CHAPTER 2

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CHAPTER 2

TESTS, INSPECTIONS, CERTIFICATIONS, AND DRILLS

2-1 GENERAL INFORMATION

This chapter sets forth details and intervals for conducting periodic tests, inspections, and certifications relating to all NOAA ships, their systems and components, and for the conducting of drills by vessel personnel with regard to safety, lifesaving, firefighting, and damage control.

Table 2-14 at the end of this chapter provides a quick reference for the frequency of all required tests, inspections, certifications, and drills. It also provides the location of the particular evolution within the contents of this instruction and the regulatory source for its requirement.

2-2 LOAD LINE CERTIFICATION

2-2.1 General. This section supersedes NC Instruction 9292C, "Load Line Assignments for NOAA Ships", dated April 30, 1992. Load line regulations that apply to NOAA vessels are summarized and the authorities and references where more detailed information may be found are identified as follows:

a. International Voyage Load Line Act of 1973, as amended (46 U.S.C. 86-86i)

b. Coastwise Load Line Act of 1935, as amended (46 U.S.C. 88-88i)

c. U.S. Coast Guard Load Lin e Regulations, 46 CFR 42-47, Subchapter E, Load Lines

2-2.2 Policy.

a. Load line certification applies to all NOAA class vessels greater than 79 feet in length which were built after July 21, 1968, and all NOAA class vessels of more than 150 gross tons built prior to July 21, 1968, which may reasonably be expected to engage in an international voyage. Part 42.05-45 of reference c cited above defines an international voyage as "a sea voyage from any country to a port outside such country, or conversely"; furthermore, United States territories are considered separate countries. By definition, Alaska and Hawaii are domestic ports.

b. The application of load line regulations must be considered for any new NOAA vessel and for existing NOAA vessels when changes in mission requirements cause a significant change in the area of operations. The U.S. Coast Guard has delegated the function of load line assignment to the American Burea of Shipping (ABS) as noted in 46 CFR 42.07-35.

c. Per the requirements of 46 CFR 170.120, each ship having a load line shall also have a U.S. Coast Guard issued stability letter unless the information can be placed on the load line certificate.

d. Although “fishing vessels” are excepted from load line requirements, NOAA has not sought to avoid load line assignments for fisheries research vessels.

e. Load lined vessels operate within stated draft limits and are inspected periodically to ascertain material condition and to ensure conformance with the “conditions of assignment” which consist of seaworthiness features such as sill heights.

f. As U. S. public vessels, NOAA ships that engage only in domestic voyages by sea (coastwise and intercoastal) are not required to have a load line.

g. While Great Lakes voyages are not regarded as “international voyages”, 46 CFR 45 does impose special load line requirements on vessels that operate solely on the Great Lakes. Public vessels are not exempted from this requirement.

h. Although 46 CFR 42.03-30 and other sections of reference c list a number of exemption circumstances, these would rarely apply to NOAA vessels.

2-2.3 Responsibilities. The marine center is responsible for initiating load line assignments for vessels not previously certified when a change in operational requirements indicates such a need. For vessels with current load line assignments, responsibility for the requisite ABS survey is divided between the marine center and the vessel command as described below. New vessels will be load lined as part of the construction and delivery process.

2-2.4 Procedures.

a. Load line surveys are to be conducted by an ABS surveyor in accordance with the requirements for surveys as listed in 46 CFR 42-47. Satisfactory completion of the survey will result in the issuance of a load line certificate which is valid for 5 years.

b. The marine center shall arrange for an out-of-water hull periodical survey prior to the expiration of the vessel's load line certificate. NOAA policy is that ships will be brought into compliance no later than the last scheduled dry-docking before expiration of the load line certificate. However, the local ABS surveyor may allow some flexibility or extensions to permit the out-of-water survey to coincide with multiples of the drydocking cycle.

c. The load line certificate must be endorsed annually by an ABS surveyor following a general survey as required by 46 CFR 42.09-40.

d. The vessel command shall apply in writing, on a timely basis, to ABS for the annual survey to occur within 3 months of the anniversary date appearing on the certificate.

e. The commanding officer/master of the vessel for which a load line certificate has been issued shall be responsible for the maintenance of the certificate and for compliance with its terms and conditions. The load line certificate original shall be retained by the ship with a copy provided for marine center files. The certificate shall be made available to surveyors when carrying out subsequent load line surveys in accordance with
46 CFR 42.09-1.

2-3 TESTS OF WEIGHT-HANDLING GEAR INCLUDING BOAT FITTINGS

2-3.1 General Requirements

a. Tests and inspections of all shipboard weight-handling equipment shall be conducted at intervals prescribed in the following parts of this section. The tests and inspections shall be conducted in the presence of designated and competent shipboard or marine center personnel.

b. No part of the equipment or structure shall show signs of permanent set or excessive deflection as a result of the testing.

c. Upon completion of the tests, all load-bearing components shall receive a thorough and careful examination for evidence of deformation, chafing, scoring, or of faulty design or poor workmanship. Any defects shall be remedied immediately, and the extent of the defect will indicate whether further testing is necessary.

2-3.2 Loose Gear. Loose gear is defined as all slings, chains, rings, hooks, links, shackles, swivels, blocks and any other gear which is used or intended for use with weight-handling gear.

a. Before weight testing any weight-handling device, all loose gear associated with the test must be inspected and renewed if the dimensions have changed by more than 10 percent or if other visible defects are evident.

b. After testing, all loose gear shall be examined to ascertain whether any part has been damaged, permanently deformed by the test, or has other visible defects. The pins and sheaves of all tested blocks shall be removed for this purpose. Any damaged gear shall be repaired or replaced.

2-3.3 Wire Rope. Wire rope must be replaced if six (6) of the composing wires have been broken within one rope lay, or three (3) wires within one strand have been broken. Wire rope that has excessive corrosion or deformation (flattening) shall be replaced. Refer to the Wire Rope Users Manual for inspection criteria (see Appendix B, reference No. 15).

