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CHAPTER 583

BOATS AND SMALL CRAFT

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Certification Sheet

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CHAPTER 583

BOATS AND SMALL CRAFT

SECTION 1.

ADMINISTRATIVE POLICIES

583-1.1 BOATS AND SMALL CRAFT

583-1.1.1 DEFINITION OF A NAVY BOAT. A Navy boat is a non-commissioned, waterborne unit of the Fleet, not designed as a service craft and capable of limited independent operation. It may be assigned to and carried on a ship as a ship's boat, or assigned to a shore station or fleet operating unit.

583-1.2 CORRESPONDENCE

583-1.2.1 BOAT CORRESPONDENCE. All correspondence related to boats should cite the boat length, type, and the hull registry number, not the local number assigned by the command, ship, or station.

583-1.3 STANDARD ALLOWANCE OF BOATS

583-1.3.1 CNO AND PEO CLA (PMS 325) ESTABLISHED BOAT LIST. The allowance of boats for forces afloat is established by the Chief of Naval Operations (CNO) and for shore stations by Program Executive Officer, Carrier, Littoral Warfare, and Auxiliary Ships (PMS (325) (PEO CLA (PMS 325)), according to OPNAVINST 4780.6 series.

583-1.3.2 CHANGES IN BOAT ALLOWANCE. A desired change in the boat allowance of the ship or shore station should be the subject of a letter request (message, in an emergency) clearly stating the reasons for the change. This letter request should be addressed to CNO or PEO CLA (PMS 325) as appropriate (refer to paragraphs 583-1.3.1 and 583-1.3.3) and forwarded through the requester's chain of command. CNO or PEO CLA (PMS 325) will determine if the allowance change is approved or disapproved, and will issue necessary instructions. The letter requesting the increase, decrease or establishment of a boat allowance should cite the boat type, length and intended end use or justification.

583-1.3.3 BOATS ASSIGNED TO FLAGS AND COMMANDS. Boats for Flag Officers and Commands will be authorized only by CNO. When assigned, these boats are not part of any ship's allowance but are in the custody of the flag. Boats assigned for personal use of flag officers are referred to as barges. Boats assigned for personal use of Chiefs of Staff, Squadron, Group, and Division Commanders, not of flag rank, and for Commanding Officers are referred to as gigs. When referring to such boats in correspondence addressed to PEO CLA (PMS 325), they should also be designated by length, type, and hull registry number. Assignment and management criteria for barges and gigs are set forth in OPNAVINST 4780.6 series.

583-1.3.4 HOW BOATS ARE OBTAINED. Boats are PEO CLA (PMS 325) special material and are not subject to standard requisitioning procedures. Under normal conditions, boats are obtained by letter request to PEO CLA (PMS 325) citing the justification and intended end use. In an emergency, requests may be submitted by naval message or telephone. Telephone requests should be confirmed by a follow-up message.

583-1.3.5 EMERGENCY ISSUES. Boats should not be issued or disposed of without specific authority from PEO CLA (PMS 325), except in an emergency. When issues must be made without approval, PEO CLA (PMS 325) should be given full details at the earliest date by letter or message.

583-1.4 TRANSFER OF BOATS

583-1.4.1 PEO CLA (PMS 325) AUTHORITY FOR TRANSFER OF BOATS. Boats should not be transferred unless an emergency exists, without specific authority from PEO CLA (PMS 325). Custodians may assign boats on sub-custody to neighboring activities when a temporary need arises. When transfers must be made without prior approval, PEO CLA (PMS 325) shall be given full details at the earliest date by letter or message.

583-1.4.2 TRANSFERRED WITH A FLAG. Boats assigned for personal use of flag officers afloat or their staffs, may be transferred from ship to ship, with the flag, without specific authority of PEO CLA (PMS 325). However, PEO CLA (PMS 325) should be advised of the date of the transfer by letter or message citing the names of the ships involved and hull registry numbers of each.

583-1.4.3 TRANSFERS TO SPECIAL PROJECTS AND TEMPORARY LOANS. Boats may be assigned by PEO CLA (PMS 325) to special projects such as disaster relief or environmental cleanup efforts. These boats may be operated by other government agencies or commercial corporations. The recipient temporary boat custodian is responsible for restoration of the boat to as-issued condition upon return to U.S. Navy custody. Receipt of U.S. Navy issue boats shall be reported by the most expeditious record means within 15 days of boat arrival at the new custodial activity. A completed Boat Inspection Report (NAVSEA 9583/series) (Figure 583-1-1) shall be completed by a NAVSEA designated boat surveyor prior to turn back acceptance. This completed form will be used by PEO CLA (PMS 325) to determine the financial liability of the user custodian from funds allotted to the special project.

BOAT INSPECTION REPORT (Insert appropriate letter/symbol in space provided:
NAVSEA 9583/3 (REV 11/97) "V" = Acceptable, "R" = Repair,"X" = Replace, "T" = Test; and "*" =Cosmetic/Maintenance Item)

Boat Type:	Engine Type:	Hull No.:	Configuration:	Date:
HULL EXTERIOR	**HULL INTERIOR**	**HULL TOPSIDE (cont'd)**	**PIPING SYSTEMS (cont'd)**	**AUXILIARY EQPT (cont'd)**
BOW/STEM	CARGO FLAT	HAND RAILS*		
PORT GUNWALE	COXSWAIN FLAT	LIFE LINES*		
PORT SIDE	CUSHIONS*	TAFF RAILS*		
PORT RUBRAIL	DOORS	TOE RAILS	Subtotal	
PORT CHINE	ENGINE COVER	PILOT HOUSE	**MAIN PROPULSION**	Subtotal
PORT BOTTOM	FLOTATION	PAINT*	ENGINE	**ELECTRICAL SYSTEMS**
KEEL/SKEG	FLOORS		REVERSE GEAR	WIRING
STBD GUNWALE	HATCHES		V-DRIVE	DIST PANEL
STBD SIDE	LIFTING PADS	Subtotal *	TRANSMISSION	SWITCHBOARDS
STBD RUBRAIL	LOCKERS	**PIPING SYSTEMS**	OUT DRIVE	LIGHTS-NAVI*
STBD CHINE	MAN HOLES	BILGE PIPING	OUTBOARD ENGINE	LIGHTS-INTER*
STBD BOTTOM	SEATS*	BILGE VALVES	ALTERNATOR	BATTERY CABLES*
TRANSOM	VOIDS	FW PIPING	STARTER	HORN*
TRANSOM CORNERS	PAINT*	FW VALVES	PUMP-FW	SPOTLIGHT*
PROPELLER		SW PIPING	PUMP-SW	FANS*
RUDDER		SW VALVES	SAND TRAP	WINDSHIELD WIPERS*
SHAFT		LO PIPING	HEAT EXCHANGER	
STRUT	Subtotal *	FO PIPING	THROTTLE CONTROLS	Subtotal *
STRUT BEARING	**HULL TOPSIDE**	FO VALVES	SHIFTING LINKAGE	**INSTRUMENTS & GAUGES**
STUFFING BOX	CABIN TOP	EXHAUST SYSTEM	WATERJET PUMP	
ZINCS	CABIN SIDES	MUFFLERS		VOLTMETER*
RAMP	CANOPY FITTINGS	KEEL COOLER		OIL PRESSURE ENG*
RAMP HINGE	CANOPY	STRAINERS	Subtotal	OIL PRESSURE REVGR*
RAMP GASKET	CHOCKS*	FILTER-FO	**AUXILIARY EQUIPMENT**	OIL TEMP*
SANDBLAST	CLEATS*	FILTER-LO	AIR COMPRESSOR	WATER TEMP*
SCRAPE/ SAND	COAMINGS	HOSES	WINDLASS	HYD PRESSURE*
PAINT	DECK	SEACOCKS	CAPSTAN	HYD TEMP*
	DECK COVERING	ACCUMULATORS	CRANES	TACHOMETER*
	WINDOWS/PORTS	HYDRAULIC PIPING	FIRE PUMPS	
Subtotal *	WINDSHIELD FRAME	TANKS	MG SET	
HULL INTERIOR	WINDSHIELD GLASS*	HAND BILGE PUMP	DIESEL GENERATOR	
BULKHEADS	BOW RAILS*		WINCHES	
CABIN (cont'd)	(cont'd)	(cont'd)	STEERING GEAR (cont'd)	Subtotal *

TYPE	LABOR/OH	TESTING & MATERIALS	TOTALS	Normal Repairs will result in the following condition:
50% OVERLOAD				SUPERIOR
HANDLING				AVERAGE
REMOVE ENGINE				POOR
INSTALL ENGINE				INSPECTED BY:
TEST SLING				
SEA TRIAL				
SUB TOTAL				

Figure 583-1-1. Boat Inspection Report NAVSEA 9583/3 (Sheet 1 of 2)

BOAT INSPECTION REPORT — Page 2 of 2 —

NAVSEA 9583/3 (REV 11/97) Hull No.: DATE:

REPAIR COSTS FROM PAGE ONE				
TYPE	LABOR	OVERHEAD	MATERIAL	TOTALS
HULL-INT., EXT., TOPSIDE				$
AUXILIARY MACHINERY				$
ELECTRICAL				$
PIPING SYSTEMS				$
NET COSTS				
BOAT ALTS PRIORITY "A"				$
BOAT ALTS PRIORITY "B"				$
COSMETIC/MAINTENANCE ITEMS				$
MAIN PROPULSION				$
TEST AND TRIALS				$
BOAT ALTS PRIORITY "C"				$
INSTRUMENT AND GAUGES				$
GROSS				
NET COSTS				
GRAND TOTAL				

REMARKS

Figure 583-1-1. Boat Inspection Report NAVSEA 9583/3 (Sheet 2 of 2)

583-1.4.3.1 Project Funded by Other Activities. Ships assigned to a project being funded by an agency or command other than PEO CLA (PMS 325), should turn in their boats to the most convenient naval repair activity upon completion of the mission for accomplishment of repairs attributed to the project.

583-1.4.3.2 Cost Estimates. Naval activities receiving boats as a result of the action in paragraph 583-1.4.3.1 should provide the project funding agency and PEO CLA (PMS 325) with an estimate of the cost required for repairing and preserving each boat received and request that funds be provided, if the boat is going to be stored. Boats received should be repaired to issuable condition and then transferred to the location designated by PEO CLA (PMS 325).

583-1.4.3.3 Funding Identification. If the source of funding has not been identified for restoration to Ready-For-Issue (RFI) condition of a U.S. Navy owned boat turned in to a U.S. Navy repair activity by a governmental agency or private corporation, PEO CLA (PMS 325) should be immediately notified by naval message. PEO CLA (PMS 325) will arrange funding for the necessary repairs to restore the boat to RFI condition or provide direction for boat disposal based upon the material condition assessment.

583-1.4.4 TRANSFERS TO MILITARY ASSISTANCE PROGRAMS. Transfer of U.S. Navy boats to foreign governments usually begins by boat identification by PEO CLA (PMS 325), inspection of the boat by the recipient foreign government, and then issuance of a formal Letter of Offer and Acceptance (LOA) by the U.S. Navy. A Foreign Military Sales (FMS) case is established upon signature acceptance of the LOA by the foreign government that specifies delivery dates and means of transportation. When boat repairs are necessary prior to delivery to a shipper for overseas transportation, PEO CLA (PMS 325) will specify funding levels and the authorized repair list. Other public laws may be invoked (such as PL506A) after a Presidential determination to reduce inventory of active or reserve forces to expedite delivery of boats or support equipment to a recipient nation. In this case, PEO CLA (PMS 325) will provide specific instruction regarding acceptance inspections and method of transportation. The PL506A transfers are usually done on short notice within an abbreviated time window specified in the Presidential determination. Frequently, the U.S. Navy unit providing the boats or equipment will be tasked to provide initial operating and maintenance instruction on site in the foreign nation using Mobile Training Teams (MTT). In all transfers to foreign nations, the boats and equipment provided should be in Ready-For-Issue/Combat Ready (C-l) material condition to preclude a U.S. Navy requirement to effect repairs on site in the foreign country and because of immediate operating requirements upon arrival in a foreign nation. The LOA specifies actual conditions at delivery for sale or transfer which the U.S. Navy is required to honor.

583-1.4.5 REPORTING TRANSFERS AND RECEIPTS. All receiving custodial commands shall report all boat transfers and receipts to PEO CLA (PMS 325) within 15 days of the transaction. This is necessary to accurately maintain custodian accounts. Record correspondence is required with attention to PMS 300 and may be accomplished by formal letter, naval message, or facsimile transmission (FAX) of DD Form 1348 (marked up). Reports are not to be used for recording changes in status of boat condition (that is, under repair or not onboard).

583-1.4.5.1 Changes in Custody Status. All stocking activities shall promptly report changes in custody status of boats and landing craft to PEO CLA (PMS 325) by marking up a copy of the PEO CLA (PMS 325) authorizing letter or message, or by forwarding a copy of DD Form 1348 as a turn-in document. The date reported shall be the exact date of the change, not the date mailed. The authority for the change in status, where applicable, shall be cited.

583-1.4.5.2 Issues. All issues and to whom issued shall be reported.

583-1.4.5.3 Receipts. All receipts and from whom received shall be reported. The submission of these receipts shall be made promptly and shall not be delayed until the submission of NAVSEA 9583/3, Boat Inspection Report, Figure 583-1-1.

583-1.4.5.4 Disposal. Boats are normally disposed of by transfer to the nearest Defense Reutilization and Marketing Office (DRMO), after receipt of authorization by PEO CLA (PMS 325). If hulls are not accepted by DRMO for disposal, PEO CLA (PMS 325) will advise the holding activity of final disposition action to be taken by the disposing activity (scrapping, burning, sinking, target, or other).

583-1.4.5.5 Repairs. Completion of repairs to all stock boats and landing craft shall be reported to PEO CLA (PMS 325).

583-1.4.6 BOAT SURVEYS AFLOAT. When a boat is damaged such that a U.S. Navy intermediate or depot level repair activity cannot effect economical repairs, a boat inspection may be performed by Commanding Officers, as defined in paragraph 583-1.5 (Turn-In Procedures). The completed Report shall be forwarded to PEO CLA (PMS 325) for approval prior to boat disposal. Once approved, all usable equipment may be salvaged from the boat and retained for use prior to transfer of the boat to a disposal activity.

583-1.5 TURN-IN PROCEDURES

583-1.5.1 PEO CLA (PMS 325) AUTHORITY FOR TURN-IN OF BOATS. Turning in a boat for stock or disposal is a specific type of transfer which has specialized requirements. General authority and reporting requirements are given in paragraph 583-1.4.

583-1.5.2 SURVEY REQUIREMENTS. Prior to turn-in, a craft survey must be conducted by the Naval Surface Warfare Center Detachment Norfolk or other PEO CLA (PMS 325) designated surveyor. As part of the survey, engine maintenance records will also be reviewed. A Boat Inspection Report, NAVSEA 9583/3, Figure 583-1-1, will be completed. The original will be submitted to the boat custodian and a copy sent to PEO CLA (PMS 325). Based on this survey, PEO CLA (PMS 325) will determine whether the boat is to be turned in for stock or for disposal, and will issue specific disposition instructions to the custodian activity. Depending on disposition of the boat and the completeness of the engine maintenance records, the custodian activity may be required to conduct a one hour underway test or have the engine tested on a dynamometer prior to turn-in.

583-1.5.3 TURN-IN FOR STOCK. Boats that do not qualify for disposal due to age and condition shall not be turned in for stock until they are in a Ready For Issue condition. It is the responsibility of the custodian activity to ensure the boat is in Ready For Issue (RFI) condition, as defined in paragraph 583-1.11.1.1, prior to turn in. Major spares, such as shafts, rudders, struts, or propellers, if available, shall be turned in with the boat. These spares are provided with new boats because of their uniqueness to a particular production run and generally cannot be interchanged between boats built under different contracts.

583-1.5.3.1 Proper Boat Maintenance is the Responsibility of the User Command/Activity. If receipt inspection of an excess boat reveals that it was not properly maintained, PEO CLA (PMS 325) is authorized to request, via the chain of command, that the former user command/activity identify funding to return the boat to a serviceable condition.

583-1.5.4 BOAT DISPOSAL. Boats shall not be disposed of unless such disposal has been authorized by PEO CLA (PMS 325). Boats are normally disposed of by transfer to the nearest Defense Re-utilization and Marketing Office (DRMO). If hulls are not accepted by DRMO for disposal, PEO CLA (PMS 325) will advise the holding activity of final disposition action to be taken by the disposing activity (scrapping, target, or other). DRMO should be contacted for specific guidance and location of the disposal lot. No boats shall be drawn from a DRMO by a Navy activity without PEO CLA (PMS 325) approval.

583-1.5.5 PREPARATION FOR TURN-IN. Whether turning in a boat for stock or for disposal it is the responsibility of the custodian activity to ensure that a lack of preservation or presence of environmentally hazardous materials onboard does not impose an additional burden on the receiving activity.

583-1.5.5.1 Removal of Hazardous Materials. All batteries and fuel shall be removed, and the bilges shall be dry and free of petroleum products prior to turn-in.

583-1.5.5.2 Preservation. The custodian activity shall preserve the craft in accordance with Section 10 prior to turn-in.

583-1.5.5.3 Certification. The custodian activity shall prepare a Boat 'Ready for Turn-In - Certification Form', submit the original to PEO CLA (PMS 325), and provide a copy of the Certification Form to the receiving activity upon delivery of the boat. The Boat Ready for Turn-In - Certification Form and a sample cover letter are provided as Figure 583-1-2.

SAMPLE LETTER

From: ***Certifying Command***
To: **Program Executive Officer, Carriers, Littoral Warfare, and Auxiliary Ships (PMS 325)**
Via: ***Chain of Command***

Subj: **CERTIFICATION OF BOAT READY FOR TURN-IN**

Ref: **(a) Naval Ships' Technical Manual Chapter 583-1.5**

Encl: **(1) BOAT READY FOR TURN-IN - CERTIFICATION FORM**

1. **Per reference (a), enclosure (1) is submitted for your records.**

2. ***Certifying command point of contact.***

Signature of Department Head or Higher Authority

Figure 583-1-2. Sample Certification of Boat Ready for Turn-In Letter with Boat Ready for Turn-In - Certification Form (Sheet 1 of 2)

DATE: _____

BOAT READY FOR TURN-IN - CERTIFICATION FORM

BOAT HULL NO.: _____

SHIP OR ACTIVITY (Current custodian): _____

1) All batteries have been removed from craft:

☐ **YES** ☐ **NO**

2) All fuel has been removed from craft:

☐ **YES** ☐ **NO**

3) Bilges are clean and free of petroleum products:

☐ **YES** ☐ **NO**

4) Craft is capable of being made operational with minimal labor or funding expenditure and all significant structural repairs required have been made:

☐ **YES** ☐ **NO**

5) The craft has been preserved in accordance with the requirements of NSTM Chapter 583, Section 583–12:

☐ **YES** ☐ **NO**

CERTIFYING OFFICIAL (Please print clearly):

_____

NAME **POSITION/GRADE/RANK/RATE** **TELEPHONE**

SIGNATURE : _____

Figure 583-1-2. Sample Certification of Boat Ready for Turn-In Letter with Boat Ready for Turn-In - Certification Form (Sheet 2 of 2)

583-1.5.6 RECEIPT INSPECTIONS. The receiving activity will inspect boats delivered for turn-in to ensure they comply with all turn-in procedures.

NOTE

The receiving activity may refuse receipt if the boat has not been properly prepared for turn-in or a signed ″Boat Ready for Turn-In - Certification Form″ has not been provided.

Additional shipping, hazardous material removal and preservation costs resulting from rejection or non-compliance with turn-in procedures of a boat for turn-in will be the responsibility of the custodian activity.

583-1.6 ALTERATIONS

583-1.6.1 CHANGES TO AUTHORIZED BOAT CONFIGURATIONS. Boat configuration changes to standard U.S. Navy boats are often necessary for user boat custodians to accomplish assigned tasks in their geographic location. Alterations may affect characteristics such as speed, displacement, cargo capability, passenger capacity, or outfit to support special functions such as diving or salvage. A Boat Alteration Record (NAVSEA 4720/series) is developed and issued by PEO CLA (PMS 325) for specific classes of boats or individual boats with special requirements. Before a boat alteration action can be initiated, an alteration authorization request (Figure 583-1-3) must be forwarded to PEO CLA (PMS 325) via the pertinent chain of command. The request must justify the need for the change; citing safety, logistics problems, increased capabilities, reduced operating cost, and a cost benefit analysis. PEO CLA (PMS 325) will review the alteration request and will determine if the alteration is economically and operationally justified. The cost benefit analysis shall include:

a. Technical Feasibility Study. Evaluate the technical feasibility of the proposed change. Specifically:
   1 Validate the current configuration.
   2 Investigate alternatives.
   3 Estimate weight change.
   4 Predict the weight change's overall effect.
   5 Evaluate structural impact.
   6 Evaluate system impact.
   7 Finalize weight impact.
   8 Report results.

b. Cost Benefit Analysis. Evaluate the cost feasibility of the change by performing a Cost of Ownership Analysis (COA) and completing a Justification/Cost form (NAVSEA FMP Manual refers). The COA compares the cost of the existing configuration with the replacement or new configuration. Total cost of ownership includes:
   1 Performance cost and saving (e.g., increase and decrease in fuel cost; reliability of the equipment).
   2 Maintenance cost and saving (e.g., changes to manuals, training, provisioning, PMS, etc.).
   3 Cost of installation of the new configuration.
   4 One time cost of the new configuration (e.g., COA, BOATALT, prototyping, testing and evaluating).
   5 Intangible costs and benefits (performance, safety, maintainability, etc.).
   6 Evaluation of the remaining life of the craft proposed for the installation (survey via correspondence and on-site; review maintenance and performance records).
   7 Calculation of the Total Cost of Ownership of the new configuration versus the existing configuration, based on the remaining life of the craft.

SAMPLE LETTER

From: ***Requesting Command***
To: Program Executive Officer, Carriers, Littoral Warfare, and Auxiliary Ships (PMS 325)
Via: ***Chain of Command***

Subj: **REQUEST FOR TECHNICAL BOAT ALTERATION AUTHORIZATION**

Ref: (a) Naval Sea Technical Manual Chapter 583-1.5

Encl: (1) BOAT ALTERATION REQUEST FORM

1. Per reference (a), enclosure (1) is submitted for your consideration.

2. **Requesting command point of contact.**

Signature

Figure 583-1-3. Sample Boat Alteration Request with Boat Alteration Request Form (Sheet 1 of 2)

DATE: _____

BOAT ALTERATION REQUEST FORM

BOAT HULL NO.: _____ **PRIORITY CLASS:** **A** **B** **C**

TITLE OF ALTERATION RECOMMENDATION: _____

REASON FOR REQUEST:

- ☐ **SAFETY**
- ☐ **IMPROVED CAPABILITY**
- ☐ **REDUCED MAINTENANCE**
- ☐ **INADEQUATE DESIGN**
- ☐ **ENVIRONMENTAL**
- ☐ **MAINTENANCE PROBLEM**
- ☐ **HUMAN FACTORS**
- ☐ **EQUIPMENT UNAVAILABILITY**
- ☐ **OTHER (EXPLAIN)**

AREA OF BOAT AFFECTED:

- ☐ **HULL**
- ☐ **MECHANICAL**
- ☐ **ELECTRICAL**
- ☐ **ELECTRONIC**

SKETCHES ILLUSTRATING PROPOSED CHANGE:

- ☐ **YES (INCLUDE WITH FORM)**
- ☐ **NO**

VENDOR INFORMATION: (IF APPLICABLE)

PART NUMBER _____
CATALOG NUMBER _____
VENDOR DOCUMENTATION _____

BRIEF DESCRIPTION OF PROPOSED ALTERATION: _____

_____
_____
_____
_____
_____
_____
_____

POINT OF CONTACT:

_____

NAME **POSITION/GRADE/RANK/RATE** **TELEPHONE**

Figure 583-1-3. Sample Boat Alteration Request with Boat Alteration Request Form (Sheet 2 of 2)

If justified by the cost benefit analysis, PEO CLA (PMS 325) will prioritize, fund, and develop the proposed alteration. If available program funding is insufficient the requesting activity may assume the cost of the developing the alteration. Unfunded, approved alterations will be deferred and considered in the next POM cycle. Alteration authority may be issued by Boat Alteration (BOATALT), Alteration-Equivalent-To-Repair (AER), or PEO CLA (PMS 325) authorizing letter, depending upon the magnitude of the proposed configuration change. Alteration of a boat, to any extent not shown on the approved NAVSEA drawing, is not permitted without prior authorization from PEO CLA (PMS 325) **regardless of the funding source** . In certain circumstances, minor configuration changes may be authorized by type commanders as Type Commander Issued Alterations (TIA). Alterations of any type will not be approved which would result in a net adverse stability condition, increase the weight of a ship's boat causing the Safe Working Load of the assigned davit to be exceeded, or result in design mission capability degradation. Changes in design mission require prior approval of the Chief of Naval Operations in most circumstances. An example of this would be a request to weld a LCM-8 bow ramp closed where an existing ship-to-shore cargo or troop lift requirement may exist.

583-1.6.2 BOATALT RECORDS. The BOATALT record describes in detail the configuration change which is authorized. Engineering sketches are provided with alteration material lists (AML), quality assurance, and integrated logistics support requirements. Maintenance, special tools and test equipment, billet and supporting technical documentation changes are identified. Boat custodians are responsible for requesting PMS documentation changes and reporting completion of alteration work on the standard OPNAV 4790/2K CSMP forms. The BOATALT's for U.S. Navy ships' boats and for boats assigned to shore stations differ in application from CRAFTALT's, which are developed for the Naval Special Warfare Command craft. CRAFTALT authority for accomplishment may be authorized by PEO CLA (PMS 325) for general utility boats, such as the 24RB or the 22UB, on a case-by-case basis, upon boat custodian request, with endorsements by the support commander. BOATALT application by registry number or boat type mark (such as all 40UB MK5) is usually annotated on the first BOATALT page.

583-1.6.2.1 Numbering. The BOATALT identification consists of the boat length, abbreviated two letter boat type, the alteration four digit serial number, and an accomplishment priority letter (Example: 26PE/0123 A). A revision to a basic BOATALT carries a letter sequence designation (Example: Rev D for the fourth revision). If an alteration has application to several different types of boats, then it will carry a GENERAL designation with the serial number, an accomplishment priority letter, and the sequential revision letter designation.

583-1.6.2.2 Priority. The BOATALT established priority indicates the relative importance for accomplishment. The priorities are defined as follows:

a. Class A: MANDATORY ACCOMPLISHMENT. Usually for safety reasons or compliance with effective public laws, regulations or court decisions.

b. Class B: ESSENTIAL FOR ACCOMPLISHMENT. Provides a needed improvement in boat capabilities.

c. Class C: DESIRABLE ACCOMPLISHMENT. A useful improvement in boat capabilities.

Example: BOATALT RECORD 50UB/0002A is the second alteration approved for the 50-foot utility boat which has first priority for accomplishment because of safety or mission essentiality.

583-1.6.3 ACCOMPLISHMENT. A BOATALT with a low sequence number should be checked for application. Boat types of the same class with a hull number year indicator later than the approval date of the BOATALT should be examined for application to the construction contract date and the type and mark of the boat. An example is BOATALT 33PE/02C which was approved in 1972 (or earlier) and would not apply to 33PE8712, which was in the 1987 acquisition contract. Another example is BOATALT 26MW/lOC, which was approved in

1964 for the MK9 26MW but has no application to MK10 and subsequent 26MW. The Historical Boat Alteration Listing is published in June of each year by the Planning Yard and given wide distribution to boat custodians, repair and overhaul activities, and operational and administrative commanders. This annual listing summarizes effective boat alterations by boat type and annotates BOATALT cancellations. This cancellation list should be examined for application to boat alteration records. Cancelled BOATALT's need not be retained for reference purposes in ship or shore station files.

583-1.6.3.1 Stock Boats. Priority A and B BOATALT's will normally be accomplished during repair of a boat to issuable status or before issue. Priority C BOATALT's will be accomplished only if deemed necessary and if funds are available.

583-1.6.3.2 Active Boats. An A priority BOATALT should be accomplished at the next scheduled Intermediate Maintenance Activity (IMA) repair availability. Ship's force or the supporting organization level maintenance organization should complete an A priority BOATALT as soon as possible after receipt of materials. A B priority BOATALT should be accomplished within one year of the approval date on the BOATALT. The elective C priority BOATALT may be accomplished at the earliest convenience of the boat custodial activity. U.S. Navy operation and maintenance funds (O&MN) administered through the major fleet commanders to subordinate activities are the usual source for BOATALT material acquisition and commercial contractor installation services, if required. BOATALT's are usually capable of accomplishment by organization or intermediate level maintenance activities during assigned repair availabilities.

583-1.6.3.2.1 Repair Activities. Repair activities should maintain active files of approved BOATALT's and AER's by boat type. The files should be updated annually within thirty days of receipt of the Historical Boat Alteration Listing described in paragraph 583-1.6.3 and canceled BOATALT's deleted from the active files. BOATALT and AER's not on file should be requested, using the replacement directions provided in the Historical Boat Alteration Listing. The BOATALT completion label plate should be examined for accuracy during assigned boat repair availabilities or overhauls and compared to the BOATALT and AER file for the type boat under repair. A review of the technical specifications for each applicable BOATALT, coupled with a boat inspection, will identify which BOATALT and AER's were not completed or only partially completed for the specific hull under repair. The boat custodial command should be advised of discrepancies for entry into his CSMP (Current Ship's Maintenance Project) for subsequent repair availability planning purposes.

583-1.6.4 BOATALT ISSUANCE AND CANCELLATION. The BOATALT and AER file is reviewed annually by PEO CLA (PMS 325) and the Planning Yard to identify candidates for cancellation. Periodic cancellation summaries are issued to a wide distribution list during the year, using the first page of the BOATALT form. The annual Historical Boat Alteration Listing recaps cancellation listings for reference. BOATALT's and AER's are approved by PEO CLA (PMS 325) after engineering development by the ISEA or the Planning Yard. Distribution is subsequently made by the Planning Yard to boat custodial commands, repair activities, and operational and administrative commanders.

583-1.6.5 AUTHORIZATION. Because most alterations required in boats can be readily accomplished with a small expenditure of funds, most BOATALT's issued are to be accomplished either by forces afloat or an Intermediate Maintenance Activity (IMA). Occasionally, BOATALT's are issued that are of a complex enough nature that they will have to be accomplished at a depot level repair activity.

583-1.6.6 FUNDING. BOATALT and AER accomplishment is funded from OPNAV directed Operation and Maintenance, Navy (O&MN) accounts managed by Support Commanders. PEO CLA (PMS 325) receives

O&MN funds each fiscal year from OPNAV sponsoring codes, to support BOATALT engineering development and specific boat type modernization and rehabilitation programs.

583-1.6.6.1 Service Craft Modernization Program (SCMP) Funds. To be used to accomplish selected SHIPALT's on active service craft. The SHIPALT's in this category will normally be limited to those that increase the military capability of the craft (that is, adding a radar, radio, or gun) or those that are the result of a directed program, such as pollution abatement. Funding of such alterations will be dependent on their being programmed in the SCMP by the CNO.

