat out over the side ready for lowering. Quadrantal davits are cranked out in the same manner.

(3) Gravity davit. Operated on the gravity principle. Davit arms are mounted on rollers in tracks set at right angles to the ship's side. They are held in position by stopper bars, gripes, a brake on the falls winch and the floating-block locking hooks at the davit tips. To operate, cast off gripes and remove stopper bars, lift brake lever slightly and davit arms will roll easily down the tracks carrying the boat out over the side to the launching position. When davits fetch up against the trackway stopper at the ship's side, the boat will continue to lower away from the davits.

(2) *Q: What is the usual size of boat falls?*

A: The manila line used is usually from two to four inches in circumference depending upon the size and weight of the boat. With a three-fold purchase, the standing part is rove over the center sheave. In passenger ships, wire falls and mechanical means for lowering boats are required if the height of the boat deck exceeds 20 feet from the lightest seagoing draft. The length of falls is sufficient to reach the water at the lightest seagoing draft plus an allowance for 15 degrees list.

(3) *Q: What happens when manila lines become wet?*

A: They shrink in length and become slippery.

(4) Q: What precautions should be taken when lowering with wet manila boat falls?

A: Take one or more extra turns around the bitts to avoid slipping.

(5) *Q: What are tricing pendants and how are they used?*

A: They are wire pendants attached to each davit arm with an eye splice and thimble at the lower end. This eye hooks into a tripping device called a tricing-pendant trip hook, which is shackled to the lower falls block. The purpose of the tricing pendant is to bring the lifeboat in close to the embarkation deck as the boat is lowered. When the boat is in position, frapping lines are passed, hove taut, and secured, and the tricing-pendant trip hooks are tripped, one at a time to reduce jerking of the boat.

(6) *Q: How can the person in charge of a lifeboat prevent it from swinging when the boat is at the embarkation deck?*

A: By the use of frapping lines passed around the falls above the lower block and hove taut and secured. A slight fore-and-aft lead can be given the frapping lines if necessary to prevent swinging in a fore-and-aft direction. If necessary, a stern fast also can be used for this purpose, in conjunction with the sea painter.

(7) *Q: With radial davits, how is an emergency boat usually carried at sea?*

A: In readiness for launching, rigged outboard over the side and griped in to the rail or a strongback. Sea painters are led out and made fast.

(8) *Q: May lifeboats be carried at sea in such a way that they have to be raised before launching?*

A No, lifeboats must be stowed so that they can be swung out without lifting from their chocks.

(9) *Q: How are the two handcranks inserted to crank out sheath screw davits?*

A: With the two handles 180 degrees from each other for easy cranking without personnel getting in each other's way.

(10) *Q: What weight limit of lifeboats, fully equipped but without passengers, governs selection of davits?*

A: Boats weighing over 5000 pounds, equipped, may be launched only from gravity davits.

(11) *Q: Is any power required to launch a lifeboat in gravity davits?*

A: No, boats can be launched without power.

(12) *Q: What supports lifeboats in gravity davits when secured for sea?*

A: The boat gripes, stopper bars, the floating-block locking hook and the winch brake.

(13) *Q: What is a limit switch and where is it found?*

A: The limit switch is a switch which cuts off power to the boat winch when the davit arms have been hoisted nearly home. When the limit switch striking plates come up against a wheel connected by an arm to the limit switch, the current is shut off. One limit switch is installed under each gravity-davit trackway, about one foot below the stops.

(14) *Q: What is the purpose of the limit switch?*

A: To prevent hoisting a boat too high and two-blocking the falls, thus damaging gear or injuring personnel.

(15) *Q: What is the purpose of the emergency disconnect switch?*

A: Primarily to ensure that power cannot be applied when the davits are being cranked up to their full-stowed position. Also as an additional means of cutting off the power in event of sticking of the operating control and to ensure against accidental operation of the winch at any time.

(16) *Q: When should limit and emergency disconnect switches be tested?*

A: At each boat drill.

(17) *Q: Who may adjust the limit switch?*

A: Only authorized personnel *(engineers or electricians)*.

(18) *Q: What is a tricing-pendant trip hook?*

A: A trip hook on each fall block for attachment of the tricing pendants *(also called MacCluney hooks)*. They are tripped separately from inside the boat after the tricing pendants have pulled the boat in to the embarkation deck and the frapping lines have been passed and secured.

(19) Q: Do the tricing pendants hold the boat close in to the embarkation deck while passengers embark?

A: No, the tricing pendants are only used to draw the boat in to that position in order to pass the frapping lines. The frapping lines hold the boat there during embarkation and until ready for lowering.

(20) *Q: Before tripping the tricing-pendant trip hooks, what should be done?*

A: See that frapping lines have been passed and secured, and require men in the boat to sit down when tripping them as the boat will jerk.

(21) *Q: How should frapping lines be passed and secured?*

A: Pass the bight around the falls just above the lower falls block, heave taut and secure. With the newer types used in MSC ships, secure shackles, snap hooks or sister hooks on the ends of the wire strap, whichever is provided for, around the falls, and in the case of sister hooks, mouse them; then pass the manila hauling line to the frapping line tender on deck who will heave it taut and secure it on the cleat provided on the davit trackway for this purpose.

(22) *Q: In which cases are manila and wire boat falls used?*

A: USCG regulations require manila falls, or equivalent, where lifeboat winches are not used. Where lifeboat winches are used, wire falls of not more than two parts, must be employed. Lifeboat winches are required in all ships where the boat deck is over 20 feet above the lightest seagoing draft and therefore wire falls must be used in such cases.

(23) *Q: In ships equipped with winches for lowering lifeboats, what speed of lowering the loaded boat should be regarded as satisfactory when the winch is fitted with a governor brake?*

A: Between 40 *(light)* and 120 *(loaded)* feet per minute, except for emergency boats where it should be 60 to 160 feet per minute.

(24) *Q: What size manila line is used for lifeboat falls; how many parts are required; and what is the required factor of safety?*

A: The size and number parts of manila boat falls are required to be of sufficient strength to support the lifeboat fully loaded plus 10 percent of the total loaded weight, allowing a safety factor of six.

d. Questions and answers for use with Lesson No. Four *(Chapter 5),* Releasing Gear.

(1) *Q: In a lifeboat not equipped with simultaneous releasing gear, which fall should be unhooked first?*

A: If the vessel is stationary or has headway, the after fall should be unhooked first. If the vessel has sternway, the forward fall should be unhooked first.

(2) *Q: When should the releasing gear in a boat so equipped be tripped?*

A: Only when the boat is waterborne or within a few inches of the water.

(3) *Q: Name and describe briefly three types of releasing gear.*

A: (1) Raymond hook releasing gear *(not approved by the USCG).* A nonsimultaneous type which releases the boat when waterborne.

(2) A simultaneous release gear, such as the Mills type, in which bow and stern hooks are connected by a chain running through fairleads under the thwarts or side benches to an operating handle about one-third the distance from the stern. A pull on the handle tumbles both hooks.

(3) A simultaneous release gear, such as the Rottmer type, in which the bow and stern hooks are connected by a shaft and universal joints to an operating lever located aft of the after thwart. The release lever is painted red and has on it, in raised letters, "DANGER LEVER RELEASES HOOKS" or "DANGER - LEVER DROPS BOAT."

(4) *Q: What color and markings should the boat release gear operating lever be painted?*

A: Bright red, with raised white letters "DANGER - LEVER RELEASES HOOKS" or "DANGER - LEVER DROPS BOAT." The area in way of the red release lever from the keel to the side bench, is painted white, to provide a contrasting background for the lever. The band is approximately 12 inches wide.

(5) *Q: Who orders the boat release lever operated?*

A: Only the lifeboat commander.

(6) *Q: What would happen if the release lever was operated while the lifeboat was at the embarkation deck?*

A: The boat would drop, carrying any or all occupants down with it. All would be subject to serious injury or possible death.

(7) *Q: When should the order be given to operate the releasing gear?*

A: When the boat is waterborne, or within a few inches of the water.

(8) *Q: What precautions should be taken in handling boats equipped with releasing gear which operates under tension (Rottmer gear)?*

A: See that the required marking "DANGER - LEVER RELEASES HOOKS" or "DANGER - LEVER DROPS BOAT" is legible and understood by all hands involved in the operation. When men are performing any maintenance or repair work in the boats, where the releasing gear might be accidentally handled, lash the release lever and provide additional pendants or preventers attached to the breasthooks or bow and stern shackles independent of the releasing hooks.

e. Questions and answers for use with Lesson No. Five *(Chapter 6)*, Lifeboat Launching Procedures.

(1) *Q: What is meant by "two-blocking" the falls?*

A: Hoisting the lower falls block until it is as close to the upper block as it will go.

(2) *Q: How should a boat be launched in a heavy seaway?*

A: The ship should first be hove to on a heading that will reduce the roll and which will offer as good a lee as possible for the boat to be launched. Some ships are better in the trough, some with the sea on the bow, and some with a quartering sea. A boat may be launched with care by a well-drilled crew under adverse conditions. If the boat is not fitted with skates, mattresses should be slung up and down the side. Prior to lowering, storm oil should be used over the ship's side so that the oil will keep spreading. If the ship is rolling, the boat itself should be kept from swinging as much as possible by frapping lines until ready to lower. If the ship is pitching, the boat should be kept from swaying by keeping the sea painter taut forward and by using a stern fast aft in the same manner or by giving the frapping lines a slight fore-and-aft lead. When ready, the frapping lines should be tended, the boat should be lowered away smartly with the boat crew fending off, the releasing gear should be tripped to drop the boat onto the crest of a sea, and the boat should be sheered off immediately from the ship's side by using the steering oar and sea painter.

(3) *Q: How should a person in charge of a lifeboat proceed to get the boat launched and away from the ship under oars?*

A: Check crew at boat stations to see that all are adequately clothed and wear life preserves properly adjusted; prepare the boat for launching by removing boat cover and strongback, clearing gripes, chocks, stopper bars, etc.; hang the embarkation ladder over the side; have bow and stern tenders close boat drains and clear lifelines; lead sea painter well forward outside of all but the forward falls and see that it is tended; with manila boat falls remove the reel covers and tend the falls; swing the boat out using the proper method for type of davits. With radial davits guy the boat out, if under quadrantal davits crank the boat out and with gravity davits raise the boat-winch brake handle to permit the boat to slide down the trackway to the outboard position. Then lower until the tricing pendants bring it close to the embarkation deck. At the embarkation deck pass the frapping lines and secure them, then trip the tricing-pendant trip hooks one at a time. Embark the remainder of the crew and prepare the boat by readying the rudder and steering oar, seats, manual propulsion handles, lifelines, etc. Then embark passengers, seeing that they are adequately attired and have their life preservers on, properly fastened. When all are aboard, lower away, having men on deck tend the frapping lines and other men at the boat falls or boat winch. Have men in the boat fend off from the ship's side with boat hooks and trip the releasing gear as soon as the boat is waterborne or within an inch or two of the water. Order the boat's bow shoved off and get clear of the ship's side as soon as possible, using the sea painter and steering oar and having the crew stand by the oars or manual-propulsion handles to *"give way together"* as soon as possible.