2-3.4 Synthetic Slings and Rope

a. Synthetic slings and rope used for boat and/or cargo-handling purposes shall be replaced at 2-year intervals, or sooner if they are frayed, unduly stretched or have cuts or tears in the material.

b. All synthetic slings must be purchased with a "sewn-on" manufacturer's tag showing certification of breaking strength, source of manufacture, date, and material. The breaking strength for rescue boat slings must be at least six times greater at all times than the actual sling stress produced by the weight of the boat and the angle of the sling legs away from the vertical.

c. The breaking strength of sling material used for handling deck loads shall be five times greater than the load applied to the sling. The use of slings in choker, basket, vertical, and bridle lifting arrangements determines the actual stress applied to the sling by the weight being lifted.

2-3.5 Double Arm and Single Point Davits and Boat Fittings. An operational test of each total boat davit system (which includes the davit, falls, boat lifting fittings, and slings) shall be conducted whenever wire rope falls are end-for-ended or replaced as described below. The test shall be made with a test load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment (assume that each person weighs 165 pounds). The added weight shall be split with one-half forward and one-half aft, with the weight as close as possible to the hoist points so as to minimize the strain on the hull. Personnel shall not be aboard for this test. Also see section 2-3.6 for testing requirements for cranes and other devices that handle boats.

2-3.5.1 As a minimum, wire rope boat falls shall be end-for-ended every 2.5 years, and replaced every 5 years. Falls which cannot be end-for-ended because of their end terminal configuration must be replaced at 4-year intervals. In addition, wire rope falls must be replaced if any of the conditions stated in section 2-3.3 above are found to exist.

2-3.5.2 The operational test will consist of lowering the boat from its stowed position to the water and retrieving it, with proper operation of the brake demonstrated during both the lowering and the hoisting operations. For single point davits, the test shall include rotation and topping motions representing the boat's unstowing and stowing operations.

2-3.6 **Cargo Booms and Cranes**. This category includes fixed-length booms, telescoping and articulating cranes, and boat-handling devices not included under section 2-3.5 of this instruction. Boats handled by these devices are not to be manned during launch and retrieval operations. Visual examination of this gear shall be performed monthly, and testing conducted every 5 years. The visual examination dates with any pertinent comments shall be noted on a log sheet and be available for review by the fleet inspector. When testing, position dunnage under the load and maintain the load position close to the deck. Avoid excessive dynamic loads during the testing.

2-3.6.1 **Tests of Fixed-Length Booms**. The test weight shall be equal to 1.25 times the SWL of the device. With the test weight attached and the boom on centerline (at an angle not greater than 15 degrees to the horizontal or to the lowest angle approved in association with the design, or when these angles are impracticable, to the lowest practicable angle), top the boom to 60 degrees elevation and return to the original angle. Rotate the load slowly as far as possible in both directions.

2-3.6.2 **Tests of Cranes**. The test weight shall be equal to 1.25 times the SWL of the crane. The test load shall be lifted, topped, and swung as far as possible in each direction. If the boom has a movable radius, the weight test shall be conducted at both the maximum and minimum radii of the boom.

2-3.6.3 In cases where hydraulic systems cannot lift the required test load because of pressure limitations, the equipment shall be tested to its maximum capability. A static test shall be conducted by placing 1.25 times the SWL on the hook and holding the weight for 10 minutes with the brake set.

2-3.7 A-Frames. All A-frames, gallows frames, hydrographic booms, and similar devices used for scientific purposes shall be tested at least every 5 years. In all cases, the test weight shall be suspended from a wire led through a sheave of appropriate capacity and inboard, such that the wire angle with the deck approximates the steepest (most vertical) angle that occurs in normal operation. The wire may be dead-ended at a convenient point such as a pad eye or a bridle around a winch drum.

2-3.7.1 Tests

a. A static test of 1.5 times the design strength (or SWL) of the structure shall be conducted on new or modified devices, those that have been reinstalled after overhaul, or after 5 years have elapsed without a test. The test load shall be held for a minimum of 10 minutes.

b. For devices that have been designed for rotation and/or inboard/outboard motion under load, three complete cycles shall be completed with a test load of 1.25 times the SWL of the structure.

2-3.7.2 Notwithstanding the requirements of section 2-3.7.1 of this instruction, the static test shall be conducted as part of cruise preparations whenever actual project loads are expected to be within 20 percent of the design load of the structure. Coring operations in particular are likely to prompt such a test.

2-3.7.3 All other appurtenances used in conjunction with the A-frame shall be inspected and given appropriate tests. Such items include all blocks, sheaves, and fairleads likely to be employed in A-frame operations.

2-3.8 Winches. Dynamometer tests at the rated line pull shall be conducted on winches that are new, reinstalled after overhaul, or are expected to operate near their rated line pull during a forthcoming project.

2-3.9 Fishing/Trawling Gear. All weight-handling gear associated with fishing and trawling operations, such as outriggers, net sonde davits, pot hauling davits, etc., shall be weight tested at 5-year intervals to 1.25 times the designed SWL of the equipment, if known, or to 1.25 times the estimated maximum load the equipment will be subjected to under normal operating conditions.

2-3.10 Marking of Weight-Handling Gear. At the completion of the weight tests of all cranes, booms, A-frames, boat davits, and boat lifting fittings, the test data plates (see Illustration 2-1) shall be updated with engraved uppercase

letters 3/16 inches in height. The plates for boat lifting fittings attached to boats and RHIBs shall be installed in the vicinity of the steering station on the boat to which they are attached. The SWL, at maximum outreach, shall be stenciled on the heel of booms, cranes, and A-frames in 3-inch high letters ("SWL XXX POUNDS"). Exception: Articulating/knuckle boom cranes where the boom is rated at varying capacities depending on the radius shall have a table or plate conspicuously posted near the controls. This plate shall be visible to the operator when working the gear and shall indicate the maximum safe working loads for the various working angles of the boom and the maximum and minimum radii at which the boom may be safely used.

2-3.11 Elevators. Elevators must be inspected and tested by an authorized inspector every 5 years. Authorized inspectors are usually manufacturer representatives who perform weight tests, electrical tests, and brake checks on the equipment.