583-1.6.6.2 Custodian or Command Support Activity Funds. When a support commander authorizes accomplishment of a PEO CLA (PMS 325) technically approved BOATALT, funding is provided for IMA material ordering and procurement of technical services. In some instances, BOATALT materials are purchased using local operating (OPTAR) funds for IMA or ship's force installation. Complex BOATALT's may be authorized for accomplishment by commercial repair enterprises holding Master Ship Repair Agreements (MSRA) or bid out to local contractors.

583-1.6.6.3 PEO CLA (PMS 325) Boat Rehabilitation Funds. Boats returned to stock are refurbished to RFI condition using available Rehabilitation funds provided to PEO CLA (PMS 325) by the OPNAV sponsors. During REHAB, approved priority A and B BOATALT's for each boat type, are usually accomplished during industrial repair availabilities. Priority C BOATALT's would only be accomplished on stock boats under unusual circumstances because of funding limitations.

583-1.6.7 EXPENDITURE OF FUNDS FOR UNAUTHORIZED ALTERATIONS. Unauthorized alterations, regardless of funding source, are strictly prohibited and could result in formal administrative review procedures when PEO CLA (PMS 325) Boat Rehabilitation funds are required to restore the boat to its original configuration.

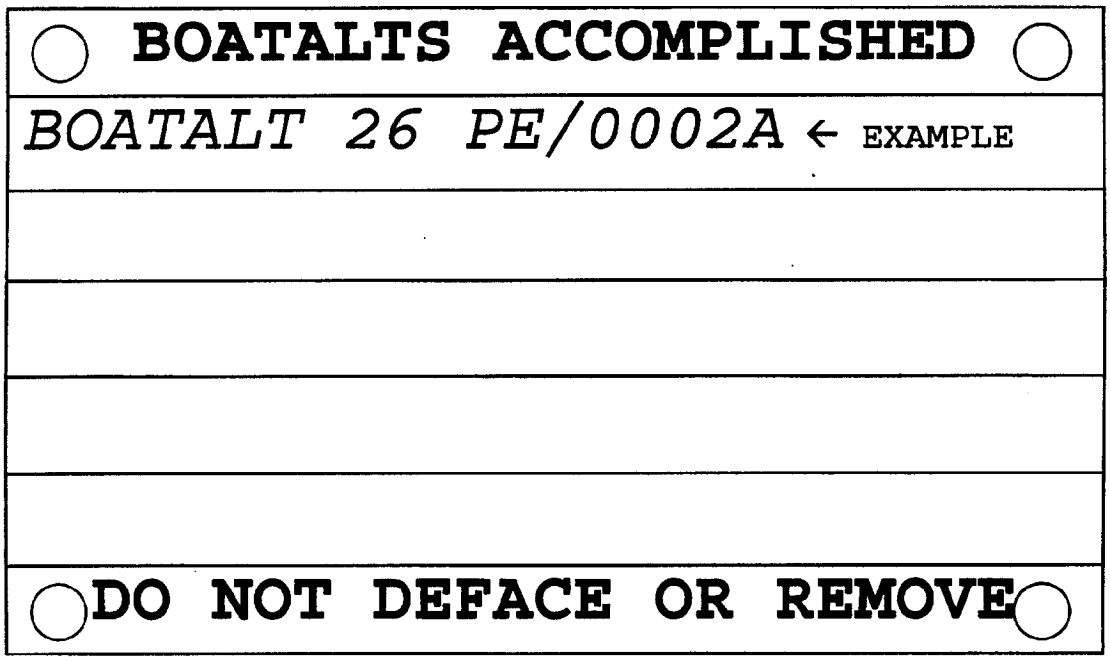
583-1.6.8 DISTRIBUTION. The BOATALT's will be distributed under cover letter by the Planning Yard after PEO CLA (PMS 325) signature approval. An approved distribution list is provided with the boat alteration. Distribution is limited to boat custodians affected by the configuration change, boat repair activities, support commanders, and OPNAV sponsor.

583-1.6.8.1 Distribution Requests. Addition or deletion change requests for the distribution list should be directed to the planning yard for boats:

Naval Surface Warfare CenterCarderock Division Detachment Norfolk116 Lake View Parkway, Suite 200Suffolk, VA 23435-2698Attn: Code 2313

583-1.6.9 COMPLETION RECORD. Upon completion of an authorized Boat Alteration, a 316L CRES plate shall be installed or updated with permanent lettering by the installing activity including completion information as depicted in Figure 583-1-4. Boat custodians should comply with applicable 3M CSMP reporting instructions, using OPNAV 4790/CK forms for recording BOATALT and AER completions in the SPCC Weapons System file. U.S. Navy boats are not included in the Fleet Modernization Program (FMP) at this time for alteration planning and reporting purposes. Boat custodians are required to weigh assigned boats upon completion of weight impacting alterations in accordance with paragraph 583-4.1.2. Scale weighing at time of receipt is advisable to estab-

lish a base line reference for future weight growth. Boat weighing by various boat construction yards has been noted to be in error by 15 percent or more because of faulty scales or weight calculation errors by the accepting contract activity.



BOATALT LABEL PLATE

MATERIAL: 3/32" MINIMUM 316L CRES SHEET –
ABOUT 6" WIDE BY 3 ½" HIGH –
WITH ¼" ENGRAVED BLACK-FILLED LETTERS.
BOATALT INFORMATION MAY BE STAMPED.

Figure 583-1-4. BOATALT Label Plate

583-1.6.10 REQUESTS FOR BOATALT ACCOMPLISHMENT BY BOAT CUSTODIANS. Boat custodians, both afloat and ashore, scheduling an applicable Boat Alteration Record for accomplishment should obtain support commander approval when funding does not derive from local unit fund operating or special project funds.

583-1.6.11 CONVERSIONS. When authorization is requested to change the standard U.S. Navy design configuration for a specialized function, such as work boat conversion to support diver operations, technical authorization is obtained from PEO CLA (PMS 325). A U.S. Navy field activity with boat design expertise will be tasked to develop a Boat Alteration Record for technical approval by PEO CLA (PMS 325). During engineering development, special equipment installation requirements are reviewed for impact on boat weight and stability and a standard installation method is established which identifies installed equipment removal and special tool requirements, provides detailed engineering drawings or sketches, and describes installation techniques, test methodology and standards, lists concurrent boat alterations to be accomplished, provides a material list with MILSPEC or MILSTD identification, and summarizes logistics support and technical documentation require-

ments. After signature approval by PEO CLA (PMS 325), the authorizing Boat Alteration Record is distributed by the Planning Yard to various boat custodians, repair activities, and administrative commanders for conversion planning and funding.

583-1.6.11.1 Conversion Without BOATALT. In those cases where a partial or full conversion has been accomplished to a standard U.S. Navy boat design in the absence of an authorizing Boat Alteration Record, PEO CLA (PMS 325) will document the technical changes to the boat, analyze the impact on weight and stability, and direct corrective action where the installation varies from U.S. Navy technical standards. A technically authorizing BOATALT will be promulgated for the information of repair activities, support commanders, and boat custodians to apprise them of current special function boat conversion opportunities and disseminate the standard installation method and material lists.

583-1.7 INSPECTION

583-1.7.1 NEW BOATS. Most new boats are delivered to U.S. Navy boat storage activities pending assignment to new construction ships or replacement for existing boats that qualify for disposal. A special inspection is accomplished by PEO CLA (PMS 325) upon arrival at the stocking point to ensure compliance with contract requirements and identify any shipping damage which may have occurred to the boat. In some cases where new construction boat delivery schedules are not in consonance with new construction ship delivery requirements, boats may be shipped directly from the building boat yard to the cognizant ship construction activity in care of the resident U.S. government inspection activity or the construction yard as government furnished equipment.

583-1.7.1.1 Warranty Period. Each new delivery carries a six month comprehensive warranty from the day of acceptance at the boat builder by a U.S. government representative. The contractor is liable for the correction of deficiencies within the six month warranty period as reported by the receiving boat custodian to PEO CLA (PMS 325) and the cognizant Supervisor of Shipbuilding, Repair and Conversion (USN) (SUPSHIPS) or the Defense Contract Management Office (DCMAO). A contract final payment percentage is held in reserve to force compliance with the contract conditions through the expiration of the warranty period. It is important to note the actual boat acceptance date because the new boat may have been placed in storage pending delivery to the ship. Some boats are reserved in storage for new construction ships in a long term ship class construction program. The boats may or not be in covered storage for periods of several years prior to delivery. Prior to shipment, these boats receive a special inspection to identify deficiencies in outfit and for damage incurred in storage. Inspection deficiencies including the effects of weathering are usually corrected at the receiving point. The 6 month contractual warranty coverage period, in some instances, will have expired prior to boat delivery and the start of boat operations. Defects in workmanship or initial parts failure should still be referred to PEO CLA (PMS 325) for resolution. PEO CLA (PMS 325) and the cognizant support commander have corrective action resources upon which to effect corrective action. It is imperative that the boat custodian conduct a receipt inspection using the Boat Check List (Figure 583-1-5 of this publication) to identify deficiencies to PEO CLA (PMS 325) and the support commander.

BOAT CHECK LIST

BOAT TYPE: HULL NO.:

SHIPPING ACTIVITY		RECEIVING ACTIVITY		DESCRIPTION	REMARKS
SAT	UNSAT	SAT	UNSAT		
				HULL EXTERIOR	
				BOW/STEM	
				PORT GUNWALE	
				PORT SIDE	
				PORT RUBRAIL	
				PORT CHINE	
				PORT BOTTOM	
				KEEL/SKEG	
				STBD GUNWALE	
				STBD SIDE	
				STBD RUBRAIL	
				STBD CHINE	
				STBD BOTTOM	
				TRANSOM	
				TRANSOM CORNERS	
				PROPELLER	
				RUDDER	
				SHAFT	
				STRUT	
				STRUT BRG	
				STUFFING BOX	
				ZINCS	
				RAMP	
				RAMP HINGE	
				RAMP GASKET	
				PAINT	
				HULL INTERIOR	
				BULKHEADS	
				CABIN	
				CARGO FLAT	
				COXSWAIN FLAT	
				CUSHIONS	
				DOORS	
				ENGINE COVER	
				FLOTATION	
				FLOORS	
				HATCHES	
				LIFTING PADS	
				LOCKERS	
				MANHOLES	
				SEATS	
				VOIDS	
				PAINT	
				HULL TOPSIDE	
				CABIN TOP	
				CABIN SIDES	
				CANOPY	
				CHOCKS	
				CLEATS	
				COAMINGS	
				DECKS	
				DECK COVERINGS	
				WINDOWS/PORTS	
				WINDOWSHIELD FRAME	
				WINDOWSHIELD GLASS	
				BOW RAILS	
				HANDRAILS	
				LIFELINES	
				TAFFRAILS	
				TOE RAILS	
				PILOTHOUSE	
				PAINT	

Figure 583-1-5. Boat Check List (Sheet 1 of 2)

BOAT CHECK LIST

SHIPPING ACTIVITY		RECEIVING ACTIVITY		DESCRIPTION	REMARKS
SAT	UNSAT	SAT	UNSAT		
				MAIN PROPULSION	
				ENGINE	
				REVERSE	
				V DRIVE	
				TRANSMISSION	
				OUTDRIVE	
				OUTBD ENG	
				ALTERNATOR	
				STARTER	
				PUMP - FW	
				PUMP - SW	
				RAW WTR STRAINER	
				HEAT EXCH	
				PIPING SYSTEM	
				BILGE PIPE	
				BILGE VALVES	
				FW PIPE	
				FW VALVES	
				SW PIPE	
				SW VALVES	
				LO PIPE	
				FO PIPE	
				FO VALVES	
				EXHAUST SYSTEM	
				MUFFLERS	
				KEEL COOLER	
				STRAINERS	
				FILTER - FO	
				FILTER - LO	
				HOSES	
				SEACOCKS	
				ACCUMULATORS	
				HYD PIPING	
				TANKS	
				ELECTRICAL SYSTEMS	
				WIRING	
				DIST PANEL	
				LIGHTS--NAVI	
				LIGHTS--INT	
				BATT CABLES	
				HORN	
				SPOTLIGHT	
				FANS	
				WINDSHIELD WIPERS	
				NAVIGATION EQUIPMENT	
				RADAR/ANTENNA	
				COMPASS	
				RADIO	
				INSTRUMENTS & GAUGES	
				AMMETERS	
				OIL PRESS, ENG	
				OIL PRESS, REVGR	
				OIL TEMP	
				WATER TEMP	
				HYD PRESS	
				HYD TEMP	
				TACHOMETER	
				AUXILIARY EQUIPMENT	
				AIR COMPRESSOR	
				WINDLASS	
				CAPSTAN	
				CRANES	
				FIRE PUMPS	
				MG SET	
				DIESEL GEN	
				WINCHES	
				STEERING GEAR	
				BILGE PUMPS	
				SPARES	
SHIPPING ACTIVITY, NAME, PHONE				RECEIVING ACTIVITY, NAME, PHONE	

Figure 583-1-5. Boat Check List (Sheet 2 of 2)

583-1.7.1.2 Transportation. In the event of direct shipment from the construction boatyard to the building yard for new construction ships, SUPSHIPS or the Defense Contract Management Area Office (DCMAO) will usually notify recipients of boats by formal letter, in advance of arrival alongside, requesting an initial boat delivery inspection with a letter report delineating material discrepancies. Most often, cosmetic or structural damage is caused by careless handling or road hazards encountered enroute after departing the boat builder's yard. The commercial transporter is eventually responsible for correction of boat damage of this type, but because of contractual claim adjudication delays, other means are used to immediately restore the boat to RFI condition. Photography and sketches are usually helpful in resolving claims of this type and should be provided as addenda to the arrival inspection report.

583-1.7.1.3 Boat Receipt Inspection. All recipients of new construction boats are requested to perform an immediate inspection upon receipt using the Boat Check List (Figure 583-1-5) and advise the cognizant SUPSHIPS if the boat is preliminarily acceptable. Boat hoisting equipment shall be verified to ensure the Davit Label Plate specifies the weight of boat to be hoisted. If the boat weight exceeds the hoisting weight, notify PEO CLA (PMS 325) immediately.

583-1.7.1.4 Unsatisfactory Inspection. If the boat is not considered to be preliminarily acceptable, recipients are requested to:

a. Notify the cognizant SUPSHIPS, DCMAO, storage facility and PEO CLA (PMS 325) if boat is not shipped direct from boat manufacturer, of any shipment damage observable, furnishing photographs if practical.

b. Notify the cognizant SUPSHIPS or DCMAO of any boats received that are unsatisfactory, defective, or deficient due to improper manufacturing or equipment installation. It is recommended that, in addition to the initial inspection, all new boats be reinspected at intervals during the warranty period as to allow for proper detection and timely reporting of defects that might occur during the guarantee period.

583-1.7.1.5 Acceptance Notification. Notification of preliminary acceptance shall be by letter and in no case shall the initial inspection be delayed for a period in excess of two weeks from the date of receipt of the boat. All boats receive extensive tests and trials under the terms of the contract. Accomplishment of additional tests and trials on new boats received is not mandatory but may be conducted if deemed advisable.

583-1.7.1.6 Estimating Costs. Only those SUPSHIP, DCMAO personnel, or other representatives designated by PEO CLA (PMS 325) having knowledge of fleet requirements, standards of workmanship required in naval craft, and of the details cited in applicable plans and specifications for various materials and equipment incorporated, shall inspect boats for nonconforming deficiencies or for estimating repair costs. See paragraph 583-1.12.4.

CAUTION

All boats received for storage or for further shipment shall be inspected to ensure the engine cooling and piping systems are drained or protected from freezing, the bilges are dry, and the preservation specified has been accomplished.

583-1.7.2 BOATS IN STORAGE. Initial inspection of boats received in stock is authorized without reference to PEO CLA (PMS 325). NAVSEA 9583/3, Figure 583-1-1, shall be completed for all boats received for stock.

Boat stocking activities, such as Naval Supply Centers, not having qualified boat inspectors, should contact the local SUPSHIPS to arrange for inspection of boats received for stock.

583-1.7.2.1 Pre-Issue Inspection. Before issuing a boat from storage, an inspection of the boat shall be made by an individual experienced in boat repair and fleet requirements. If deficiencies exist, or required alterations have not been accomplished, these deficiencies shall be reported to PEO CLA (PMS 325) for further instructions. New boats, that were trialed before shipment and then preserved, need not be trialed but may be issued as is. Depreservation and starting instructions shall be available to guide the recipient of the boat. If the boat has been stored for a year or more and the condition is not known, a trial run shall be made unless otherwise directed by PEO CLA (PMS 325).

583-1.7.2.2 Post Issue Rejection. Rejection of a boat after issue and shipment to the ship or shore station should be carefully considered because of time delays which can occur in identifying and shipping another suitable boat. If an RFI boat is received and discrepancies are found and indicated on the Boat Check List, Figure 583-1-5, forward a copy of Figure 583-1-5 (mark-up) along with the receiving report to PEO CLA (PMS 325). However, the following factors shall not be cause for rejection by ships and shore stations:

a. Incomplete inventory of 90 day operations spares which are shipped separately. Notify SUPSHIP/DCMAO immediately in the event of an imminent deployment where full Boat Allowance List (BAL) and required COSAL load lists are necessary as deployment spares.

b. Slight variations in hull painting schemes caused by fading or touch-ups.

c. Water line salt water discoloration caused by initial operations testing at the building yard. Hull bottoms are usually scrubbed and hull dings touched up at the building yard prior to shipment.

d. Slight rusting on metallic parts which can be readily cleaned and preserved by ship’s force.

e. Incomplete outfitting discrepancies, which should be immediately described to SUPSHIP/DCMAO for correction.

f. Cosmetic blemishes correctable by buffing or light sanding and road hazard dings occurring during surface delivery.

583-1.7.2.3 Non-RFI Issue. Because of budgeting constraints and scheduling requirements, a non-RFI boat may be offered by PEO CLA (PMS 325) to boat custodians requesting turn-in and replacement of damaged boats or boats which are not economical to repair. A newer boat of later design but with prior fleet use may be offered on an as-is basis. Usually an inspection opportunity is offered to the receiving boat custodian prior to acceptance. The following factors are not cause for rejecting a non-RFI boat when it is received alongside:

a. Lack of complete hull painting.

b. Slight cracks or dished-in hull areas not affecting hull integrity or strength.

c. Oxidized metallic areas which can be preserved by ship’s force.

d. Absence of original outfit items and repair parts.

e. Lack of technical documentation such as Boat Information Book, Technical Manuals, and operating records. Technical documentation can be obtained from publications stocking activities.

f. Deformation of hull parts such as the hull beading or bilge keels.

It is recommended that non-RFI hulls accepted by boat custodians receive an immediate repair availability at an Intermediate Maintenance Activity to restore the boat to an acceptable condition of readiness and appearance.

583-1.8 PREPARATION FOR SHIPMENT

583-1.8.1 SHIPMENT DESTINATION. Unless otherwise specified, boats shipped from stock or for transfer shall be prepared for delivery as follows:

a. Local destination. Boats issued locally shall be delivered in the as-is or as stored condition. All items not installed should be secured against movement. Unprotected equipment openings shall be sealed to prevent entrance of dirt or water. Attach depreservation instructions to the equipment involved. Refer to paragraphs 583-10.3 through 583-10.4.3.2 for engine starting instructions.

b. Destination not local. Boats shipped beyond the local area shall be preserved as required by paragraphs 583-10.2 through 583-10.2.5.

583-1.9 SHIPMENT OF BOATS

583-1.9.1 PEO CLA (PMS 325) SHIPMENT ORDER. Shipment of boats will normally be accomplished by shipment order prepared by PEO CLA (PMS 325).

583-1.9.2 SHIPMENT PRECAUTIONS. The following precautions shall be observed when loading boats for shipment:

a. Cradle cross members (chocks) shall be rigidly braced to prevent collapse.

b. Towing padeyes or other fittings installed on the boat shall not be used as tiedown points.

c. Strongbacks shall not be tensioned to such a degree that the chocks deform the hull.

d. Bumpers shall be installed where the ends or sides of the boat may be damaged during shipment.

e. Snubbing of boats so that the forces received during transit are transmitted to the stem or transom end is not permitted.

f. The weight of the boat shall be borne by the keel supports, not the side bunks. Side bunks for plastic and steel boats should be at least 10 inches wide and should be located opposite a frame or bulkhead, or where weights are concentrated, such as the engines. In case the boat does not have structural type keel, full strength supports shall be installed opposite the interior longitudinal bilge stringers.

g. Bilge plugs shall be removed and attached to the steering wheel at coxswain’s station.

h. Ensure that the engine cooling and piping systems are drained or protected from freezing.

i. Batteries shall be disconnected.

j. Fuel tanks shall be drained.

k. Consideration should be given to temporary storm cover over windows, radar, mast antenna removal, and door and hatch locks.

583-1.10 REPLACEMENT OF BOATS IN SERVICE

583-1.10.1 REPAIR COST ESTIMATES. Estimates of repair costs to boats shall be made by either a SUPSHIP activity or experienced personnel. A boat needing repairs beyond the capability of ship's force or station personnel shall be made the subject of a work request to a repair activity in the availability period. The size, type of boat, and its registry number shall be given.

583-1.10.2 TYPE OR AREA COMMANDER'S FUNDS FOR REPAIR. The repair of boats shall be funded with Type or Area (Support) Commander's funds and shall be accomplished without reference to NAVSEA, unless deemed irreparable or beyond the expected service life (20 years for fiberglass boats and 25 years for metal boats) of the boat.

583-1.10.3 REPAIRABILITY OF BOATS. No in-service standard Navy designed boat will be considered for replacement until it has reached the expected service life or has encountered a major catastrophe that renders it unusable or unserviceable. If the repair activity or Type or Area Commander considers the cost of repair to be excessive, the responsible activity shall complete and submit NAVSEA 9583/3 (Figure 583-1-1) and forward to PEO CLA (PMS 325). If PEO CLA (PMS 325) decides the boat is repairable, repairs shall be made and funded with Type or Area Commander's funds. The feasibility of repairing or the replacing the boat will be determined solely by NAVSEA.

583-1.10.4 ENGINE STATUS. The NAVSEA 9583/3 (Figure 583-1-1) shall include a statement as to whether or not the engine is serviceable or warrants repair.

583-1.10.5 PREPARATION OF POWERBOAT TURNED IN FOR REPAIR OR STOCK. Whenever a powerboat is turned in for repair or for stock, the fuel tanks shall be drained and the bilges cleaned. Ensure that the engine cooling system is drained or protected from freezing and that necessary preservation is accomplished. There shall be no cannibalization of the boat or propulsion system. The technical manuals, spare propellers, and shafts shall be turned in with the craft.

583-1.11 STOCK CLASSIFICATION, LEVELS, AND DISTRIBUTION

583-1.11.1 STOCK CLASSIFICATION. Stock boats are divided into three categories. As noted below, stock boats shall be placed in one of these categories only as a result of inspection by qualified personnel who complete NAVSEA 9583/3 (Figure 583-1-1) according to paragraph 583-1.12.6.1.

583-1.11.1.1 Issuable (Ready for Issue) (A Condition). Any boat that can be made operational and seaworthy with a minimum amount of productive labor time and without expenditure of funds for major alterations or repair other than depreservation, varnishing, painting, minor caulking, testing, and electrical or mechanical adjustments. These items shall be accomplished when the boat is issued. The presence of miscellaneous outfit items, such as life jackets, boat hooks, life ring, mooring lines, etc., which are part of the ship's Allowance Equipage List (AEL) for the boat, is not required for a boat to be considered issuable.

583-1.11.1.2 Repairable (F Condition). Any boat not in issuable condition, for which a determination has been made - it is economically feasible to repair the boat to an issuable condition, see paragraph 583-1.10.3.

583-1.11.1.3 Beyond Economical Repair (X Condition). Any boat considered too costly (see paragraph 583-1.10.3) to place in issuable condition.

583-1.11.2 STOCK LEVELS. The total number of boats to be carried in inventory at stocking activities will be determined by PEO CLA (PMS 325).

583-1.11.2.1 Minimum Stock Levels. Minimum stock levels of issue boats are no longer being established. Stock boats will be repaired to meet near term requirements as directed by PEO CLA (PMS 325).

583-1.11.2.2 Uneconomical Repair to Stock Boats. Stock boats which are considered to be uneconomical to repair, based upon the latest Inspection Report may be held in stock because of a critical shortage or because no substitute boat can be utilized. When it is determined by PEO CLA (PMS 325) that the special status of the boat no longer exists, disposal will be directed by PEO CLA (PMS 325).

583-1.11.2.3 Stock Boat Repairs. Repairs to stock boats shall not be accomplished unless specifically authorized by PEO CLA (PMS 325). Preference will be given at all times to those boat types having the highest rate of issue and the largest requirement of mobilization. Selection of boats for repair to issuable condition shall be made from existing inventory.

583-1.11.3 STOCK DISTRIBUTION. Selection of boats for issue shall be on the first in-first out basis whenever practical and shall be made from existing stocks of issuable boats.

583-1.12 PRESERVATION, MAINTENANCE, AND REPAIR

583-1.12.1 PRESERVATION AND MAINTENANCE. Initial preservation is authorized on all boats determined to be economically repairable without reference to PEO CLA (PMS 325). Cyclic preservation and routine maintenance of boats in storage is necessary to maintain stock boats in an issuable or repairable condition. This work is authorized without reference to PEO CLA (PMS 325) (refer to paragraphs 583-1.10.1 through 583-1.10.4).

583-1.12.2 REPAIR. Repairs to boats in storage will be made according to paragraphs 583-1.11.2.1 through 583-1.11.2.3.

583-1.12.3 COST. The cost of work stated in paragraph 583-1.10.2 will be charged to funds provided by PEO CLA (PMS 325) for the repair of boats in storage. The cost of work listed in paragraph 583-1.10.1 should be charged to funds provided by the Naval Supply Systems Command, except at activities whose supply operations are funded by PEO CLA (PMS 325). These costs are to be charged to the funds granted for supply operations. If funds are not available, PEO CLA (PMS 325) should be advised. The procedures for estimating repair costs to stock boats are outlined in the following paragraphs.

583-1.12.4 ESTIMATING COSTS. NAVSEA 9583/3 refer toFigure 583-1-1) shall be used by boat inspectors when preparing repair cost estimates and shall be completed promptly for:

a. All boats and landing craft in service which have been inspected and for which the user will require repairs or need to request replacement. Send original copy to user and a copy to PEO CLA (PMS 325).

b. All boats and landing craft received in stock from deactivating ships or those craft turned in as excess to allowances. Send original copy to PEO CLA (PMS 325).

c. All boats and landing craft in stock when deterioration or unauthorized stripping has significantly changed the condition and former estimate of repairs. Send original copy to PEO CLA (PMS 325).

d. All boats and landing craft in stock when local labor rates have increased significantly. A yearly review should be made of previously submitted inspection reports and marked up to show the current estimated costs. Send a copy to PEO CLA (PMS 325).

583-1.12.5 BOATS ASSIGNED TO SHIPS OR ACTIVITIES. Should the NAVSEA 9583/3 indicate a high repair cost or if replacement has been recommended, the user shall enclose the original copy in a letter to PEO CLA (PMS 325) requesting a review and determination on a possible replacement. The user shall include the possible date that a replacement is required and any changes in ship's location.

583-1.12.6 BOAT INSPECTION REPORT. Page 1 of NAVSEA 9583/3 is divided into nine sections: hull exterior, interior and topside, piping systems, main propulsion, auxiliary equipment, electrical systems, instruments and gauges, and testing and trials. Page 2 is for notes describing problem areas and for the Boat Inspector to determine final estimated net and gross repair costs.

583-1.12.6.1 Inspection Report Use. During the inspection, the inspector is to indicate in the appropriate left hand block, either an X for replacement, R for repair, I for items requiring testing, a ″check″ for items considered to be satisfactory, or NA when not applicable. At the same time, the percentage of each item, (for example, 20 percent of bottom) or number of square feet (for example, 15 square feet of side plating) and the estimated man-hours to correct, can be noted in the space at the right of each item. The subtotal line can indicate material and labor costs for use in developing final estimated costs. The items marked with an asterisk on the report are either cosmetic in nature and not essential to the boat's operation or are normal maintenance items that should be maintained, repaired, or replaced by ships' force during normal upkeep. These costs are not to be included in the net cost estimate that is used by PEO CLA (PMS 325) to determine if an in-service boat should be repaired or replaced. These costs will be used however, to determine disposition of PEO CLA (PMS 325) stock boats.

583-1.12.6.2 Routine Maintenance. Accomplish routine maintenance of all onboard or installed boat equipment including items of outfit.

583-1.12.6.3 Inspection Report Use by Fleet Personnel. NAVSEA 9583/3 may be used by fleet personnel for local use in determining the condition of assigned boats for planning purposes when budgeting or requesting repair funds, or to assist in work loading at Intermediate Maintenance Activities and tenders.

583-1.12.6.4 Net Cost. When preparing repair cost estimates for boats, the following items shall be used as a basis for arriving at the net cost entered on NAVSEA 9583/3:

a. Include the cost of repairing, renewing, testing, and refinishing all defective portions of the hull structure and hull portable parts. For this cost element, boat inspectors should separate, except for accident damage losses, costs of cosmetic and normal maintenance type items.

b. Include the cost of renewing, repairing, and testing of all defective electrical wiring, fixtures, and electrical components not associated with the engine or items of outfit.

c. Include the cost of renewing, repairing, and testing of all defective machinery not associated with the engine, engine components, or items of outfit.

d. Include the cost of performing all authorized priority A and B alterations except those associated with the engine, engine component, and items of outfit.

e. Exclude the cost of conducting water trials and the 50 percent overload test. Add to gross cost.

f. Exclude the cost of renewing, repairing, altering, and testing of all items of outfit.

g. Exclude the cost of altering, repairing, testing, and depreserving the engine(s) or engine components. Add to gross cost.

h. Exclude the cost of removing or installing the engine(s) or engine components. Add to gross cost.

i. Exclude the cost of moving the boat.

j. Exclude the cost of chrome plating all hardware if boat is a barge or a gig. Add to gross cost.

k. Exclude costs of priority C BOATALT's.

583-1.12.6.5 Local Repair Authorization. The repair of boats assigned to ships and shore stations may be accomplished without reference to PEO CLA (PMS 325), unless the cost of repair is deemed excessive, in which case refers to paragraph 583-1.10.3.

583-1.12.6.6 Gross Cost. The gross cost shall include items e, g, h, and j of paragraph 583-1.12.6.4. In addition, the repair or purchase of a replacement engine is to be included in the estimate.

SECTION 2.

EQUIPMENT AND REPAIR PARTS

583-2.1 GENERAL

583-2.1.1 BOAT EQUIPMENT ALLOWANCE. The allowance of equipment furnished with each boat, and that required to be requisitioned to operate and maintain each boat, is set forth in the following publications:

a. Boat Allowance List (BAL).

b. Allowance Equipage List (AEL).

c. Allowance Parts List (APL).

583-2.1.2 BOAT ALLOWANCE LIST (BAL). The BAL details all the applicable plans used for constructing the boat, identifies all equipment installed, cites the applicable technical manuals, and lists spare and repair parts required.

583-2.1.3 ALLOWANCE EQUIPAGE LIST (AEL). The AEL lists the allowance of conventional equipage; that is, rope, anchor, fenders, bells, batteries, and so forth, required for most boats and small landing craft. It has been standardized and consolidated into one list, AEL 2-820004001, copies of which are available from any Naval Shipyard or Naval Sea Systems Command (NAVSEA). Use of this list will simplify determining what equipage outfit is allowed for subsequent requisitioning.