(4) *Q: What are frapping lines and how are they used?*

A: A frapping line is any piece of line with a bight passed around the boat fall above the falls block, one end being made fast on deck and the other being hauled taut and belayed to prevent the boat from swinging. Manila frapping lines have been superseded in MSC vessels by improved wire strap frapping lines. Authorized frapping lines for lifeboat falls on MSC ships consist of a wire strap with an eye in each end secured to the falls by shackles, snap hooks or sister hooks of adequate size and strength and with a manila hauling line spliced around the bight of the wire strap. Where they can be left in place, with the falls two-blocked and the boats stowed, shackles will be used. Where shackles cannot be left in place on the falls, snap hooks or sister hooks will be used; and if sister hooks, they will be moused after hooking around the falls. Frapping lines will be stowed in the boat ready for use.

(5) *Q: What are the most important things to be done before a boat is lowered:*

A: (1) Make sure that the boat drain is closed and that the sea painter is carried well forward and tended.

(2) Make certain that release hooks and release lever are in the normal closed and locked position and that the safety toggle pin in the release lever securing device is in place before permitting the main gripes to be let go.

(3) Make sure that tricing pendants are correctly attached to the tricing-pendant trip hooks on fall blocks, and cleared.

(4) Make sure that all members of the boat crew and launching crew thoroughly understand their particular duties and responsibilities.

(6) *Q: What is the emergency signal for abandon ship or boat stations?*

A: Abandon ship, boat stations, or boat drill - more than six 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.

(7) *Q: What is the emergency signal for man overboard?*

A: Three long rings on the general alarm bells, announcement on the PA system in ships so equipped, then three more long rings on the general alarm bells *(international code signal "O").* Note: This signal has been adopted for MSC use; various other signals are used in the merchant marine.

(8) *Q: What other boat signals are given by whistle blasts for handling boats during boat drills?*

A: One short blast - lower boats.

Two short blasts -stop lowering boats. During drills at sea, this signal is frequently used as an order to hoist boats from the embarkation deck.

Three short blasts - dismissal from boat stations.

One short, one long, one short blast *(international code signal "R")* - recall and recover boats.

(9) *Q: Where would the station bill posted onboard be found?*

A: In the crew's quarters, living areas, in public spaces, such as the saloon mess, crew's day rooms, officers' day rooms, pilothouse, etc.

(10) *Q: Who authorizes sounding the signal for abandon ship?*

A: The Master.

(11) *Q: Who may order the signal for man overboard sounded?*

A: In event of an actual casualty, the senior watch officer may sound this signal.

(12) *Q: How should a boat crew be mustered at abandon ship drill?*

A: At their boat stations, nearest to the location of the equipment they are responsible for or where they will perform abandon ship duties.

(13) *Q: Name two advantages obtained by mustering at duty stations.*

A: The chance of crewmembers being obstructed by passengers is reduced; action is speeded by assembly of men at their stations.

(14) *Q: Should members of the lifeboat crew understand only their own duties?*

A: No, they should understand and be capable of performing the duties of all other members of the crew so that, in the absence of any one member, a prompt substitution may be made.

(15) *Q: Why are procedures in carrying out emergency drills standardized?*

A: To avoid confusion and so that a member of one ship's crew will understand his duties if transferred to another ship.

(16) *Q: Is a second in command assigned?*

A: Yes, one is assigned in each boat. He assumes command of the boat in event of absence or incapacity of the boat commander.

(17) *Q: Why should all hands wear a head covering at abandon ship?*

A: To afford protection from rain, snow or strong sunlight. Adequate clothing for the weather should be worn at all boat drills.

(18) *Q: Why should even an expert swimmer wear a life preserver, properly tied and adjusted, at abandon ship?*

A: To afford protection in event of insufficient lifeboat or liferaft capacity in case of damage to equipment; for protection in event of injury, being thrown into the water, being knocked unconscious when jumping overboard or being hit by falling objects while in the water; also, to provide body warmth.

(19) *Q: What is done when the order to prepare to launch boats is given?*

A: Bow and stern tenders board boats; remove boat covers, strongbacks and battens; hand test securing of release hooks by pulling on fall block lines; check securing of release lever and that safety toggle pin is in place; check and clear tricing pendants and trip hooks; let go gripes; assist in clearing gripes when let go; close boat drains and free manropes. Boat Commander must assure himself that release hooks and release lever are properly engaged and secured before permitting the gripes to be let go.

(20) *Q: How is the sea painter led?*

A: Over the inboard bow inside the forward boat fall, carried well forward outboard of everything else on the ship, and tended to keep the boat in position under the davits when in the water.

(21) *Q: What is done as soon as the boat is triced in at the embarkation deck?*

A: Frapping lines are passed, hove taut and secured.

(22) *Q: Before tripping the tricing-pendant trip hooks, what do the bow and stern tenders do?*

A: Sit down in the boat and grasp a manrope since the boat will jerk.

(23) Q: After the gripes are cleared, what is done with them?

A: They are lowered to the boat deck.

(24) *Q: After the signal to lower away boats has been sounded on the ship's whistle, what does the Boat Commander do?*

A: He checks to see that all is clear for lowering, then orders or signals the winchman to lower away easily. The signal means *"Lower when ready"* and the responsibility to see that the boat is ready for lowering is the Boat Commander's.

(25) *Q: When is the boat considered properly triced in?*

A: When the boat's gunwale is about one foot from the embarkation deck. The falls must not be slacked off so as to put the boat's full weight on the tricing pendants.

(26) *Q: When are the tricing-pendant trip hooks tripped?*

A: Only after the frapping lines have been hove taut and secured, and before passengers and crew, except for the bow and stern tenders, are embarked. Bow and stern tenders trip the tricing-pendant trip hooks separately, on order of the Boat Commander, after they are seated.

(27) Q: *When and how are passengers embarked in the boat?*

A: When at the embarkation deck, after the crew is aboard and boat has been readied to receive them and prepared for lowering. They are distributed through the boat so as not to effect the trim and to keep boat on an even keel, and are seated so as to avoid interference with the crew's handling of oars. Women and children should be placed in the center to protect them from spray or from falling out.

(28) *Q: While being lowered, how is a lifeboat kept from swinging as the ship rolls?*

A: By the use of frapping lines hauled taut and secured and by bow and stern tenders, or other available crewmembers, fending off from the ship's side with the butt ends of boathooks. Frapping lines must be tended while the boat is lowered.

(29) *Q: How should the sea painter be secured onboard ship?*

A: On the deck forward, led outboard of everything but the forward fall, and with just enough slack to permit the boat to drop back alongside the embarkation ladder or net.

(30) *Q: What is the most dangerous point in lowering a boat?*

A: The most dangerous point in lowering is at the time of unhooking, when the boat may be smashed against the ship's side. The coxswain must be free at this time to use all his energy to get the boat away from the ship's side.

(31) *Q: Is the forward or after fall unhooked first in lowering a boat not equipped with releasing gear?*

A: The forward fall must never be unhooked until after the after fall is free, unless the ship has sternway.

(32) *Q: When should you trip the releasing gear in a boat so equipped?*

A: Only when the boat is waterborne or within a few inches of the water.

(33) *Q: When clearing the ship's side, how should the boat be steered?*

A: With the steering oar. The boat can be kept in position alongside by the sea painter, assisted by use of the steering oar. When ready to cast off, the boat is sheered out, the sea painter toggle is pulled, and the crew ordered to give way. When well clear, the rudder can be shipped.

(34) *Q: How far up are the falls brought by the winch after the bottom boat has been launched and the falls are being recovered in order to lower the top boat?*

A: To a point where the lower chain links on the fall blocks are slightly below the boat's releasing hooks. Power is then shut off, the engaging links are held in position on the hooks and the slack is taken up by using the quick-return or small handwheel on the winch.

(35) *Q: During drills, how may the sea painter be made available to boats returning alongside?*

A: By a tricing line about 1½ fathoms from the eye; by lightly securing the end to the falls above the block or by hanging it in a bight under the davits.

(36) *Q: In addition to wearing life preservers during emergency drills, under what other circumstances should life preservers be worn?*

A: The question of wearing or not wearing life preservers whenever there is a chance of falling overboard, such as painting over the side, handling mooring lines at the pier's edge, working or rowing in small boats or entering lifeboats, either afloat or hoisted for any purpose, is a question which has been debated among seamen for years. It is a question, however, to which there is but one realistic answer--wear them! Less bulky working lifejackets also are provided.

(37) *Q: Should the passengers aboard an ocean passenger vessel be encouraged to participate in fire and boat drills?*

A: Yes, passengers should be encouraged to participate fully in the drills. They also should be instructed in the use of life preservers.

f. Questions and answers for use with Lesson No. Six *(Chapter 7)*, Boat Handling.

(1) *Q: What is meant by the term "broaching to?"*

A: When a boat is caught broadside to sea or swell.

(2) *Q: What is the effect of storm oil?*

A: Storm oil does not lessen the size of seas, but it does tend to prevent them from combing or breaking. It will usually be of aid in any sea in which a lifeboat can survive.

(3) *Q: What is the purpose of feathering an oar?*

A: To reduce wind resistance and prevent *"catching a crab."*

(4) *Q: What is the meaning of the order "back water?"*

A: To row the opposite way in order to obtain sternway.

(5) *Q: What is meant by the order "stern all?"*

A: To take the way off a boat which has headway. To carry out this order, the blades of the oars are dipped very slightly in the water on the backstroke for only a few strokes. The depth to which the oars are dipped is increased as in rowing ahead. When headway is off the boat, a well-trained crew will commence to *"back-water"* without further order.

(6) *Q: Adrift in a lifeboat at sea, what equipment could be used to signal or attract an airplane or ship?*

A:
(1) Radio, if so equipped.
(2) Signal pistol and parachute flares.
(3) Distress flares.
(4) Orange-smoke signals.
(5) Signaling mirrors.
(6) Flashlights.
(7) Searchlight, if so equipped.
(8) Lantern.
(9) Orange sails, if so equipped.

(10) Dye or sea marker.

(7) *Q: What is the USCG signal meaning "Launching here highly dangerous?"*

A: By day - horizontal motion of a white flag or arms extended horizontally. By night - horizontal motion of white light or flare.

(8) *Q: What is the USCG signal meaning "This is the best place to land?"*

A: By day - vertical motion of a white flag or the arms. By night - vertical motion of a white light or flare. A range *(indication of direction)* may be given by placing a steady white light or flare lower and in line with the observer.

(9) *Q: In a lifeboat under sail, running before a gale in a heavy sea with night coming on, it becomes dangerous to run. What should be done?*

A: Douse the sail and heave to. Put out the sea anchor and ride to it, using storm oil on the water.