TEST DATA PLATE FORMAT

LIFTING TEST DATA

SAFE WORKING LOAD	_____	LBS	AT _____	FT
125% OVERLOAD TEST	_____	LBS	AT _____	FT
150% OVERLOAD TEST	_____	LBS	AT _____	FT

DATE TESTED _____

PLACE TESTED _____

DATE TESTED _____

PLACE TESTED _____

DO NOT DEFACE OR REMOVE

Illustration 2-1

2-4 LIFESAVING EQUIPMENT

At each fleet inspection, the fleet inspector shall ensure that the following tests and inspections of lifesaving equipment were made annually:

2-4.1 Inflatable Liferaft Overhaul. Inflatable liferafts shall be serviced at an approved servicing facility (see USCG COMDTINST M16714.3, "Equipment Lists") every 12 months. The period for servicing is computed from the date of the last servicing. Except in emergencies, no servicing should be done aboard vessels. If at any time external damage is found to the container or straps, or if the seal is broken, the rafts shall be serviced by an approved servicing facility. After each servicing, the date, port, and initials of the inspector are to be stamped on the metal tag. Commanding officers/masters and officers in charge of support facilities shall supply personnel to witness this annual testing if a USCG inspector is not available to witness and endorse the testing. The dates of the 5-year servicing shall also be clearly marked on the liferaft servicing tag.

2-4.2 Hydrostatic Release Overhaul. A hydrostatic release used in the installation of any inflatable liferaft, life float, or buoyant apparatus shall undergo periodic servicing and testing, normally every 12 months from the date of installation, as determined by its inspection tag. The spring of a spring-tensioned gripe used in such an installation shall be renewed when the accompanying hydrostatic release is serviced and tested.

Sealed disposable hydrostatic releases are approved for use and have a service life of 2 years from their date of installation. These hydrostatic releases shall be disposed of after reaching their expiration date.

2-4.3 Life Preserver/Survival Suit/Work Vest/Float Coat Inspection. Each unit shall be examined annually to determine its serviceability. If not in serviceable condition, the life preservers and work vests shall be destroyed and removed from the vessel. Any survival suit or float coat that is not serviceable shall be returned to the marine center. Each unit shall be of a USCG-approved type. Any hardware attached to a survival suit shall not impede the safe operation of the suit or cause any external damage.

2-4.4 Watertight Door and Fire Screen Door Inspection. At least once each week, all watertight doors and fire screen doors shall be operated by manual power and also by hydraulic or electric power, if so fitted. Where remote control is fitted, the doors shall also be operated by the remote control apparatus. A ship's deck log entry shall be made stating the degree of satisfaction or any problems encountered during the test.

2-5 FIRE EXTINGUISHING EQUIPMENT

All fire extinguishing equipment shall be maintained in operating condition at all times. At each annual inspection the

fleet inspector shall determine, by evidence of a separate and concise log, if the tests and inspections required by these regulations have been conducted.

2-5.1 **Portable Fire Extinguishers**. All hand-portable fire extinguishers and semiportable fire extinguisher systems shall be checked annually as noted in the following table and, in addition, shall be examined for excessive corrosion and general condition.

TYPE UNIT	ANNUAL TEST
Soda Acid	Inverting types of extinguishers, including soda acid, foam, and cartridge operated, are no longer manufactured. Replace with equivalent dry chemical type. For details, see Appendix B, reference No. 3, page 144, listed on page B-3 of this instruction.
Foam	Same as above.
Pump Tank (water or antifreeze)	Discharge. Clean hose and interior of extinguisher. Recharge with water or antifreeze.
Carbon Dioxide	Weigh cylinders. Recharge if weight loss exceeds 10 percent of weight of charge. Inspect hose and nozzle.
Dry Chemical (cartridge-operated type)	Examine pressure cartridge and replace if end is punctured, or if in unsuitable condition. Dry chemical should be free flowing (not caked) and chamber shall contain a full charge.
Dry Chemical (stored-pressure type)	See that the pressure gauge is in operating range. If not, or if seal is broken, weigh or otherwise determine if full charge is in container. Recharge if pressure is low or if dry chemical is needed.
Halon	See pressure gauge reading. A 10-percent loss (after temperature corrections) requires recharging.

2-5.2 **Fixed Fire Extinguishing Systems**. All fixed fire extinguishing systems shall be inspected and tested annually in accordance with the following table. In addition, all parts of

the fixed extinguishing systems shall be examined for excessive corrosion and general condition. All associated piping, controls, valves, and alarms, including time delays, shall be checked to ensure that the system is in proper operating condition. A separately charged cylinder shall be used where necessary for these tests.

TYPE OF SYSTEM	**ANNUAL TEST**
Foam	Systems using a soda solution shall have such solution replaced. Ensure powder is not caked. If date of manufacture exceeds 10 years, twice yearly manufacturer testing is required.
Carbon Dioxide	Weigh cylinders and ensure loss does not exceed 10 percent of weight of charge. Use separate cylinder for test of alarms and delays.
Halon	Test and inspection procedures as portable system. Check all hoses, couplings, and controls.

Carbon dioxide cylinders shall be tested and marked in accordance with 46 CFR 147.65 and section 2-11.3 of this instruction. Carbon dioxide or halon cylinders forming a part of a fixed or semi-portable fire extinguishing system must be hydrostatically tested at least every 12 years.

2-5.3 **Fire Main Systems**. During any 1-year cycle, each fire main station shall have been exercised at a fire drill, and charged with water. That fact shall be logged in the ship's deck log and on a separate fire drill matrix which is to be presented to the fleet inspection officer at the annual inspection. All fire hoses shall be tested biennially to a minimum pressure of 100 PSI or the maximum normal operating pressure of the ship's fire pump, whichever is the greater. The results of these tests shall be recorded for presentation to the fleet inspection officer at the time of the annual inspection. The date that the test was conducted and the test pressure shall be stenciled on each hose. All defective hoses and/or fittings shall be removed from service.