583-2.1.4 ALLOWANCE PARTS LIST (APL). When each boat or group of identical boats under a procurement contract are accepted in the Navy, the BAL is superseded by an APL. The APL is issued by NAVICP and may be incorporated into a ship's Coordinated Shipboard Allowance List or activity's allowance.

583-2.1.5 EQUIPMENT FURNISHED WITH BOAT. The equipment furnished with each boat, referred to by custom as portable parts, generally consists of the following items:

a. Backboards
b. Bitts, chocks, and cleats
c. Buoyancy tanks or flotation material
d. Canopies
e. Fire extinguishing systems (built in)
f. Engine and engine accessories
g. Electrical systems and equipment
h. Flagstaffs
i. Fuel tanks, piping, and fittings
j. Horn
k. Piping systems and hand bilge pumps
l. Portable gratings or shutters, rails
m. Propeller and associated parts, rudder
n. Seat cushions (refer to paragraph 583-2.1.5.1)
o. Slings
p. Steering mechanism
q. Towing posts
r. Ventilation sets, electrical (gasoline engines only), and ventilator cowls.

The types of items listed above are included in the invoice price of the boat. They will always be issued with and turned in with the boat to which it was originally fitted.

583-2.1.5.1 Boat Cushions. Boat cushions will be furnished as indicated in the publications listed in paragraph 583-2.1.4. In general, personnel boats will be furnished with one set of seat cushions and back cushions in the after cockpit.

583-2.1.5.2 Bilge Ventilation Fans and CO_2 /Halon Systems. Bilge ventilation fans and fixed CO_2 /Halon systems are fitted on gasoline inboard engine boats. On diesel engine boats, bilge ventilation fans are not required, as diesel oil will not volatilize at temperatures ordinarily encountered in boat bilges.

583-2.1.6 EQUIPMENT NOT FURNISHED WITH BOAT. Items to be requisitioned by the ship or receiving activity are listed in the appropriate publications referred to in paragraph 583-2.1.1. These items are commonly referred to as outfit and onboard repair parts.

583-2.2 OUTFIT EQUIPMENT AND ONBOARD REPAIR PARTS

583-2.2.1 REQUIREMENTS FOR EQUIPMENT AND PARTS. Requisitions for items of outfit or onboard repair parts are to be submitted to the applicable Inventory Control Point. In the event the stock number of a required item is not known, include the size and type of boat and its registry number. Stock numbers can often be obtained by referring to the applicable allowance or equipment list.

583-2.2.2 FUNDING. Items of outfit and onboard repair parts for all boats shall be charged as follows:

a. Ships or service craft being constructed or converted. Charge to funds provided for construction or conversion.

b. Active ships, naval districts, and naval attaches. Charge to supplies and equipage allotments, Operation and Maintenance Navy, provided to the activity receiving the boat.

c. Fleet Command Headquarters, Unit Commanders, Type Commanders, and other activities of the operating forces. Charge to funds provided for daily maintenance and operation of the activity receiving the boat.

d. Military Sealift Command (MSC). Charge to funds cited by MSC.

e. Shore activities of the Navy. Charge to funds provided by the shore activity receiving the boat.

f. Activities outside the Navy, including foreign governments. Charge to funds cited to pay for the transfer.

583-2.2.3 DISPOSITION OF OUTFIT, ONBOARD REPAIR PARTS, AND PORTABLE PARTS. All ships, shore activities, and other activities shall retain or turn in to storage, outfit and onboard repair parts as described in the following paragraphs.

583-2.2.3.1 Boats Replaced by Similar Boats. Items requisitioned by the ship or receiving activity (outfit) including the boat's letters and numerals and onboard repair parts are to be retained when a boat is turned in to storage and replaced by a similar boat. Portable parts furnished with the boat are to be turned in to storage with the boat.

583-2.2.3.2 Boats Replaced by Dissimilar Boats. In case a boat is to be replaced by a dissimilar boat, outfit items and repair parts which are identical for both boats should be retained by the ship or activity turning in the boat for replacement. The outfit and repair part items not applicable to the new boat should be turned in to storage and appropriate items should be requisitioned. Equipment furnished with the boat, portable parts, are to be turned in to storage with the boat. When a boat is removed from a ship or station and is not replaced, all equipment furnished with the boat, items of outfit, and repair parts are to be turned in with the boat.

583-2.2.3.3 Shipborne Boats Received into Storage. All items of outfit and repair parts received with shipborne boats turned into storage shall be screened, and that portion found to be in usable condition shall be identified and taken up in Navy Stock Account. That portion found unusable shall be scrapped. Identification can be made by referring to the applicable APL.

583-2.2.3.4 Non-Shipborne Boats Received into Storage. All items of outfit and repair parts received with non-shipborne boats turned in, shall be identified with the particular boat to which they are applicable and reissued when the boat is issued. If the items of outfit or repair parts are removed from the boat while it is in storage, a note to this effect shall be attached to the coxswain stand. Identification of items of outfit and repair parts can be made by referring to the applicable APL.

583-2.2.3.5 Portable Parts of Boats Received into Storage. All equipment furnished with the boat (for example, portable parts) are to be retained aboard the boat received into storage unless such is not practical due to possible deterioration. If portable parts are removed to prevent deterioration they shall be identified with the boat from which they are removed (paragraph 583-2.2.3.4). All equipment received with new boats, delivered under contract or purchase order, are to be identified for that boat when received and issued with the boat.

583-2.2.4 REPLACEMENT ENGINES. Boat alterations have been issued covering replacement of engines no longer supportable which are installed in active boats. Questions concerning the status of obsolete engines should be directed to NAVSEA. Engines needed to replace installed units that are beyond economical repair or otherwise nonsupportable should be requisitioned for SPCC according to NAVSUP Pub 4107N and Pub P 485, Afloat Supply Procedures.

SECTION 3.

REGISTRY NUMBERS AND IDENTIFICATION MARKINGS

583-3.1 REGISTRY NUMBERS

583-3.1.1 NAVSEA ASSIGNED REGISTRY NUMBERS. Each boat is assigned a registry number by Naval Sea Systems Command (NAVSEA). The registry number can be found on the transom of each craft. Before 1965, the hull registry numbers were serial numbers as assigned to commercial small power boats (for example, C 3713). These numbers are utilized for accountability (OPNAV INST 4780.5 series) and are normally separate from identification markings assigned by operating activities. After 1965, identifying hull registry numbers consist of the boat length in feet, boat type, and serial number. The first numerals in the boat's identifying numbers signify boat length followed by letters identifying boat type (as 26MW). Refer to Table 583-3-1. The final series of numbers indicate year of contract award or option year award (first two digits) and boat number (in sequence of its completion) starting with 01 or 1.

EXAMPLE: 36PL9015 is the fifteenth 36-foot PL delivered under a 1990 boat acquisition contract. Under the new metric system for measuring boats, l0MPE9129 is the twenty-ninth 10-meter personnel boat delivered under a 1991 boat acquisition contract.

583-3.1.2 APPLICATION FOR REGISTRY NUMBER FROM NAVSEA. In case a boat is found to be without a registry number, application should be made to NAVSEA to determine hull registry number or to have one assigned.

583-3.2 IDENTIFICATION MARKINGS

583-3.2.1 AMPHIBIOUS FORCES SHIPBORNE LANDING CRAFT. Ships of the amphibious forces will paint applicable white letters and numbers on their landing craft according to Figure 583-3-1 and Figure 583-3-2. The following are examples of the type abbreviation that shall be used.

Type	Abbreviation
LCC	CC
LPA	PA
LPD	PD
LKA	KA
LHA	HA
LSD	SD

Type	Abbreviation
LST	ST
LHD	HD
LPH	PH

a. Paint used for numbers and letters should conform to either Fed Spec TT-E-489 or TT-E-490. See **NSTM Chapter 631, Preservation of Ships In Service-Surface Preparation and Painting** , for additional information.

b. Letters and numbers may not be shaded.

c. Letter designation for bow ramps will consist of a two letter abbreviation of the ship's name and will be assigned by the Commander, Surface Force, U.S. Pacific Fleet and Commander, Surface Force, U.S. Atlantic Fleet to the ships in their commands. The Commanders should forward the lists of these abbreviations to NAVSEA and report all additions, deletions, or changes.

d. Landing craft of LST's will be similarly painted except that VP ramps will be marked by the ship's hull number painted in 24 inch block, black numbers with a 3 inch stripe.

e. Distinguishing markings for a landing craft used as a barge, gig, or officer's boat should be according to Standard Boat Details, Sheet 21 (C&R dwg 220598) and are described in paragraph 583-3.2.2 through 583-3.2.2.5

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT

Boat Craft	Length Overall (FT/M)	Max Beam (FT/M)	Height Without Cradle (FT/M)	Each Eng (HP/KW)	Fuel Cap (GAL/ LITER)	Max Speed (KTS) at Max Dis-placement	Design Hoisting Weight (LBS/KG) 1	Max Displ (LBS/KG)	Cargo Cap (LBS/KG)	Crew No.	Passen-gers Cap 2
14' PT, Alum	14'	4' 8"	1' 6"				175	1180			3
18' TD QST 33	20' 11"	7' 4"	3' 9"	230	42	42	3850	3850			
18' UB	17' 6"	6' 8"	4'	90	36	27	2200	2600	400	1	3
18' UB (Boston Whaler, BW)	18' 6"	7' 2"	4'	70	54	27	2100	3900	1755	1	6
22' UB	21' 10"	7' 9"	6'	50	30	8	5500	7800	2300	2	14
22' UB (Stock) (BW)	22' 3"	7' 5"	6'	100	77	30	3000	5655	2655	1	8
22' UB (Seal) (BW)	22' 3"	7' 5"	6'	140	127	30	3600	5655	2055	1	8
22' UB (EOD) (BW)	22' 3"	7' 5"	6'	100	127	30	3400	5655	2255	1	8
22' UB (Std) FY91, Riverine	21' 8"	8' 6"	7'	100	100	31.5	4600	6300	1690	1	6
24' HS, Alum (includes dive platform)	26'	8'	9' 4"	165	68	25	6450	6800	1150	2	2
24' HS, Alum (Gas O.B. conv.) Twin	29'	8'	9' 4"	100 (min)	68	30	6450	6800	1150	2	2
24' BH, Alum (Includes trim tab guard)	25' 3"	8'	8'	260	130	23.5	10500	10500	500	2	3
24' WB (EOD), Alum	24'	8'	8' 6"	165	68	16	6250	9225	3000	4	15
24' RB MK1	23' 9"	9'	6' 9"	165	35	17	5300	7300	2000	3	15
24' RB MK2	23' 9"	9'	6' 9"	165	35	17	5300	7300	2000	3	15
24' RB MK3	23' 9"	9'	6' 9"	175	35	25	5600	7500	1900	3	15
7m RB 4	23' 9"/7.25	9'/2.74	6' 9"/2.06	175/130	34/130	25/46	5600/2540	7500/3400	1900/860	3	15
26' MW MK 10 (built prior to 1980)	26' 1"	8' 3"	6' 8" 11	25	30	7.5	6400 3	9300	3000	2	18 5
26' MW MK 10 (built from 1980 through 1984)	26' 1"	8' 3"	6' 8"	25	30	7.5	7000 12	9300	3000	2	18

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (cont.)

Boat Craft	Length Overall (FT/M)	Max Beam (FT/M)	Height Without Cradle (FT/M)	Each Eng (HP/KW)	Fuel Cap (GAL/ LITER	Max Speed (KTS) at Max Dis-placement	Design Hoisting Weight (LBS/KG) 1	Max Displ (LBS/KG)	Cargo Cap (LBS/KG)	Crew No.	Passen-gers Cap 2
26' MW MK11	26' 1"	8' 3"	6' 8" 11	25	30	7.5	6200 3 12	9900	3600	2	22
26' MW MK12	26' 1"	8' 3"	6' 8"	25	30	7.5	6200 3 12	9900	3600	2	22
26' PE (built prior to 1966 "C" hulls)	26' 6"	9' 5"	9' 4"	250	90	21	12200	14200	2000	2	12
26' PE	26' 6"	9' 5"	8' 7"	250	80	21	11690	13550	2000	2	12
26' PE MK2	26' 6"	9' 4"	8' 8"	250	90	21	10800	13100	2000	2	12
26' PE MK3 (MK2 fitted with rigid bail)	26' 6"	9' 4"	10' 8"	250	90	21	11250	13550	2000	2	12
26' PE MK4	26' 3"	9' 4"	8' 8"	197	52	21	10000	12000	2000	2	12
26' PE MK6	26' 3"	9' 4"	8' 8"	197	52	22	9500	11200	2000	2	12
26' PE MK7	26' 3"	9' 4"	8' 10"	204	52	20	9500	10000	2000	2	12
8m PE 4	26' 3"/8	9' 1"/2.77	8' 10"/2.70	175/130	52/200	20	8800/4000	10000/4500	2000/910	2	12
30' HH MK2	30' 11"	9' 4"	7'	100	80	8	9500	12500	3300	3	20
31' RP MK2	32'	11' 8"	8' 3"	215	160	30	17200	19200		4	
33' PE MK2	32' 9"	11' 4"	12' 6"	250	100	14	16000	19000	3500	3	21
33' PE MK4	33' 3"	11' 4"	12' 6"	250	100	13	16000	19200	3500	3	21
33' PE MK5	33' 3"	11' 4"	12' 6"	257	100	16	15700	18500	3500	3	21
33' PE MK6	32' 9"	10' 11"	12' 6"	257	100	18	15700	17500	3500	3	21
33' PE MK7	32' 9"	10' 11"	12' 3"	214	100	17	15700	16000	3500	3	21
10m PE 4	32' 9"/10	11'/3.35	12' 4"/3.75	214/160	95/360	18	14350/6500	16550/7500	3500/1588	3	21
10m RB (NSW) 4	32' 9"/10	10' 7"/3.23	6' 9"/2.06	400/298	256/970	40	17600/8000	18500/8400	4000/1820	3	8
33' UB MK3	33' 10"	11' 4	7' 6"	100	100	9	12200	18200	7100	3	42
33' UB MK4	33' 5"	11'	8'	100	100	9.5	11000	16600	7100	3	42
10m UB FY90 4	33' 4"/10.16	10' 9"/3.28	7' 10"/2.40	112/84	90/340	10	11000/5000	17000/7700	7100/3200	3	42
35' WB, Alum, Twin	37' 1"	11' 1"	9' 4"	100	100	10.5	17500	22200	6500	3	

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (Cont)

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (cont.)

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (Cont)

Boat Craft	Length Overall (FT/M)	Max Beam (FT/M)	Height Without Cradle (FT/M)	Each Eng (HP/KW)	Fuel Cap (GAL/ LITER	Max Speed (KTS) at Max Dis-placement	Design Hoisting Weight (LBS/KG) 1	Max Displ (LBS/KG)	Cargo Cap (LBS/KG)	Crew No.	Passen-gers Cap 2
35' WB, Alum, Twin (FY89)	36' 10"	11' 1"	8' 9"	74	76	10	14700	21100	6500	3	
36' AT MK1, Alum, Twin	36'	13'	5' 11"	270 or 445	431	28/32	26000	29300	3200	2	16 6
36' AT MK2, Alum, Twin	35' 10"	13'	6' 2"	270 or 445	392	28/32	26000	29800	3200	2	16 6
36' HL (1982 & Later)	36'	12' 4"	13' 6"	425	250	18	25300 7	25100	–	6	
36' PL MK11	36' 1"	13' 1"	10' 5"	270	160	17	18500	20200	3000	3	17 8
36' PL MK12	36' 2"	12' 8"	9' 8"	425	200	17	20000	24600	3000	3	17 8
36' PL MK13	36' 2"	12' 4"	9' 8"	425	200	19	22400	27400	3000	3	17 8
11m PL	35'11"/10.95	12'/3.67	9' 6"/2.90	455/340	198/750	19	19800/9000	20900/9500	3000/1360	3	17 8
36' VP MK7	35' 9"	10' 7"	10' 9"	225	180	9	18500	26600	8100	3	36 6
36' PB (SEAFOX) Twin	35' 5"	9' 4"	8'	257	280	30	26000	25600	2500	3	10
40' PE MK4, MK6	40' 5"	12' 4"	12' 9"	257	160	15	19000	24500	6600	3	40
40' PE MK5, Twin	41' 9"	11' 10"	12' 6"	214	180	22.5	22700	28300	6600	3	40
40' PE MK7, Twin	41' 3"	11' 11"	12' 6"	214/160	150	22.5	22000	26000	6600	3	40
12m PE 4	39'11"/12.17	11' 10"/3.61	12' 6"/3.81	214/160	150/570	15	19000/8600	26500/12000	6600/2994	3	40
40' PR MK3, Steel, Twin	41' 1"	11' 9"	15' 1"	250	380	20	26600	28900	2000	4	11
40' UB MK3	40' 3"	12' 1"	9'	165	112	10	18000	28500	11800	4	71
40 UB MK4, MK5, MK6	40' 3"	12' 1"	9'	174	112	11	17000	27700	11800	4	71
12m UB 4	39'11"/12.17	11' 10"/3.61	9'/2.74	175/131	106/400	11	15400/7000	26900/12200	26000/11800	4	71
42' PR MK4 Alum Twin	41' 4"	14' 9"	15' 2"	450	670	25	38000	40900	4000	3	20
42' PR MK5, Twin 4	42'	11' 5"	17' 11"	243	498	22	25000	29000	3500	3	20
50' DW, Steel	50' 5"	14' 9"	15' 2"	200	400	9	93750	89300		5	
50' DW MK2, FY89	50' 0"	14' 2"	18' 4"	173	418	9.5	87800	80300		5	
50' PF MK1, Alum, Twin	50' 0"	13' 10"	17' 6"	430	800	22	44000	47600		6	
50' PF MK2, Alum, Twin	50' 0"	13' 10"	17' 6"	430	828	24.5	44000	48400		6	

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (cont.)

Boat Craft	Length Overall (FT/M)	Max Beam (FT/M)	Height Without Cradle (FT/M)	Each Eng (HP/KW)	Fuel Cap (GAL/ LITER	Max Speed (KTS) at Max Dis-placement	Design Hoisting Weight (LBS/KG) 1	Max Displ (LBS/KG)	Cargo Cap (LBS/KG)	Crew No.	Passen-gers Cap 2
50' UB MK4	50' 2"	14' 11"	10' 6"	160	170	10	27200	4700	23400	4	142
50' UB MK6, MK7	50' 3"	14' 10"	10' 6"	174	170	10.5	24000	47100	23400	4	142
15m UB FY90	49' 11"/15.21	14' 3"/4.34	10' 6"/3.20	175/131	170/640	11	24000/10900	45600/20700	23400/10600	4	142
50' WB Steel Twin	50' 3"	14' 5"	15' 8"	200	490	9	56400	95000	38700	5	
56' CM(6) Mod 2, Steel, Twin	56'	14' 4"	13' 5"	225	490	10	56000	124700	68800	5	
56' CM(6) Mod 2 HPI, Steel, Twin	56'	14' 4"	14'	450	768	11	69600	137600	68800	5	
56' CM(6) MK6, Mod 2 HPI (FY86), Steel, Twin	56' 8"	15' 2"	14' 4"	600	768	11	69600	137600	68800	5	
63' AR MK3/4, Wood, Twin	63' 4"	15' 4"	15' 6"	630	1580	28	62800 9	64600	1800	8	10
65' AR, Alum, Twin	65'	17' 3"	17' 6"	585	800	24	70000	69400	2400	6	
65' SC (EOD), Alum, Twin	64' 6"	19' 6"	21'	270	886	12.5	94400	89400		3	9
65' SC (EOD) MK2, Twin, Al 4	65' 9"	19' 5"	21'	450	1100	12.5	94400	105000	10000	3	9
65' PB MK3, Alum (3 engines)	64' 11"	18' 2"	19'	600	1800	25	93000	100700		5	6
65' TR, Alum, Twin	65' 2"	17' 5"	21' 6"	460	800	18.5	77000	77600	11100	6	
68' PB MK4, Alum (3 engines)	68' 5"	18' 3"	17' 7"	650	1800	27.5	101300	99800		5	
70' PE, Twin	70' 7"	21' 2"	16'	174	400	10	– 13	90000	28000	2	150
70' PE MK2, Twin	69' 8"	20' 8"	15' 9"	228	400	12	78000	85000	25000	2	150
72' TR, Wood, Twin	72' 9"	17'	20'	500	1800	18	118000	116300	24000	6	
74' CM(8) Mod 2, Alum, Twin	74' 6"	21' 1"	14'	300	870	12	83600	213600	130000	5	

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (Cont)

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (cont.)

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Boat Craft	Length Overall (FT/M)	Max Beam (FT/M)	Height Without Cradle (FT/M)	Each Eng (HP/KW)	Fuel Cap (GAL/ LITER	Max Speed (KTS) at Max Dis-placement	Design Hoisting Weight (LBS/KG) 1	Max Displ (LBS/KG)	Cargo Cap (LBS/KG)	Crew No.	Passen-gers Cap 2
74' CM(8) Mod 3, Steel, Twin SLEP	73' 7"	21' 7"	17' 4"	400	870	10	135000	277700	130000	5	
74' CM(8) Mod 4, Alum, Twin SLEP	74' 6"	21' 7"	16' 8"	400	870	11	83600	231000	130000	5	
74' CM(8) MK5, Steel, Twin	74' 3"	21' 7"	17' 1"	437	1140	12	134400	285000	160000	5	
74' CM MK6, Alum, Twin	74' 4"	21' 4"	18' 1"	350	750	10.6	88000	248000	160000	5	
85' TR, Alum, Twin	85'	18' 8"	20'	580	2400	20	– 13	135000	22200	8	
85' TR FY77, Alum, Twin	84' 9"	18' 10"	22'	929	2750	18	123000	167400	22100	5	
100' TR, Steel, Twin	102' 9"	21' 9"	48'	880	8690	17		362000 10	38500	15	
108' YP, Wood	108'	24' 3"	54' 9"	437	6550	13		378600	45000	4	26
120' TR, Steel	120'	25'	28' 7"	1140	8700	14		555500	34400	18	
135' CU 1610, Steel, Trim	134' 3"	29' 9"	16' 4"	500	3220	11	414400	800900	376300	12	
135' CU 1627, Steel, Twin	134' 3"	29' 9"	16' 4"	500	3320	11	414400	800900	376300	12	
135' CU 1646, Steel, Twin	134' 3"	29' 9"	16' 4"	500	3380	11	414400	873600	380800	12	
135' CU 1680, Steel, Twin	134' 9"	30' 1"	17' 9"	425	3460	11	492800	904960	403000	12	

Table 583-3-1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (cont.)

Boat Craft	Length Overall (FT/M)	Max Beam (FT/M)	Height Without Cradle (FT/M)	Each Eng (HP/KW)	Fuel Cap (GAL/ LITER	Max Speed (KTS) at Max Dis-placement	Design Hoisting Weight (LBS/KG) 1	Max Displ (LBS/KG)	Cargo Cap (LBS/KG)	Crew No.	Passen-gers Cap 2

Notes:

1. The hoisting weight of a boat is defined as the weight of the boat completely filled out and ready for service with machinery and electrical installations in operating condition. All outfit, on–board repair parts, navigational and lifesaving equipment, or their equivalent weights, must be on board. Weights representing the crew at 165 pounds per man must also be on board; fuel tanks must be full except in special cases. Actual hoisting weights should not exceed the design hoisting weights.

2. Personnel capacity shown in exclusive of crew. See BOATALT 26' MWB/10A for Restrictive Limits of Personnel Capacities for Forward Compartments all 26' MWB's.

3. Life saving crew of five plus two rescued, total seven persons.

4. Characteristics are taken from specifications and contract drawings.

5. Capacities for forward compartment of MWB's 6, 7, 9, and 10 are 11 men.

6. The weight of a SEAL with fall combat gear is 270 pounds. The weight of a marine with full combat gear is 225 pounds. These craft are hoisted at the devits in a fully loaded condition; at the slings in the hoisting condition. All weights are approximate only and should not be used for design purposes.

7. Hoisted in fully–loaded condition.

8. Light ship condition.

9. Hoisted with cradle.

10. Weight data taken from Inclining Experiment Report; no Scale Weight Reports available.

11. Including 26' MW MK10, MK11, and MK12 boats fitted with rigid hoisting bails. Height does not include bail.

12. Hoisting Weight for 26 MW MK10, MK11, and MK12 boats built drom 180 through the present include allowances for the lifeboat party (7 personnel and gear).

13. Cannot verify weight from existing library data.

Table 583–3–1. CHARACTERISTICS FOR NAVY BOATS AND CRAFT (Cont)

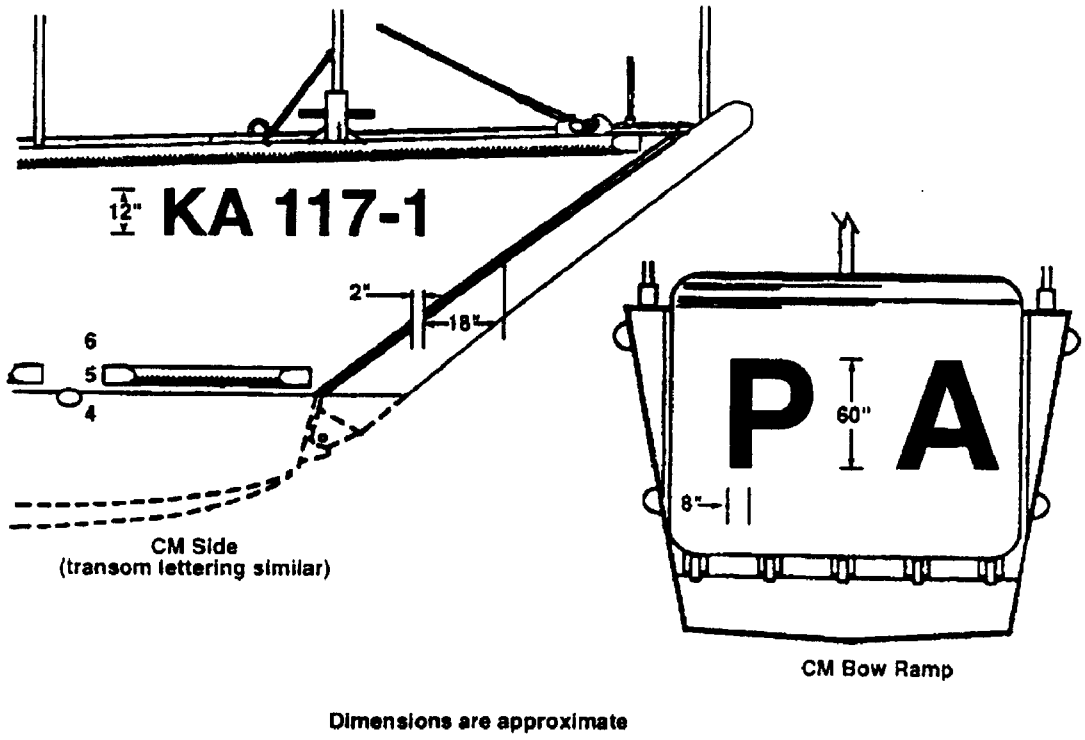

Figure 583-3-1. Landing Craft Mechanized (CM) Markings

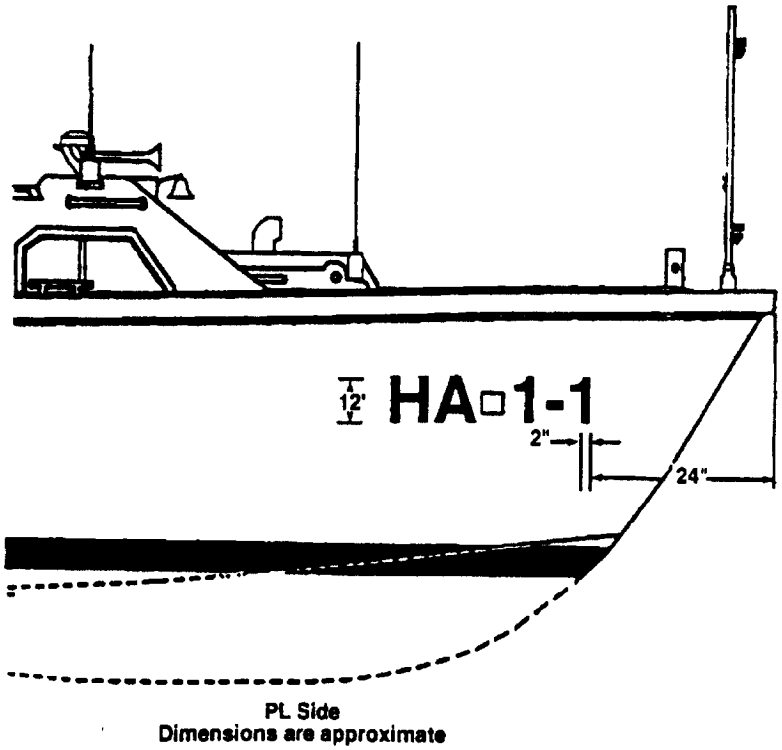

Figure 583-3-2. Other Landing Craft Markings

583-3.2.2 SHIPBORNE BOATS AND LANDING CRAFT NOT ASSIGNED TO AMPHIBIOUS FORCES. Letters, numerals, and special insignia, as authorized, shall be fitted on both the port and the starboard bows of shipborne boats. The locations,bevels, and proportions of these letters and numerals shall be indicated generally as on Standard Boat Detail, Sheet 21 (C&R dwg 220598). The letters and numerals in the markings shall be made of chrome or brass (bright or painted) as specified here, and shall be of a proper level to suit the sheer of the particular type of boat as specified in Standard Boat detail, Sheet 21 (C&R dwg 220598). Plastic letters, numerals, and insignia of similar appearance may be used to reduce cost. When special insignia are authorized, they shall be made of sheet brass and painted according to Standard Boat Detail, Sheet 7 (C&R dwg 258943). Markings on the transoms of barges and gigs shall be of gold leaf decals as specified in paragraph 583-3.2.2.1 through 583-3.2.2.4.

583-3.2.2.1 Flag Officer. Flag officers' barges shall be marked as follows:

a. Chrome stars shall be fitted on the bow according to the arrangement on the admiral's flag. The stars shall be of the size and spacing shown on Standard Boat Detail, Sheet 21 (C&R dwg 220598).

b. The official abbreviated title of the command shall appear on the transom in gold leaf decal letters (for example, Surface Force, Atlantic (SURFLANT)).

583-3.2.2.2 Unit Commander. The insignia on boats assigned for the personal use of unit commanders not of flag rank, shall be as follows:

a. Broad or burgee command pennants, as appropriate, shall be fitted on the bow, with the squadron or division numbers superimposed, together with chrome arrows according to Standard Boat Detail, Sheet 7 (C&R dwg 258943).

b. The official abbreviated title of the command shall appear on the transom in gold leaf decal letters (for example, Destroyer Squadron TWO (DESRON 2)).

583-3.2.2.3 Chief of Staff. The gig for a Chief of Staff, not of flag rank, shall be marked with the official abbreviated title of the command in chrome letters with an arrow running fore and aft through the letters. The letters shall be according to Standard Boat Detail, Sheet 21 (C&R dwg 220598). Other boats assigned for staff use shall be similarly marked except that the arrows shall be omitted and the letters shall be brass (bright).