(10) *Q: Which is the luff, foot, leech, tack, clew, peak and throat of a fore-and-aft sail? (See Figure 7-3.)*

A: LUFF - the forward side; FOOT - the lower side; LEECH - the after side; HEAD - the upper side *(no head on a triangular sail)*; TACK - the bottom of the luff where the tack line goes, or the lower forward corner; CLEW - the after lower corner where the sheet is secured; PEAK - the upper after corner; THROAT - the forward upper corner *(there is no throat on a triangular sail)*.

(11) *Q: What kind of sails are lifeboats equipped with and how should they be set?*

A: Lifeboats are generally equipped with lug sails. The dipping lug is the one most commonly used. To set a dipping lug, a yard which is attached to the head of the sail is hoisted up the weather side of the mast by a halyard. The halyard is generally made fast to a strop located one-third to one-half of the distance from the forward end of the yard. This strop is kept secured in position so that the sail will always be set properly. The tack is temporarily made fast near the bow, leaving sufficient slack. After the sail has been hoisted by the halyard, the tack is hauled down tight and the sheet carried aft. Where a jib is carried, a standing lug is generally used. In this case, the tack is made fast to a cleat on the mast or to a cleat on the thwart to which the mast is clamped. To set the jib, the tack is made fast at the bow; then, the jib halyard is hauled down until the luff is tight, after which the sheet should never be made fast but a turn should be taken around the cleat and held in hand ready for release. A sprit sail is sometimes provided for a lifeboat. This sail is kept spread by a spar with a pointed end which is stuck into the cringle at the peak of the sail, while the bottom part of the spar is carried in a strop near the tack at the mast.

(12) *Q: Describe tacking, wearing and gybing.*

A: (1) In tacking, a sailboat changes course so that the wind comes over the opposite side by turning with the bow passing through the wind.

(2) Wearing is the same except that the boat's stern passes through the wind.

(3) Gybing occurs during wearing and takes place when the main sail passes from one side of the boat to the other; this is dangerous if not skillfully done in anything but a light breeze.

(13) *Q: When running well off the wind or running free in a sailboat, how can a sudden gust of wind, which threatens to capsize the boat, be met?*

A: Slack the sheet to spill the wind out of the sail and luff the boat up into the wind at the same time.

(14) *Q: What does "running before the wind" mean?*

A: Sailing with the wind well abaft the beam; running free.

(15) *Q: What is the meaning of "close-hauled?"*

A: Sailing as close to the direction from which the wind blows as the boat will sail and still gain the most distance to windward, generally five or six points off the wind; by the wind or close to the wind.

(16) *Q: How should a person in the water be picked up?*

A: The circumstances and judgment should determine the best approach. Normally, it is best to approach a man in the water so as to put him on the windward side of the boat. If he is approached from windward, the boat may drift down on him. However, if speed is essential, then the most direct approach is the best. Order *"In bows"* and have bowmen stand by with boat hooks. When close to the victim, get enough oars boated to take him aboard amidships.

(17) *Q: From which direction should a drifting plane be approached in a lifeboat?*

A: From windward, to avoid the plane drifting down on the boat.

(18) *Q: From which direction should a burning ship be approached in a lifeboat?*

A: From windward, to avoid sparks, smoke and heat.

(19) *Q: If hove to by the sea anchor and the dragline is carried away, how should the boat's head be kept up to the wind and sea?*

A: By using the oars; rig a drogue *(drag)* or other substitute sea anchor as soon as possible.

(20) *Q: When steering a boat by compass, where should the compass be placed?*

A: Aft, where it is convenient for the man steering to see, and secured so that the lubber's line is as close to the centerline of the keel as possible and in line with the keel.

(21) *Q: If heading for a particular place or point of land in a lifeboat, and fog shut in, what should be done?*

A: As soon as signs of fog appeared, take a compass bearing of the place or point and then steer by compass, keeping a sharp lookout for breakers.

(22) *Q: How should attention be attracted in a lifeboat at sea if the lights of a ship were seen at night?*

A: Use distress or other signals until an answer is received. If the ship is a considerable distance off, use the signal pistol until an answer is received.

(23) *Q: Name three safe methods of approaching a beach through a moderate surf.*

A: By veering an anchor, using a drogue or drag or by backing in stern first.

(24) *Q: How should a lifeboat be landed on the beach with a strong wind on shore, a high sea and heavy surf?*

A: If it is possible for the lifeboat to ride out the sea, it is probably better to wait outside the breakers until the sea moderates or else seek a better landing place. There are many cases where lives have been lost in attempting to go through surf at a time when the boat was perfectly safe outside the breakers. Watch carefully when approaching and find a good place where the surf is least heavy. Head directly for the beach, towing the sea anchor over the stern, spreading oil, and have the oarsmen pull an easy stroke to keep a strain on the dragline so as to prevent the stern from being thrown around by the sea and the boat from being capsized. Storm oil may be used as an advantage to prevent the seas from combing and breaking over the boat. When on the last sea and making the beach, trip the sea anchor and have the oarsmen pull vigorously so that the boat will go up on the beach as far as possible and not capsize. A bucket or any drag also can be used instead of a sea anchor. Another method consists of dropping an anchor outside the breakers and keeping a strain on the anchor line while going through the surf, using it to hold the bow or stern *(as the case may be)* up to the sea. If there is no anchor or drogue available, pull in close to the breakers, watch for a lull and then back the boat in, pulling toward each sea as it breaks. Do not let the boat fall broadside to and capsize. With an inexperienced crew or with passengers embarked, it is usually best to turn the boat outside the outer line of breakers and approach the beach stern first.

(25) *Q: Why do experienced seamen back water when a breaker approaches while rowing in through the surf towards the beach, either bow or stern first?*

A: To prevent the boat from being picked up and carried along by the breakers.

(26) *Q: In a motor lifeboat, how does the torque of the propeller affect the boat when the ordinary right-handed marine engine is used?*

A: With the helm amidships, and the engine running ahead, the boat's head gradually goes to port. With the helm amidships and engine going astern, the boat's stern goes to port rapidly. When going ahead, a small amount of right rudder is necessary to counteract the propeller thrust. As the effect of the torque is greater when going astern, advantage may be taken of this tendency when maneuvering in close quarters by turning the boat to the right. By going ahead with right rudder, and astern with left rudder, and repeating the process, the stern is sheered rapidly to port and the boat is quickly turned. In maneuvering a motor lifeboat it is best to use the engine at a moderate speed, both ahead and astern, in order to get the maximum benefit in steering.

(27) *Q: What will probably happen when going astern in a motorboat in a high wind?*

A: The stern will come up into the wind.

(28) *Q: Is the action of the rudder in a motor lifeboat more pronounced than in a large vessel?*

A: It is, because of comparative rudder areas. A motor lifeboat can be steered when going astern much better than a ship can.

(29) *Q: Which moves first when the rudder is put over, the boat's head or stern?*

A: The boat's stern moves first.

(30) *Q: Describe a manually operated propeller as used in a lifeboat?*

A: The manually operated propeller *("Fleming gear")* performs the function of oars. The usual clutch, shafting, stuffing box and propeller found in a motor lifeboat are used. Shafts run the length of the boat along the footings and are connected to the propeller shaft by a system of gears. Wooden pulling handles are inserted in sockets along the shaft and motive power is furnished by the movement of the bars in a fore-and-aft direction by the occupants of the boat *(either passengers or crew)*, causing the propeller to rotate. The whole device is so constructed that no previous instruction is necessary for its operation. The direction of rotation of the propeller, and hence the direction of motion of the boat, may be reversed by means of a gear lever located in the stern of the boat.

(31) *Q: Describe how to take a reef in a lifeboat sail while underway in a fresh breeze.*

A: When the boat has good headway and the men are assigned their duties and all seated, the boat is luffed, but not to the point where control and steerageway are lost. One hand lowers the halyards as much as necessary; another hauls down on the luff of the sail and shifts

the tack. The sheet is hauled in a little to let the men detailed for the reef points get hold of and gather in the foot. The sheet is then slacked and shifted, the reef points passed, the halyards manned, the sail hoisted and the sheet trimmed. It is important to keep the boat under command while reefing and for this she must have sufficient way on to obey her rudder. If the crew is not well-trained, it may be best to lower the sail entirely in order to take the reef, keeping her head into the wind by use of the oars.

(32) *Q: How is the North Star located and a course set by it if at sea in a lifeboat with a damaged compass?*

A: The North Star is located on a line extending from the pointer stars of the Big Dipper, about midway between the Big Dipper and Cassiopeia. Since the North Star is always within a few degrees of true north *(the maximum difference is 2.9 degrees in latitude 70 degrees N)*, a course can be set by merely heading the boat in such a direction that the relative bearing between the boat's heading and the North Star is the same as the angle between the desired true course and true north. To steer east, head the boat so that the North Star bears abeam to port.

(33) *Q: In what direction would the lifeboat be heading if the North Star bore broad on the starboard quarter?*

A: The lifeboat would be heading about southwest.

(34) *Q: How is a sea anchor hauled in?*

A: A sea anchor is hauled in by means of its tripping line, which upsets it so that it is brought in with the small end first, reducing resistance of its passage through the water.

(35) *Q: Which oar is the stroke oar in a lifeboat?*

A: The oar nearest the stern in a single-banked boat. In a double-banked boat, the port and starboard oars nearest the stern are both stroke oars.

(36) *Q: When steering a lifeboat by compass, where and how is the compass secured for maximum efficiency?*

A: Aft, where the Boat Commander and coxswain can best see it, and as far away from metal installations as practicable. It should be placed as near the boat's fore-and-aft centerline as possible, with the lubber line parallel to the keel. Metal articles should be kept away from the compass.

(37) *Q: What is the name of the line which is used to haul in the sea painter?*

A: The tripping line.

(38) *Q: How can the approximate compass error of a lifeboat compass be determined at sea?*

A: By observing the North Star the error can be found within 3 degrees.

(39)*Q: What is the principal objective of boat launching and handling?*

A: To remove passengers and crew from a ship in distress and get them safely ashore or to a rescue ship.

(40)*Q: How can a boat alongside under the davits be kept from swinging forward with the motion of the sea?*

A: By rigging a line from the stern to point aft on the ship. This is called a stern fast.

(41)*Q: In using an accommodation ladder while at anchor in a seaway, how can boats be prevented from getting under the ladder due to their rising and falling with the waves?*

A: A stout timber lashed or otherwise secured to the lower outside end of the accommodation ladder or platform and extending down into the water will act as a fender and prevent boats getting under the gangway.

(42)*Q: If in charge of a lifeboat, how should the boat be brought alongside a gangway under ordinary conditions, and what orders should be given?*

A: Come up to the vessel from astern so that the boat is parallel to the vessel when about 100 yards from the gangway, and then give the order *"in bows"* whereupon the two-bow oarsmen boat their oars and stand by with boat hooks; when the boat is about two boat lengths from the gangway, give the order *"oars"* followed by *"boat your oars,"* whereupon all of the oars are boated; next, sheer the bow in toward the gangway, and when it nearly touches, shift the helm and steer the bow out, bringing the stern in. Due regard, of course, must be had for wind, tide and sea. It is customary to have a painter ready at hand at the gangway, and led well forward on the vessel, for use in moderate weather.