2-6 FIRE AND SMOKE DETECTION SYSTEMS

All fire detection systems shall be USCG-approved, marine type. All smoke detection systems, with exception, shall be USCG-approved, marine type. Non-Coast Guard-approved smoke detection equipment (i.e., residential type, overhead mounted smoke detectors) listed and labeled by a nationally recognized testing

laboratory may be installed. This equipment, however, cannot be substituted for required equipment although it may supplement that which is required. Since these nonapproved systems may not have been tested for durability, vibration and corrosion resistance, and other properties important to marine use, normal roving security watches may not be reduced because of their installation (see NVIC 7-80).

A summary test sheet shall be maintained showing test dates for smoke and fire detection systems and for fire alarm boxes. This test sheet shall be presented to the fleet inspector at the annual inspection.

2-6.1 Smoke Detection System Test. Annually, each smoke detection sensor shall be tested by actual activation of the sensor head and that fact logged in the summary test sheet.

2-6.2 Fire Detection System Test. Annually, each fire detection heat sensor shall be tested by actual activation of the sensor head and that fact logged in the summary test sheet. The circuitry for sensors that are one-time-only use may be tested by disconnecting or removing the sensor.

2-6.3 Fire Alarm Boxes. Annually, each fire alarm box shall be manually tested using manufacturer prescribed test procedures and that fact logged on the summary test sheet.

2-7 MUSTER LISTS

A muster list (formerly called station bill) shall be prepared with the commanding officer's/master's signature and the date signed. It shall be duly posted in conspicuous locations on the vessel, particularly in the wheelhouse, engine room, and crew's quarters, prior to the vessel's departure.

2-7.1 Emergency Duties of the Crew. The special duties and duty station of each member of the crew and scientific personnel shall be set forth in the muster list. The duties, as far as possible, shall be comparable with the regular work of the individual. The general duties shall include the following and any additional duties necessary for the particular vessel to properly handle a specific emergency (i.e., fire, flooding, abandon ship, etc.):

a. closing of watertight doors, scuppers, sanitary and other vessel system's valves, and openings below the hull's margin line; stopping fans and ventilating systems; stopping operation of systems, and manning all safety equipment;

b. preparing for launching and crewing rescue boats and liferafts;

c. designating persons in command and second in command for each emergency evolution and station;

d. custody of portable radio apparatus or any other communication equipment;

e. seeing that a supply of blankets and other emergency equipment are taken to the liferafts;

f. designating the person or persons responsible for maintenance and readiness of all lifesaving and fire fighting appliances;

g. designating substitutes for any persons, as required; and,

h. preparing all other lifesaving appliances.

2-7.2 **Emergency Signals**. Signals shall be set forth to be used for calling the crew to their stations and for giving supplemental instructions while at their stations.

2-7.2.1 The **fire and emergency signal** shall be a continuous blast of the ship's whistle for a period of not less than 10 seconds supplemented by the continuous ringing of the general alarm bells for not less than 10 seconds. For dismissal from fire and emergency stations, the general alarm shall be sounded three times supplemented by three short blasts of the ship's whistle.

2-7.2.2 The **abandon-ship signal** shall be a succession of more than six short blasts of the ship's whistle followed by one long blast supplemented by a comparable signal on the general alarm bells. For dismissal from abandon ship drill, the general alarm shall be sounded three times supplemented by three short blasts of the ship's whistle.

2-7.2.3 The **man-overboard signal** shall be three prolonged blasts on the ship's whistle supplemented by a similar signal on the general alarm bells. Notification of a man overboard situation to other vessels in the vicinity may be accomplished with an international code "OSCAR" flag hoist or an "OSCAR" flashing light signal. For dismissal from man overboard, the general alarm bells shall be sounded three times supplemented by three short blasts of the ship's whistle.

2-7.2.4 **Other emergency signals** may be established by commanding officers/masters to provide all officers, crew, and passengers a positive and certain notice of an existing emergency.

2-8 INSTRUCTION TO CREW

The commanding officer/master shall conduct such drills and give such instructions as are necessary to ensure that all hands are familiar with their duties as specified in the muster list.

2-8.1 Fire Drills. Drills shall be conducted at weekly intervals when the vessel is at sea. In-port fire drills shall be conducted at weekly intervals during the first 30 days in port and at monthly intervals thereafter. At least once a year, an in-port fire drill shall be conducted with shoreside fire units participating. The scheduling of drills shall be at the discretion of the commanding officer/master except that at least one fire drill will be held prior to or within 24 hours of leaving port if more than 25 percent of the complement changed at that port. Where the duration of a voyage is not expected to exceed 1 week, a fire drill shall be held before the vessel leaves port or within a 24-hour period from the time of departure.

2-8.2 Abandon-Ship Drills. Drills shall be conducted weekly, except when the vessel is in port during a drill period, in which case the abandon-ship drill shall be conducted upon resuming a navigational status. Emergency lighting for mustering and abandonment shall be tested at each abandon-ship drill. At least once a month, one of the weekly abandon-ship drills must include donning of the survival suits, unless the survival suit donning is conducted as a separate exercise. The appropriate deck log entry shall be made. The scheduling of drills shall be at the discretion of the commanding officer/master except that at least one fire drill will be held prior to or within 24 hours of leaving port if more than 25 percent of the complement changed at that port. Where the duration of a voyage is not expected to exceed 1 week, an abandon-ship drill shall be held before the vessel leaves port or within a 24-hour period from the time of departure.

2-8.3 Man-Overboard Drills. Drills shall be conducted at least quarterly, using either the ship or rescue boat recovery method as dictated by conditions. The appropriate log entry shall be made. As far as is reasonable and practicable, in conjunction with a man-overboard drill or as a separate exercise, rescue boats shall be launched with their assigned crew aboard and maneuvered in the water each month. However, such launching and maneuvering **must** occur at least quarterly.