583-3.2.2.4 Commanding Officer. Boats assigned to Commanding Officers of ships shall be marked on the bow with the ship type or name (refer to paragraph 583-3.2.2.5) and number in chrome letters and numerals with a chrome arrow running fore and aft through the markings. Officers' boats shall be similarly marked except that the arrow shall be omitted and the letters shall be brass (bright). The ship's name, abbreviated name, or initials may be used in place of the ship's type. An assigned boat number may be used in place of the ship's number.

583-3.2.2.5 Ships' Boats. Other ships' boats shall be marked on the bow with either the ship's type and number, followed by a dash, and the boat number, such as CV 37-1, or the ship's name, abbreviated name or initials, followed by a dash, and the boat number, such as NIMITZ-1. These markings should also appear on the transoms of all boats, except whale boats. Letters and numbers shall be of brass, and may be painted black or chrome plated. Type commanders shall designate which of the above methods of markings shall be used on the boats assigned to ships under their command. The method of marking shall be uniform for all ships of the same type assigned to the same command.

583-3.2.2.6 Miscellaneous. Painted boat numerals shall be used on miscellaneous small boats such as line handling boats and punts.

583-3.2.3 BOATS AND CRAFT ASSIGNED TO SHORE STATIONS. Naval Base Commanders may assign blocks of numbers to the individual activities within their district for permanent assignment to the boats suballotted to the various activities. The activity may assign, to each allowed boat, a consecutive number from the block provided. Each boat, except personnel boats, may then carry on each bow the abbreviation of the naval district and the consecutive number assigned.

583-3.2.3.1 Shore Station. As an alternative to the foregoing, individual shore stations may use the name or abbreviated name, of the station on each bow followed by a number commencing with one and running consecutive through the total number of boats assigned.

Example: NS KEYWEST 1, NS KEYWEST 2, and so forth

583-3.2.3.2 Shore Based Command. Personnel boats for shore based commands will normally carry the same command insignia prescribed for forces afloat on each bow. In addition, they will carry the command abbreviation and location of the command neatly lettered on the transom. Personnel boats assigned names will carry the name displayed on each bow, and the command abbreviation and geographical location of the command on the transom. Gigs will carry the abbreviated name of the command in chrome letters, struck through with a chrome arrow on each bow and the location of the command on the transom in gold leaf decals.

583-3.2.3.3 Letters and Numeral Location. The locations, bevels, and proportions of letters and numerals shall be as indicated on Standard Boat Detail, Sheet 21 (C&R dwg 220598). Brass letters on personnel boats should be chrome plated.

583-3.2.4 IDENTIFICATION MARKINGS FOR COMBATANT CRAFT. Combatant craft will have applicable numbers painted at bow location port and starboard and at centerline of stern according to Figure 583-3-3 and Figure 583-3-4.

583-3.2.4.1 Painting. Color of numbers shall be such as to provide nominal contrast with the craft color scheme, acceptable to the individual command. Use paint conforming to Fed Spec TT-E-489 or Fed spec TT-E-490 (refer to **NSTM Chapter 631**) for additional information. For combatant craft lettering size and placement, refer to Table 583-3-2.

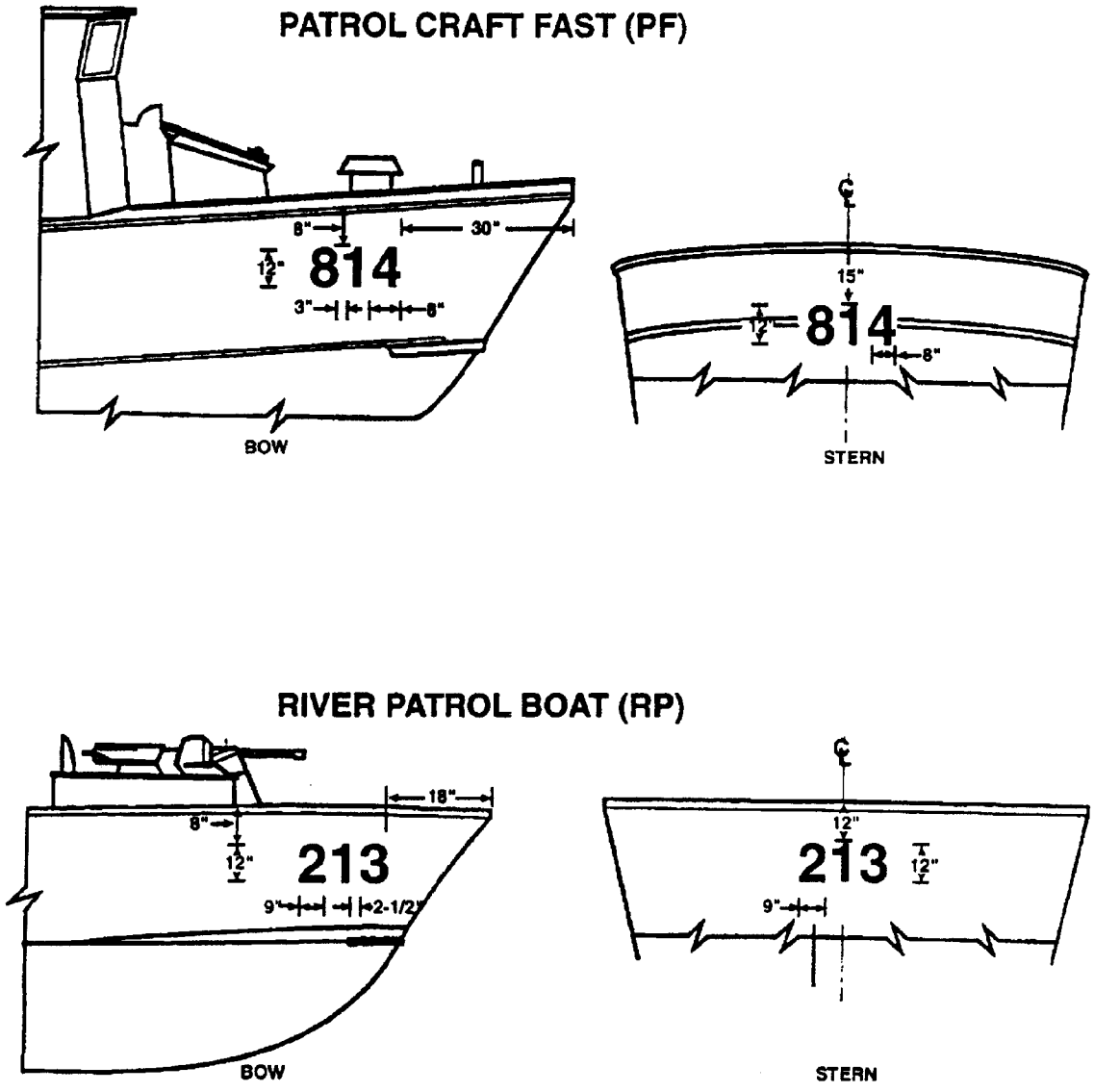

Figure 583-3-3. Patrol Craft Markings

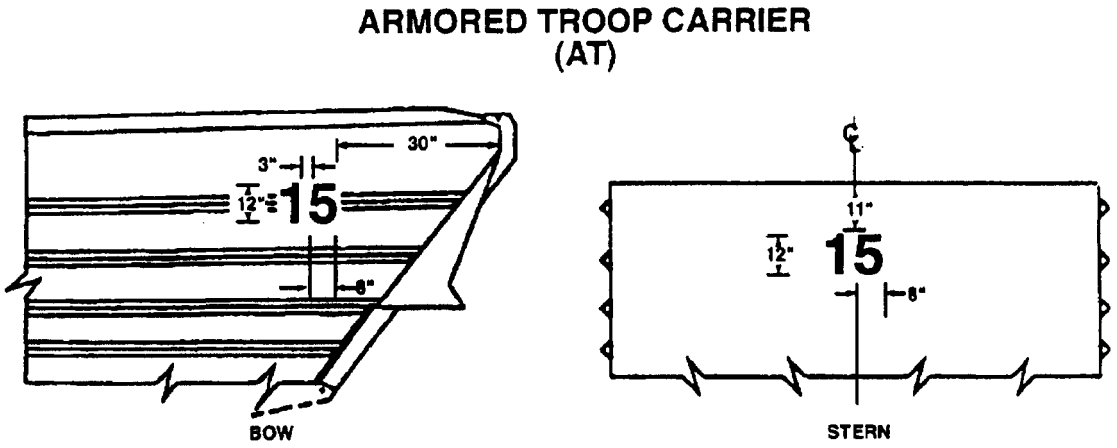

Figure 583-3-4. Armored Troop Carrier Markings

Table 583-3-2. COMBATANT CRAFT LETTERING

Lettering	Craft		
	AT	RP	PF
Length	12″	12″	12″
Width	8″	9″	8″
Distance Between	3″	2 1/2″	3″
Distance from Gunwale at Bow	8″	8″	8″
Distance from Deck to Stern	11″	12″	15″
Distance from Bow Thickness	30″2″	18″1 1/2″	30″2″

SECTION 4.
DIMENSIONS, WEIGHTS, AND CHARACTERISTICS

583-4.1 STANDARD NAVY BOATS

583-4.1.1 DIMENSIONS, WEIGHTS, AND CHARACTERISTICS. These measurements of U.S. Navy standard and nonstandard boats can be found in the latest edition of the unclassified NAVSEA 0900-LP-084-3010 Data Book for Boats and Craft of the United States Navy, which is updated every four years.

583-4.1.2 WEIGHT REPORTING. All standard Navy boats and craft are weighed upon delivery at the construction yard and this weight recorded as the Contract Acceptance Weight. For ships' boats, a Design Hoisting Weight is established which includes the Contract Acceptance Weight, the weight of the authorized crew members at 165 pounds each, full fuel tanks, outfitting items, and an allowance for onboard engineering consumables. The lifting davits are rated by an engineering evaluation of their mechanical component breaking strengths and failure levels. The weight of the boat should never exceed the Safe Working Load rating of the davits.

583-4.2 REFERENCE FOR OPERATING PERSONNEL

583-4.2.1 IMPORTANT CHARACTERISTICS. Table 583-3-1 furnishes a ready reference for operating personnel of the important characteristics of most Navy boats and craft. The hoisting weights given in this table are

not to be used for testing boat handling davits. Refer to paragraph 583-9.6.1 for specific davit weight testing requirements. All weights given in Table 583-3-1 are average weights and all boats are glass reinforced plastic, unless otherwise noted.

583-4.3 PAINT PUNT PURCHASE DESCRIPTION

583-4.3.1 The punt is a non-powered craft used to inspect the waterline area of a ship while at anchor or in port. The punt is manhandled from its stowed position, then lowered from the deck to the water by rope pendants secured to the bow and stern handles. Up to three persons with painting or other gear board the punt from the ship's access ladders. The punt is propelled by paddles or positioned using the pendants. Light weight, stability, resistance to swamping and durability are valued characteristics for the application.

a. General form: the punt shall be a flat bottom, transom-ended punt or jonboat with bow, center and stern bench seats.

b. Dimensions:
   1 length: 13.5 to 14.5 feet (4.1m to 4.4m)
   2 overall beam: at least 55 inches (1.4m)
   3 chine beam (bottom width): at least 36 inches (.9m)
   4 depth: at least 17 inches (.43m) measured vertically (punts designed to accommodate outboard motors may have transom cutout of not less 15 inches (.38m) depth)
   5 weight: shall not exceed 200 pounds (90.9kg)

c. Materials and construction: the hull and structural components shall be manufactured of 5000 or 6000 series aluminum alloy suitable for use in seawater, except that stainless steel fasteners may be used. Use of wood shall be limited to plywood suitable for exterior exposure, where necessary for backing plates, reinforcement of transoms designed for outboard motors, and similar components. The punt shall be fitted with a minimum of two handles on each end of the punt (for handles total). Handles shall be well rounded to prevent injury to or undue stress on hands. Handles shall be secured to the punt with through-bolts or solid rivets, or may be integral to the hull. Tubular rivets, pop rivets, or self-tapping screws shall not be used to secure handles. Handles shall as a minimum be strong enough to support the entire weight of the punt when suspended from a single handle.

d. Stability and load capacity: the punt shall have a capacity of at least three persons, shall have a total load capacity of at least 600 pounds (persons and gear). The punt shall provide level flotation, and shall have a load capacity plate installed in accordance with the requirements of 33CFR183.

e. Acceptable products are: Alumacraft 1436 lite, Alumacraft 1436, Alumacraft 1442, Lowe 1436. However, due to the possibility of manufacturing changes, the specifications of the product shall be verified against the requirements of this purchase description prior to procurement.

SECTION 5.

BOAT CAPACITY, OPERATING INSTRUCTIONS, AND SAFETY PRECAUTIONS.

583-5.1 BOAT CAPACITY

583-5.1.1 BOAT REGISTRY AND BOATALT LABEL PLATES. Every boat in the naval service should be fitted with a label plate which provides data concerning its design, manufacture, and maximum capacity. The maxi-

mum capacity designated on the label includes the boat crew and assumes that all passengers are in the cockpits and are seated. A boat alteration (BOATALT) label plate (Figure 583-1-3) shall be provided according to paragraph 583-1.6.9. Boat Information Books (BIB's) are provided with each U.S. Navy boat and craft. The BIB provides general configuration, operational, and maintenance information. It contains guidelines on the safe operation and proper maintenance of the specific boat or craft. The BIB is designed for use at the organizational level to support boat and craft crews.

583-5.1.1.1 Registry Plate Format. Boat registry plates on standard boats will be of sheet 316L CRES grade, approximately 6 inches by 2-1/4 inches with engraved letters approximately 5/16 inch high, filled with black sealing wax. The data on the label plates will be formatted as follows (the exact data to suit the particular boat):

33-FOOT PERSONNEL BOAT, MK5 Boat Registry No. 33PE8028 built for the United States Navy, Builder, City, Month, Year, NAVSEA dwg 33PE MK5 101-5703535, Crew 3 persons, Capacity 24 persons (including crew).

583-5.1.1.2 Drawing Number. The Naval Sea Systems Command (NAVSEA) drawing number shall be the general arrangement plan from which the boat was built. In case the inboard profile, deck, and sections are not all on the same drawing, the drawing number of the inboard profile should be used. The general arrangement or inboard profile drawing will refer to the other drawings of the set.

583-5.1.2 DETERMINATION OF CARRYING CAPACITIES. The carrying capacity (established by NAVSEA) of a pulling boat is determined by calculating the internal volume of the boat in cubic feet and allowing 10 cubic feet of such volume for each man carried. It is assumed that each man will be wearing a lifejacket and 165 pounds will be allowed for each man so equipped.

583-5.1.2.1 Powerboat. In the case of a powerboat, the preceding determined capacity shall be decreased by the number of men which would equal the total weight of machinery (wet), fuel, engine accessories and equipment, outfit, and parts of hull not ordinarily found in a pulling boat.

583-5.1.3 CAPACITY NOT TO BE EXCEEDED. When carrying liberty parties, the designated carrying capacity should never be exceeded. In carrying stores, the load in pounds, including crew and stores, should never exceed the maximum allowable cargo load, as given on the boat label or as listed in Table 583-3-1. In motorboats, the practice of carrying passengers, stores, or baggage on the topsides should be prohibited. When it is necessary to carry stores or baggage, a corresponding reduction in maximum number of passengers should be made.

583-5.1.3.1 Flotation Material. The installation of flotation material shall not be considered as relieving operating personnel from exercising sound judgement in the loading of boats or providing of lifejackets when conditions warrant. Since the amount of flotation material to be installed is limited by the space available in the boat, it has been possible to provide a reserve buoyancy of only 22 pounds per man. In rough seas, the boat should be loaded to less than capacity so that this margin of reserve buoyancy will be somewhat greater. Twenty two pounds will support a seated man submerged in water approximately to his armpits. With water this high, there will be a tendency for passengers to stand up, which could result in the sinking or capsizing of the swamped boat. If lifejackets are worn, personnel near the sides may take to the water and hold onto the gunwale. Other personnel should remain seated to avoid overcrowding around the outside of the boat.

583-5.1.4 HANDLING OF STORES. On small ships, such as destroyers, submarines, and mine sweepers, limited availability of ships' boats frequently renders it necessary (for purposes of economy) for stores and liberty parties to be carried together. For the benefit of personnel, and particularly coxswains, the following example is presented.

Example: Assume that the coxswain of a 26-foot motor whaleboat (MK11) is ordered to make a shore trip to pick up stores weighing approximately 2,000 pounds, and to pick up a liberty party. The rated capacity of a 26-foot motor whaleboat (MK11) is 22 men, or, in terms of pounds of stores, 22 times 165 or 3,630 pounds. The coxswain should, therefore, pick up the stores (approximately 2,000 pounds) and bring back not more than 8 persons as passengers for: (3,630 - 2,000)/165 = 9.9 or 10 - 2 crew = 8 passengers.

Operating personnel should be familiar with the designated carrying capacity of the boat and be able to calculate the load and regulate the number of men accordingly.

583-5.1.5 REDUCTION IN CAPACITY. The rated capacity designated on the label plate, represents the maximum capacity under normal weather conditions in sheltered waters. Reduction of capacity is always necessary for extreme weather conditions or in the open sea. Frequently, conditions will be such as to greatly reduce this rated capacity (see Table 583-3-1).

583-5.2 OPERATING INSTRUCTIONS

583-5.2.1 INTERNAL BUOYANCY OF LIFE RAFTS. Open boats, to be acceptable as life rafts under the U.S. Coast Guard Regulations, shall be provided with internal buoyancy according to the Code of Federal Regulations. Title 46; Chapter 1, Shipping; Subchapter Q, Subspecification Part 160.035, Lifesaving Equipment.

583-5.2.2 LIFE PRESERVERS STOWED IN BOATS. Except for small landing craft (other than VP) which are not fitted to stow life preservers for passengers, life preserver stowage in boats is established upon 50 percent allowance of maximum boat capacity. This is based on the following:

a. Suitable stowage space is not available for 100 percent allowance.

b. The maximum number of persons permitted to be carried is a matter of ship's administration based upon the boat's loading and boating conditions. One life preserver for each crew member shall be aboard before embarking. When conditions warrant, boat passengers shall be issued life preservers before embarking.

c. The number of life preservers shall be drawn from the regular ship's allowance. Conditions under which life preservers are carried may vary to a considerable degree; thus, they have not been included as items of boat outfit.

Boat personnel should frequently (particularly after wet weather, or when spray has entered the boat) break out all stowed life preservers for drying and airing out.

583-5.3 POWERBOAT FIRE HAZARDS

583-5.3.1 LIST OF FIRE HAZARDS. A fire is serious at any time, but in a gasoline or diesel powered boat, it has a more fatal aspect. Boats are equipped with firefighting devices; but the best safeguard to those concerned with the handling of boats is recognition of the hazard and a knowledge of the cause. This information may then be used to prevent conditions leading to a fire. The following is a list of fire hazards that exist. Each will be discussed in detail.

a. Gasoline

b. Clothing and oily waste or rags

c. Fuel leaks

d. Ventilation

e. Fueling

f. Bilges and sumps

g. Exhaust pipe

h. Dirty engines

i. Defective electric wiring

j. Battery charging

k. Smoking

583-5.3.2 GASOLINE. As gasoline vapor is highly combustible when mixed with air, the use of gasoline for cleaning the engine or bilges is strictly prohibited. A spark, caused by smoking or various other sources, may ignite the fumes and cause a dangerous fire.

583-5.3.2.1 Containers. Inspect portable gasoline containers periodically for any leaks. If leaky containers are found, transfer their contents immediately to a tight container. Leaky, defective gaskets and plugs should be replaced. Water should not ordinarily be introduced into a gasoline drum but if a leaky container cannot be made tight by tightening up on the filling and vent plugs, or repairs are required involving the application of heat, the drum should first be filled with water, emptied, and blown through with a steam or air jet to eliminate any vapor present. Repairs to gasoline drums or containers are not ordinarily required to be made by ships' force as they are repaired at their distribution depots. Before making shipment of empty containers, inspect them carefully to see that they are tight and that all plugs are tightly secured. Unless this is done, empty containers constitute a fire hazard to the carrier. Refer to **NSTM Chapter 542, Gasoline and JP-5 Fuel Systems** .

583-5.3.3 CLOTHING AND OILY WASTE OR RAGS. Keep engine room clear of clothing. Cleaning rags and waste shall be kept in a closed container and burned after use Clean engines, clean engine rooms, and clean bilges are requisites of efficient powerboat engineering.

583-5.3.4 FUEL LEAKS. The presence of fuel in the bilges or in a free state in a boat is dangerous. The fumes may be ignited easily and a fire results. Free fuel may come from leaks in the fuel lines or units of the system, or result from filling the fuel tanks too full. Fumes shall be disposed of by proper ventilation.

583-5.3.4.1 Shutoff Valves. Fuel lines, connections, and fittings shall be kept tight. Use shellac in sealing joints. Fuel lines in all cases, shall be fitted with shutoff valves installed near the fuel tank and so fitted as to be readily accessible for closing in an emergency. Shutoff valves are to be fitted with extension rods and operating handwheels so that they may be operated from a convenient location outside of the probable fire area.

583-5.3.4.2 Stowages. Anchors or other heavy items should not be stowed near fuel lines because of the danger of them striking lines or fittings and causing leaks. Lightweight items, such as lifejackets, should not be stowed on top of fuel lines, since such stowage interferes with inspection.

583-5.3.5 VENTILATION. The importance of proper ventilation to expel all fuel fumes cannot be overemphasized.

583-5.3.5.1 Leakage. On various craft using gasoline as fuel, there exists danger of explosion and resulting fire due to carburetor flooding, leaky gasoline lines, strainers or tanks, and overflow during fueling. This involves a very serious fire hazard and is as dangerous as other explosives aboard ship.

583-5.3.5.2 Gasoline Vapor. Gasoline is a highly volatile liquid which will give off a flammable vapor if left exposed to the air. Gasoline vapor is about three times as heavy as air and the highest percentage is found in the lowest places. The mixture will gradually spread throughout the whole boat. The mixture, formed by gasoline vapor and air, is highly explosive in character and only needs a slight spark or flame to cause a violent explosion and fire.

583-5.3.5.3 Vapor in Bilges. All personnel are to strictly observe the safety precautions relating to the use and handling of gasoline. Practically all motorboat fires can be traced to the presence of explosive gasoline vapors in the bilges. Evidence shows that this condition frequently occurs immediately after taking on fuel.

583-5.3.5.4 Explosive Sparks. In a gasoline engine installation, there is the possibility of gasoline vapors being present continuously, especially in the lower spaces. The danger of a spark necessary for an explosion is always present and cannot be eradicated. A spark, so minute as to be invisible to the eye, may be formed by striking a nut with a wrench, by arcing of the brushes of a motor or generator, by grounds or shorts in electric circuits, by opening or closing electric switches, by static electric charges formed by the rubbing of two surfaces together, or by nails in shoes hitting or rubbing metal. Sparks may be produced in so many ways that the only insurance against explosion and fire is to take every precaution to prevent the accumulation of gasoline vapors in the boat. This can be done by proper ventilation.

583-5.3.6 FUELING. Except in emergencies, gasoline boats should not fuel unless in the water, with engines stopped, clear of other boats, and where possible, near enough to the ship to receive aid if needed.

583-5.3.6.1 In the Skids. In an emergency, if it is necessary to fuel a boat in the skids, the following safety precautions, in addition to those described in paragraph 583-5.3.6.5 shall be observed.

a. Adequate firefighting equipment shall be provided at the scene.

b. The firemain shall be under suitable pressure and the hoses led out to the scene from at least two fireplugs.

c. If practical, a rubber hose, thoroughly grounded to the supply tank or drum and the boat’s tanks, should be used for transferring gasoline.

d. Where the use of a grounded rubber hose is not practical, and a separate container will be used to pour gasoline into the boat’s tanks, the supply tank or drum should be interconnected by a flexible conduction wire of sufficient length. After emptying portable containers, inspect them to ensure that all gasoline has been drawn off and then close them tightly by setting up on the filling and vent plugs.

583-5.3.6.2 Passengers Aboard. Boats shall not be fueled with passengers aboard.

583-5.3.6.3 At Night. Except in emergencies, boats shall not be fueled at night.

583-5.3.6.4 Heat Producing Sources. No smoking and no naked lights (such as produced by oil lanterns, candles, matches, exposed electric switches, slip rings, commutators of a dynamo, or by any burning material involving heat) shall be permitted in the vicinity while fueling in a compartment containing a gasoline engine or a bilge, or elsewhere within 50 feet of gasoline storage tanks or of gasoline vapor.

583-5.3.6.5 Drums and Containers. Gasoline shall not be transferred to a boat from a drum or portable container unless the container has been removed from the proximity of other containers, except in the cases of vessels where drums are stowed in quick releasing racks. In this case, the drum shall be left in its rack when fueling boats. An adapter shall be provided with a standard iron pipe screw thread on one end to fit the opening in a standard gasoline drum; the other end to be fitted with a Navy standard hose thread to take a standard 1-1/4-inch inside diameter flexible metallic hose covered with rubber fabric. Hose will be furnished in 25 foot lengths having couplings and nozzles with Navy standard threads. Standard gasoline filling hose nozzles are the wet hose type that will release gasoline only when the operating lever is gripped and will automatically cut off the flow when the lever is released. Due to this instantaneous control of the flow, the over filling of tanks can be readily avoided. Overflow of the tank should be avoided, especially on boats where the filling fitting is located inboard. In decked over boats and motor launches, the filling fitting is located on deck and overflow gasoline will pass overboard and not into the bilges.

583-5.3.6.6 Grounding Wire. To avoid danger of ignition of gas from a static spark, the filling hose nozzle is provided with a grounding wire that is fitted at the end with a spring clip. This clip should be clamped on the screw provided in the deck flange of the filling connection for grounding the hose nozzle, before unscrewing the cover of the filling connection. This connection will equalize electric potential. The ground should be maintained throughout the fueling operation and until the hose has been withdrawn and the filling flap closed. The use of a funnel increases the danger from sparks. It is preferable to insert the nozzle of the grounded hose directly into the filling opening. When fueling funnels are used, they shall be fitted with 40 mesh wire gauze strainers. The use of a chamois strainer is prohibited.

583-5.3.6.7 Passing a Drum to Boat. It is not considered good practice to pass a gasoline drum to a small boat for the purpose of fueling. The boat presents an unstable platform and spilling of gasoline is almost inevitable. When such an arrangement is considered to be necessary due to prevailing conditions, care should be taken that the nozzle of the hose is entered into the filling pipe before gasoline is released.

583-5.3.6.8 Fueling Procedures. The following procedures should be observed when fueling a boat:

a. See that no passengers are aboard.

b. Close all engine covers to prevent fuel vapor from entering engine spaces.

c. Inspect tanks and filling pipes. Do not fuel unless these are tight at all joints.

d. Close shutoff valves at tanks.

e. See that the hatch in coxswain’s flat on motor launches is tightly in place.

f. Close all openings near filling pipes through which fuel vapor might pass into closed compartments.

g. Attach the spring clip on the end of the hose ground wire to the screw provided in the deck flange of the filling pipe (refer to paragraph 583-5.3.6.6). The grounding screw is not required on diesel engine boats.

h. One member of the boat crew is to stand by with a portable CO_2 fire extinguisher ready for use. Extinguisher is not to be returned to stowage position until fueling is completed and engine is operating satisfactorily.

i. Unscrew the filling pipe cap. Open filling pipe flap and sound to determine approximate amount of fuel required to fill tank.

j. Insert hose nozzle, open nozzle valve, and fill tank.

k. If for any reason the hose nozzle is withdrawn from the filling pipe during fueling and the ground wire becomes detached from the grounding screw, the ground wire should be reattached to the screw before the nozzle is again inserted in the filling pipe (not required on diesel boats).

l. The nozzle trigger shall be kept under control so that fuel will not flow too fast to pass through the filling pipe strainer, and also so that when the tank is nearly full, the flow will be reduced to avoid overfilling. Diesel oil will pass through the strainer more slowly than gasoline.

m. When the tank is filled, withdraw the hose nozzle, close the flap, and screw on the cap.

n. Detach ground wire clip (not required on diesel engine boat).

o. If any fuel has been spilled, wash down and wipe dry.

583-5.3.6.9 Before Starting Engine. Before starting the engine, it is particularly important to clear the boat compartments and bilges of any gasoline vapor that may be present from the fueling operation.

WARNING

Operate exhaust fans for at least 4 minutes before starting engine, and check engine compartment bilge for gasoline vapors.

The following procedures should be observed prior to starting engines:

a. Open the engine covers to permit circulation of air to dissipate fuel vapors. The same precautions apply if gasoline vapor is noticed in the boat while underway. Gasoline fires have occurred through ignition by sparks from some part of the electrical equipment while the engine is turning over It is safer for both personnel and material to stop and clear out gasoline vapor and to remove its cause rather than to continue running the engine. When stopped for this purpose, one of the crew should stand by ready to operate the fire extinguishing equipment. This is particularly important with motor boats having closed engine compartments.

b. If gasoline is spilled during fueling and runs into the bilges, the bilges should be washed down, pumped, wiped out, and aired thoroughly before the engine is started.

583-5.3.6.10 Shore Station Fueling. The same general precautions should be observed when fueling from shore stations. Serious fires have occurred due to the absence of grounding connections. Before permitting a gasoline engine boat to fuel, an inspection of such stations should be made by the officer or petty officer in charge of powerboats to see that grounding connections are provided either by the boat or the station. These grounding connections should be of wire or solid metal and care should be taken to see that the contacts are positive. Wrapping wire around the metal parts of the filling hose is not sufficient and the use of chains is not considered a positive method.

583-5.3.6.11 Lighting. Oil lanterns shall not be used in gasoline driven powerboats when the electric lighting system is in good operating condition. If oil lanterns are in use when it becomes necessary to fuel, they shall be extinguished and portable electric hand lanterns or flashlights used.

583-5.3.6.12 Flame Screen. Tank wire gauze in the filling connection is a flame screen designated to minimize possibility of a flame flashing into the tank from some outside source. It should always be kept in place.

583-5.3.7 BILGES AND SUMPS. Bilges and sumps shall be kept dry and frequently washed out to clear them of fuel and oil. They should be washed before hoisting into the boat skids. The space directly under the engine can be readily washed down by using hot water or a steam hose. This method will carry heavy oil and grease over into the sump from which it can be pumped. Oily bilge water should be pumped to a location where the oil can be separated from the water rather than pumped over the side of the ship. Frequent inspections of engine room bilges should be made to ensure that residue is not present. The forward and after engine space bulkheads should be inspected for tightness in the bilges in order that liquid and gas may be prevented from passing over into adjacent compartments.

583-5.3.8 EXHAUST PIPE. Improper insulation of the dry exhaust pipe, where it passes through the hull, may set the boat afire. A poorly insulated exhaust pipe may set fire to nearby objects or ignite gas fumes if the hot pipe is exposed to gas in the engine room. Any defects of this type should be corrected immediately. Exhaust pipes should be properly insulated with refractory felt, covered by glass cloth, and attached with nonconductive fittings.

583-5.3.9 DIRTY ENGINES. Greases and oil with which an engine becomes encrusted are sources of danger if not cleaned at regular intervals. These petroleum products will feed a fire, enabling it to get out of control rapidly.