(43)*Q: When should commands to oarsmen be given while rowing?*

A: At the start of a stroke. Oarsmen complete that stroke, then execute the new command in unison.

(44)*Q: Why should the steering oar be used when clearing the ship's side?*

A: It gives the Boat Commander much better control of the boat.

(45) *Q: Describe how to rig a boat with sails.*

A: Lay mast and sails along the thwarts with the mast heel near the mast clamp. Lower the centerboard and ship the rudder with tiller in place. Clear stays and shrouds and reeve the halyards. Raise and step the mast, close and secure the mast clamp. Set up and secure the forestay and shrouds. Bend the jib on and secure the jib tack in the bow. Hoist the jib and pass jib sheets aft in the boat. See that the mainsail is clear and hoist it after stationing a man aft to tend the main sheet.

(46) *Q: What direction is meant by windward and leeward?*

A: Windward means toward the direction from which the wind blows; leeward is the direction the wind is blowing.

(47) *Q: What is accomplished by reefing the sail?*

A: Less area is exposed to the wind; sail is shortened.

(48) *Q: Is it right to "wear" a sailboat in a strong wind?*

A: No, wearing is dangerous in a strong wind and should not be attempted except when necessary. Instead, douse the sail and turn the boat with the oars or else come completely around and head into the wind and then let her drop off with the wind on the other side.

(49) *Q: What is the duty of the boat's crew to passengers?*

A: The boat crew shall exercise the utmost care to ensure passenger safety, comfort and welfare.

(50) *Q: How is chafing of the drag line prevented when a boat is riding to the sea anchor or a drogue?*

A: By the use of chafing gear wrapped around the drag line at points of chafing, as over the gunwale.

(51) *Q: Why is it important that lifeboat sail dimensions and mast and yard specifications be adhered to as closely as possible?*

A: It is important that the pertinent regulations be adhered to in order to provide a minimum of sail power. If the dimensions are exceeded there is danger of capsizing from too great a heeling moment.

(52) *Q: When running before a heavy sea in a lifeboat with sail set, what precautions should be taken to keep the boat from broaching to?*

A: The weights in the boat should be so distributed that the stern is deeper in the water than the bow. If necessary, a drag, such as a sea anchor, a bucket on a line or a rope in the water should be used over the stern.

(53) *Q: How is storm oil usually spread from a lifeboat?*

A: From the sea anchor. A conical oil container inserted in the sea anchor is fitted with two petcocks; each should be partly opened to permit the oil to escape.

g. Questions for use with Lesson No. Seven *(Chapter 8)*, Recovering Lifeboats.

(1) *Q: If in charge of a lifeboat, what steps should be taken to recover it under ordinary conditions?*

A: Bring the boat alongside the ship under the davits; get the painter and make it fast. The Master may, at his discretion, send all of the crew except bow and stern tenders and ladder tender aboard by the embarkation ladder or he may have the entire boat crew ride the boat up to the embarkation or boat deck. Hook on boat falls, making sure that release hooks and release lever are closed and secured; immediately thereafter commence hoisting. If both falls are not led to the same winch, see that boat comes up evenly; ladder tender will stow the ladder as boat comes up. As soon as boat is clear of water, have boat drains opened; frapping lines will keep the boat from swinging and a stern fast also may be used. Stop the boat and remove the ladder at the boat deck; then heave the boat inboard to its stowed position according to type of davit used. With gravity davits, crank the davits up the last foot by means of the hand crank; secure by means of gripes and stopper bars and replace and secure boat cover.

(2) *Q: Why should the approach back to the boat falls in a lifeboat be made at an oblique angle?*

A: If the approach is not at a proper angle when coming alongside, the boat may drift in under the counter of the ship or accidentally ram its bow or stern on the ship's hull.

(3) *Q: Why is the steering oar used in coming alongside in a lifeboat?*

A: It is safer and more practical to use the steering oar because of its improved maneuverability. The rudder will not steer a boat without headway while the boat's stern may be pulled around with the steering oar even without way on.

(4) *Q: What command may be given to oarsmen coming alongside that would permit the stowing of oars from a rowing position?*

A: *"Oars"* followed by *"Boat yours oars."*

(5) *Q: Who fends a lifeboat off forward with a boat hook when coming alongside?*

A: The bow tender.

(6) *Q: Why is it important to grasp the boat falls if they are hanging near the water bringing a boat alongside to hoist it?*

A: To prevent the fall blocks from striking personnel in the boat and to assist in maneuvering boat to embarkation position under the davits.

(7) *Q: What equipment can be used in bringing a lifeboat into position alongside the embarkation ladder and under the davits.*

A: Its own way and the steering oar, boat ropes, manropes, sea painter, stern fast, the boat falls, boat hooks, etc.

(8) *Q: How many of the boats crew should be left in the boat when it is hoisted?*

A: This is left to the Master's discretion. He may have most of the crew come aboard via the embarkation ladder or may let the entire boat crew ride the boat up to the embarkation or boat deck. In rough weather, it may be necessary to hoist the boat without delay, in which case all of the crew would remain in the boat to help fend it off. If most of the crew come aboard first, not more than four men remain in the boat, the bow and stern tenders and ladder tenders.

(9) *Q: Why consider debarking unnecessary personnel from a lifeboat before hoisting it?*

A: For safety in reduced weight, lighter draft for hooking on the boat falls, and more working space.

(10) *Q: How are the wire boat falls slacked off in order to hook them on to a lifeboat's releasing hooks in order to recover it?*

A: The winchman slacks off using the small handwheel on the boat winch and the men in the boat overhaul the falls by hauling down on them.

(11) *Q: Why can't the boat winch be used to slack off the falls in order to recover the boat?*

A: Winches for boats under gravity are designed to operate only on *"hoist"* and to lower boats by gravity by releasing the brake. Therefore, slack must be backed off by means of the quick-return handwheel and the falls must be overhauled by hand.

(12)*Q: How is a boat's releasing gear secured before hoisting?*

A: By closing releasing hooks and release lever and securing the release lever in its closed position by means of the safety toggle pin.

(13)*Q: Who gives the order to hoist a lifeboat?*

A: The Boat Commander.

(14)*Q: Where should the men who remain in the boat stand while it is being hoisted?*

A: They should not stand; they should be seated and hold onto the manropes.

(15)*Q: What is the term used to describe lowering the falls in order to recover the boat?*

A: Overhauling the falls.

(16)*Q: How may the limit switches on gravity davits be tested during boat drills?*

A: Limit switches shall be tested each time the boats are hoisted. This may be done by momentarily pulling down on each contact breaker wheel while hoisting boats to ensure that power cuts off. This should be done after men are out of the boat and while well clear of the stowed position.

(17)*Q: How is a boat under gravity davits brought up to its stowed position after it has been stopped just short of the point at which the limit switch would cut power off the winch?*

A: The handcrank must be inserted and the boat and davits cranked up to their full-stowed position by hand.

(18)*Q: Why are the tricing pendants engaged to boat fall blocks after the boats have been recovered and before securing them?*

A: Tricing pendants are attached to ready the boats for their next launching and ensure that they will trice in to the embarkation deck when lowered.

(19)*Q: How is additional slack in the gripes obtained in order to secure the boats?*

A: By loosening the turnbuckles.

(20) *Q: How should the manropes be stowed?*

A: Manropes should be faked so that they can be run free; they should not be coiled.

h. Questions and answers for use with Lesson No. Eight *(Chapter 9)*, Rafts and Floats.

(1) *Q: Why are inflatable liferafts important articles of a vessel's abandon ship equipment?*

A: They may be necessary to take care of personnel in the event all lifeboats cannot be launched due to casualty damage or loss in launching.

(2) *Q: What is the weight of a USCG approved inflatable liferaft complete with container and equipment?*

A: Not more than 400 pounds.

(3) *Q: Describe the allowed capacity of an inflatable liferaft with half the compartments in the buoyancy tubes deflated.*

A: The raft will carry its rated number of persons even when half the compartments in the buoyancy tubes are deflated.

(4) *Q: What is the purpose of the steel retaining bands around a USCG approved inflatable liferaft container?*

A: They are straps that seal the halves of the container together, which break when the raft is inflated.

(5) *Q: Describe the different ways an inflatable liferaft can be launched.*

A: (1) Automatic -- float free of sinking ship.
(2) Manual -- container is tossed overboard.
(3) Davit -- launched from ship's deck.

(6) *Q: What is the length of the painter/operating cord of a USCG approved inflatable liferaft?*

A: 100 feet.

(7) *Q: Describe the automatic launch sequence for an inflatable liferaft.*

A: As the ship sinks the liferaft container floats free of the ship pulling the operating cord from the container as the ship sinks deeper. When the ship sinks below the length of the operating cord, the raft's inflation system is activated inflating the raft.

(8) *Q: What is the purpose of the weak link at the point of attachment of the inflatable liferaft's operating cord to the ship?*

A: During the automatic launching of the liferaft, the buoyancy of the raft causes the weak link to break due to the pull of raft and operating cord against the weak link on the ship.

(9) *Q: What are the principal differences between USCG approved inflatable liferafts and the U.S. Navy Mark 6 inflatable lifeboat?*

A: (1) Instead of a weak link, the Mark 6 is fitted with a painter of 5/32" braided nylon with a breaking strength of 540 pounds. The painter performs the same function as the weak link.

(2) Laps and seams of the Mark 6 upper and lower tubes are secured by vulcanizing in a steam or air pressure autoclave. USCG approved rafts use adhesive glue to bond laps and seams.

(3) Inflation is attained by high pressure air cylinders in the Mark 6. USCG approved rafts are inflated by carbon dioxide (CO_2).

(10) *Q: How often must buoyant apparatus be overhauled?*

A: They must be cleaned and thoroughly overhauled at least once a year.

(11) *Q: May lifefloats of over 400 pounds be carried?*

A: Yes, but they must not require lifting in order to launch them; they are stowed on launching skids.

(12) *Q: How are lifefloats secured?*

A: By lashings which can be easily released.

(13) *Q: May lifefloats be stowed one above the other?*

A: Yes, but not over four tiers high. When so stowed, each unit must be separated by suitable spacers.

(14) *Q: What is the weight limit of buoyant apparatus?*

A: 400 pounds.

(15) *Q: What means are provided for persons in the water to hold onto lifefloats and buoyant apparatus?*

A: A grab line is festooned around them in bights not over three feet long.

(16) *Q: How do persons in the water hold on to buoyant apparatus?*

A: By lifelines becketed around the outside, or by pendants attached to it, or both.

i. Questions and answers for use with Lesson No. Nine *(Chapter 10),* Signals and Lifesaving. **Note:** Many questions pertaining to signals and lifesaving have been covered in the preceding lessons.