2-8.4 Conduct of Drills. Drills shall be conducted as if an actual emergency existed. All hands should report to their

respective stations properly dressed, equipped, and prepared to perform the duties specified in the muster list.

a. Fire pumps shall be started and a sufficient number of outlets used to ascertain that the system is in working order.

b. Appropriate rescue and safety equipment shall be brought from the emergency equipment lockers and the persons designated shall demonstrate their ability to use the equipment.

c. All Class 1 watertight doors (sliding doors operated by hand gear only) and Class 2 watertight doors (sliding doors operated by power and by hand gear) shall be exercised.

d. The persons in command and second in command of each liferaft shall have a list of the crew assigned to the liferaft and shall ensure that the individuals under their command are acquainted with their duties, are suitably dressed according to prevailing weather conditions, have their life preservers and/or survival suits with them and any emergency equipment such as blankets, EPIRBs, or portable radios, which they are assigned to provide. Life preservers will be inspected by the person in charge for material condition and to ensure that they are properly equipped with in-date waterlights, whistles, and retroreflective material. If called for, the person in charge will check for proper donning of survival suits.

e. Liferafts shall be examined at least once a month to ensure that they are correctly stowed and that spring-tensioned gripes are properly tensioned.

f. Damage control repair parties shall be staffed by trained personnel. All repair party personnel shall demonstrate the use of selected equipment appropriate for each drill scenario. All emergency equipment shall be demonstrated over a two-month period.

2-8.5 <u>On-Board Training</u>. Instructions in the use of lifesaving equipment, survival at sea skills, and the use of fire extinguishing equipment must be given at the same interval as drills and all such equipment and skills must be covered within any 2-month period. In order to accomplish this, every other weekly drill may be converted to a training session.

2-9 LINE-THROWING APPLIANCE DRILLS

It is the duty of the commanding officer/master to drill the crew in the use of the line-throwing appliance at least once in each 3-month period in which the vessel is operated. Actual firing of the appliance is at the discretion of the commanding

officer/master. Each drill shall be recorded in the ship's deck log.

2-10 MAIN AND AUXILIARY MACHINERY TESTS AND INSPECTIONS

The following tests and inspections shall be conducted and a record of the results shall be maintained to be presented to the fleet inspection officer at the time of the annual inspection. If it is found that these tests have not been conducted in the period preceding the fleet inspection and operating conditions permit, such tests shall be conducted in the presence of the fleet inspection team.

2-10.1 Remote Mechanical and Electrical Shutdowns and Overspeed Trips. Remote mechanical and electrical shutdowns for main engines, diesel generators, forced and induced draft blowers, fuel oil transfer pumps, fuel oil purifiers, boilers, and fans in the ship's power ventilation and machinery space ventilation systems shall be tested at 2-year intervals. The remote controls for all valves, whether power-operated (pneumatic, electric, or hydraulic) or mechanically-operated (reach rods), shall be tested at 2-year intervals. All engineering equipment overspeed trips shall also be tested at 2-year intervals.

2-10.2 Steering Gear Testing, Operating Instructions, and Mechanical Indicators

2-10.2.1 Testing. At least once during each 3-month period that the vessel is operated, primary and secondary steering gear shall be tested and inspected in all modes and from all stations. These tests shall include all devices employed in the changeover from automatic to manual operation, and will include:

a. operation of the main steering gear from within the steering gear compartment;

b. operation of the means of communication between the navigating bridge and the steering gear compartment; and

c. operation of the alternate power supply for the steering gear if the vessel is so equipped.

2-10.2.2 Instructions for Changing Steering Gear. Instructions shall be posted on the bridge and in the steering engine room relating, in order, the different steps to be taken in changing to the emergency steering gear. Letters and figures for the steering engine room instructions shall be at least 1/2-inch in height. Each clutch, gear, wheel, lever, valve, or switch that is used during the changeover shall be numbered or

lettered on a metal plate or painted so that the markings can be recognized at a reasonable distance. The instructions shall indicate each valve or switch that is to be "opened" or "closed" in shifting to any means of steering for which the vessel is equipped. Instructions shall be included to line up all steering wheels and rudder amidships before changing gears.

All officers concerned with the operation or maintenance of the steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.

2-10.2.3 **Rudder Orders.** At all steering stations, there shall be installed a suitable notice to indicate the direction in which the steering wheel or device must be turned for "right rudder" and for "left rudder". The notice shall be posted on the wheel or device or in such other position as to be directly in the helmsman's line of vision.

2-10.2.4 **Mechanical Rudder Indicator.** A mechanical rudder indicator shall be provided in each steering gear compartment for emergency indication of the rudder position.

2-10.3 **Emergency Lighting and Power Systems**

a. Where fitted, the emergency lighting and power systems will be operated and inspected at least once a week when the vessel is navigated to be sure that the system is in proper operating condition.

b. Internal combustion engine-driven emergency generators shall be operated under load for at least 2 hours, at least once a month when the vessel is navigated.

c. Battery-powered, relay-operated emergency lanterns shall be checked monthly for proper operation.

d. Storage batteries for emergency lighting and power systems shall be tested at least once in each 6-month period that the vessel is navigated to demonstrate the ability of the storage battery to supply the emergency loads for the specified period of time.

e. The date of the tests and the condition and performance of the apparatus shall be noted in the ship's deck log.

2-10.4 **Tests Before Getting Underway or Entering Port**

2-10.4.1 Not more than 12 hours before getting underway or entering port, the following equipment shall be tested:

a. **Primary and Secondary Steering Gear**. The test procedure includes a visual inspection of the steering gear and its connecting linkage, and where applicable, the operation of the following:

(1) each remote steering gear control system;

(2) each steering position located on the navigating bridge;

(3) the main steering gear from the alternative power supply, if installed;

(4) each rudder angle indicator in relation to the actual position of the rudder;

(5) each remote steering gear control system power failure alarm; and

(6) the full movement of the rudder to the required capabilities of the steering gear.

b. Test all internal vessel control communications and vessel control alarms;

c. Test standby or emergency generator, for as long as necessary to show proper functioning, including steady state temperature and pressure readings;

d. Test storage batteries for emergency lighting and power systems in vessel control and propulsion machinery spaces;

e. Test main propulsion machinery, ahead and astern.