583-5.3.10 DEFECTIVE ELECTRICAL WIRING. Electric wiring shall not be permitted in the bilges. Care should be exercised to reduce sparks to a minimum. Sparks may be caused by static charge electricity, short circuits in electric wiring, grounds, striking steel with hand tools, striking of shoe nails on steel, opening and closing switches, and so forth. The battery box shall be located outside of a closed engine compartment, where practicable, and should be provided with a suitable drip proof cover. All naked electric terminals shall be wrapped with insulating tape.

583-5.3.11 BATTERY CHARGING. Charging of batteries will produce sufficient hydrogen gas which, if trapped and ignited, will produce an explosion. This applies particularly to boats having their batteries under the seats of the after part of the boat. If the battery is charged (other than from the boat engine generator) while in the boat, hydrogen may collect under the seats and, if not removed, may be ignited by a spark from the battery caused by a loose terminal or when charging wires are disconnected. Batteries should either be charged on deck or removed to an open space in the boat until the operation is completed. The battery box should be well ventilated.

583-5.3.12 SMOKING. Smoking should not be permitted in gasoline powered boats and only with caution in other boats. Only safety matches should be allowed in any naval boat.

583-5.4 SAFETY PRECAUTIONS

583-5.4.1 GASOLINE VAPOR. Most gasoline fires and explosions in boats occur when engines are started which is due to an accumulation of gasoline vapor in the bilges. Such fires and explosions can be prevented by exercising proper safety precautions.

WARNING

No list of precautions can provide for every conceivable situation that might arise. The only adequate safety precaution is a constant awareness of the hazards and a consistent application of common sense to situations that arise.

583-5.4.2 CLOSED ENGINE ROOM. Except in an emergency, a boat with a closed engine room should not be operated without the engineer being onboard at his station.

583-5.4.3 ELECTRIC CONNECTIONS. At least once a day during periods when the boat is in use, inspect to see that all electric connections are in place and secured. Electric cabling shall be secured with clamps to prevent movement and resultant wear of any cable in contact with metal surfaces and the attendant danger of short circuits. The inspection should be made any time the operator has reason to believe the cable or connections may have been loosened by passengers or cargo.

583-5.4.4 FUEL PIPING AND TANK FITTING At least once a day, during periods of operations and at any time the operator has reason to believe damage may have occurred, the fuel lines, strainers, and tank fittings should be inspected for possible leaks and loosening of tanks in the saddles. Fueling connections shall be tight in the tank and the filling cap in place. Any opening in the top of the fuel tank through which fuel may slop out due to rolling or pitching, or through which fuel vapor may be forced out during fueling operations, shall be tightly plugged. Any defects discovered during inspection shall be remedied immediately.

583-5.4.5 WIRE GAUZE SCREENS. At least once a day, during periods when the boat is in use, inspect to see that wire gauze screens are intact and clean. On gasoline engines, screens over carburetor and breather pipe connections shall be securely clamped so they cannot be blown loose in case of backfire or crankcase explosion. Backfire screens shall be installed according to the latest NAVSEA instructions.

583-5.4.6 CARBURETOR DRIP PAN (GASOLINE ENGINES ONLY). The drip pan should be inspected, emptied, and washed. This should be done when the engine is stopped, at intervals when the boat is running, during the day, and before it is hoisted to its cradles. Drip pans are safe only when kept empty.

583-5.4.7 BILGES AND SUMPS. Bilges and sumps should always be inspected before the engine is started. If they are not dry and free from fuel, vapor, and oil, they should be pumped and dried out. If gasoline is spilled in the boat during fueling, the bilges should be flushed down with water, pumped, and wiped dry before starting the engine.

583-5.4.8 VENTILATION. On gasoline engine boats, ventilation is of prime importance at all times. All spaces subject to accumulation of gasoline vapor shall be inspected and thoroughly ventilated. Before the engine is started, every precaution should be taken to ensure that the bilges are open to ventilation, and that any gasoline or gasoline line vapors in bilges and sump are removed. Explosion proof exhaust fans are required on all gasoline engine boats and should be run at least 4 minutes before the engine is started, intermittently for at least 1 additional hour daily, and at any time the presence of gasoline vapor is suspected. At any time gasoline is spilled, the exhaust fans shall be run sufficiently to remove all gasoline fumes. After each fueling and before starting, open the cover of the engine for ventilation to remove gasoline vapor.

583-5.4.9 SAFETY INSTRUCTIONS. Safety instructions posted in all gasoline powered boats shall include the following requirements:

a. Floorboards immediately adjacent to the engine should be lifted and secured in an open position at all times when the engine is not running.

b. The bilges should be inspected for the presence of gasoline and gasoline vapor immediately before each starting of the engine.

c. Before starting the engine, the engine cover should be lifted exposing the top of the engine for not less than 4 minutes while the bilge exhaust blower is operating.

d. The engine cover should not be closed until after the engine is started and operating satisfactorily.

e. All fire extinguishers should be in place and charged.

In performing the foregoing inspection, special attention should be given to boats that have been out of service for several days or subjected to overhaul. For additional information, refer to **NSTM Chapter 233, Diesel Engines** , for diesel powered boats.

583-5.4.10 LIQUEFIED GAS. The use of liquefied gas (propane) for any purpose is prohibited.

583-5.4.11 SIGNAL FLARES. All powered boats should carry distress signals (flares) to be used when conditions warrant.

583-5.4.12 FIRE RESISTANT HOSE. Fire resistant hose is now available for use on Navy boats and craft fuel and lubrication systems. As existing hose needs to be replaced, fire resistant hose should be utilized as follows:

a. Where hose is used for connections between the engine and fuel service system, within the fuel service system and for engine and transmission lubricating oil service, that hose shall be flexible, fire resistant, compatible with all petroleum products, with brass plated steel wire reinforcement, and shall be suitable for operating pressures up to 400 pounds per square inch. End fittings shall be reusable, flange or swivel, corrosion resistant 316 steel and shall be secured to the hose by threaded wedge action.

b. The above requirements are known to be met by Aeroquip Corporation FC 234 AQP Hose and Fittings and Stratoflex Corporation 5219 HSP Hose.

SECTION 6.

POWERBOAT RULES

583-6.1 NAVIGATION RULES (RULES OF THE ROAD)

583-6.1.1 INTERNATIONAL AND INLAND NAVIGATION RULES. Navigation Rules shall be followed as set forth in U.S. Navy Regulations, Article 1120, Rules for Preventing Collision. Comments and information should be addressed to Commandant, U.S. Coast Guard, (G-NSR-3).

a. Prevention of collisions is the primary goal of the Navigation Rules. Navigation lights, day shapes, and sound signaling devices are a major part of the rules, indicating type and size of vessel, the movement of such vessels, the work a vessel is doing and the privileges and responsibilities of vessels.

b. The adoption of the Inland Navigation Rules Act, 1980 (also referred to as UNIFIED RULES) on the inland waters, western rivers, and the Great Lakes has eliminated much of the confusion that previously existed between the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS) and the U.S. Rules. With the exception of the maneuvering signals and some special rules for the western rivers and the Great Lakes, the rules are now truly uniform.

c. The COLREGS have been in effect since 1977 and vessels fitted with the lights prescribed by these rules are in compliance with the Inland Rules.

d. Unless operating exclusively in an area where the Inland Rules apply, vessels must be outfitted with navigation lights required by the COLREGS.

e. Since January 1, 1983, each self-propelled vessel on inland waters 39.4 feet (12 meters) or more in length must carry onboard and maintain a copy of the INLAND RULES for ready reference.

f. The penalty provisions of the COLREGS and the INLAND RULES allow for a civil penalty.

g. For information on the technical details regarding sound signaling devices and the placement of lights, obtain a copy of the U.S. Coast Guard booklet, ″Navigation Rules, International-Inland (COMDTINST M16672.2A)″. Request stock number 050-012-00205-3. They are available from:

Superintendent of DocumentsU.S. Government Printing OfficeWashington, D.C. 20402

583-6.2 NAVIGATION LIGHTS REQUIREMENTS POWER DRIVEN VESSELS COLREGS/INLAND RULES

583-6.2.1 NAVIGATION LIGHTS REQUIREMENTS. Navigation lights requirements are:

a. When displayed:

1 Lights must be displayed from sunset to sunrise and during periods of restricted visibility, fog, mist, falling snow, heavy rainstorms, sand storms, or other similar conditions.

2 Working lights must not interfere with another person’s ability to identify vessel’s navigation lights.

b. Colors and Arcs of Visibility:

1 Side Light(s). Green to starboard, red to port; each arc 112.5 degrees; separated side lights must be fitted with matt black screens inboard.

2 Masthead Light(s). White, 225 degrees, and so fixed as to show light from right ahead to 22.5 degrees abaft the beam on each side of the vessel; must be located higher than the sidelights and on the centerline of the vessel.

3 Stern Light. White, 135 degrees and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel and located on the centerline of the vessel, as far aft as practical.

4 All-Round Lights. 360 degree arcs of visibility, color as indicated in the rules, lights not to be obstructed by the rigging of the vessel.

c. Running Lights (COLREGS, Rule 23). Refer to Table 583-6-1.

Table 583-6-1. NAVIGATIONAL LIGHT REQUIREMENTS 72 COLREGS

Fore Part of Vessel	Side Lights	At the Stern of Vessel
Vessels 65-ft and 7 3/8 in (20m) But Less Than 164-ft and 1/2-in (50m) Long		

Table 583-6-1. NAVIGATIONAL LIGHT REQUIREMENTS 72 COLREGS -

Continued

Fore Part of Vessel	Side Lights	At the Stern of Vessel
A 20-point white masthead light showing an unobstructed light over an arc of the horizon of 10 points on each side of the vessel from right ahead to 2 point abaft the beam on both sides. The masthead light shall be located not less than 19 ft and 8 1/4 in. above the gunwale. If the breadth of the vessel exceeds 19 ft and 8 1/4 in., the height shall be no less than the breadth and not to exceed 39 ft and 4 7/16 in. (12m). Light visibility at least 5 miles.	A green side light starboard and a red side light port each showing an unobstructed light over an arc of the horizon of 10 points from right ahead to 2 points abaft the beam. They shall not be forward of the masthead light nor more than three quarters its height above the hull. Light visibility at least 2 miles.	A white stern light located to show an unobstructed lgiht over an arc of the horizon of 12 points fixed to show the light 6 points to each side of the vessel from right aft. Light visibility at least 2 miles.
Vessels 39 ft and 4 7/16 in (12m) To 65 ft and 7 3/8 in (20m) Long		
A 20-point white masthead light showing an unobstructed light over an arc of the horizon of 10 points on each side of the vessel from right ahead to 2 points abaft the beam on both sides. The masthead light shall be located not less than 8 ft and 2-7/16 in. (2.5m) above the gunwale. Light visibility at least 3 miles.	A green side light starboard and a red side light port each showing an unobstructed light over an arc of the horizon of 10 points from right ahead to 2 points abaft the beam. They may be combined in a lantern carried on the longitudinal center-line of the vessel and no less than 3 ft and 3-3/8 in. (1 m) below the masthead light. Light visibility at least 2 miles.	A white stern light located to slhow an unbostructed light over an arc of the horizon of 12 points fixed to show the light 6 points from each side of the longitudinal centerline of the vessel. Light visibility at least 2 miles.
Vessels Under 39 ft and 4 7/16 in (12m) Long		
A 20-point white masthead light located to show an unobstructed light over an arc of the horizon of 10 points on each side of the bessel from right ahead to 2 points abaft the beam. The masthead light shall be located at least 3 ft and 3-3/8 in. (1m) higher than the side lights. Light visibility at least 2 miles.	A green side light starboard and a red side light port each showing an unobstructed light over an arc of the horizon from right ahead to 2 points abaft the beam. They may be combined in a lantern carried on the longitudinal centerline of the vessel. Light visibility at least 1 mile.	A white stern light located to show an unobstructed light over an arc of the horizon of 12 points fixed to show the light 6 points from each side of the longitudinal centerline of the vessel. Light visibility at least 2 miles.

NOTES:

1. All vessels up to 164 ft and 1/2 in. (50m) shall have installed a 32-point clear anchor light, visible all around the horizon (360 degrees).
2. The requirements of the 72 COLREGS rules 24 and 27 for towing, restricted ability to maneuver, and not under command lights have not been addressed in the table but are specifically covered in BOATALT GENERAL/25A as appropriate for Navy boats and craft.
3. A point as used in the table for light arcs visibility is 11.25 degrees of the compass (1 10-point light covers 112.5 degrees).
4. Vessel limiting dimensions in the table are conversions of the metric dimensions in meters (m) of the 72 COLREGS

1 Power-driven vessels 164 feet (50 meters) or more in length must display: separate side lights; stern light; and two masthead's lights in-range (in a line), higher than the sidelights; the after masthead light higher than the forward.

2 Power-driven vessels less than 164 feet (50 meters) in length must display: separate side lights; stern light; and one masthead light forward and higher than the side lights.

3 An alternative for power-driven vessels less than 65 feet (20 meters) in length includes: side lights, either separate or in a combined lantern carried on the fore and aft centerline of the vessel; stern light; and one masthead light forward and higher than the sidelights.

4 An alternative for power-driven vessels less than 40 feet (12 meters) in length includes: side lights, either separate or in a combined lantern carried on the fore and aft centerline of the vessel; and either a masthead light and a stern light or an all-round white light carried on the fore and aft centerline and higher than the side lights.

NOTE

The masthead light or all-round white light may be displayed from the fore and aft centerline, provided the sidelights are carried in a combined lantern on the fore and aft centerline or as near as practicable in the same fore and aft line as the masthead light or the all-round white light.

5 Visibility of Lights (COLREGS RULES, Rule 22). The lights prescribed in these Rules shall have an intensity as specified in Section 8 of Annex I to these rules (COMDTINST M16672.2A) so as to be visible at the following minimum ranges:

(a) In vessels of 50 meters or more length:

- A masthead light, 6 miles
- A side light, 3 miles
- A stern light, 3 miles
- A towing light, 3 miles
- A white, red, green, or yellow all-round light, 3 miles

(b) In vessels of 12 meters or more in length but less than 50 meters in length:

- A masthead light, 5 miles; except that where the length of the vessel is less than 20 meters, 3 miles
- A side light, 2 miles
- A stern light, 2 miles
- A towing light, 2 miles
- A white, red, green, or yellow all-round light, 2 miles

(c) In vessels of less than 12 meters in length:

- A masthead light, 2 miles
- A side light, 1 mile
- A stern light, 2 miles
- A towing light, 2 miles
- A white, red, green, or yellow all-round light, 2 miles

(d) In inconspicuous, partly submerged vessels or objects being towed:

- A white all-round light, 3 miles.

d. Running Lights (INLAND RULES, Rule 23).

1 An alternative for power-driven vessels less than 65 feet (20 meters) in length, built prior to 25 December 1980 includes: side lights, either separate or in a combined lantern carried on the fore and aft centerline of the vessel, and either a masthead light and stern light or an all-round white light carried aft visible all-round the horizon.

NOTE

A power-driven vessel less than 50 meters in length may also carry, but is not obligated to carry, a second masthead light abaft of and higher than the forward one.

2 An alternative for power-driven vessels less than 40 feet (12 meters) in length includes: side lights, either separate or in a combined lantern carried on the fore and aft centerline of the vessel, and either a masthead light and stern light or an all-round white light carried higher than the sidelights and as near as possible to the fore and aft centerline of the vessel.

3 Visibility of lights (INLAND, Rule 22). The lights prescribed in these rules shall have an intensity as specified in Section 84.15 of Annex I to these Rules (COMDTINST M16672.2A), so as to be visible at the following minimum ranges:

(a) In a vessel of 50 meters or more in length:

- A masthead light, 6 miles
- A side light, 3 miles
- A stern light, 3 miles
- A towing light, 3 miles
- A white, red, green, or yellow all-round light, 3 miles
- A special flashing light, 2 miles.

(b) In vessels of 12 meters or more in length but less than 50 meters in length:

- A masthead light, 5 miles; except that where the length of the vessel is less than 20 meters, 3 mile
- A side light, 2 miles
- A stern light, 2 miles
- A towing light, 2 miles
- A white, red, green, or yellow all-round light, 2 miles
- A special flashing light, 2 miles.

(c) In vessels of less than 12 meters in length:

- A masthead light, 2 miles
- A side light, 1 mile
- A stern light, 2 miles
- A towing light, 2 miles
- A white, red, green, or yellow all-round light, 2 miles
- A special flashing light, 2 miles.

(d) In inconspicuous, partly submerged vessels or objects being towed:

- A white all-round light, 3 miles.

583-6.3 SOUND SIGNALING DEVICE REQUIREMENTS COLREGS/INLAND RULES

583-6.3.1 SOUND SIGNALING DEVICE REQUIREMENTS. Sound signaling device requirements are:

a. Vessels less than 40 feet (12 meters) in length:
   1 Whistle and bell are not specifically required for commercial and pleasure craft however, most Navy boats are required to carry both whistle and bell.

b. Vessels 40 feet (12 meters) to 328 feet (100 meters) in length:
   1 Must carry whistle and bell.

NOTE

Technical details for sound signaling devices can be found in Annex III of the Navigation rules (COMDTINST M16672.2A).

A bell is an instrument capable of producing a metallic resonant tone suitable for use as a navigational warning when a vessel is at anchor during conditions of reduced visibility. The bell may be carried inside the cabin, but provision must be made so that it can be mounted and sounded outside. A horn/whistle is a sound producing and projecting device capable of a tone well within the frequency range of normal human hearing. The device must be capable of producing distinctly all the blasts required by the navigation rules.

583-6.4 SPECIAL NAVIGATION LIGHTS

583-6.4.1 DIVING OPERATIONS. Whenever the size of a vessel engaged in diving operations makes it impractical to exhibit all lights and shapes prescribed in Rule 27 paragraph (d), the following shall be exhibited:

Night: Three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white.

Day: A rigid replica of the International Code flag ″A″, not less than one meter in height. Measures shall be taken to ensure its all-round visibility.

583-6.4.2 MINE CLEARANCE OPERATIONS. A vessel engaged in mine clearance operations shall, in addition to the lights prescribed for a power-driven vessel in Rule 23, or to the lights or shapes prescribed for a vessel at anchor in Rule 30 as appropriate, exhibit three all-round green lights or three balls. One of these lights or shapes shall be exhibited near the foremast head and one at each end of the foreyard. These lights or shapes indicate that it is dangerous for another vessel to approach closer than 1000 meters astern or 500 meters on either side of the minesweeper (in international waters within 1000 meters in all directions).

583-6.4.3 AIR CUSHION VESSEL An air cushion vessel when operating in the nondisplacement mode shall, in addition to the lights prescribed in Rule 23, paragraph (a), also exhibit an all-round flashing yellow light where it can best be seen.

583-6.4.4 SAILING VESSELS UNDERWAY AND VESSELS UNDER OARS. A sailing vessel and vessels under oars shall exhibit the lights and shapes prescribed in Rule 25 in the Navigation Rules.

SECTION 7.

HOISTING SLINGS AND FITTINGS

583-7.1 GENERAL REQUIREMENTS

583-7.1.1 NAVSEA REQUIRED SAFETY FACTORS

583-7.1.1.1 Boats and Craft Assigned to Ships. Because of the dynamic nature of boat hoisting loads and the potential for large accelerations, it is the policy of the Naval Sea Systems Command (NAVSEA) to require safety factors as follows for all boats and craft normally assigned as ships' boats to be lifted into shipborne stowages:

a. All parts shall be designed to a safety factor of at least six, based on the ultimate strength of the material.

b. All terminating sling shackles shall be Type IVA, class 3 safety anchor shackles, in accordance with RR-C-271D. All open sockets terminating a sling leg shall have the pin replaced with a bolt, nut and cotter pin, similar to a safety anchor shackle pin. Pin material shall be in accordance with RR-C-550D.

c. Attachment points shall be on strength members of the boat.

d. Design of all slings and attachments shall be approved by NAVSEA before fabrication.

583-7.1.1.2 Boats and Craft Assigned to Shore Stations. For boats and craft not designed to be routinely hoisted aboard ship, such as LCU's, and those permanently assigned to shore stations, the factors of safety shall be at least five. Such hoisting gear is considered to be logistical only. This category of boats includes extensively reconfigured craft where the specialized nature of the craft, as modified, precludes its being returned to service requiring shipboard hoisting (such as LCM's to diving tenders, work boats, and so forth) as well as other specifically designed craft. In addition:

a. Attachment points shall be on strength members of the boat.

b. All terminating sling shackles shall be Type IVA, class 3 safety anchor shackles, in accordance with RR-C-271D. All open sockets terminating a sling leg shall have the pin replaced with a bolt, nut and cotter pin, similar to a safety anchor shackle pin. Pin material shall be in accordance with RR-C-550D.

c. Design of all slings and attachments shall be approved by NAVSEA before fabrication.

583-7.1.2 HOISTING CONDITION WEIGHTS. The design and testing of all components related to hoisting are based on the design hoisting weight of the boat. The design hoisting weight generally includes hull, machinery (wet), full fuel, full outfit (boat hook, fire extinguishers, etc.), crew, and a growth margin. The design hoisting weight is specified on the hoisting test data plate generally located near the coxswain's station. General information on design hoisting weights is given in Table 583-3-1. Only the weight indicated on the hoisting test data plate shall be used for the baseline weight for determining the overload weight for tests. Should the hoisting test data label plate be missing or illegible, the applicable ″Hoisting Arrangement and Details″ drawing shall be consulted to determine the correct design hoisting weight.

583-7.1.3 GALVANIZING OF PARTS. Ferrous (i.e., ordinary steel) chain, shackles, sockets, links, rings, equalizing thimbles attached to wire rope, and chains shall be galvanized.

583-7.1.4 IMPROVISING OF SLINGS. Since all ships' boats are furnished with slings, improvising of slings is not authorized except at naval shipyards and repair activities by qualified riggers.

583-7.2 MANUFACTURE OF HOISTING SLINGS, BAILS, AND FITTINGS

583-7.2.1 Any repair activity that has the capability of testing slings, bails, hoisting shackles, rods, pins, chain links, and rings is authorized to manufacture such equipment according to applicable drawings, EXCEPT for Kevlar slings which shall not be obtained from any source other than those given on the applicable drawing. Manufacture shall not be accomplished if the equipment is available as a standard stock item. Testing, inspections, marking, and record keeping shall be accomplished in accordance with the further provisions of this section.

CAUTION

Kevlar rope slings require specialized manufacturing process controls to maintain safety standards. Kevlar slings shall not be obtained from any source other than those designated on the approved drawings.

583-7.3 INSPECTIONS

583-7.3.1 GENERAL. All slings, bails, and hoisting fittings shall be visually inspected for proper assembly and condition at least once a month or before each lift and they shall not be used if signs of deterioration are noted. Sockets and shackles shall be checked to ensure the intended pins are used. Before conducting any hoisting test, a careful inspection shall be made of all hoisting fittings, slings, or bails to determine whether the parts are in proper condition. After any load test, inspect all components for signs of permanent deformation, cracking of any of the components or supporting boat structure, elongated holes, or bent shackle or socket pins.

583-7.3.2 WIRE ROPE SLINGS. Wire rope slings shall be inspected for broken or damaged strands, crimps, kinks, cuts, and corrosion. Inspection and removal shall be in accordance with **NSTM Chapter 613** .

583-7.3.3 WEBBING SLINGS. Webbing slings shall be inspected for abrasion, tears, cuts, snags, punctures and fraying of the webbing and stitching. Slings exhibiting any of the following shall be removed from service:

a. Acid or caustic burns

b. Melting or charring of any part of the sling

c. Snags, punctures, tears or cuts

d. Broken or worn stitches

e. Distortion of fittings

f. Wear or elongation exceeding amount recommended by manufacturer

g. Other apparent defects that cause doubt as to the strength of the sling

h. Loading of the sling beyond its rated capacity

i. Exposure of Red Guard warning yarn

j. Paint present on any part of webbing

Since new webbing exhibits different stretch characteristics from older webbing, the entire sling should be disposed of in lieu of replacing only the bad sling legs. Tying knots in webbing slings will dramatically reduce the strength of the webbing and is not allowed. Paint will also reduce the strength of the webbing and should not be used for stencilling.

583-7.3.4 KEVLAR SLINGS. Kevlar slings should be inspected for cuts, abrasions, snagging and badly worn areas in the outer jacket. Extensive damage to outer jacket could indicate damage to inner load bearing core. Slings exhibiting any of the following shall be removed from service:

a. Core has been cut or damaged

b. Slings have been exposed to excessive heat (greater than 150 degrees Fahrenheit)

c. Slings shave been loaded beyond their rated capacity

d. Distortion of fittings

e. Other apparent defects that cause doubt as to the strength of the sling

f. Abrasions or cuts on the jacket which prevent the jacket from providing sufficient protection for the core.

Since new rope exhibits different stretch characteristics from older rope entire sling should be disposed of in lieu of replacing only the bad sling legs. Typing knots in Kevlar sling will dramatically reduce the strength of the sling and is not allowed.

583-7.3.5 RIGID BAILS. Rigid bails shall be inspected for cracks, deformation, corrosion, crimping, and loose fasteners. Rigid bails that contain cracks, deformation, corrosion, or crimping shall be taken out of service. Loose fasteners and similar discrepancies shall be corrected before the bail is placed into service.

583-7.4 TESTING

583-7.4.1 HOISTING SLING LOAD TESTS. Job orders or contracts for manufacture of boat slings shall require that the sling and associated hardware not permanently attached to the boat be tested as indicated under the heading of ″Test Procedures″ on the respective ″Hoisting Arrangement and Details″ drawings. The number for this drawing can usually be found on the hoisting label plate located near the coxswain’s station or in the Boat Information Book. Test loads are intended to be 100 percent in excess of the design working load of the part. Sling tests shall be performed in load testing equipment designed for that purpose. One-hundred percent overload tests are never performed in the boat. Unless specifications call for testing slings in the same configuration as used, one or more legs may be tested at a time using the straight line pull method at 100 percent overload based on the design load for each leg.

583-7.4.1.1 Wire Rope Sling Load Test Periodicity. During normal repair and overhaul availabilities of a ship, all wire rope slings that have not been tested in the preceding 18 months, except those shipped with new boats, shall be retested and marked before issue. Hoisting slings for boats assigned to shore stations shall be subjected to a 100 percent overload test every 24 months.

583-7.4.1.2 Webbing Sling Load Test and Replacement Periodicity. Operators of boats provided with webbing slings shall refer to the applicable Maintenance Index Page (MIP) for the periodicity of testing and replacement.

583-7.4.1.3 Kevlar Sling Load Test and Replacement Periodicity. Operators of boats provided with Kevlar slings shall refer to the applicable Maintenance Index Page (MIP) for the periodicity of testing and replacement.

583-7.4.1.4 Retesting of New Slings. The time interval after which the first periodic testing is required for new slings received from stock or shipped with new boats is taken from the date the slings were placed in service that will be indicated on the in-service tag. If no in-service tag is present the retesting period is taken from the date on the certification test markings. If no test markings are present the sling certification shall be assumed to be out of date and the slings shall be retested.

583-7.4.2 RIGID BAIL LOAD TESTS. Rigid bails are similar to other permanently installed hoisting fittings in that they are less prone to wear and damage than wire rope, webbing or Kevlar slings. Rigid bails shall be load-tested upon completion of a new boat or after any repairs to the bail. The rigid bail shall be tested by weighting the boat 50 percent in excess of its normal design hoisting weight and lifting it, using the bail, just clear of the water or shop floor for 10 minutes. When conducting the 50 percent overload test, it is absolutely necessary that the correct weight be used. The design hoisting weight is specified on the hoisting test data plate. Only the weight indicated on the hoisting data plate shall be used for the baseline weight for the 50 percent overload test. The added weight shall be distributed, one half forward and one half aft, as near the hoisting fittings as possible, care being taken not to place any significant added weight amidships.

583-7.4.3 HOISTING FITTING LOAD TESTS. Hoisting fittings permanently attached to the boat shall be load-tested upon completion of a new boat or after extensive repairs have been made to a boat in service. The boat's lifting slings or bail shall be inspected prior to conducting this test to ensure their adequacy for the test load and to verify that they have been load tested within the required certification period. The boat's hoisting fittings shall be tested by weighting the boat 50 percent in excess of its normal design hoisting weight and lifting it by its hoisting slings or bail just clear of the water or shop floor for 10 minutes. For boats that have fittings for both sling lifting and davit lifting, the overload test shall be conducted for both configurations. When conducting the 50 percent overload test, it is absolutely necessary that the correct weight be used. The design hoisting weight indicated on the hoisting data plate shall be used for the baseline weight for the 50 percent overload test. The added weight shall be distributed, one half forward and one half aft, as near the hoisting fittings as possible, care being taken not to place any significant added weight amidship.

583-7.4.4 FIT TESTS. Before finally accepting newly issued, repaired, or altered hoisting slings or bails, ships shall test them for fit by hoisting the boat using the method that normally will be used in service. The boat shall be lifted by its slings and suspended for at least 10 minutes, just clear of the water, deck, or stowage, to minimize damage in case of failure.

583-7.5 MARKING

583-7.5.1 GENERAL. Slings are not designed to be interchangeable between different boat types and marks. Due to differences in the details of the design, slings for a given boat are not always suitable for use on all other boats of the same type. For these reasons, identification markings must be placed on all slings. Slings shall not be issued without test markings attached. If unmarked slings are found in stock or if slings or bails have been

repaired they shall be retested and marked. Naval shipyards receiving boats with hoisting slings which are uncertified may use these slings before recertification testing to hoist the boat within the shipyard if the following steps are adhered to:

a. The sling is verified as having previously been tested to the correct load from the test bands installed on the sling.

b. The wire rope or webbing and fittings are visually inspected for damage, wear, corrosion, or other defects.

c. If the above inspections determine that the sling is satisfactory, the boat should be secured to the sling and hoisted just clear of all other support and held for a minimum period of 10 minutes by the sling. The sling is then reinspected for evidence of failure or permanent deformation.

Kevlar slings shall be marked in accordance with the MIP.

583-7.5.2 WIRE ROPE SLINGS. When slings are manufactured and after the load test has been satisfactorily completed, a copper or stainless steel band shall be fitted to each sling leg, identifying the leg (for example aft-port), indicating the test has been made and giving the name of the certifying activity, the contract number (if applicable), the registry number of the boat for which manufactured (for example, 26MW9001), the government inspecting office (if applicable), and the date of the test. If the sling is being returned to service after periodic testing, the bands shall be marked with the test date and name of the testing activity. If, for any reason, slings are assigned to another boat of like design (type and mark), the boat number on the band shall be changed accordingly.

583-7.5.3 WEBBING SLINGS. When slings are manufactured and after the load test has been satisfactorily completed, an etched leather tag shall be sewn to each sling leg, identifying the leg (for example aft-port), indicating the test has been made and giving the name of the certifying activity, the contract number (if applicable), the registry number of the boat for which manufactured (for example, 24RB9101), the government inspecting office (if applicable), and the date of the test. If the sling is being returned to service after periodic testing, the tags shall be marked with the test date and name of the testing activity. If, for any reason, slings are assigned to another boat of like design (type and mark), the boat number on the tag shall be changed accordingly.

583-7.5.4 RIGID BAILS. When bails are manufactured or repaired and after the load test has been satisfactorily completed, a copper or stainless steel hoisting test data plate shall be secured to the bail with stainless steel bands. The hoisting test data place shall give the design working load of the bail (i.e. the design hoisting weight), the weight of the boat for the 50 percent overload test, the date of the test, and the place tested.