(1) *Q: What is the most immediate danger to a man falling overboard from a steamer?*

A: The most immediate danger is that of being struck by the propeller. The first thought of a man falling overboard should be to swim outward from the ship.

(2) *Q: What should be done if someone is seen falling overboard?*

A: Shout *"Man overboard,"* throw over a ring buoy and get word to the bridge as soon as possible, indicating which side he went over.

(3) *Q: Which distress signals can be used either by day or at night?*

A: A gun or other explosive fired at one-minute intervals, continuous sounding of any fog signal apparatus, SOS by radio or by any other signaling method; the word *"Mayday"* by radio telephone and flames on the ship.

(4) *Q: Which distress signals can be used only by day?*

A: The international code signal flag hoist N over C; the distant signal consisting of a square flag having above or below it a ball or similar shape; the national ensign flown inverted.

(5) *Q: Which distress signals can best be used by night?*

A: Flames, as from a burning tar or oil barrel; rockets or shells, throwing red stars fired one at a time at short intervals; rocket parachute flares showing red lights.

(6) *Q: Who is usually in charge of launching the emergency boat?*

A: The First Officer.

(7) *Q: How is an emergency boat directed to a man in the water?*

A: Lookouts are posted to keep watch on the victim and the boat is directed by radio or by visual signals -- Turn to starboard - one; turn to port - two; dead ahead - three; towards ship - four and stand off, we are maneuvering *(danger signal)* - five.

(8) *Q: What lifeboat equipment may be used to attract attention of rescue craft?*

A: Dye marker, which colors the surface of the sea; flashlight; lantern; signal mirrors to deflect the sun's rays; pyrotechnics, including hand distress signals, floating orange-smoke signals and parachute flares; radio, if provided. Orange-colored lifeboat sails assist in the daytime and the searchlights of motorboats at night. Hoisting a metallic object aloft, such as a bucket, will aid in earlier detection by radar equipped vessels.

(9) *Q: What are line-throwing guns used for?*

A: For lifesaving in cases where boats cannot be used.

(10) *Q: Describe the use of the breeches buoy.*

A: A light line, called the shot line, is shot or sent over to a ship in distress. Those onboard haul in this line until a tailblock with a whip or endless line rove through is brought aboard. Take the tailblock and make it fast to the lower mast well up, or to the best place available, and cast off the shot line. See that the endless line runs free, then signal the shore. A 3-inch hawser will be hauled onboard; make it fast about two feet above the tailblock. See that all is clear and the rope in the block runs free and signal the shore. The shore party hauls the hawser taut and hauls the breeches buoy to the ship. One person gets in, a signal is shown, and he is hauled to shore. This procedure is repeated until all are ashore. Instructions in English and French are attached to the tailblock and the hawser.

(11) *Q: What is the principal feature of a Class "A" EPIRB?*

A: They are designed to float off the sinking vessel and automatically activate.

(12) *Q: What is the purpose of the lanyard provided with an EPIRB?*

A: The lanyard on an EPIRB is intended to be used to secure the EPIRB to a lifeboat, liferaft or person in the water. Under no circumstances is the lanyard to be attached to the vessel. To do so defeats the float-free operation of the EPIRB.

j. Questions and answers for use with Lesson No. 10 *(Chapter 11),* Enclosed Lifeboats.

(1) *Q: When should seat belts be fastened in enclosed lifeboats?*

A: Seat belts should be securely fastened immediately upon boarding. The boat is designed to be self-righting but *"hanging on"* rather than using the seat belts creates instability. Should the boat roll in a seaway a shift of the passenger load may cause the boat to capsize.

(2) *Q: During lowering with the Miranda Gravity Boat Davit system, how is the boat protected?*

A: The cradle rolls down the side of the ship supporting the lifeboat. The cradle separates when the boat becomes waterborne.

(3) *Q: After enclosed lifeboats are loaded, how is lowering accomplished?*

A: The Boat Commander pulls down on the brake control wire. Lowering is controlled from inside the boat as it moves downward. Release of the wire will stop boat lowering.

k. Questions and answers for use with Lesson No. 11 *(Chapter 12)*, Exposure *(Survival)* Suits.

(1) *Q: Exposure suits are required for each crewmember and person in addition to the crew. For what purpose are additional exposure suits required?*

A: Additional exposure suits are required at watch or workstations, usually the pilothouse, engineroom or the bow lookout station. Workstations may include the radio room, galley, ship's office, laboratories or shop facilities depending on the location and the proximity of the living quarters of the persons who man the workstation.

(2) *Q: Why should an exposure suit never be worn as part of the "fireman's outfit?"*

A: Approved suits manufactured between 1980 and 1986 will not self-extinguish. When exposed to flame the suit may continue to melt and burn slowly until consumed. Suits constructed after July 1986 are required to self-extinguish but are not fireproof.

(3) *Q: Should a life preserver be worn with a USCG approved exposure suit?*

A: No. . . the USCG approved exposure suit provides flotation as well as warmth. Wearing a life preserver over the suit is not practical.

14.3 PRACTICAL DEMONSTRATIONS

Prepare seamen for the USCG practical demonstration of proficiency in clearing boats away, swinging them out, lowering boats and rafts and handling of boats under oars and sail. This is best done aboard ship, using the ship's boats, whenever the opportunity presents itself. The group can be organized as a boat crew and assigned stations, rotating the various stations and assignment as Boat Commander. Thus all hands can be drilled and checked out in:

a. Operation of davits.

b. Clearing away, swinging out, and lowering of boats and rafts.

c. Handling boats under hand-propelling gear or oars.

d. Rigging and handling boats under sail.

e. Ready identification of all equipment.

f. Ability to take charge as boat commander in clearing away, swinging out, lowering and handling boats under oars and sails.

g. Recovering boats.

CHAPTER 15

U. S. COAST GUARD EXAMINATIONS
(Lesson No. Fourteen)

15.1 EXAMINATION BY USCG INSPECTOR

a. Practical Demonstration. The examination requires practical demonstration of proficiency in clearing away, swinging out and lowering of lifeboats and liferafts, and handling of lifeboats under oars and sails. Since July 1957, an applicant for certification as lifeboatman is required to qualify as lifeboat commander in addition to qualifying as a skilled member of the boat crew. The practical demonstration includes:

(1) Operation of commonly used types of davits.

(2) Clearing away, swinging out and lowering boats and rafts.

(3) Handling boats under oars.

(4) Rigging and handling boats under sail. Actual sailing may or may not be required.

(5) Identification of davits, boats, rafts, boat parts and equipment, including sails.

(6) Demonstration of ability as Boat Commander by taking charge and issuing proper orders to direct clearing away, swinging out, lowering and handling a lifeboat in the water, including use of the rudder and steering oar.

b. Written Examination. The written examination is conducted only in the English language. The examination includes:

(1) Types and operation of commonly used davits.

(2) Name and label of essential parts of boats and rafts.

(3) List and describe the articles of lifeboat equipment.

(4) Label parts of an oar and/or or anchor.

(5) Label parts of a lifeboat sail.

(6) Boat launching and handling procedures, including handling a boat in a heavy sea.

c. Oral Examination.The oral examination is conducted only in English. Questions are similar to those in paragraph 15.2 below. They may cover davits, boats and rafts, equipment, launching and handling procedures, seamanship and duties of a lifeboat commander as well as of a boat crewmember. Questions are generally asked in rapid-fire style and a brief, concise answer is usually expected.

15.2 EXAMINATION BY SHIP'S LIFEBOAT INSTRUCTOR

a. Demonstrate proficiency in the boat.

(1) Assign students as a lifeboat crew.

(2) Exercise students at the oars, with each taking a turn as Boat Commander and coxswain, using the steering oar and standard commands. Run through at least ten commands to the oars, having each coxswain shove off, maneuver and come alongside.

(3) Assign five or six men to rig sails. Determine by questioning that all of the crew can identify parts of the sails and rigging, including stays, shrouds, halyards and sheets.

b. Conduct written examinations, providing sketches for showing boat and sail parts and equipment as desired.

(1) Side, section and top view of a lifeboat

(2) Rig of lifeboat mainsail and jib

(3) Parts of an oar

(4) Sketch an old-fashioned *(or patent)* anchor and label the ring, stock, shank, crown, arms and flukes (see Figures 15-1 and 15-2).

(5) List 30 articles of lifeboat equipment, five of additional equipment in motor lifeboats, and at least ten commands to boat under oars.

c. Conduct oral examinations based on the following typical examination questions: *(Answers are in paragraph d.)*

(1) What are boat falls?

(2) Describe a boat hook and its use. Why is a groove sometimes cut along the underside of the shaft?

(3) What is the size and length of a sea painter?

(4) How and where is the sea painter made fast in the boat?

(5) How does the sea painter lead?

(6) For what purpose is the sea painter used?

(7) How long are boat falls?

(8) What is a tricing pendant?

(9) How is the tricing pendant let go?

(10) Where is the stopper bar found and for what purpose is it used?

(11) Where is the toggle pin for the sea painter made fast and why?

(12) What are manropes and how are they used?

(13) Where is the release lever located and what color is it painted?

(14) What is the signal for abandon-ship or boat stations?

(15) How do passengers know their abandon-ship stations?

(16) How are gravity davits lowered after releasing the gripes and stopper bars?

(17) What is the purpose of frapping lines?

(18) Where are frapping lines passed?

(19) Storm oil is usually made of what kind of oil?

(20) When and where is storm oil used?

(21) Name at least two ways of rigging a jury sea anchor in case of emergency when a regular sea anchor is not available.

(22) Name two suitable rigs which may be used as boat fenders in case of emergency.

(23) What precaution is taken before inserting hand boat-winch cranks or wheels?

(24) Who authorizes the opening of boat drains when boats are stowed?

(25) What is the signal for dismissal from abandon-ship or boat stations during drills?

(26) Where would you find your stations and duties for fire, collision, CBR defense, abandon ship or man overboard?

(27) What are boat gripes used for?

(28) What is a tricing-pendant trip *(or MacCluney)* hook?

(29) What is spanner guy, spanner stay or davit span?

(30) Why is maintenance of discipline during emergency and boat drills of paramount importance?

(31) How are cranks inserted in sheath screw boom-type davits?

(32) What precautions should be taken with the sea painter when launching a lifeboat?

(33) What is the purpose of the sea anchor? What is the trip line used for and how long should it be?

(34) How many and what type painters are required in a boat and where are they kept?

(35) For what purpose is the steering oar used when launching a boat?

(36) What is meant by the expression *"to frap?"*

(37) What is the name of the hook at the end of the tricing pendant?

(38) What do the following abandon-ship whistle signals mean?

(a) One short blast.

(b) Two short blasts.

(c) Three short blasts.

(39) From whom does a man at boat drill receive orders?

(40) How should additional slack in falls in order to hook on and hoist a boat be provided?

(41) How are the oars stowed in a lifeboat?