2-10.4.2 Inclusion of the above items in the vessel's preparation for getting underway and entering port checkoff lists is required.

2-11 BOILERS, PRESSURE VESSELS, SAFETY-RELIEF VALVES, AND COMPRESSED-GAS CYLINDERS

2-11.1 **Boilers**. The term "boiler" as used includes heating/auxiliary boilers subject to 46 CFR 53. The term "boiler" includes all piping, valves, and appurtenances therewith. All periodic tests and inspections are to be conducted by a qualified marine inspector as defined in 46 CFR 50.10-15. It is the responsibility of the vessel's chief marine engineer to prepare the boiler(s) for inspection following the requirements delineated in 46 CFR 61.05-5.

2-11.1.1 Boiler Inspections. Each boiler, including superheater, reheater, economizer, auxiliary boiler, and low pressure heating boiler shall be examined by a marine inspector at the intervals specified in Table 2-11.1.4 and more often, if necessary. Where a hydrostatic test is required, the marine inspector shall examine all accessible parts of the boiler while it is under pressure.

2-11.1.2 Hydrostatic Tests. Hydrostatic tests shall be applied to all boilers and main steam piping at the intervals specified in Table 2-11.1.4 of this instruction. All steam piping, other than main steam piping, which is subject to main boiler pressure, will be hydrostatically tested at 4-year intervals to 125 percent of the maximum allowable working pressure (MAWP); however, steam piping with a nominal size of 3 inches or less is not required to be tested.

a. All boilers of lap seam construction, and all boilers to which extensive repairs have been made or the strength of which the marine inspector has any reason to question, shall be subjected to a hydrostatic test of 150 percent of the MAWP. All other boilers and steam piping that is subject to main boiler pressure will be subjected to a test pressure of 125 percent of the MAWP. The test pressure shall be held for a sufficient length of time to permit inspection of all joints and connections.

b. If the boiler inspector has reason to believe that the boiler has deteriorated to any appreciable extent under the bottom where it rests on saddles or foundations, the boiler shall be lifted to such a position that it can be thoroughly examined, provided the examination cannot be made otherwise.

c. If pipe covering (lagging) is not removed, the test pressure shall be maintained for a minimum period of 10 minutes. Any evidence of moisture or leakage shall cause the covering to be removed and the piping thoroughly examined.

2-11.1.3 Boiler Mountings and Attachments

a. **Boiler Valves**. Each valve must be opened and inspected at the intervals specified in Table 2-11.1.4.

b. **Studs and Bolts**. Each stud or bolt for each boiler mounting must be examined at the intervals specified in Table 2-11.1.4.

c. **Boiler Mountings**. Each boiler mounting must be removed from the boiler and be examined at intervals specified in Table 2-11.1.4 when any of the following conditions exist:

(1) where boiler mountings are attached directly to the boiler plating by screwed studs and nuts;

(2) where boiler mountings are attached to a reinforcing pad by screwed studs and nuts, and this pad is attached directly to the boiler plating; and

(3) where boiler mountings are so installed that a satisfactory examination of these mountings or of their attaching studs cannot be made by removing the bonnet and internal parts of the valve.

Note: Where boiler mountings or valves are attached to boiler nozzles and a satisfactory internal examination of these mountings or valves and their attaching studs, bolts, or other means of attachment, can be performed by opening up the valves, such mountings or valves need not be removed from the boiler unless deemed necessary by the marine inspector.

d. **Water Columns, Gage Glasses, and Gage Cocks**. Each of these items shall be examined at intervals specified in Table 2-11.1.4.

e. **Steam Gages and Fusible Plugs**. Each steam gage for a boiler or a main steam line must be examined and checked for accuracy and each fusible plug must be examined at intervals specified in Table 2-11.1.4.

f. **Boiler and Steam Piping Safety Valves**. Each safety valve for a boiler drum, superheater, or reheater must be tested and resealed and the setting of safety and relief valves installed in steam piping systems shall be inspected by the marine inspector at intervals specified in Table 2-11.1.4.

TABLE 2-11.1.4

TESTS AND INSPECTIONS OF BOILERS AND ASSOCIATED EQUIPMENT

Test/Inspection	Frequency (years)
Boiler Hydrostatic Test	4
Steam Piping	4
Fireside Inspection	2
Waterside Inspection	2
Boiler Safety Valve Test	2
Steam Piping Safety and Relief Valve	2

Test/Inspection	Frequency (years)
Steam Valves Inspection	4
Boiler Mountings Inspection	8
Steam Gages, Water Columns, Gage Glasses, and Gage Cocks	2

2-11.2 Pressure Vessels. Each pressure vessel shall be tested or examined biennially. The extent of the test or examination must be that necessary to determine that the pressure vessel's condition is satisfactory and that the pressure vessel is fit for the service intended. All records of results must be presented to the fleet inspector during the annual fleet inspection.

a. **Internal and External Tests and Inspections**. Each pressure vessel stamped with the USCG symbol that is fitted with a manhole or other inspection opening so it can be satisfactorily examined internally, must be opened biennially. Each pressure vessel must be thoroughly examined internally and externally. Each pressure vessel is not required to be hydrostatically tested unless defects are found that, in the marine inspector's opinion, may impair its safety; but, where such defects are found, the pressure vessel must be hydrostatically tested at a pressure of 1.25 times the MAWP.

b. **Hydrostatic Pressure Tests**. Each pressure vessel, other than one satisfactorily meeting the internal and external visual inspection requirements of the above section, or exempted by the provisions of the following section, must be subjected biennially to a hydrostatic test pressure of 1.25 times the vessel's MAWP.

c. **Exemptions**. The following pressure vessels shall be exempt from hydrostatic testing: (1) tubular heat exchangers; (2) pressure vessels used in refrigeration systems; (3) hydraulic accumulators; and (4) pressure vessels that have been satisfactorily inspected internally by a marine inspector and in which no defects have been found that impair the safety of the pressure vessel.

d. **Safety Relief Valves**. The settings of safety valves or relief valves on all pressure vessels shall be checked at the same time a hydrostatic test or internal visual inspection is required to be performed as required by sections 2-11.2.a. and b. Hand-relieving gear also will be checked.