583-7.5.5 LIFTING FITTINGS. New boats shall be delivered with a hoisting test data label plate which identifies the design hoisting weight of the boat, the weight of the boat for the 50 percent overload test, the NAVSEA drawing number for the ″Hoisting Arrangement and Details″ drawing, the date of the test, and the place tested. In addition, spaces shall be provided for stamping the date and place tested for subsequent overload tests on the fittings permanently attached to the boat. Repair activities shall update the hoisting test data label plate by stamping or engraving the data and activity certifying subsequent overload tests of the boat's lifting fittings. If there is no hoisting test data label plate, a new label plate shall be fabricated in accordance with the applicable ″Hoisting Arrangement and Details″ drawing and installed in the vicinity of the coxswain's station.

583-7.5.6 IN-SERVICE TAGS. Slings shipped with new boats or received from stock should be marked by the receiving activity to indicate the date the slings are actually put into service. This is done to avoid unnecessary retesting when new slings, which were load tested during manufacture, have been kept in storage prior to issue.

The date placed in service should be engraved or punched on the in-service tag provided with the sling. If no tag is provided, an in-service tag may be fabricated by the receiving activity and attached to the lifting ring in a manner that does not interfere with any of the working surfaces of the sling. The in-service tag should indicate the date placed in service and the activity placing the sling in service. The original load test tag shall not be removed. The in-service date is the date the sling is placed on a boat aboard ship or begins use by a shore facility. For new ship construction service begins when the slings are first used for handling the boat after delivery to the shipbuilder.

583-7.6 RECORDS OF INSPECTION AND TESTS

583-7.6.1 CRAFT LOG. Boat operators or the ship's force concerned shall maintain a record of inspections and test of hoisting fittings, rigid bails, shackles, rings, and slings. Records shall show the date, and shall describe the condition of the parts inspected and tested. These records shall be kept as a part of the normal craft log.

583-7.6.2 REPAIR ACTIVITIES' RECORD OF INSPECTIONS AND TESTS. Repair activities shall keep a record of inspections and tests of hoisting fittings, rigid bails, shackles, rings, and slings. Records shall show the date and boat registry number, and shall describe the condition of the parts inspected and tested. Results of these inspections and tests shall be entered in the material history of the boat by the ship or other cognizant activity concerned.

583-7.7 SIDE GUYS

583-7.7.1 GENERAL. Side guys (steadying lines for slings) are required on certain boats where the hoisting fittings are below the center of gravity. Their purpose is to prevent the boat from rolling to one side while being hoisted. Wire rope shall not be used. These guys are not intended to take any part of the weight of the boat in lifting; therefore, no separate load test is required. However, side guys shall be properly installed prior to conducting overload tests on the boat's hoisting fittings.

583-7.7.2 RIGGING FIBER LINE SIDE GUYS. The following procedure should be used in rigging side guys:

a. Secure a fiber guy to each padeye or cleat intended for its use.

b. While the boat is onboard ship, take a strain on the slings, adjust length of side guys so that they will not take the hoisting strain.

c. Secure side guy with a rolling hitch backed up by a half hitch and marry the better end of each side guy to the standing part with a length of marlin.

In hoisting, each side guy should be secured to its padeye before a strain is taken on the slings. The foregoing is to be done for slings assigned to each boat. The position of the rolling hitch must be adjusted periodically to compensate for any stretch of the fiber lines used as side guys.

SECTION 8.

BARGE

583-8.1 CONVERSION OF STANDARD BOATS

583-8.1.1 STANDARD ITEMS APPROVAL AND INSTALLATIONS. All conversions of Navy standard boats to barges and gigs shall be accomplished in a cost effective manner.

583-8.2 STANDARD ITEMS

583-8.2.1 CONVERSION OF STANDARD BOATS TO BARGES AND GIGS. Barges and gigs as outlined in paragraph 583-1.3.3 are authorized for installation of standard items listed in Table 583-8-2. Installation of these items shall be approved by type and fleet commanders for afloat commands and by the immediate senior in command for shore commands. In no instance shall installation of standard items and conversions be accomplished which will increase weight or impair operational and performance characteristics or result in a decrease in safety. Installation of items on gigs beyond the standard items is not authorized.

583-8.2.2 STANDARD ITEMS APPROVAL AND FUNDING. Conversion of standard boats to barges and gigs, will be funded by Type or Fleet Commanders. Serviceable items or components not in conformance with Table 583-8-2, already installed in assigned boats, will be required to be removed when item is not longer serviceable. Buffed and polished CRES fittings, molding, and strips should be used wherever chrome plated items are permitted, particularly if the item is commercially available at a reasonable price. It is recommended that barges and gigs be painted as noted below using polyurethane or epoxy type paint for decks, hull and boottop stripe, and antifouling bottom paint below the boottop stripe:

Table 583-8-1. RECOMMENDED COLORS FOR BARGES AND GIGS

Barges		Gigs	
Deck	White/Off White	Deck	Standard Navy Grey
Hull	Black	Hull	Standard Navy Grey
Boottop	3″ White Stripe 1″ Above Waterline	Bootstripe	3″ Red Stripe 1″ Above Waterline
Bottom	Medium Green or Tropical Green	Bottom	Black

It is also recommended that barges and gigs which are in continual use (not hoisted at frequent intervals) receive two coats of antifouling paint on the underwater body.

Table 583-8-2. STANDARD ITEMS FOR BARGES AND GIGS

Standard Items	Barges	Gigs[1]
Deck and engine cover caulked[2]	Yes	No
Cabin trim		
If wood-varnish finish	Yes	Yes
If metal or plastic-white painted finish	Yes	Yes
Linoleum on flats or suitable indoor/outdoor carpeting (fire retardant[3])	Yes	Cabin only
Seat cushions and curtains	Yes	Yes
Ladders, wood, varnish finish	Yes	Yes
Kickplates and treads, CRES, polished	Yes	Yes

Table 583-8-2. STANDARD ITEMS FOR BARGES AND GIGS - Continued

Standard Items	Barges	Gigs[1]
Water closet	Yes	Yes
Galley	Yes	No
Swimmer's platform	Yes	No
Chrome plate[4]		
Handrails	Yes	Yes
Flagstaff, jackstaff, and mast	Yes	Yes
Sockets	Yes	Yes
Sockets	Yes	Yes
Bow lettering, nocks, arrowheads, and stars[5]	Yes	Yes
Portable rings	Yes	Yes
Interior lighting fixtures	Yes	Yes
Fire extinguisher bracket	Yes	Yes
Chain plate	Yes	Yes
Taffrail and bow rail	Yes	Yes
Cleats	Yes	Yes
Beading and stem band[6]	Yes	Yes
Horn, windshield fittings (less wipers)	Yes	Yes
Chocks	Yes	Yes
Towing post (if metal)	Yes	No
Engine control	Yes	Yes
Steering wheel (metal portions)	Yes	Yes
Searchlight	Yes	Yes
Deck vents and fuel covers	Yes	Yes
Chafing plate[7]	Yes	Yes
Hatch moldings and fittings	Yes	Yes
Door and ladder fittings	Yes	Yes
Emergency tiller plate	Yes	Yes
Bell, bracket, and stand	Yes	No
Appropriate communications equipment[8]	Yes	Yes

NOTES:
1. Boats converted and used as barges and gigs generally are standard U.S. Navy designs. Non-standard commercial boats may also be assigned for flag officer's use as barges. Those items which are welded or otherwise affixed to the hull in such a manner than excessive expenditures would be required for their removal and replacement shall not be chrome-plated.
2. Barges are authorized to have herringbone decks of unvarnished teak or herringbone decks consisting of varnished mahogany margins, king plank, and filler pieces with Alaska cedar or mahogany strakes. Caulked decks, if installed on standard craft being modified as gigs, shall not be removed.
3. Vinyl tile may be used in place of linoleum. Color is to be in harmony with cabin interior.
4. Where applicable, only the exposed portions of the items designated shall be chrome-plated. Stainless steel fittings shall not be chrome-plated as the purpose for the installation of these fittings is to avoid the cost of chrome-plating. Stainless steel fittings shall be polished.
5. Chrome-plated bow letters, nocks, and arrowheads may be installed on any boat used as a gig.
6. Polyurethane fenders are installed on new personnel boats and are selectively backfit by BOATALT on older boats. Maintainability is improved over the traditional white oak with stainless steel bar beading. The urethane fenders shall not be removed when a standard boat is issued as a barge or gig.
7. Chafing plate is non-standard equipment which should be installed on transom corner angles (badgers)
8. Equipment may be installed, permanent, or portable, to allow sufficient communications for command and safety purposes within the boat control station for the barge and gig operators.

SECTION 9.
HANDLING AND STOWING BOATS ABOARD SHIP

583-9.1 GENERAL INFORMATION

583-9.1.1 PURPOSE. The purpose of this section is to:

a. Provide and define the accepted terms used in conjunction with boat handling and stowage systems

b. Provide guidance concerning preweight test inspections and testing requirements

c. Amplify general safety requirements and operational procedures for boat davit and stowage systems

d. Provide convenient reference information to personnel to reduce interpretation errors concerning the requirements of boat handling and stowage systems

583-9.1.2 BOAT DAVIT DESIGN TYPES. There are seven design types of boat davits currently in use for handling boats aboard Naval ships. Each of these design types comes in several different configurations. It is therefore important to properly identify the design type and configuration of the boat davit in question when using this manual for guidance. The design types and configurations are listed in Table 583-9-1. In addition to the davit designs and configurations identified, some davits are further categorized by the number of boats that a particular davit installation handles and how the boats are stowed with respect to a davit system. These categories are:

Table 583-9-1. BOAT DAVIT DESIGN TYPES AND CONFIGURATION

Davit Design Types	Configuration
1. Overhead Suspended (Figure 583-9-2)	Double Arm, Fixed
2. Pivoted (Figure 583-9-3)	Single ArmDouble Arm, SpanwireDouble Arm, Strongback
3. Pivoted Link (Figure 583-9-4)	Double Arm, SpanwireDouble Arm, Strongback
4. Pivoted Sheath Screw (Figure 583-9-5)	Double Arm, Spanwire
5. Radial (Figure 583-9-6)	Double Arm
6. Slewing (Figure 583-9-7)	Single Arm, StandardSingle Arm, Non-magneticSingle Arm, Overhead
7. Trackway (Figure 583-9-8)	Single Arm, Double Arm, SpanwireDouble Arm, Strongback

a. Single Bank

b. Double Bank

c. Triple Bank

d. Quadruple Bank

These design and configuration categories are further discussed in paragraph 583-9.2.

583-9.1.3 BOAT STOWAGE TYPES. There are three boat stowage types; deck, dolly and davit. Specific information regarding stowages is provided in paragraph 583-9.7.

583-9.1.4 TYPICAL BOAT DAVIT FUNCTIONAL BLOCK DIAGRAM. A typical boat davit functional block diagram is depicted in Figure 583–9–1. This diagram, while not exact for every boat davit configuration used in the Navy, is representative of the electromechanical davit as a system and reflects the general interrelationship of the components identified.

583-9.2 TERMS AND DESCRIPTIONS

583-9.2.1 GENERAL. The terms utilized in this section are listed and defined in the following paragraphs in alphabetical order. Where applicable, amplifying information is provided to assist personnel engaged in the supervision of operation or maintenance of the boat handling and stowage system.

583-9.2.2 BOAT HOISTING RIGID BAIL. A rigid hoisting fixture fabricated from round bar or pipe, and fitted to the boat for lifting at a single point with a single arm davit.

583-9.2.3 BOAT HOISTING SLINGS. Two or more wire rope, flat polyester or Kevlar straps. One end of each strap is attached to a common hoisting ring and the other end is attached to the boat hoisting fittings. Refer to Section 7 of this Naval Ships' Technical Manual (NSTM) chapter for further information.

583-9.2.4 BOAT RELEASE GEAR. The hook or hooks used to facilitate attaching or releasing the boat hoisting shackle or device. The standard boat release gear used by the Navy on double arm davits is known as a Raymond release hook. The standard boat releasing gear used by the Navy on single arm davits other than the Slewing Arm Davit (SLAD) is the quick release hook. The hook used on most SLAD is the on-load release safety hook.

583-9.2.5 BOOM, BOAT. A horizontal spar, strut, or other long member extending from the hull of the ship, to which boats are moored.

583-9.2.6 BOOM, BOAT HANDLING. An inclined spar, strut, or other long member used to handle boats over the side of the ship for launch and retrieval.

583-9.2.7 DAVIT, DOUBLE ARM. A davit having two arms, falls, and hoisting hooks. With this type of davit, the boat is suspended from two points.

583-9.2.8 DAVIT, MECHANICAL. A davit requiring the application of an external force (other than gravity) to move the boat from the inboard position to the outboard position in preparation for launching.

583-9.2.9 DAVIT, OVERHEAD SUSPENDED. A gravity davit consisting of sheaves mounted beneath a sponson or other overhang. The boat is suspended by the falls. This davit type is only used on some aircraft carriers (CV) and helicopter landing (LHD) type ships. Refer to Figure 583-9-2.

583-9.2.10 DAVIT, PIVOTED. A gravity davit consisting of an arm or arms which pivot around a single axis to move inboard and outboard. Refer to Figure 583-9-3.

583-9.2.11 DAVIT, PIVOTED LINK. A gravity davit consisting of two arms which pivot around multiple axes through links to move inboard and outboard. Refer to Figure 583-9-4.

583-9.2.12 DAVIT, PIVOTED SHEATH SCREW. A mechanical davit, the arms of which are generally in crescent form, which is mechanically operated in and out by means of a sheath screw. Refer to Figure 583-9-5.

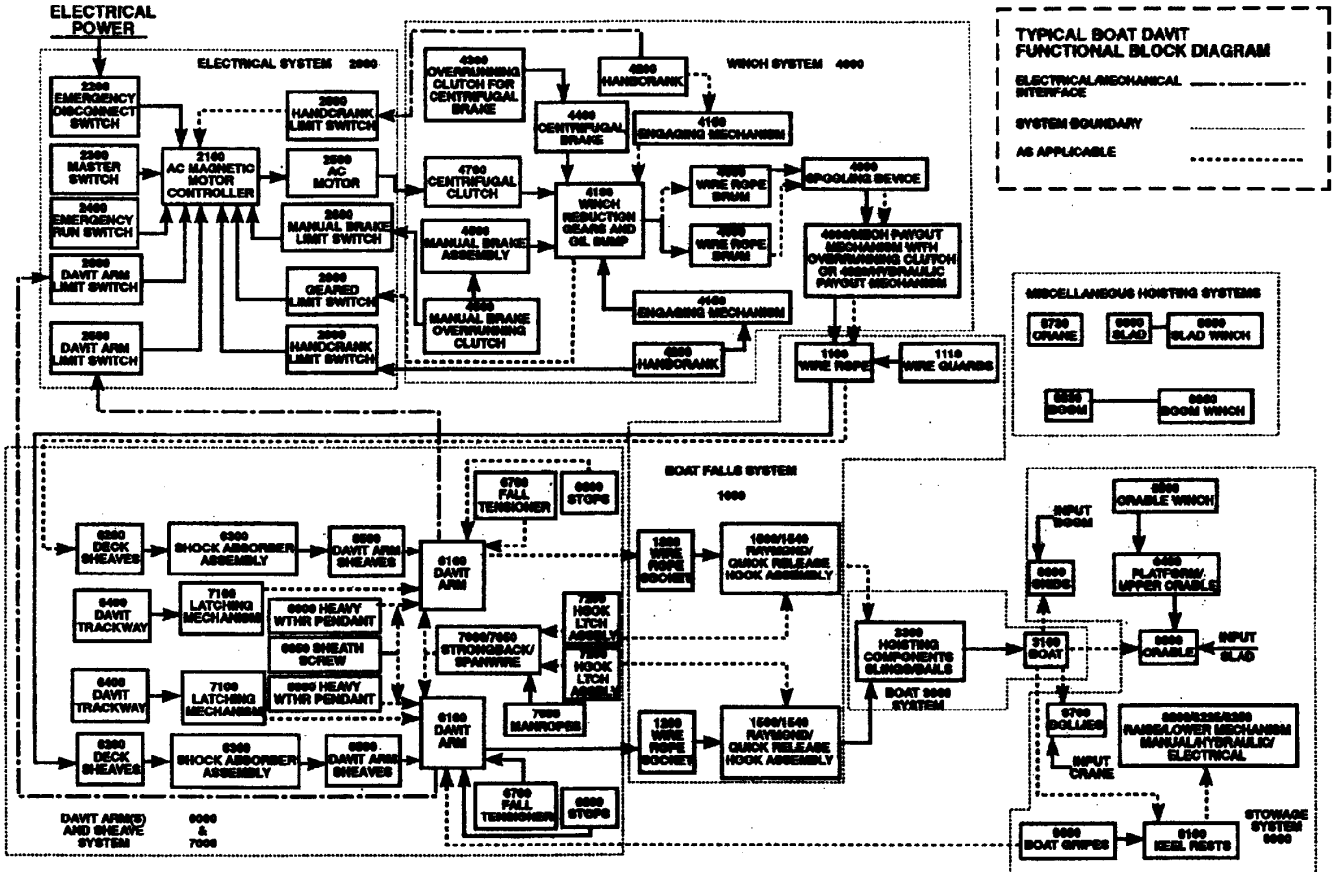

Figure 583-9-1. Typical Boat Davit Functional Block Diagram

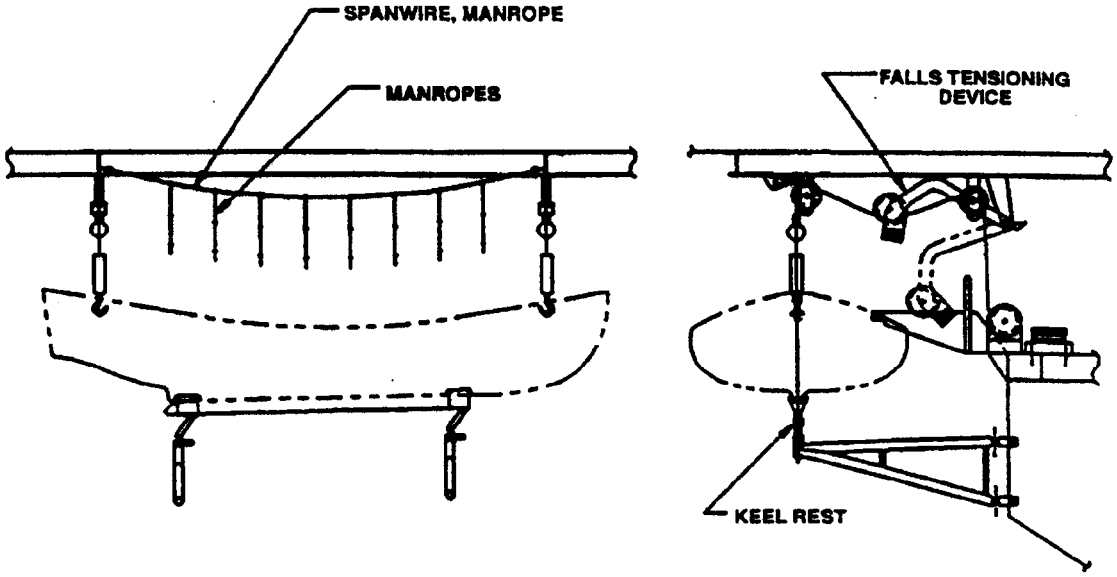

Figure 583-9-2. Overhead Suspended Davit

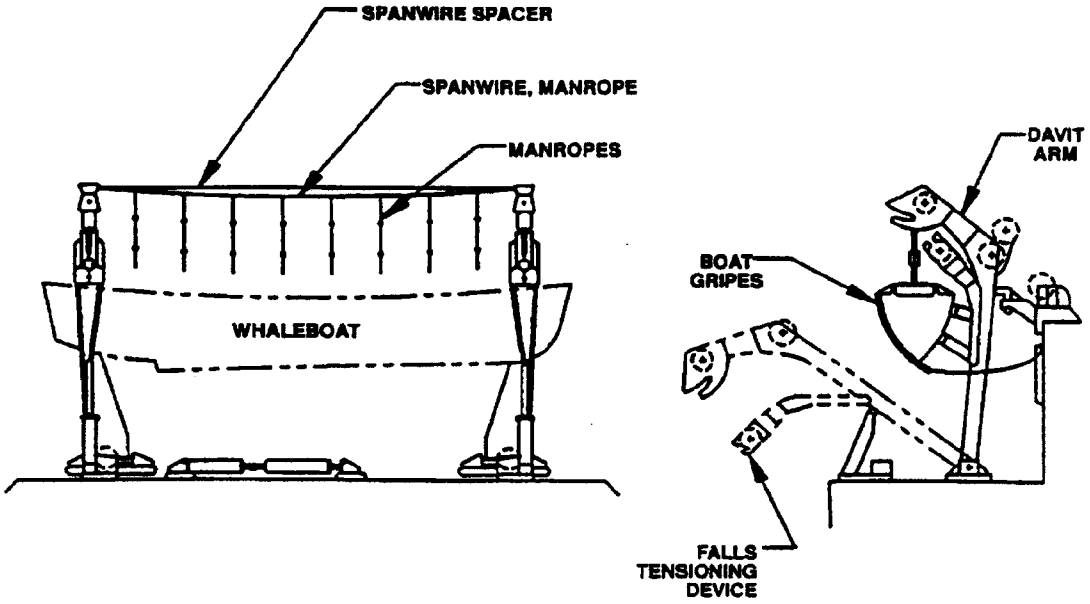

Figure 583-9-3. Pivoted Double Arm Spanwire Davit

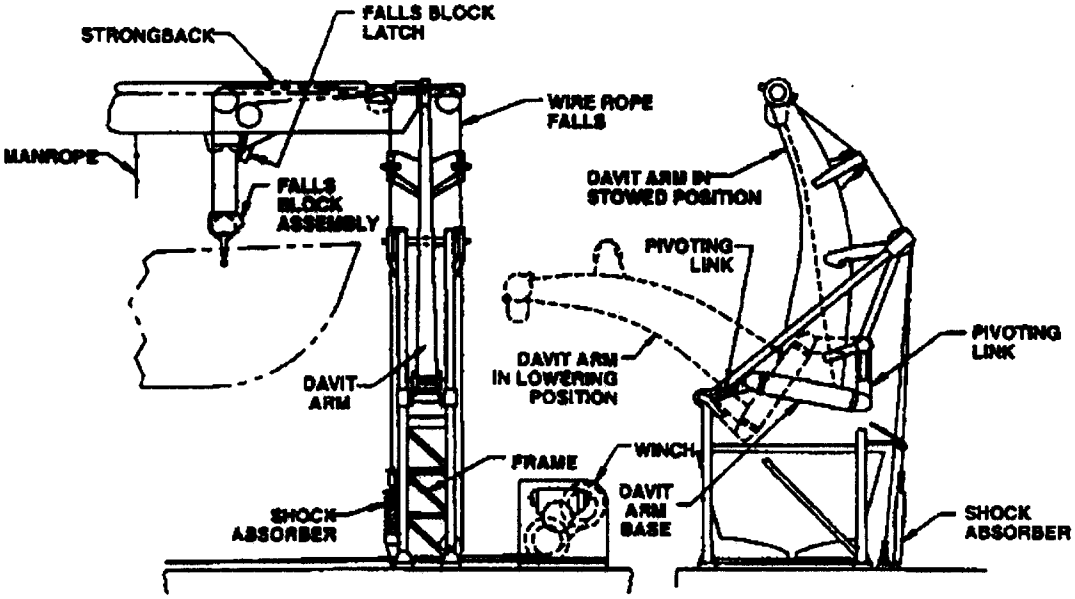

Figure 583-9-4. Pivoted Link Double Arm Strongback Davit

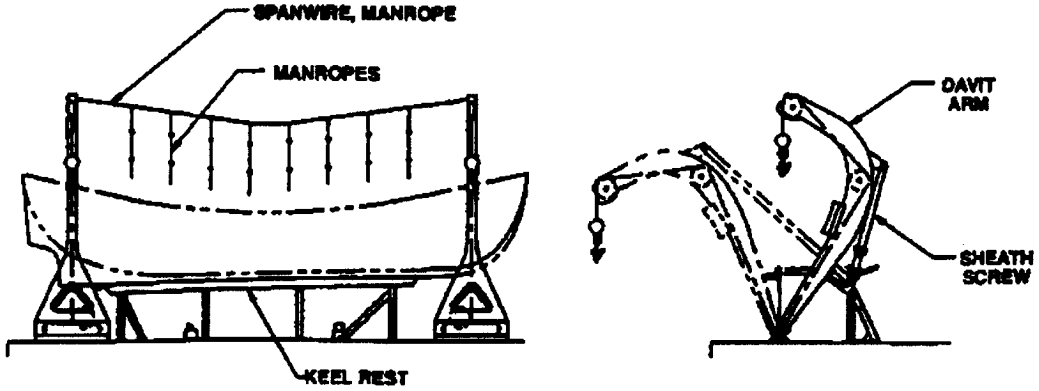

Figure 583-9-5. Pivoted Sheath Screw Davit

583-9.2.13 DAVIT, RADIAL. A mechanical davit consisting of a pair of vertical arms each extending from a pedestal. The boat is moved to the outboard position by partially rotating the arms. The boat falls on this type of davit may be of manila or double braided nylon rope handled by a deck winch or block and tackle. Refer to Figure 583-9-6.

583-9.2.14 DAVIT, SINGLE ARM. A davit having one arm, fall, and hoisting hook. With this type davit, the boat is suspended from a single point.

583-9.2.15 DAVIT, SLEWING ARM (SLAD). A mechanical davit with a single arm. The davit arm is mounted on a pedestal and rotates about a vertical axis when moving the boat outboard and inboard in a slewing type motion. This type of davit handles a 24 foot Rigid Inflatable Boat (RIB). Refer to Figure 583-9-7.

583-9.2.16 DAVIT, TRACKWAY. A gravity davit consisting of an arm or arms mounted on rollers that run on an inclined trackway or trackways that are mounted on the deck. The incline on the trackway(s) is sufficient for gravity to cause the boat and arm(s) to move down the trackway(s) from the inboard position to the outboard position so that the boat may be lowered into the water. Refer to Figure 583-9-8.

583-9.2.17 DOUBLE BANK. An arrangement for stowing two boats, one above the other.

583-9.2.18 FALLS. The apparatus that transmits winch controlled hoisting and lowering to the boat. A typical fall is shown in Figure 583-9-9.

583-9.2.18.1 Assembly. The falls generally consist of, but are not limited to, the following equipment: hooks, blocks, links, sockets and wire or fiber rope. The rope is then reeved through the system (winch drum, sheaves, shock absorber assembly, etc). For slewing and radial arm davits, swivels are installed as part of the falls.

583-9.2.18.2 Falls Twisting. Falls twisting will occur if the rope is allowed to twist when reeving the rope through the system during installation. Refer to paragraph 583-9.5.2.

583-9.2.19 FALLS TENSIONING DEVICE. A weighted sheave arrangement installed in the davit wire rope reeving arrangement. Its weight is enough to counterbalance and lift the hook(s) or falls clear of the boat and its crew when launching the boat. A typical falls tensioner device is shown in Figure 583-9-10.

583-9.2.20 GRAVITY DAVIT. A davit that requires only the force of gravity to move a boat from the inboard launching position to the waterborne position.

583-9.2.21 GRIPE. An adjustable rope or belt assembly used to secure the boat when it is in the stowed position. Refer to Figure 583-9-11.

583-9.2.22 HOOK, SAFETY, ON-LOAD RELEASE. The hook type is used on some SLAD and single-arm davits. Refer to Figure 583-9-12.

583-9.2.23 HOOK, RAYMOND RELEASE. The Navy standard hook used for double arm davits is shown on NAVSEA dwg 803-5000491 and depicted in Table 583-9-2.

Table 583-9-2. NAVY STANDARD RAYMOND RELEASE HOOK

Safe Working Load Per Hook	NSN	Minimum Shank Diameter
7000 lbs	4030-00-408-5484	7/8 in.
10000 lbs	4030-00-408-5485	1-1/8 in.
14000 lbs	4030-00-238-6192	1-3/8 in.