(42) What are limber holes?

(43) What is meant by *"broaching to?"*

(44) What happens when manila falls are wet?

(45) What precautions are taken with wet manila falls?

(46) What are the first things to do before lowering a boat?

(47) How should a boat be landed in a heavy sea or surf?

(a) With an experienced crew?

(b) With a green crew?

(c) With women and children in the boat?

(48) Briefly describe the Rottmer boat-releasing gear.

(49) What is meant by *"overhauling the falls?"*

(50) What is meant by *"two-blocking the falls?"*

(51) Name and briefly describe the operation of three types of boat davits.

(52) How are boats numbered aboard ship?

(53) What is the limit switch and where is it found?

(54) State three places in a lifeboat where the boat's passenger capacity is marked.

(55) Name five parts of an oar.

(56) Name five parts of an anchor.

(57) Describe how to approach and pick up a person in the water.

(58) What is the purpose of feathering an oar?

(59) Describe the hand-propelling *(Fleming)* gear in a lifeboat.

(60) Describe the following:

(a) Reefing.

(b) Tacking.

(c) Wearing.

(d) Gybing.

(61) What does *"running before the wind"* mean?

(62) What should the Boat Commander check as soon as his boat crew arrives at their boat stations?

(63) What is a tailblock? Where is one always used?

(64) What is the signal for man overboard?

d. The answers to the oral lifeboat examination questions in c above are as follows:

(1) Boat falls are wire or manila ropes rove through blocks and tackles, by which a ship's lifeboats are lowered or hoisted.

(2) A boat hook is a long pole with metal hook and knob on one end, used to fend off or hang on. It may have a groove along the pole to show which way the hook points when it cannot be seen at night.

(3) A sea painter is at least 2-3/4 inches in circumference and in length not less than three times the distance from the boat deck to the ship's lightest seagoing draft.

(4) The sea painter is made fast in the boat with a strop eye and toggle at the center of the forward thwart.

(5) The sea painter leads forward from the boat, inside the forward fall and outboard of everything else; the forward end is made fast well-forward on the ship and is tended to hold the boat under the davits when waterborne.

(6) The sea painter tends to sheer the lifeboat away from the ship's side and can easily be cast off from the boat.

(7) Boat falls are of sufficient length to reach the light water line from the davit head with the ship listing 15 degrees.

(8) A tricing pendant is a short length of wire attached to the davit arm, used to draw the boat in to the ship's side at the embarkation deck.

(9) The tricing pendant is let go by tripping a line attached to the locking clip of the tricing-pendant trip hook.

(10) The stopper bar is a hinged bar attached to the upper side of the davit trackway; it is used to lock the davit arms in secured position and prevent their accidental release.

(11) The toggle pin is made fast to the forward thwart by a small line or chain to prevent its striking personnel when the sea painter is released.

(12) Manropes are knotted lines hanging from the davit span to provide a grab line for the safety of the crew when the boat is being lowered or hoisted.

(13) The release lever is located in the bottom of the boat near the stern; it is painted a bright red so that it can be easily located and has raised letters on it reading **"DANGER-LEVER RELEASES HOOKS,"** or in later designs, **"DANGER - LEVER DROPS BOAT."** The area in way of the red release lever from the keel to the side bench, is painted white, to provide a contrasting background for the lever. The band is approximately 12 inches wide.

(14) The signal is more than six short blasts followed by 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.

(15) Life-preserver instruction cards posted in staterooms list passenger's abandon ship stations.

(16) Gravity davits are lowered by raising the winch manual-brake lever, permitting the davit arms to roll down the trackways to the outboard position.

(17) Frapping lines hold the lifeboat in to the ship's side for embarkation and prevent it from swinging in a heavy sea during lowering or hoisting.

(18) Frapping lines are passed around the boat falls above the lower block as soon as the boat is triced in at the embarkation deck and before letting go the tricing pendants.

(19) Storm oil is an animal or vegetable oil, but fuel oil may be used in emergency.

(20) Storm oil is used in heavy seas and when breaking water is encountered; storm oil prevents, to some extent, the destructive force of breaking seas. It does not lessen the size of the swells but keeps them from combing and breaking.

(21) A jury sea anchor can be rigged from a boat bucket slung from an oar, an air tank filled with water or oars and canvas lashed and weighted.

(22) Suitable rigs are life preservers, lines, puddings, etc.

(23) Before inserting hand boat-winch crank, cut off winch power by means of the emergency disconnect switch.

(24) Boat drains are left open at the discretion of the Master.

(25) Give three short blasts of ship's whistle and the same signal on the general alarm bell, followed by PA announcement in ships so equipped.

(26) Emergency stations and duties are listed on the ship's station bill and also on seamen's bunk cards.

(27) Gripes hold boats in secured position when stowed.

(28) The tricing-pendant trip hook is a patented quick-tripping hook used to attach the tricing pendants to the lower fall blocks and to cast them off quickly and easily after the boat has been triced in to the embarkation deck and the frapping lines passed.

(29) A spanner guy is a horizontal wire extending between the heads of the davit arms from which the manropes are suspended.

(30) Discipline during emergency drills is imperative in order to avoid confusion, assure that duties are carried out efficiently and promptly and to safeguard passengers.

(31) Crank handles are inserted directly opposite each other.

(32) When launching a lifeboat, the slack should be taken out of the line so that the boat rides directly under the falls and the strain is on the sea painter.

(33) The sea anchor is used to check the boat's way, keeping it end on to the sea to prevent broaching and capsizing while encountering heavy seas or breaking surf. The trip line is a lighter line secured to the small end of the sea anchor to facilitate hauling it in. It should be about two fathoms longer than the drag line.

(34) Two painters are required in each boat. One is a sea painter which is kept with one end attached to the forward thwart by a strop eye and toggle and coiled down on the inboard side of the bow. The other is a boat painter, kept shackled to the stem of the boat and coiled down in the bow. The sea painter is cast off when clearing the ship's side; the boat painter is used for towing or tying up.

(35) The steering oar is used to clear the ship's side where the rudder would be ineffective.

(36) To *"frap"* is to wrap, bind or draw together with a line. Frapping lines are passed around boat falls to steady the boat while launching in a seaway.

(37) These are called MacCluney hooks.

(38) Abandon-ship whistles are:

(a) Lower boats when ready *(one short blast).*

(b) Stop lowering boats *(two short blasts).*

(c) Dismissal from boat stations *(three short blasts).*

(39) A man at boat drill receives orders from the Boat Commander.

(40) Slack can be backed off by the winchman turning the small handwheel on the winch or by the davitman backing it off by means of the quick-return handwheel. In either case, the winchman must hold the brake lever in the raised, or released position, and the men below must haul down on the falls, and current must be cut off the winch. Manila boat falls are slacked off and overhauled.

(41) Oars are stowed flat on the thwarts with blades forward. The steering oar is stowed with blade aft.

(42) Limber holes are holes through the frames close to each side of the keelson to permit water in the boat to drain through to the boat-drain hole.

(43) *"Broaching to"* is being caught broadside to sea or surf.

(44) Wet manila falls shrink in length and become slippery.

(45) Take one or more extra turns on bitts or cleats to prevent slipping when manila falls are wet.

(46) Before lowering a boat, check crew at their boat stations; make sure the releasing hooks and release lever are closed and locked before permitting main gripes to be let go; clear and ready the boat for launching; close boat drains; rig sea painter; put over embarkation ladder or net; check davits, falls, boat winch and tricing pendants.

(47) To land a boat in heavy sea or surf:

(a) Stream sea anchor over stern before reaching the outer line of surf and pull for the beach; at the inner line of surf trip the sea anchor and pull hard onto the beach, keeping the stern to seaward.

(b) Before reaching the outer line of surf, stream the sea anchor over the bow, turn the boat and backwater onto the beach, keeping the boat's head seaward.

(c) Place women and children in the center and proceed as in (b) above.

(48) The Rottmer is a simultaneous releasing gear with release hooks operated by a release lever located in the bottom of the boat, aft of the last thwart; the release lever is secured in its closed position by a safety toggle pin; it is painted red with raised letters which reads: **DANGER-LEVER RELEASES HOOKS** or **DANGER-LEVER DROPS BOAT**. When toggle pin is removed and the release lever is swung in an arc of 180 degrees, a

shaft operating through universal joints is rotated, permitting the release hooks to tumble and open. The release lever should only be operated on order of the Boat Commander; it should be operated only when the boat is waterborne or within a few inches of the water.

(49) *"Overhauling the falls"* is lowering the falls with no boat hooked on. Slack is backed of the winch drum by the small handwheel or the quick-return handwheel and is hauled down by men in the boat.

(50) *"Two-blocking the falls"* is hoisting until the blocks are brought together or as nearly so as possible.

(51) Three types of boat davits are:

(a) Radial, or round bar davits - the boat rests in chocks on deck under the davits. To launch, the boat must be hoisted out of the chocks and the guys cast loose and tended. The boat is swung aft and the bow pushed outboard. The boat is centered over the side between the falls and the guys are set up and secured. The boat is lowered by slacking the falls.

(b) Sheath screw or quadrantal davit - the boat rests in chocks on deck under the davits. Clear chocks and crank the davit arms outboard until the boat is suspended out over the side. Lower the boat by slacking the falls or easing up on the brake lever if the falls are led to a winch.

(c) Gravity davits - operate on the gravity principle. The boat is suspended from the davit arms and rests on a cradle with the davits on rollers in trackways at right angles to the ship's side. After removing the gripes and stopper bars, the davit arm assemblies and boat roll down the side, the davit arms fetch up on stoppers, stop moving and the boat continues to lower. Tricing pendants pull it into the embarkation deck as the boat is lowered. These are cast off after frapping lines are passed, passengers are embarked and the lowering continued.

(52) Boats aboard ship are numbered consecutively from forward, with odd numbered boats to starboard and even numbers to port. Nested boats take the same number, with the lower boat additionally identified by the letter **"A"** following the number.

(53) The limit switch cuts off power to the winch when the davit arms are hoisted well up on the tracks within a foot of the stowed position. One is found on the underside of each trackway, about one foot from the top. Its purpose is to prevent the boats being hoisted too high and damaging ship's gear or causing injuries. It must not be used as an automatic stop.

(54) Passenger capacity of a lifeboat is marked on the builder's plate, on each side of the bow and on at least two thwarts.

(55) Five parts of an oar are the handle, loom, leather, blade and tip.

(56) Parts of an anchor are:

(a) Patent or stockless anchor - shackle or ring, shank, head or crown, palm or fluke and bill or pea. *(See Figure 15-1.)*

(57) A person in the water should be, generally, approached from his lee side in order to avoid the boat drifting down on him. Order *"In bows,"* then *"Oars"* and boat sufficient oars to permit taking the man onboard amidships. Of course wind, sea or circumstances will determine the best approach. With time the most important factor, it may be best to make the shortest, most direct approach.

(58) Oars are feathered to reduce wind resistance and prevent "catching a crab."