2-11.3 Compressed-Gas Cylinders. Cylinders shall bear upon the shoulder, a test date marking that indicates such

cylinder has been hydrostatically tested within a period of 5 years. A cylinder continuously installed, in place, on board a vessel that has not been discharged, refilled, or removed from the vessel may be permitted to be tested at 12-year intervals. See section 3-9.3 for additional information and section 2-5.2 for fixed firefighting systems.

A cylinder that has stamped on its shoulder a five-point star, is less than 35 years old, and meets the criteria of 49 CFR 173.34, shall be retested at intervals not to exceed 10 years.

A cylinder used for the storage of acetylene and meeting the requirements of 49 CFR 173.303 does not require retesting.

SCBA air cylinders shall be hydrostatically tested in accordance with section 4-16.1 of this instruction.

SCUBA cylinders shall be hydrostatically tested and inspected in accordance with the Diving Safety Inspection Checklist issued by the NOAA Diving Safety Officer and Appendix C, Section 7 of this instruction.

2-12 COMPASS ADJUSTMENT

Magnetic compass deviations shall be determined on at least an annual basis, following a shipyard repair period, or anytime there is doubt that the existing deviation table has significant changes. A compass comparison log shall also be maintained.

If significant updating of the current deviation table is required, the compass magnets and/or quadrants shall be adjusted by a qualified person. This compass adjustment shall result in a dampened compass error and the adjustment being logged in the ship's deck log.

2-13 MONTHLY COMMAND INSPECTIONS

The commanding officer/master of a vessel is responsible for conducting frequent inspections in order to ensure safety, cleanliness, good order, proper material condition, and efficiency of the ship as a whole. Commanding officers/masters shall inspect the entire vessel not less frequently than monthly. Commanding officers/masters shall be accompanied by the cognizant chief of the department being inspected and any other personnel deemed necessary. This inspection shall be entered into the ship's deck log.

An examination shall be made of all commissioned officers' quarters, ship officers' quarters, crew quarters, galleys, storerooms, toilets and showers, work spaces, and deck and engineering equipment. All safety deficiencies and repair items shall be noted and assigned for corrective action. Monthly

command inspections are in addition to the weekly sanitary inspections that are normally conducted by the executive officer.

TABLE 2-14, TABLE OF TESTS, INSPECTIONS, AND DRILLS

Required Test, Drill or Inspection	WK	MO	QTR	6 MO	1 YR	2 YR	3 YR	5 YR	10 YR	12 YR	
Operate Rescue Boat Motor 46 CFR 199.190(d)(2), 5100.1B, Sec. 4-3.2	X										
Emergency Lighting and Power Systems Operation 46 CFR 196.15-30; 5100-1B, Sec. 2-10.3a.	X										
Fire & Abandon Ship Drills, Test Watertight Doors 46 CFR 199.180(d)(f); 5100.1B, Sec. 2-8.1/2-8.2	X										
Emergency Generator, Transfer Load Test 46 CFR 196.15-30; 5100-1B, Sec. 2-10.3.b		X									
Emergency Battery Lanterns 46 CFR 112.39, 5100-1B, Sec. 2-10.3.c.		X									
Command Inspections 5100.1B, Sec. 2-13		X									
EPIRB Tests 46 CFR 199.190(e)(2); 5100-1B, Sec. 7-1.2.3		X									
Lifesaving Appliances Inspection 46 CFR 190.190(g); 5100.1B, Sec. 2-8.4		X									
Operation of Emergency Generator, Under Load 46 CFR 196.15-30; 5100.1B, Sec. 2-10.3.b.		X									
Man-Overboard Rescue Boat Drill 46 CFR 199.180(d)(7), 5100.1B, Sec. 2-8.3		X	X								
Dewatering and Electrical Submersible Pumps NC INST. 9880, Sec. 8.4.1.2/8.4.2.1		X	X								
Condition of Boat Lift Fittings 46 CFR 199.190(i)(5); 5100.1B, Sec. 2-3.6		X				X					
Remote Gasoline Release 5100.1B, Sec. 3-11			X								
Line-Throwing Appliance Test 46 CFR 199.180(e); 5100.1B, Sec. 2-9			X								
Steering System Test 33 CFR 164.25(d), 5100.1B, Sec. 2-10.2			X								

TABLE 2-14, TABLE OF TESTS, INSPECTIONS, AND DRILLS

Required Test, Drill or Inspection	WK	MO	QTR	6 MO	1 YR	2 YR	3 YR	5 YR	10 YR	12 YR	
OBA/SCBA Inspection, NC INST. 9880, Sec. 4.2.2.4 and 4.3.3.; 5100.1B, Sec. 4-16.1/4-16.2			X								
Auto Alarm GEN/TX. 5100.1B, Sec. 7-4			X								
Watch Receiver 5100.1B, Sec. 7-7.2			X								
Control Substance Audit NC INST. 6000, Chapter 7.6.c			X								
Watertight Integrity Inspection 5100.1B, Sec. 3-5.4.1; NC INST 9880, Sec. 3.6.3			X								
Fire Hazard Conditions NC INST. 5100.1B, Sec. 5.1.2; 46 CFR 189.25-45			X			X					
Chemical and Explosive Hazards NC INST. 9880, Sec. 7.2; 46 CFR 189.25-47			X			X					
Diver Accident Drill NOAA Diving Program				X							
Emergency Battery Load Test 46 CFR 196.15-30; 5100.1B, Sec. 2-10.3.e				X							
Deck Vents, Covers are not Frozen Shut 5100.1B, Sec. 3-3.3				X							
Quarters Escape Drill (May be Done in Conjuntion with a Fire or Collision Drill) 46 CFR 199.180(d); 5100.1B, Sec. 3-5.6				X							
Radio Direction Finder Calibration 5100.1B, Sec. 7-2					X						
Compass Deviation Card 5100.1B, Sec. 2-12					X						
Life Preserver Inspection and Inventory 46 CFR 199.190(b), 199.217; 5100.1B, Sec. 2-4.3					X						
Work Vest Inspection and Inventory 5100.1B, Sec. 2-4.3					X						