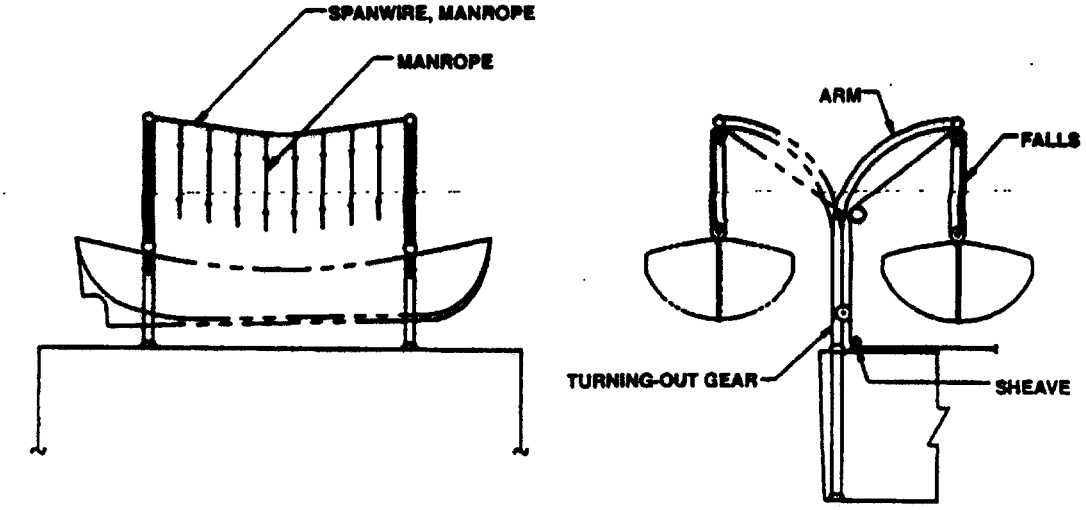

Figure 583-9-6. Radial Davit

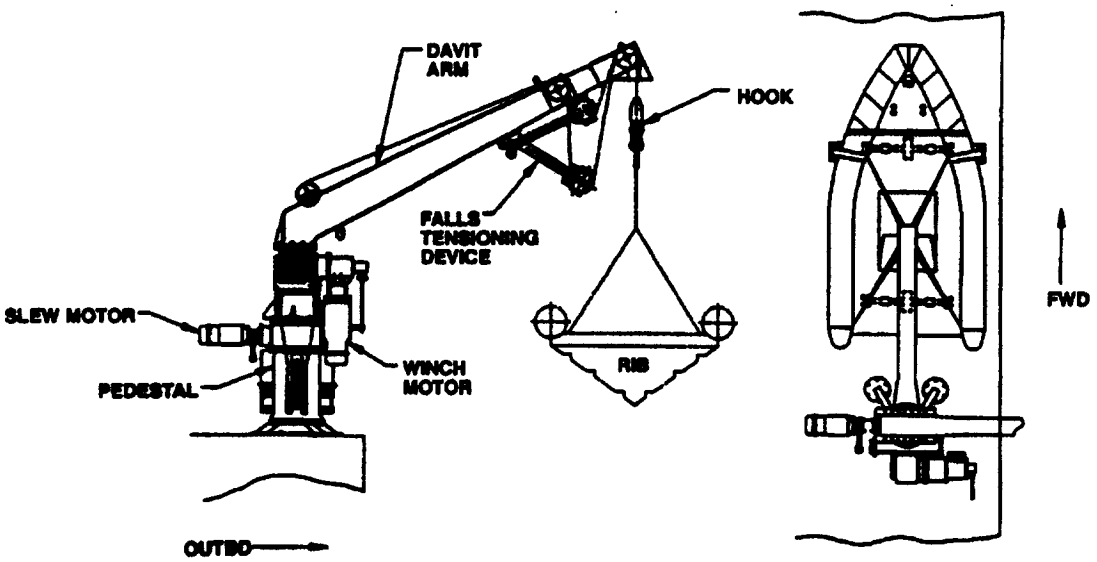

Figure 583-9-7. Slewing Single Arm Standard Davit

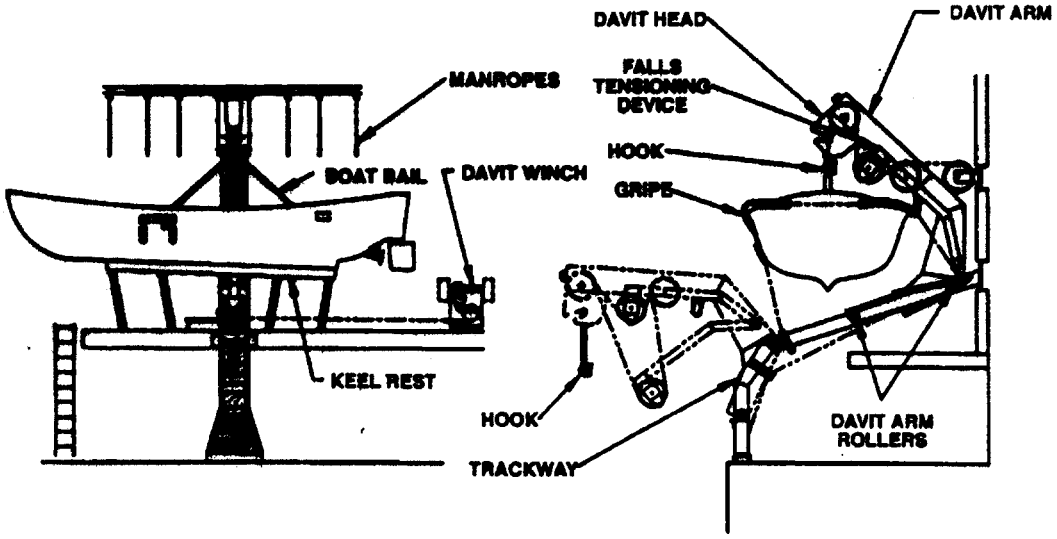

Figure 583-9-8. Trackway Single Arm Davit

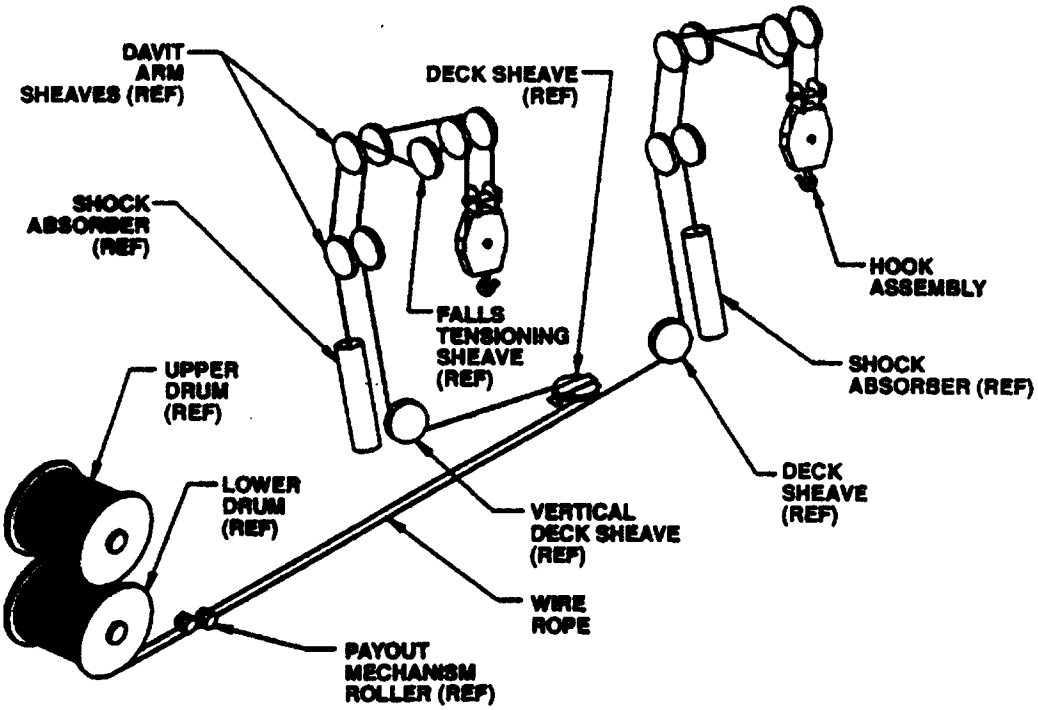

Figure 583-9-9. Wire Rope Falls

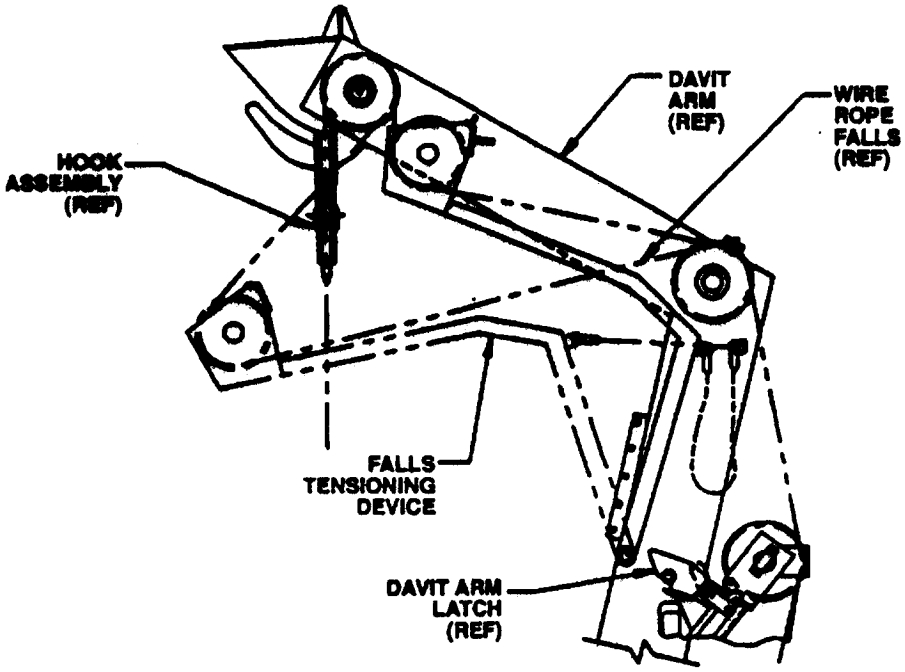

Figure 583-9-10. Falls Tensioner

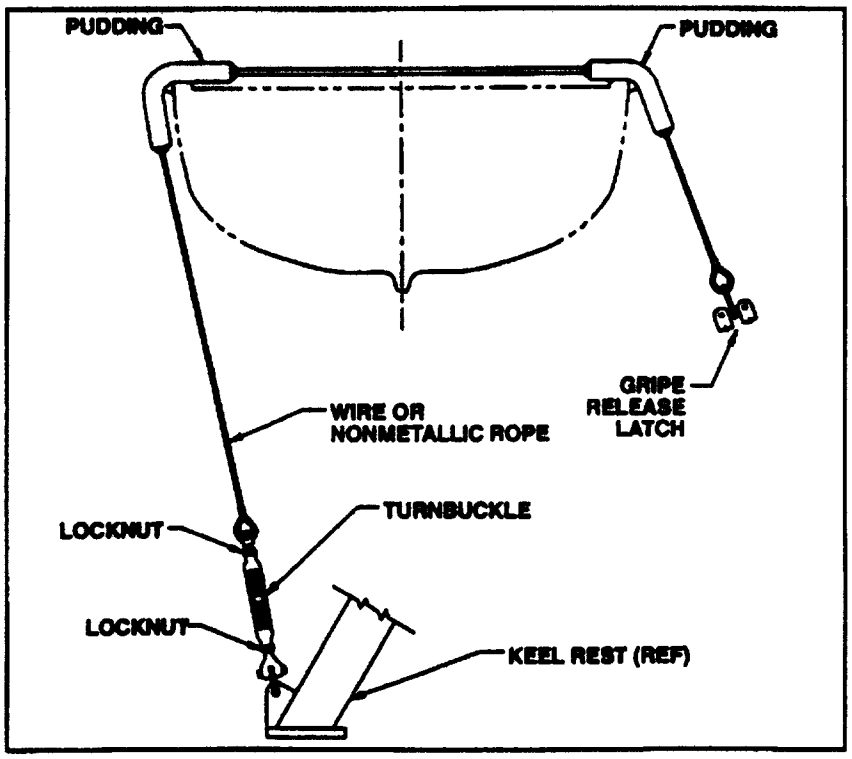

Figure 583–9–11. Boat Gripe Assembly

Figure 583-9-11. Boat Gripe Assembly

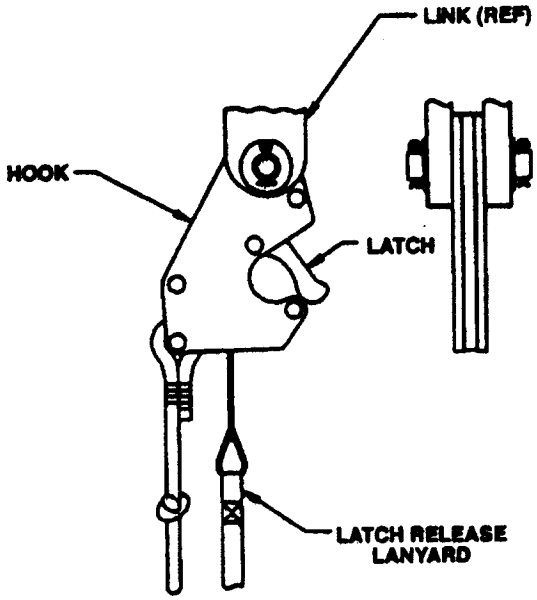

Figure 583-9-12. Hook, Safety, On-Load Release

583-9.2.23.1 Adaptation. These hooks have a straight shank with ample material for adaptation to suit the falls block design of any existing mounting configuration found in the fleet. The reason for the straight shank is that it is not practical to stock different hooks for each of the many different mounting configurations found in the fleet. The three hook capacities, shown in Figure 583-9-13, will meet all existing fleet boat davit needs and will support maintenance replacement of all boat davit hooks in service, and all new construction, except for single arm type boat davits. When this hook is requisitioned by a ship, it will be necessary for the straight shank of the hook to be adapted by a shipyard or tender to suit the mounting configuration for that ship's boat davit. The hook shanks may be machined to the minimum diameter shown in Figure 583-9-13, for adaptation to any existing mounting configuration without prior approval of NAVSEA.

WARNING

Welding repair to the surface of Navy standard Raymond release hooks is not permitted unless approved by NAVSEA and only in extreme emergency.

583-9.2.23.2 Installation and Testing. After final machining and installation, bare hook area shall be protected against corrosion by painting with an inorganic zinc paint system selected from **NSTM Chapter 631 Volume 2, Preservation of Ships in Service - Surface Preparation and Painting** . Final topcoat shall be white per FED Spec TT-E-489 or TT-E-490 to improve visibility during night operations. Care shall be taken during hook handling to ensure that no damage occurs that could disturb the close and freely working fit between mating surfaces of hook and tripper bill. After hook replacement is made, a system test is required in accordance with paragraph 583-9.2.47 of this chapter.

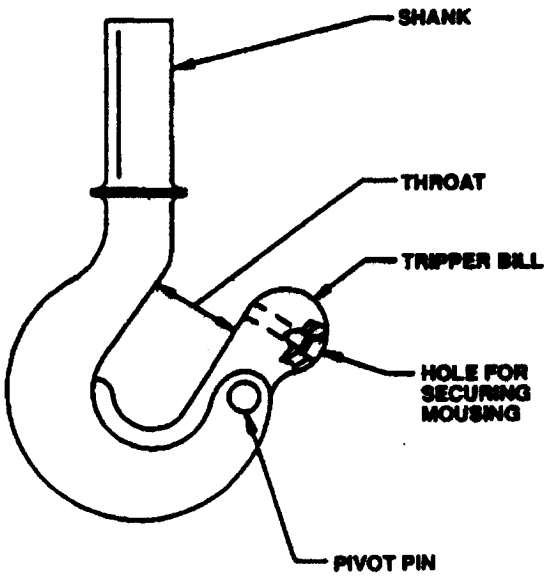

Figure 583-9-13. Hook, Raymond Release

NOTE

Use of similar commercial hooks has resulted in various problems that can cause the boat to be dropped. Visually compare the hook material and throat dimensions and angles against NAVSEA dwg 803-5000941. Replace with Navy standard Raymond release hook if discrepancies found. If modification to the existing mounting design is required, design approval of the modification shall be obtained from a naval shipyard, SUPSHIP, or NAVSEA activity.

583-9.2.24 HOOK, SAFETY, OFF-LOAD RELEASE. The standard Navy hook used to handle 26-foot Motor Whale Boat (MWB) having a single point rigid bail arrangement is shown on NAVSEA dwg 601-5489210 and depicted in Figure 583-9-14. This hook is designed to permit quick engagement and secure locking during hoisting while still allowing quick release during launching. The NSN for this hook is 2040-01-117-5485.

583-9.2.24.1 Hook, Safety, Off-Load Release. This hook type is used on some single point pick-up davits handling RIB's and is shown in Figure 583-9-15.

583-9.2.25 LAUNCHING POSITION (Ready to Launch). The position of the boat such that it is suspended by the hooks and can be made waterborne without further hoisting the boat.

583-9.2.26 MANROPES. Fiber or synthetic ropes made up with a series of overhand or figure-eight knots evenly spaced. The ropes are attached to the boat davit spanwire or strongback. The boat crew holds onto these for safety during hoisting and lowering of boats. These ropes are sometimes called monkey lines.

583-9.2.26.1 Replacement. Deteriorated manropes of manila or nylon may be replaced with polyester using NAVSEA dwg 803-5184124 for guidance.

583-9.2.27 MONKEY LINES. A term sometimes used in place of the preferred term MANROPES.

583-9.2.28 PENDANT, BOAT HANDLING. A fabrication, consisting of wire rope, wire rope sockets, a lifting ring and a remote release hook. The overall length of a pendant is about four feet (typically). Pendants are used when handling boats by booms or cranes not equipped with remote release hooks.

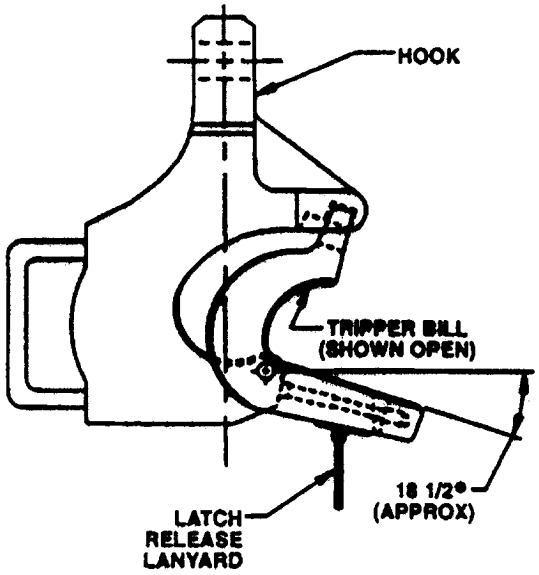

Figure 583-9-14. Hook, Quick Release

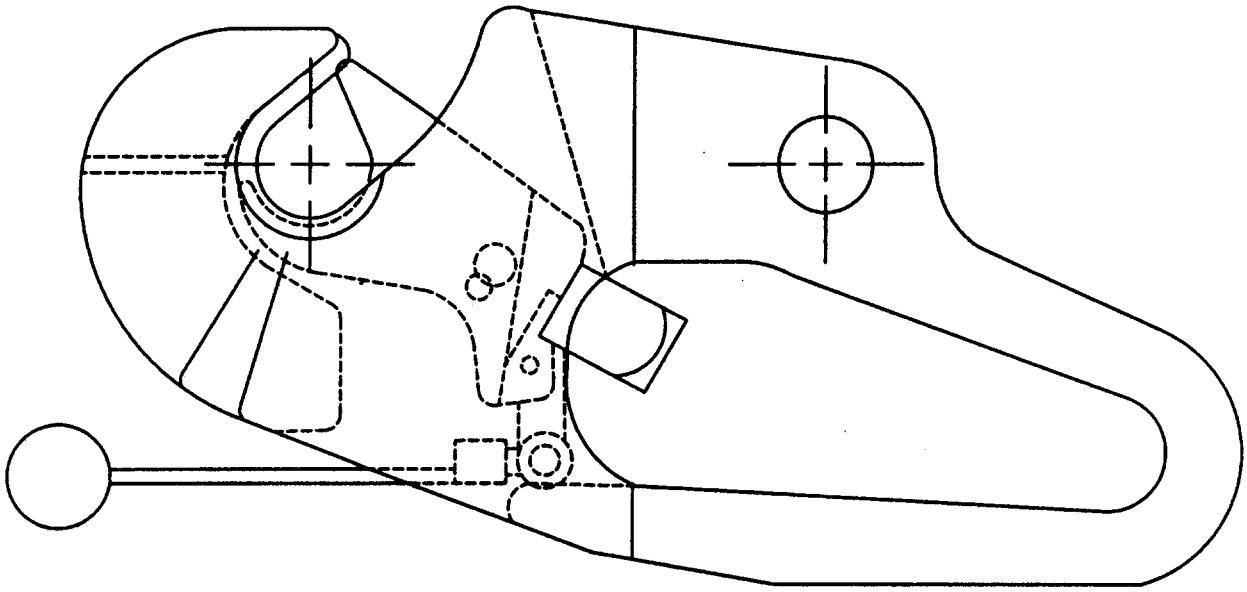

Figure 583-9-15. Standard Navy Hook for 26-Foot Motor Whale Boats (MWB)

583-9.2.28.1 Engagement and Disengagement. The boat handling pendant shall be designed for easy engagement, proper fit, and suspension from the crane or boom hook. The remote release hook shall be compatible with the boat sling thimble or lifting link. The hook shall have a small ring attached to its bill through which a shackle is passed. An 18-foot wire rope safety runner is connected to the shackle. A 50-foot (minimum length) tripping

line, 3-inch circumference fiber rope (MIL-R-24537) shall be connected to the safety runner by a shackle so that the boat sling can be engaged and disengaged from the pendant hook when the boat is waterborne. The tripping line length is to allow remote operation of the tripping line from the ship's deck. In the event that the utilization of a pendant would result in increased boom length, the remote release hook features discussed above shall be incorporated into the crane or boom primary hook or shall be furnished as a separate interchangeable hook.

583-9.2.29 PREVENTER STAY. An adjustable wire or fiber rope assembly used for additional safety or security when the davit arm(s) is in the stowed position. Refer to Figure 583-9-16.

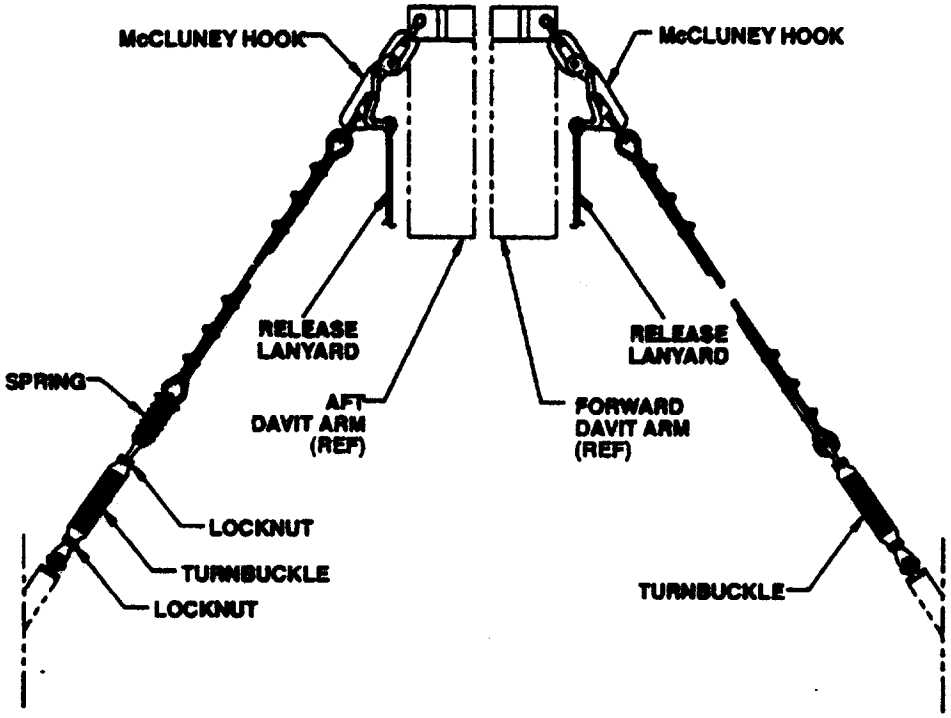

Figure 583-9-16. Preventer Stay

583-9.2.30 QUADRUPLE BANK. Suitable for stowage of four boats. Three boats are stowed between the davit arms. The fourth boat is griped against the side of the ship.

583-9.2.31 RATED LOAD. The working capacity (at the hook(s)) to which the davit was constructed.

583-9.2.32 READY LIFEBOAT. The boat selected by ship's force as the boat that will be used in a man-overboard situation. Generally a 26 foot motor whaleboat (26 MWB), 26 foot personnel boat (26 PE), or 24 foot Rigid Inflatable Boat (RIB).

583-9.2.33 SHOCK ABSORBER. A spring loaded assembly to which the falls are attached to, or reeved around via a sheave. Refer to Figure 583-9-17.

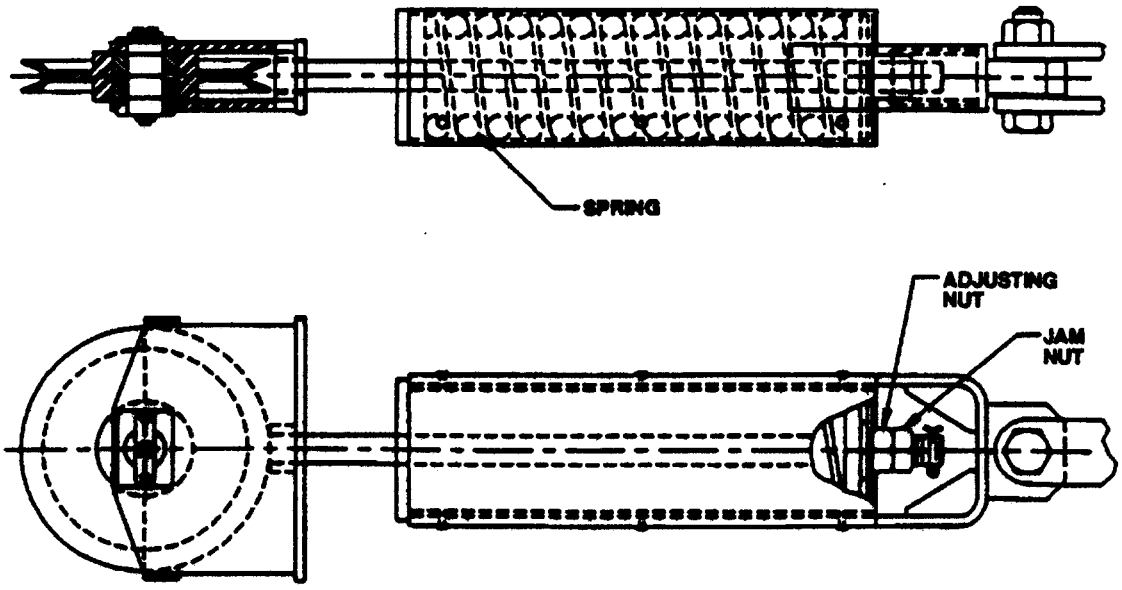

Figure 583-9-17. Shock Absorber

583-9.2.33.1 Purpose. The function of the shock absorber is to minimize shock loads that may occur during launching or hoisting a boat in rough seas. Typically the shock absorber permits up to 6 inches of movement (shock absorption) of the falls when loaded. In addition, a shock absorber assembly often incorporates a falls adjustment feature which permits a total adjustment of up to 6 inches (± 3 inches) at the boat hook(s) which is used for falls equalization after initial installation.

583-9.2.34 SHEAVE. A rotating wheel or pulley with a grooved rim.

583-9.2.34.1 Sheave Groove Diameter. The following calculations are provided to determine the maximum and minimum groove diameter for boat davit sheaves. Maximum diameter = Nominal wire rope diameter x 1.05 + .125. Minimum diameter = Nominal wire rope diameter x 1.025. Any sheave having a groove diameter smaller than the minimum diameter must be re-grooved or replaced.

583-9.2.35 SINGLE BANK. A single boat stowage arrangement.

583-9.2.36 SPANWIRE, MANROPE. A wire or fiber rope assembly connected to, and bridging, two davit arms. This is the wire or line to which the manropes are attached.

583-9.2.37 SPANWIRE, SPACER. A wire rope assembly which connects two davit arms together and prevents them from spreading apart. On davits where no manrope spanwire is provided, the manropes are connected to the spacer spanwire.

583-9.2.38 STOWAGE, DAVIT. A stowage arrangement where the boat is suspended from the davit hooks and supported by a keel rest.

583-9.2.39 STOWAGE, DECK. A stowage arrangement attached to the deck and capable of supporting the full weight of the boat(s).

583-9.2.40 STOWAGE, DOLLY. A wheeled, movable platform capable of supporting the full weight of the boat(s). This type stowage can transport the boats from one deck location to another.

583-9.2.41 STRONGBACK, DAVIT ARM. A structural load bearing member (SPAR) attached to and spanning between the davit arms.

583-9.2.42 SWIVEL. A mechanism which connects the wire or fiber rope and hook assembly together while allowing each to rotate independently.

583-9.2.42.1 Use on Davits. Swivels are only authorized for radial and slewing arm davits to compensate for alignment changes as the davit arm(s) rotates inboard and outboard.

583-9.2.42.2 Removal. Active swivels in hooks or any part of the boat falls system, except for radial and slewing arm davits, cause accelerated deterioration of wire ropes. Swivels also cause the falls to twist above the floating blocks and the hooks to spin when the weight of the boat is removed. Swivels shall be removed at the earliest opportunity. This may be at the next regular overhaul or when the falls are replaced.

583-9.2.42.3 Modifications. To maintain a properly working arrangement upon removal of swivels, substitution of suitable hard type links will be required in most cases. A hard type link may be defined as a connecting link that is not capable of rotation or swiveling about the vertical axis. Substituted hardware shall have a breaking strength to provide a safety factor of at least five based on the safe working load of the davit hook and shall be protected against corrosion by galvanizing or painting. Welding to deactivate existing swivel(s) shall not be used unless approved by a design activity. Care shall be taken to obtain correct orientation of hooks and tee-bar handles and proper fit and assembly to effect a proper working arrangement. Swivel removal shall be made only by a shipyard or tender following a design prepared or approved by the naval shipyard, SUPSHIP, or NAVSEA activity. The activity directing the modification to the hardware shall revise or initiate action to revise the subject equipment technical manual, as required, to reflect the change. After swivel removal, load testing of the davit shall be performed.

583-9.2.43 TEST, DYNAMIC LOAD. A test conducted using 125 percent of the rated load of the davit system.

583-9.2.44 TEST, NO-LOAD OPERATION. A test conducted on the davit system with empty hook(s).

583-9.2.45 TEST, RATED LOAD. A test conducted using 100 percent of the load for which the davit system was designed to handle at the hook(s).

583-9.2.46 TEST, STATIC LOAD. A test conducted using 200 percent of the rated load of the davit system.

583-9.2.47 TEST, SYSTEM. A series of tests consisting of a no-load operational test followed by static, dynamic, and rated load tests. These tests are then followed by a second no-load operational test.

583-9.2.48 TRIPLE BANK. An arrangement suitable for stowage of three boats. Two of the three boats are stowed on the deck between the davit arms, tiered one above the other. The third boat is gripped against the side of the ship at, or near, the rail and suspended by the boat falls. With this type of stowage, the boat davit arms

are connected by a strongback that carries the boat being handled. When the third boat (which is stowed outboard) is not carried, this is sometimes called a double bank stowage.

583-9.2.49 TWO-BLOCKED FALLS. A condition where the boat falls are prevented from further movement either by design or obstruction. Continued hoisting against a two-block condition will result in over stressing or failure of davit components.

583-9.2.50 WORKING LOAD. A term sometimes used in place of the preferred term RATED LOAD.

583-9.2.51 WINCH, AUXILIARY DECK. A steel or aluminum case supporting a gypsy type drum (or drums) driven through a set of reduction gears by an electric motor. The winch is used for various deck functions such as warping, and boat handling on older ships to handle boats with radial davits using fiber rope falls.

583-9.2.52 WINCH, BOAT DAVIT, ELECTROMECHANICAL. A steel or aluminum case supporting a grooved drum or drums driven through a set of reduction gears by an electric motor, handcrank or gravity to control boat handling.

583-9.2.53 WINCH, CONSTANT TENSION. A winch that keeps a set constant tension on a wire by automatically paying out and recovering slack.

583-9.3 BOAT DAVIT SAFETY DEVICES

583-9.3.1 GENERAL. Boat davit installations are provided with various safety and protective devices. These safety devices are visual, electrical, and mechanical in nature. All safety devices should be functional and operating in accordance with PMS requirements whenever the boat davit is operated. If safety devices are nonfunctional, bypassed, or otherwise unable to protect boat, boat davit and personnel from hazardous situations; the boat davit should be tagged OUT OF COMMISSION. Operation of a boat davit with one or more safety devices inoperative is not authorized without an approved Departure From Specifications in accordance with Type Commander directives. Paragraphs 583-9.3.2 through 583-9.3.14 describe various devices and their functions.

583-9.3.2 SAFE HOISTING POSITION STRIPES. These stripes are used as a visual aid. They indicate when the electric motor must be deenergized during hoisting in order to avoid a two-blocked condition. They shall be visible from the boat davit operator station. The stripes, usually red in color and 2 inches wide, shall be used on all types of boat davits except fixed overhead suspended davits. The stripes shall be provided on both arms and also on a fixed structure (4 stripes total) to indicate the position of both arms relative to each other and to the davit structure (as applicable). They shall coincide at a minimum distance of 8 inches from either the two-blocked position or the solidly compressed position of the buffer spring. The stripes may be painted to coincide at the stowed position so long as the minimum distance of 8 inches from the two-blocked position is maintained.

583-9.3.3 SLEWING POSITION STRIPES. These stripes are used as a visual aid to indicate when to deenergize the electric motor during slewing. The stripes, usually red in color and 2 inches wide, shall be used on all types of slewing arm davits (standard and non-magnetic). One stripe shall be provided on the boat davit arm and two on the fixed pedestal. All shall be visible from the boat davit operation station. One of the two fixed pedestal stripes shall indicate when the davit is slewed to the stowed position and the other fixed pedestal stripe shall indicate when the davit is slewed to the launch position.