(59) Hand-propelling gear consists of shafts along the bottom fitted with sockets at each thwart. The shafts lead to a gear box from which a propeller shaft connects to the propeller. Pulling handles are inserted in the sockets and worked fore-and-aft to provide power. A gear lever aft permits selecting ahead, neutral and astern positions.

(60) (a) Reefing means to reduce the sail area. The sail is lowered, the part between the reef band and the foot is furled, reef points are passed and tied with square knots and the sail is again hoisted.

(b) Tacking is to change from one tack to the other in a sailboat, with the bow passing through the wind.

(c) Wearing is to change from one tack to the other with the stern passing through the wind.

(d) Gybing occurs during wearing when the main sail shifts from one side to the other. This shift may be a violent one and should be avoided in any thing but a light breeze.

(61) A sailboat is *"running before the wind"* when the wind comes from well abaft the beam.

(62) The Boat Commander should ensure that crewmembers are adequately attired, have on life preservers properly fastened and muster at their assigned station.

(63) A tailblock is a block with lanyard attached for making it fast. It is always used with the breeches buoy in lifesaving and is sent over secured to the shot line or to a messenger attached to the shot line.

(64) The man overboard signal varies in merchant ships. MSC has adopted a signal of three long rings on the general alarm bells, announcement on the PA system, followed by three more long rings on the general alarm bells.

15.3 GENERAL

a. Correct, grade and return papers. Note whether mistakes are concentrated in some subjects or well-distributed over all. If errors are prevalent in certain areas, review and discuss the sections in which they occurred.

b. Determine whether further study and practice are necessary.

c. Select those ready to take the USCG examination and arrange for their checkout, applications and examination through the home port training division during first available time in port.

d. Assign further review to those not yet considered ready.

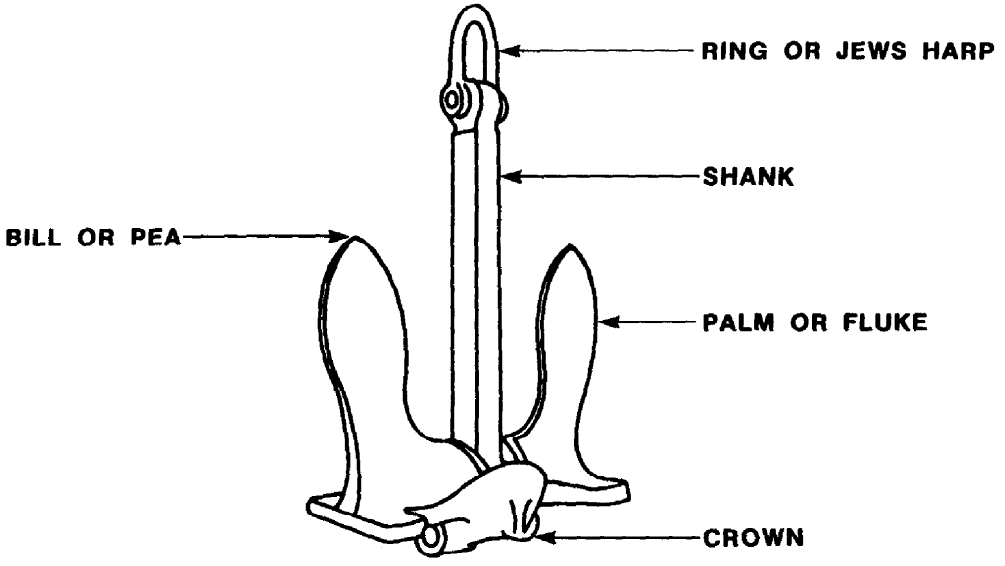
15.4 COAST GUARD REQUIREMENTS ON DRILLS

All lifeboat trainees should be familiar with the requirements for fire and boat drills in 46 CFR parts 70 to 89 *(Rules and Regulations for Passenger Vessels)* and 46 CFR 90-106 *(Rules and Regulations for Cargo and Miscellaneous Vessels).* The following are the more significant requirements:

a. 46 CFR 78.17-50(a) - *"The Master shall be responsible for conducting a fire and boat drill at least once in every week. In the case of a vessel where the duration of the voyage exceeds one week, a fire and boat drill shall be held before the vessel leaves port and at least once a week thereafter."*

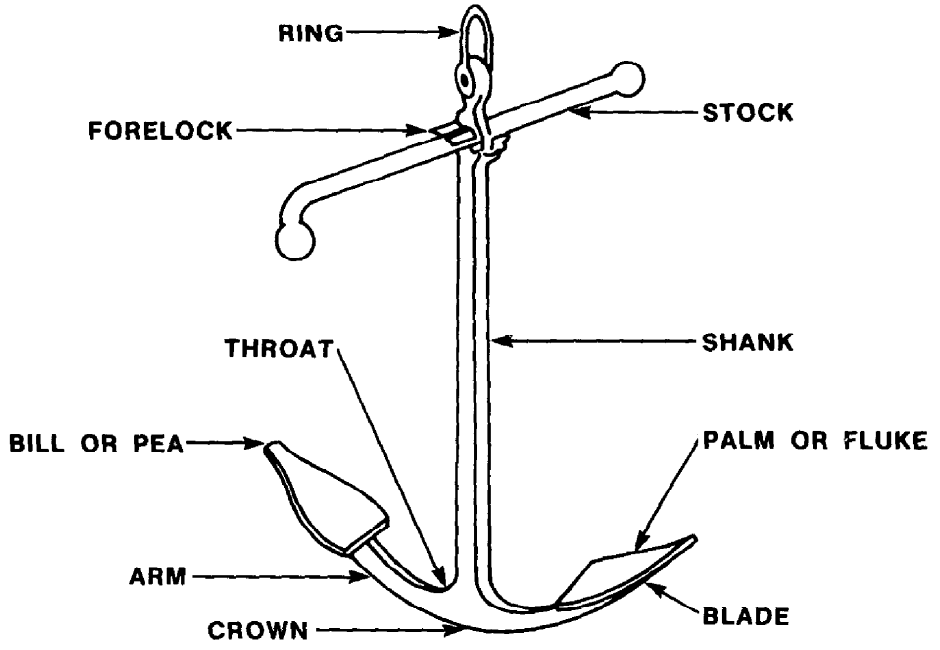
b. 46 CFR 97.15-35(a) of - *"The Master shall be responsible for conducting a fire and boat drill at least once in every week."*

c. 46 CFR 78.17-50(b) (6) and 46 CFR 97.15-35(b) (6) - *"In port, the unobstructed lifeboats shall be lowered to the water and the crew exercised in the use of the oars and other means of propulsion if provided for the lifeboat. Although all lifeboats may not be used in a particular drill, care shall be taken that all lifeboats are given occasional use to ascertain that all lowering equipment is in proper order and the crew properly trained. The Master shall be responsible that each lifeboat is lowered to the water at least once in each three months."*



STOCKLESS ANCHOR
(BALDT)

FIGURE 15-1



OLD-FASHIONED ANCHOR

FIGURE 15-2

APPENDIX A

COMSC POLICY

LIFEBOAT TRAINING FOR CREWMEMBERS OF MSC SHIPS IN SERVICE *(USNS) (CIVIL SERVICE MANNED)*

1. Purpose. This Appendix defines COMSC policy with respect to crewing civil service manned ships with qualified lifeboatmen, and establishes a lifeboat training program.

2. Background. COMSCINST 4730.3E provides that all MSC ships in service *(USNS)*, except as specifically exempted, will be inspected by the USCG in the same manner as commercial ships, and will be required to comply with USCG requirements for certificated lifeboatmen. CMPI 410 defines the basic policy for training civilian marine personnel and authorizes lifeboat training for certification, defining the conditions under which this training will be conducted.

3. Policy. To ensure operational readiness of ships, the policy of COMSC is to provide approximately 25 percent in excess of the minimum USCG requirements for certificated lifeboatmen. Preference in employment will be given to qualified personnel who possess endorsement as lifeboatmen. Endorsement as lifeboatman also will be a factor considered in promotions. Training for endorsement as lifeboatman is authorized for the purpose of qualifying an employee for USCG documentation.

4. Requirements for Certification. USCG requirements for certification as lifeboatman include an examination, demonstration of ability and the following sea service:

a. one year sea service in the deck department, or two years sea service in other departments; or

b. three months sea service together with successful completion of a training course approved by the USCG, consisting of at least 30 hours actual lifeboat training.

5. Afloat Training. Training afloat will continue to be the principal means of qualifying civilian marine personnel for USCG endorsement as lifeboatman. This Lifeboat Training Guide will be used by ships' officers in conducting shipboard lifeboat instruction. Crewmembers who meet USCG sea service requirements for certification as lifeboatmen shall be encouraged to prepare for the lifeboat examination by studying aboard ship. This preparation shall be under the direction and guidance of the ship's officers as assigned by the Master. In addition to boat drills at sea, practice in handling lifeboats, under the supervision of the ship's officers, shall be given to crewmembers eligible for lifeboatman endorsement through the use of the ship's lifeboats, when in port or at anchor, or by use of

the command's facilities when in the home port. When ships' officers consider personnel qualified, the training division at the home port will coordinate their applications and examinations with the local USCG marine inspection office.

6. Training Ashore

a. General Provisions

(1) Lifeboat training ashore is authorized only if recruitment, the afloat training program, and transfers of qualified personnel between ships fail to provide approximately 25 percent above the minimum USCG requirements for lifeboatmen.

(2) Training ashore in pay status will be limited to crewmembers who do not have the one or two years' sea service to qualify for certification otherwise, but who do have three months sea service. Personnel with one or two years' sea service will be expected to qualify for endorsement as lifeboatmen through the afloat training program.

(3) Lifeboat training in a pay status ashore shall not exceed one week in length, since the USCG requires only a one-week course for certification.

b. Lifeboat Training Facilities *(LTF)*. Lifeboat training facilities, if and where available, will be utilized to meet lifeboat training needs by encouraging and assisting the enrollment of marine personnel during annual leave or by granting official leave without pay. Training ashore for certification of lifeboatmen will not be conducted by any MSC subordinate command where LTFs are available and adequate.

c. MSC Facilities

(1) USCG Approved Lifeboat Course. When recruitment, the afloat training program, transfers of qualified personnel and LTFs fail to provide the number of lifeboatmen required, MSC Area Commands may request COMSC approval to conduct a one to two-week lifeboat training course ashore for certification of lifeboatmen. USCG approval of such courses serves to reduce the normal sea service requirement from one or two years to three months. Although lifeboat training courses have been authorized at COMSCPAC and COMSCLANT, and approved by the USCG, training will be conducted only in accordance with the limitations herein. Other commands which may be authorized to establish lifeboat training courses ashore will follow the same training plan, providing for a minimum of 30 hours of lifeboat handling, together with related instruction. The total length of the course shall be not less than five days or more than ten days and the request for USCG approval will be initiated by the command after authority is obtained from COMSC.