TABLE 2-14, TABLE OF TESTS, INSPECTIONS, AND DRILLS

Required Test, Drill or Inspection	WK	MO	QTR	6 MO	1 YR	2 YR	3 YR	5 YR	10 YR	12 YR	
Fire Alarm Boxes 46 CFR 71.25-20; 5100.1B, Sec. 2-6.3					X						
Fire Main System 46 CFR 189.25; 5100.1B, Sec. 2-5.3					X						
Fixed Fire Extinguishing System Test 46 CFR 196.15-60; 5100.1B, Sec. 2-5.2					X						
Portable and Semiportable Fire Extinguisher Tests, 46 CFR 196.15-60; 5100.1B, Sec. 2-5.1					X						
Tests of all Smoke and/or Heat Sensors 46 CFR 111.12; 5100.1B, Sec. 2-6					X						
Damage Control Locker Inventory 5100.1B, Sec. 5-11 and Appendix E					X						
CPR Training for ETs 5100.1B, Appendix I, Sec 3.6					X						
Test of Sound-Powered Phone System 46 CFR 113.30; 5100.1B, Sec. 7-3.4					X						
Test of all Signal Lights SOLAS Chapter V, Reg. 11					X						
Inflatable Liferafts and Hydrostatic Releases 46 CFR 199.190(f,g,h); 5100.1B, Sec. 2-4.1/.2					X						
Remote Control for all Valves So Fitted 46 CFR 189.25-25; 5100.1B, Sec. 2-10.1					X						
Asbestos Report to Marine Center 5100.1B, Section 9-6.6					X						
Rescue Boat Overhaul 46 CFR 199.190(f) + (g); 5100.1B, Sec. 4-3.2					X						
Pyrotechnic Locker (flares, rockets, etc.) 46 CFR 192.60; 5100.1B, Sec. 4-11					X						
Load Line Annual and 5-Year Surveys 46 CFR 42.09-15; 5100.1B, Sec. 2-2.2 and 2-2.3					X			X			

TABLE 2-14, TABLE OF TESTS, INSPECTIONS, AND DRILLS

Required Test, Drill or Inspection	WK	MO	QTR	6 MO	1 YR	2 YR	3 YR	5 YR	10 YR	12 YR	
Overspeed Trip Tests 46 CFR 111.12; 5100.1B, Sec. 2-10.1						X					
Machinery Remote Shutdown 46 CFR 61.20; 5100.1B, Sec. 2-10.1						X					
Load Test for Boat Davits 46 CFR 199.190(i)(5); 5100.1B, Sec. 2-3.5						X					
Fire Hose Pressure Test and Marking 46 CFR 189.25-20; 5100.1B, Sec. 2-5.3						X					
Pressure Vessel Hydrostatic/Visual Tests/Insp. 46 CFR 61.10-5; 5100.1B, Sec. 2-11.2						X					
Boiler Safety and Relief Valve Tests 46 CFR 61.05-20; 5100.1B, Table 2-11.1.4						X					
Fireside and Waterside Inspections 46 CFR 61.05; 5100.1B, Table 2-11.1.4						X					
Steam Gage, Water Columns, Gage Glasses and Gages; 46 CFR 61.05-15; 5100.1B, Sec. 2-11						X					
Hydrostatic Test of Compressed-Gas Cylinders 46 CFR 147.65;49 CFR 173.34;5100.1B,Sec.2-11.3 and 4-16.1							X	X	X	X	
Main and Other Steam Piping 46 CFR 61.15-5; 5100.1B, Table 2-11.1.4								X			
Steam Valves Inspection, 46 CFR 61.05-15; 5100.1B, Table 2-11.1.4								X			
Boiler Hydrostatic Test, 46 CFR 61.05-10; 5100.1B, Table 2-11.1.4								X			
Load Test for Cargo Cranes, Booms, A-Frames 46 CFR 189.35; 5100.1B, Sec. 2-3.7/2-3.8								X			
Ground Tackle Inspection 5100.1B, Sec. 3-8								X			
Boiler Mountings and Attachments 46 CFR 61.05-15; 5100.1B, Sec. 2-11									X		

SAMPLE DRILL SUMMARY SHEET (See Chapter 1, Section 1-4.2.3(d) for Requirement)

TESTS, INSPECTIONS, AND DRILLS
SUMMARY SHEET BY WEEKS - CY 19__

INSPECTIONS	JAN				FEB				MAR				
DRILLS, & TESTS,	1	2	3	4	1	2	3	4	1	2	3	4	REMARKS
FIRE, IN PORT (STA. NUMBER)													
FIRE, AT SEA (STA. NUMBER)													
HEAT SENSOR NUMBER TESTS													
SMOKE SENSOR NUMBER TESTS													
SHORE HOSE PSI TEST													
ABANDON SHIP													
DONN SURVIVAL SUITS													
EMERGENCY STEERING													
MAN OVERBOARD													
QUARTERS EVACUATION													
WATERTIGHT DOOR TEST													
FIRE SCREEN DOOR TEST													
EPIRBs TEST													
RESCUE BOAT OPS. TEST													
LIFERAFT INSPECTIONS													
LIFERAFT RELEASES													
LOCAL FIRE DEPT. DRILL													
(OTHER DRILLS)													

NOTE: ALL TESTS, INSPECTIONS, AND DRILLS REQUIRED BY TABLE 2-14 OF THIS CHAPTER HAVE NOT BEEN INCLUDED IN THIS SAMPLE SHEET BUT MUST BE INCLUDED IN THE SUMMARY SHEET(S) PREPARED BY THE VESSEL FOR PRESENTATION TO THE FLEET INSPECTION OFFICER AT THE PRE-INSPECTION BRIEFING. THE FORMAT OF THIS EXAMPLE MAY BE REVISED TO SUIT.