(2) Short Indoctrination Course. Subordinate commands may conduct short lifeboat training courses ashore for the following purposes:

(a) To support the afloat training program by providing a means of evaluating the proficiency of crewmembers prior to application for USCG examination.

(b) For indoctrination of new employees.

(c) For general safety and refresher training.

(d) For leadership training of lifeboat commanders.

(3) Lifeboat Facilities. When lifeboat training facilities are available and adequate, MSC lifeboat facilities will not be established for the certification of lifeboatmen. Where lifeboat training equipment has been established, it may continue to be used in support of the afloat, indoctrination, safety and refresher training programs referred to in subparagraph 6c(2) above. Use of the shore lifeboat equipment to provide practice in handling lifeboats shall be under the supervision of a training officer *(lifeboats)*, a deck officer or a boatswain in the receiving section, awaiting assignment. COMSC will assist commands to obtain necessary lifeboat training equipment, upon request.

APPENDIX B

LESSON PLAN AND PRESENTATION OUTLINES

All the planning and effort devoted to the preparation of this training guide would serve little purpose if the shipboard instructor is unable to present the material in an interesting, logical manner. Therefore, the following lesson plans and presentation outlines are appended in order to provide assistance in the effective planning and arrangement of instruction subject matter.

PART I - KNOWLEDGE-TYPE LESSON PLAN AND PRESENTATION OUTLINE

TITLE: Identifies lesson - should be descriptive and concise.

OBJECTIVES:

- **I Establish aims and goals.**
- **II A guide in preparing more detailed presentation.**
- **III Use such terms as to acquaint, familiarize, give, show, impress, stress and develop.**

MATERIAL:

- **I Training aids.**
- **II References.**
- **III Expendable supplies and handouts.**

INTRODUCTION: ***(The preparation phase)*** **To stimulate interest and relate to objectives--keep it brief.**

- **I Establish friendly relations.**
- **II Establish scope of lesson and state objectives.**
- **III Arouse general interest. Relate lesson to past experience.**
- **IV Create personal interest. State benefits of the lesson.**
- **V Secure group's cooperation. Give instructions regarding questions, notes, etc.**
- **VI Reestablish scope of the lesson. What should students know at the end of the lesson?**

PRESENTATION: ***(The "putting-over" and "application" phases).***

I Develop a complete outline with directions for presentations, application, use of training aids and questions.

- **II Guides instructor in presentation and application phases.**
- **III Use proper outlining *(as I - - - 1 - a - (1) - (a) etc.)***
- **IV Use appropriate method of instruction.**
  - **A. Teaching by *"telling"* - for imparting knowledge.**
  - **B. Teaching by "showing" - for knowledge or operations difficult to describe--includes teaching by *"telling"* and utilizes training aids.**
- **V Make presentation effective:**
  - **A. Talk on the level of the class.**
  - **B. Maintain two-way contact:**
    - **1. Eye contact.**
    - **2. Class participation.**

C. Use effective gestures.
D. Emphasize and repeat important points.
E. Work class mentally by posing questions.
F. Appeal to as many of the senses as possible.
G. Use appropriate training aids properly.

VI Check on application:
A. By watching class reaction.
B. Oral questions.
C. Class participation.

SUMMARY:

I Outline *"must know"* subject matter.
II Assure that students take with them all *"must know"* subject matter, either through notes or handouts.

TEST:

I List representative questions to measure effectiveness of the instruction and to gauge progress.
II Give questions orally or in writing.

ASSIGNMENT:

I Provide for individual self-improvement outside class.
II Explain what, when, where, how and why of assignment.

PART II - SKILL-TYPE LESSON PLAN AND PRESENTATION OUTLINE

TITLE: Identifies lesson - should be descriptive and concise.

OBJECTIVES:

I Establish aims and goals.
II A guide in preparing more detailed presentation.
III Use such terms as to acquaint, familiarize, give, show, impress, stress and develop.

MATERIAL:

I Training aids.
II References.
III Expendable supplies and handouts.

INTRODUCTION: ***(The "preparation" phase)*** **To stimulate interest and relate to objectives--keep it brief.**

I Establish friendly relations.
II Establish scope of lesson and state objectives.
III Arouse general interest. Relate lesson to past experience.
IV Create personal interest. State benefits of the lesson, the importance of mastering the skill.
V Secure group's cooperation. Give instructions regarding questions, notes, etc.
VI Reestablish scope of the lesson. What should students know at the end of the lesson?
VII Stress the application periods and safety precautions.

PRESENTATION:

I Develop a complete outline with directions for presentation, application, use of training aids and questions.
II Guides instructor in presentation and application phases.
III Use proper outlining *(as I - - - 1 - a - (1) - (a) etc.)* physical skills, prepare a job analysis--what to do--how to do it--and key points. Use it as the basis for preparing the presentation.
V Define terms, explain equipment, and give background information.
VI Use actual equipment or appropriate training aids.
VII Use the teaching by *"doing"* four-step method to teach complex skills.
A. For large groups:
1. Instructor does and tells slowly *(presentation).*
2. Instructor repeats at almost normal rate *(presentation)*.
3. An average trainee does and tells.
4. All students practice under supervision *(application and inspection)*.
B. For a small group:
1. Instructor does and tells slowly *(presentation)*.
2. Instructor does and students tell *(presentation)*.
3. Students do and tell *(application)*.
4. Students practice under supervision *(inspection)*.
VIII Use the *"coach and pupil"* method to teach simple skills to large groups. Students are paired off and each pair given the necessary equipment.
A. Instructor does and tells slowly *(presentation)*.
B. One of each pair does and other checks and coaches *(application)*.
C. Pairs reverse and repeat the procedure.
D. Instructor checks each pair *(inspection)*.

SUMMARY:

I May be omitted since sufficient repetition in presentation part.

TEST:

I Need only cover related knowledge since skill was demonstrated in application.

ASSIGNMENT:

I As necessary to provide for additional individual practice and self-improvement.

APPENDIX C

MILITARY SEALIFT COMMAND - U.S. COAST GUARD

INSPECTION AND CERTIFICATION AGREEMENT

1. Inspection Agreement. The Commander, Military Sealift Command desires that the Coast Guard inspect and certificate MSC vessels which are civilian manned. These vessels are normally designated *"MSC, in service, civilian manned."* The term *"in service"* as applied to vessels of the MSC refers to those vessels which are manned by civilian or merchant marine crews in contradistinction to those vessels which are manned by Naval crews and which are termed *"in commission."*

2. Certificate of Inspection. The Military Sealift Command intends that no such vessel proceed to sea until such time as a Certificate of Inspection is issued indicating that the vessel complies with the applicable rules and regulations of the United States Coast Guard, unless military considerations make it necessary to dispatch the vessel without such certification. However, the Coast Guard will not, normally, be asked to certificate the following group of *"MSC, in service, civilian manned"* vessels;

(a) Those vessels assigned to the control of Commander, Military Sealift Command, Far East Area *(COMSCFEAREA)*

(b) Vessels of the landing craft type, such as LSTs, LCTs and LSMs.

(c) Vessels essentially military in character by virtue of mission assignment or construction standards.

3. Applicable Vessel Regulations. Title 46, Code of Federal Regulations, Subchapters I, D, H, U, F, J and E are the basic Coast Guard rules and regulations applicable to MSC vessels, insofar as they reasonably apply.

***"MSC, in service, civilian manned vessels,"* being vessels of the Department of Defense and used for public purposes, are a part of the military fleet and are therefore considered to be ships of war and not subject to the provisions of the International Convention for Safety of Life at Sea. Accordingly, they will not be furnished with Convention certificates. The Coast Guard regulations for required lifesaving equipment on vessels in ocean service, not on an international voyage, apply to these vessels. This provision does not apply to those vessels on time charter to the MSC from the U.S. Maritime Administration.**

4. Manning. The Coast Guard will specify the minimum manning requirements on the Certificate of Inspection. All personnel in the deck, engine, steward and staff departments will be required to be properly licensed and certificated in accordance with Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel. Such licensing and/or certification will be required as a condition of employment.

5. Shipment and Discharge. The shipment and discharge of the crewmembers except civil service and military personnel will be in accordance with the laws and regulations applicable to vessels of the United States.

6. Casualty Review. Civil Service and Military manned vessels and their Masters/ Commanding Officers will not report marine casualties to the Coast Guard and the Coast Guard will not investigate such casualties except when specifically requested by the Commander, Military Sealift Command. Contract operated vessels and their Masters will report marine casualties to the Coast Guard and the Coast Guard will investigate such casualties except when the Commander, Military Sealift Command specifically requests there be no investigation.

7. Disciplinary Action. The Coast Guard has authority to take disciplinary action under Public Law 98-89, Chapter 77, *(46 USC 7701 et seq.)* against licenses or certificates, held by any Civil Service or Contract crewmember signed on vessels of the MSC, when possession of a valid license or seamen's document issued by the Coast Guard is a condition of employment. The Coast Guard will normally not initiate action in cases of Civil Service employees unless requested to do so by MSC.

8. Modification of Standards

(a) Applicable Standards. In addition to material normally accepted by the Coast Guard, the Coast Guard may accept material and equipment found on vessels operated by the MSC which meet the requirements of the technical bureaus of the Department of the Navy, Military *(JAN or MIL)* specifications, federal specifications used for military purchases and National Military Establishment specifications *(NME)*.

(b) Vessels of Special Design. For MSC vessels of special design, the Coast Guard may, in individual cases, permit variations from the requirements of law and regulations as deemed necessary.

(c) Lifesaving Equipment. It is intended that all MSC inspected vessels be equipped with lifesaving equipment in accordance with the rules and regulations applicable to vessels of the United States; however, the Coast Guard may accept alternative equivalent arrangements if the MSC operating conditions so warrant.

(d) Pyrotechnics. Navy pyrotechnics may be accepted in lieu of Coast Guard approved pyrotechnics.

(e) Persons in Addition to Crew. Inspected MSC vessels, when determined necessary in the interest of National Defense by the Commander, Military Sealift Command, may carry civilian/military personnel for the express purpose of carrying out the business of the vessel. Such personnel will not be involved in the navigation of the vessel. These civilian/military personnel will not be considered members of the crew, nor will they be considered passengers. The carriage of such personnel will be indicated by separate endorsement on the Certificate of Inspection and will also be reflected in the total persons allowed.

9. Plan Approval. Required plan approval for new construction, conversion and alterations will be carried out in accordance with the U.S. Coast Guard rules and regulations.

10. Repair and Alterations. Required notice of repairs or alternations shall be carried out in accordance with the rules and regulations applicable to vessels of the United States.

Approved for THE UNITED STATES COAST GUARD	**Approved for THE MILITARY SEALIFT COMMAND**
Signature: /s/ B.L. STABILE	**Signature:/s/ WILLIAM H. ROWDEN**
Title: VICE COMMANDANT	**Title: COMMANDER**
Date: 12 Apr 1985	**Date: 14 Feb 1985**