583-9.3.4 EMERGENCY DISCONNECT SWITCH. This is a switch connected in the winch motor supply leads, between the motor and the motor controller. This switch is located at the boat davit operation station and turns off the motor when actuated by the boat davit operator. The switch is intended to allow the operator to prevent two-blocking of the davit if another control component fails to function properly or in an emergency situation.

583-9.3.5 HANDCRANK ELECTRICAL INTERLOCK SWITCHES. The control interlock switches are mounted on the winch. These switches prevent energizing of the winch motor when the handcrank(s) is installed. Installation of the handcrank opens the electrical contacts.

583-9.3.6 DAVIT ARM OVERTRAVEL ELECTRICAL INTERLOCK SWITCHES. These switches are located on the davit structure or at the shock absorbers. These switches, when actuated, deenergize the winch motor to prevent the davit arms from being driven beyond safe power hoisting position.

NOTE

These switches are intended to function as overtravel switches, not as stop switches. The safe hoisting position stripes are to be used to indicate when to deenergize the electric motor.

583-9.3.7 HOIST LIMIT SWITCHES. These control switches are usually of the geared type. This type of switch regulates the distance of boat hoist by deenergizing the winch motor after the winch has completed a set number of revolutions. This feature is to prevent a two-blocked falls condition.

583-9.3.8 SLEW OVERTRAVEL SWITCHES. These switches are lever operated and regulate the slewing of the davit arm. The switch deenergizes the slewing motor when the davit is slewed beyond the safe slewing position of the davit as indicated by the painted slew position stripes.

NOTE

These switches are intended to function as overtravel switches, not as stop switches. The slew position stripes are to be used to indicate when to deenergize the electric motor.

583-9.3.9 MANUAL BRAKE ELECTRICAL INTERLOCK SWITCH. The control interlock switch is located at the manual brake to prevent energizing the motor in the payout direction when the brake is set. This switch is intended primarily for protection of the winch gearing and shall not be used as a stop switch.

583-9.3.10 DOUBLE BREAK FEATURE. Electrical contacts subjected to momentary jogging service are prone to sticking or welding. This can cause uncontrolled operation of the winch. The double break feature is the arrangement of two independent contactors in the supply leads to protect against this danger. When the motor power supply is interrupted by the MASTER SWITCH the supply leads are opened in two places by contactors which are not interlocked. In the event that the MASTER SWITCH is moved to OFF and one contactor sticks, the second contactor should interrupt power.

583-9.3.11 SAFETY TYPE HANDCRANKS. These types of handcranks include an overriding mechanism. This mechanism functions in such a manner that, if the winch motor is energized while the winch is being manu-

ally cranked, no force is exerted on the crank handle from the winch side, and thus prevents back drive. This device is limited to use on non-reversing winches and may be used in place of handcrank electrical interlock switches on that type of winch. For the SLAD, the formlock clutch in the planetary gear systems of slewing and hoist drives prevents the back drive of slewing and hoist handcranks, and thus both drives can be power driven with the handcranks being engaged.

583-9.3.12 FALLS TENSIONING DEVICE. The function of the falls tensioning device is to keep the hook assembly above the seaman's head prior to boat hookup and after release. This reduces the danger to boat and crew from a swinging hook assembly. When the hook is cast off during launching, the falls tensioning device counterweighted sheave should cause the hook to rise clear of the boat and crew. Refer to Figure 583-9-10.

583-9.3.13 FLUID BRAKE. A fluid brake is attached to the output shaft of the electric clutch on the SLAD Hoist Drive Motor. The purpose of this fluid brake is to regulate the speed of a descending boat and thus prevent any damage to the equipment or personnel.

583-9.3.14 CENTRIFUGAL BRAKE WITH OVERRUNNING CLUTCH. A centrifugal brake with overrunning clutch is mounted on the high-speed shaft end of the winch reduction gear. In the event of overspeed during lowering, the brake drags thus regulating the speed of the descending boat.

583-9.4 GENERAL OPERATING PROCEDURES

583-9.4.1 GENERAL PRECAUTIONS. During operation of any boat handling system the following general precautions should be observed:

a. See that all non-operating personnel are clear of the area prior to any boat handling operation.

b. During gravity lowering do not turn on the winch electric motor when a boat and or davit arm is being lowered.

c. Keep the number of personnel riding in a boat to the minimum manning required. Exceptions may be made for combat operations and survival situations where potential dangers to human life exist.

d. Do not permit the davit arm to run into the outboard stop at full speed.

e. For double arm davits, always release the stern hoisting hook before releasing the bow hoisting hook when launching a boat. When retrieving a boat, engage the bow hoisting hook before engaging the stern hoisting hook.

f. Do not use overtravel switches as stop switches. When the painted safe hoisting position stripes coincide (refer to paragraph 583-9.3.2), the MASTER SWITCH for controlling the motor shall be moved to the OFF position immediately. If the davit arm(s) come(s) to rest before reaching stowed position, it should be hand cranked to the stowed position. In the event that the motor does not stop when the MASTER SWITCH is moved to OFF, the EMERGENCY DISCONNECT switch should immediately be moved to the OFF position.

g. Ensure that personnel riding in the boat use manropes when lowering or raising the boat. The manropes are to be rigged outboard of the boat.

h. Ensure that hoisting hooks are seating properly and secured before a boat is raised or lowered.

i. For trackway type davits, ensure that the davit arm(s) latching mechanism(s) is (are) removed from the trackway(s) prior to hoisting or lowering the davit arm(s).

j. Boats shall not be launched or recovered with water in the bilges in excess of that which would normally be removed by properly functioning bilge pumps. In the event excessive bilge water cannot be removed with installed pumps, the water should be removed through the hull drain plugs or with a portable pump before launching or recovering. Refer to Section 7 of this NSTM chapter for precautions regarding boat hoisting fittings and slings.

k. Follow night operation guidelines (refer to paragraph 583-9.4.6 for general guidance).

583-9.4.2 OPERATING RESTRICTIONS. The following operating restrictions shall be invoked on boat davits that handle boats whose hoisting weights (refer to Section 4 of this NSTM chapter) exceed the rated load of the davit:

a. For other than emergency usage, launch and recover in sea state one or less.

b. Inspect all running rigging, winches and foundations monthly for cracks, deformation and loose or missing fasteners and hardware using PMS requirements as guidance. Davit components should be structurally sound.

c. A qualified safety officer should be present during boat hoisting and lowering.

d. Embark and debark crew with the boat at the rail where possible and deemed safe by the safety officer.

e. Minimize stress on the davit structure by lowering the davit arm(s) slowly to the stop(s). After the arm(s) rest(s) on the stop(s), continue lowering the boat at slow speed. When possible, avoid sudden application of the brake.

583-9.4.3 BOAT PREPARATION. A boat is ready to launch when:

a. A crew of the watch has been mustered and each person is at their station and understands their duties. This includes personnel handling the steadying lines, tripping line, and sea painter.

b. The boat is located in a stowage position with tension on the boat falls, or the boat sling ring is hooked to the crane whip.

c. Forward and after steadying lines are rigged and coiled down, ready for paying out when the boat is hoisted out and lowered.

d. The sea painter is secured abaft the bow of the boat on the inboard side and led clear. The sea painter must be adjusted so that when the boat is in the water, the boat tows from the sea painter, not the whip or falls.

e. Boat fuel tanks are full (ready lifeboat).

f. Lubricating oil reservoir is full and a reserve can of lubricating oil is in the boat.

g. Required fire extinguishers are aboard.

h. Life preservers, one for each crew member, are available so that the crew can don them before manning the boat. If this is not practicable, life jackets shall be secured in place, one under each position occupied in the boat when the boat is lowered.

i. The bilges are dry

j. The boat plugs are in place.

k. Suitable light for blinker signalling is in place.

l. All articles of boat equipment are ready to use.

m. Two days supply of water and provisions for crew is in place (ready lifeboat).

n. Manropes are available for all personnel manning the boat, except for the RIB handled by the SLAD.

NOTE

Emergency boarding ladders, manufactured locally according to Figure 583-9-18, may be added as optional lifeboat equipment.

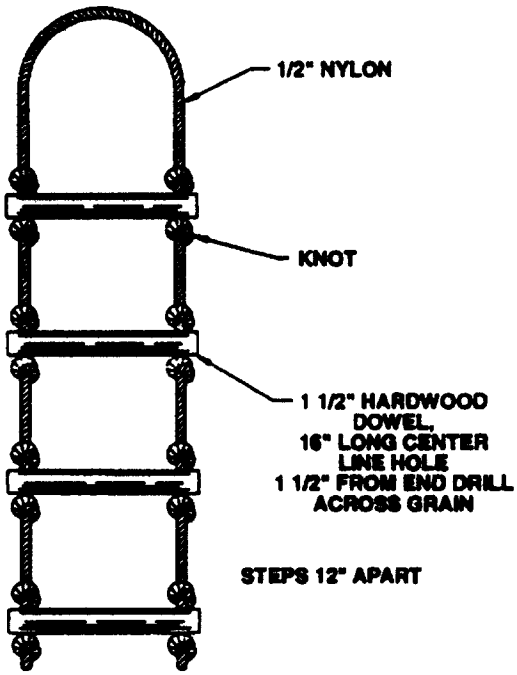

Figure 583-9-18. Emergency Boarding Ladder

583-9.4.4 GENERAL OPERATING PROCEDURES FOR BOAT DAVITS. The following are general operating instructions for launching and recovering boats using davits. Detailed operating instructions for boat davits can be found in the technical manuals supplied with the systems.

583-9.4.4.1 Launching Procedures.

1. Remove boat gripes from the boat.
2. Ensure that the boat hoisting hook(s) supports the weight of the boat. Disengage the boat stowage system from the boat.
3. Disengage davit arm(s) latching mechanism(s).
4. Move davit arm(s) to the outboard position.
5. Lower the boat to the water. The boat crew will start the boat engine so that the engine is running as soon as the boat is waterborne.

WARNING

When launching a boat using double arm davits, always release the stern hoisting hook before releasing the bow hoisting hook.

6. When the boat is waterborne, the boat crew will release the boat hoisting hook(s). Ensure that the boat hoisting hook(s) is clear of the boat crew after the hook(s) is released.
7. The boat crew will cast off the boat steadying lines.
8. The boat crew will cast off the sea painter.

583-9.4.4.2 Recovery Procedures.

1. Move davit arm(s) to the outboard position.
2. Cast sea painter overboard to allow the boat crew to secure the sea painter to the boat's bow.
3. Allow the boat to drift back and to align with the davit, then cast the boat steadying lines to the boat crew.
4. Lower the boat hoisting hook(s) to the boat crew.

WARNING

When recovering a boat using double arm davits, always engage the bow hoisting hook before engaging the stern hoisting hook.

5. The boat crew will pull down and attach the hook(s) to the boat.
6. Once the hoisting hook(s) is secured, hoist the boat to the davit arm(s). Use the boat steadying lines to keep the boat parallel to the ship.
7. Bring the boat and davit arm(s) to the inboard position and engage the davit arm(s) latching mechanism(s).
8. Engage the boat stowage system to the boat.
9. Place the boat gripes in position to secure the boat in stowage.

583-9.4.5 GENERAL OPERATING PROCEDURES FOR CRANE OR BOOM BOAT HANDLING. Crane and boom handling of boats is generally restricted to sea states of two or less when the ship is anchored. The crane or boom shall be provided with hooks which fit the boat lifting ring and allow for quick remote release of the boat when the boat becomes waterborne. If the crane or boom does not incorporate a remote release hook, a boat handling pendant or separate interchangeable release hook will be used. Cleats, padeyes and other fittings shall be provided for use of handling and steadying lines. Guidance concerning the operating procedures for cranes and booms may be found in **NSTM Chapter 589, Cranes** and **NSTM Chapter 573, Booms** .

583-9.4.6 NIGHT OPERATIONS. Boat handling operations that may be straightforward in the daylight, can become more difficult and complicated after dark. All ships must maintain the capability to launch, recover and stow boats at night. Night operations should be well planned ahead of time. In addition to the general operating procedures provided, the following preparations for night operations are recommended:

a. Ensure personnel safety devices are used. Issue whistles, dye markers and chemical lights to all personnel requiring life jackets. Ensure ring buoy light is operational.

b. Paint all attachment points and major fittings white to aid visibility under night lighting conditions.

c. Ensure weather deck lighting is operational (refer to paragraph 583-9.8).

d. Attach chemical lights to critical handling lines (i.e. sea painter, steadying lines, etc.) as appropriate.

583-9.5 MAINTENANCE

583-9.5.1 PLANNED MAINTENANCE. Although boat handling and stowage systems are designed for use in the marine environment, planned maintenance is necessary for sustained safe, reliable performance.

NOTE

Prior to any attempt to operate, maintain or repair the boat davit system; all warnings, cautions and tagout procedures should be thoroughly reviewed and understood. Refer to the equipment technical manual, Planned Maintenance System (PMS) and OPNAVINST 3120.32.

Specific requirements for minimum maintenance and inspection are contained in the PMS for each system.

NOTE

Failure to accomplish PMS in accordance with currently installed Maintenance Requirement Cards (MRC's) is a major contributing factor to boat handling and stowage system failure.

583-9.5.1.1 Electrical Components. Particular attention should be paid to the electrical components mounted in exposed locations. Leakage of water into the enclosures of those components is one of the major causes of casualties.

583-9.5.2 INSTALLATION OF FALLS. When installing new falls or reinstalling old falls without swivels, the following procedure should be followed:

1. If provided, set the falls adjustment mechanism (usually contained within the falls shock absorber assembly) to the mid point.
2. Utmost care should be taken that twists will not be built into the rope when reeving the rope through the system.
3. After completing the installation, make all necessary safety checks, then lower the boat to the water and unhook.
4. If the falls twist above the floating blocks, provide support for the blocks, then disconnect the standing end of the falls. Turn the rope in the direction of lay, while manually working the turns back to the floating block. Continue until the block hangs true. Precautions should be taken to prevent injury to personnel due to fly back of the device used to turn the rope.
5. Reconnect the standing end of the falls.

6. If the falls again twist above the floating blocks, repeat steps 3 through 5 above until the blocks hang true upon release of the hooks from the boat.

NOTE

The foregoing procedure may need to be repeated at intervals until the rope has broken in or reached its maximum stretch.

583-9.6 WEIGHT TEST AND INSPECTION

583-9.6.1 GENERAL. The purpose, type and extent of boat davit weight tests and inspections vary with the reasons for testing the boat handling system. An annual (9 to 15 months) weight test generally only requires one cycle for each test. The annual test is to demonstrate:

a. Ability of the davit and winch to handle the rated load at the rated speed.

b. Ability of the davit and winch to withstand the additional dynamic loads imposed on the system when handling boats under unfavorable sea conditions.

The dynamic load test has been revised to reflect the results of a detailed analysis of boat davits using ship's motion load factors in accordance with DOD-STD-1399. The dynamic load test has been reduced to 125 percent of the boat davit rated load.Discrepancies found during the annual inspection and system testing that do not affect the safe operation or the load carrying capability of the system should be identified and recorded in the ship's Current Ships Maintenance Project (CSMP) for correction. These types of discrepancies are not cause for annual weight test failure. A new, modified, or repaired system may require two or more cycles of each test, depending on the type and extent of work done. Reference **General Specifications for Overhaul of Surface Ships** , NAVSEA S9AA0-AB-GOS-010, Section 583, for test requirements of modified or repaired systems.

583-9.6.2 BOAT DAVIT WEIGHT TEST REQUIREMENTS. Boat davits shall be weight tested after each new installation, annually (9 to 15 months but, not to exceed 15 months), and after major repairs or modifications to load bearing components. Specific test weights are selected on a basis of the rated load of the boat davit and not the weight of the boat(s) handled by the boat davit. The specific test weight values to be used are currently being added to the Maintenance Index Page (MIP) of the PMS for each boat davit. The MIP shall be used as the first source of reference when selecting test weight values. If unavailable at the time of testing, the equipment technical manual or Ship's Information Book should be used as alternate sources to select the test weight value. At the successful completion of a system test, the davit system shall have a visible label plate indicating the following information:

a. Activity that conducted the system test.

b. Date when system test was conducted.

c. Weights used for static, dynamic, and rated load tests.

583-9.6.3 BOAT DAVIT ANNUAL WEIGHT TEST PROCEDURES.

NOTE

When applicable, the ship specific Intermediate Maintenance Standard (IMS) shall be used to conduct the annual weight test of the boat davit systems.

583-9.6.3.1 Pre-Weight Test Inspection. An inspection shall be conducted, prior to the test, to ensure that the system is ready for testing. The inspection is intended to identify the adjustments and repairs necessary to ensure satisfactory operation under test conditions. It is recommended that the inspection be performed prior to scheduling crane services to perform the test(s) and again prior to starting the test(s). The inspection shall include the following, but a specific inspection plan should be developed for the boat davit.

a. Preview ship's quarterly PMS logs to ensure it is current for the boat handling system. If PMS is not current, the system may not pass the inspection or tests.

NOTE

More specific system component inspection criteria is provided by the MRC's. Review the MIP for applicable MRC's.

NOTE

The numbers provided in parentheses following system components are for easy reference to Figure 583-9-1 and Table 583-9-3.

b. Inspect at least two areas of each wire rope (1100) in the areas that travel most over the sheaves. Look for wear, corrosion, and broken wires.

c. Inspect wire rope (1100) connection to wire rope drum (4600) for looseness of fit.

d. Examine wire rope socket (1200) for looseness of fit.

e. Measure the insulation resistance of the AC electric motor (2500).

f. Inspect winch gear case (4100) for proper oil level.

g. Inspect the centrifugal brake (4400) lining for wear, damage and oil contamination.

h. Examine manual brake (4500) and fulcrum pin to ensure both are free of rust and that there is sufficient amount of brake lining material.

i. Inspect centrifugal clutch (4700) for indication of oil and grease contamination.

j. Examine hooks (1500/1540/1580) for any distortion, permanent deformation, or cracked welds.

k. Examine limit switches (2600/2900) for proper operation and installation.

l. Inspect all foundations for loose or missing parts, distortion, rust, deterioration, misalignment, and cracked welds.

NOTE

For overhead suspended boat davit designs, ignore inboard and outboard position statements.

NOTE

Unless otherwise specified by system technical manual or drawings, double arm davits shall have the test weights equally divided between the two boat falls.

583-9.6.3.2 Static Load Test (200 Percent Davit Rated Load).

CAUTION

Do not attempt to hoist or lower the static test weight with the davit winch.

1. Position the davit arm(s) fully outboard and the boat hook(s) approximately 10 feet above the water level.

CAUTION

In the event of a component failure, the load may drop uncontrollably. Maintain a safety rig on the test weight with a crane.

2. Suspend the test weight from the boat hook(s) for a period of 10 minutes.

NOTE

The manual brake shall hold the weight without applying additional weight or force to the brake lever.

3. At the completion of the ten minutes, remove the test weight from the boat hook(s) and inspect the davit, winch, and associated structures for any signs of permanent deformation. NONE IS ALLOWED.

583-9.6.3.3 Dynamic Load Test (125 Percent Davit Rated Load)

1. Position the davit arm(s) fully outboard and the boat falls approximately 10 feet above the water level.

CAUTION

In the event of a component failure, the load may drop uncontrollably. If possible, maintain a safety rig on the test weight with a crane.

2. Suspend the test weight from the boat falls.
3. Lower the weight under control of the manual brake to the water level or lowest point above the water level possible.
4. Power hoist and gravity lower the test weight at no specified speed through one complete cycle between the lowest point and the inboard position.

583-9.6.3.4 Rated Load Test (100 Percent Davit Rated Load).

1. Position the davit arm(s) fully outboard and the boat falls approximately 10 feet above the water level.

CAUTION

In the event of a component failure, the load may drop uncontrollably. If possible, maintain a safety rig on the test weight with a crane.

2. Suspend the test weight from the boat falls.

CAUTION

Do not apply manual brake suddenly when stopping the test weight.

3. Lower the test weight, under control of the manual brake, to the lowest point above the water level possible.
4. Power hoist and gravity lower the test weight through one complete cycle. A cycle is defined as movement from the lowest point above the water level possible to the davit arm(s) inboard stowed position and return.
5. Position the test weight approximately 3 feet below the davit arm(s).
6. Place a mark on the wire rope(s) with tape or equivalent at the point where the rope(s) enters the davit winch.
7. Using the davit winch lower the test weight 20 feet and mark the rope(s) again as in step 6.
8. Using a stopwatch to record the time, hoist the test weight until the mark placed on the rope(s) in step 6 is at the point where the rope(s) enters the davit winch.

CAUTION

Do not apply manual brake suddenly when stopping the test weight.

9. Using a stopwatch to record the time, lower the test weight by fully releasing the manual brake. Allow the lowering speed of the weight to be controlled by the centrifugal brake only. Manual brake release and starting of the stopwatch must be done simultaneously. When the second mark placed on the wire rope(s) in step 7 is seen leaving the davit winch, stop the stopwatch and apply the manual brake.

NOTE

Refer to the system technical manual to determine the rated speed of the davit winch centrifugal brake.

10. Using the formula provided in Figure 583-9-19, determine the rated hoisting time and the minimum centrifugal brake payout time.
11. Compare the times recorded in steps 8 and 9 to the times calculated in step 10.
12. Any recorded time on the stopwatch greater than or less than 10 percent of the rated hoisting time calculated in step 10 is cause for failure.
13. Any recorded time on the stopwatch less than the minimum centrifugal brake payout time calculated in step 10 is cause for failure.

583-9.6.3.5 No-Load Operational Test. With no weight on the boat falls and the davit arm(s) at the inboard position, lower the falls to the lowest point above the water level possible and then hoist back to the inboard position (one complete cycle). Ensure that the falls tensioner(s) operates and no fouling of the wire rope occurs.

583-9.6.4 NEW ITEMS AND LOOSE GEAR WEIGHT TEST REQUIREMENTS. New hooks, blocks, sheaves, wire rope, fiber rope and other loose hardware or gear need not be load tested for strength after installation if the installed item has not been modified and has been purchased to military specifications or NAVSEA standard drawings and delivered to the ship through the Naval Supply System. In addition, installation of zinc poured sockets manufactured (poured) by qualified personnel (refer to **NSTM Chapter 613, Wire and Fiber Rope and Rigging** , paragraph 613-1.11.2.1) does not require a system test of the boat davit. Refer to paragraph 583-9.5.2 for falls installation procedures.

NOTE

A Material/Quality Deficiency Report shall be submitted for all new components received through the Naval Supply System which fail to conform to the applicable military specification or NAVSEA standard drawing.

Rated Hoisting Time (sec) = $\frac{\text{60 (sec/min) X Measured Boat Falls Distance (ft)}}{\text{Rated Hoisting Speed (FPM)}}$

Minimum Centrifugal Brake Payout Time (sec) = $\frac{\text{60 (sec/min) X Measured Boat Falls Distance (ft)}}{\text{Rated Speed of Centrifugal Brake (FPM)}}$

A sample calculation is provided using a winch with a rated hoisting speed of 40 feet per minute and a measured boat falls distance of 20 feet.

Rated Hoisting Time = $\frac{\text{60 (sec/min) X 20 (ft)}}{\text{40 (FPM)}}$ = 30 seconds

Tolerance = ± 10% of the Rated Hoisting Time = ± 0.1 X 30 seconds = ± 3 seconds

Test Criteria: PASS = 27 - 33 seconds
FAIL = Hoisting Time > 33 seconds OR Hoisting Time < 27 seconds

A sample calculation is provided using a winch whose centrifugal brake has a rate speed of 100 feet per minute and a measured boat falls of 20 feet.

Minimum Centrifugal Brake Payout Time = $\frac{\text{60 (sec/min) X 20 (ft)}}{\text{100 (FPM)}}$ = 12 seconds

Tolerance = ≥ Minimum Centrifugal Brake Payout Time = ≥ 12 seconds

Test Criteria: PASS = Payout Time ≥ 12 seconds
FAIL = Payout Time < 12 seconds

Figure 583-9-19. Centrifugal Brake Test Formula

583-9.6.4.1 Load Carrying Loose Gear Testing. Any load carrying loose gear procured or manufactured otherwise shall be tested prior to placing in service. Generally, this test is a static test equal to 200 percent Safe Working Load (SWL) of the part in question or 40 percent of the rated breaking strength of the wire rope used. For wire rope, a sample is tested to breaking strength. If any sheave, block or hook assembly is delivered to the ship that does not bear the manufacturer's test stamp (SWL, test data, factory abbreviation), it must be tested by a tender or shore facility in accordance with applicable requirements. There is no periodic load test requirement for preventers and pendants.

583-9.6.4.2 Post-Test Inspection. After performing the tests, tested gear shall be examined for and rejected if there are any signs of damage or permanent set introduced by the testing. Inspection for proper fit and function is required after installation of any repaired or replaced items.

583-9.6.5 BOAT DAVIT COMPONENT WEIGHT TEST REQUIREMENTS. Refer to **General Specifications for Overhaul of Surface Ships** , NAVSEA S9AA0-AB-GOS-010, Section 583, for test requirements of modified or repaired systems. Component weight test guidelines are provided and discussed in Table 583-9-3. The numbers provided in parentheses following the system's components are for easy reference to Figure 583-9-1.

583-9.7 LOCATION AND DESIGN OF BOAT STOWAGES

583-9.7.1 GENERAL. There are three stowage types: deck, dolly, or davit.

583-9.7.2 GENERAL STOWAGE CONSIDERATIONS. Proper design of boat stowages involves several basic details that shall be thoroughly considered in order to prevent damage to ships' boats and to facilitate their handling.

a. Stowages shall be designed and installed as low to the deck as practical. Boats which are davit handled shall be stowed such that the rake of the boat in stowage is the same as the rake of the boat during hoisting. The boats shall be stowed with the bow pointed forward. The only exception is when the SLAD handles two boats. One boat is stowed facing forward and the other is stowed with the bow pointed aft to facilitate handling with the SLAD. When the boats are secured in the stowed position, no part of the davit(s) and boat(s) shall project outboard of the ship's shell.

b. Chocks, cradles, keel rests, strongbacks, gripes, gunwale guards, and necessary fittings shall be provided as required. Chocks, cradles, keel rests, and attachments shall be designed to prevent the retention of water.

c. Boat chocks shall be mounted from fixed supports or frames. Chocks shall consist of metal shoes to which wooden inserts are attached. Where possible, wooden inserts shall be bolted through. Chocks shall be contoured to suit the area of the hull they bear against and shall be of sufficient size to avoid localized pressure on the hull (i.e. 6 inches minimum width for wooden hull, 10 inches minimum width for metallic or plastic hulls).

d. Chocks shall be contoured to match the boat hull with the ship on an even keel. Wooden inserts shall be a minimum thickness of 4 inches to permit refacing or replacement in the event of boat substitution. Chocks shall be located opposite frames, bulkheads, or areas in the boat where weights are concentrated. The face of the chocks shall be covered with synthetic rubber (MIL-R-900) having a minimum thickness of 1/4 inch.

e. In general, chocks should be located such that there is no more than 10 feet between chocks or 6 feet of unsupported length at each end. Keel rests and boat chocks should have 90 percent minimum contact in stowed position.

f. Boats shall be secured in their stowage utilizing gripes or strongbacks with gripe rods. Loads imposed by the gripe pads on the boat's hull shall be applied to frames or bulkheads, or shall be distributed over as wide an area as is necessary to prevent deformation during long stowage periods. Gunwale guards shall be attached to gripes where there is contact with the boat's gunwale. Gripe attachments to fittings on the boat shall be such that no damage or deformation will occur to the boat and connection points. Takeup devices on the gripes shall be marked to identify when the gripe is properly adjusted for a snug and tight fit. This mark is to serve as a guide to prevent overtightening which might cause permanent deformation to the gripe or boat hull. The takeup devices shall be provided with a locking feature to maintain set adjustment. The stowage arrangement shall provide safe access to the boat's batteries to facilitate charging in place.

g. Portable and removable stowage fittings and equipment shall be provided with stowages close to the boat stowage locations where used.

Table 583-9-3. COMPONENT LOAD TESTING GUIDELINES

Component	Test Requirement(s)	Reason(s)
(1100) Wire Rope (1200) Wire Rope Socket	1. No-Load Operational test followed by a rated load test[1] if all of the following conditions are met: a. Wire rope and socket were purchased to MIL Spec or NAVSEA standard drawing and delivered through the Naval Supply System. b. Either wire rope socket was poured by qualified personnel (refer to **NSTM Chapter 613** , paragraph 613-1.11.2.1) or wire rope socket was pull tested to 40 percent of the minimum breaking strength of the wire rope. c. After installation of wire rope, three dead wraps remain on drum(s) at the full payout position (taking into account a 10 degree adverse list on the ship). d. Wire rope connection to drum(s) is in accordance with **NSTM Chapter 613** , Section 1. 2. System test required if above conditions are not met.	Failure of rope or socket will result in catastrophic lowering of load. However, the four conditions listed are sufficient to negate the need for a system test.
(1500/1540/1580) Boat Release Gear (Raymond/Quick/ Automatic Release Hook Assembly	1. Static load test. [2] 2. Load test may be waived if hook was purchased to NAVSEA standard drawing and delivered through the Naval Supply System or test certificate is provided with hook proving the hook was load tested to 200 percent of hooks rated load.	1. Failure of hook(s) will result in catastrophic lowering of load. 2. Qualifications of socket pourer ensured by **NSTM Chapter 613** . Quality of hook is ensured at time of procurement.
(2100) AC Magnetic Controller	No-Load Operational test.	Failure of controller will not result in catastrophic lowering of load.
(2200) Emergency Quick Disconnect Switch	No-Load Operational test.	Failure of switch will not result in catastrophic lowering of load.

Table 583-9-3. COMPONENT LOAD TESTING GUIDELINES - Continued

Component	Test Requirement(s)	Reason(s)
(2300)	No-Load Operational test.	Failure of switch will not result in catastrophic lowering of load.
(2400) Emergency Run Switch	1. No-Load Operational test.	Failure of switch will not result in catastrophic lowering of load.
(2500) AC Motor	1. No-Load Operational test [3] if motor is purchased to MIL Spec and delivered through the Naval Supply System. 2. Dynamic and rated load tests if motor is repaired, overhauled or modified.	1. Failure of motor will not directly result in catastrophic lowering of load. Quality of motor is ensured at the time of procurement. 2. Testing is required to ensure motor can meet operational needs.
(2600 & 2900) Limit Switches	No-Load Operational test[4] .	Failure of limit switches will not result in catastrophic lowering of load.
(3300) Hoisting Components (Boat Slings/Bail)	Refer to Section 7 of this NSTM chapter for testing requirements.	Load bearing components.
(4100) Winch, Reduction Gears, Oil and Sump (includes drive train piece parts)	1. No-Load Operational test if component (oil fill plug, access covers, etc.) is not load bearing. 2. System test if component (gear, bearing, key, shaft, etc.) is load bearing.	1. Failure of component will not result in catastrophic lowering of load. 2.″>Failure of component can result in catastrophic lowering of oad.
(4150) Handcrank Engaging Mechanism	1. Partial manual No-Load Operational test[5] if engaging mechanism is purchased to MIL Spec or NAVSEA standard drawings and delivered through the Naval Supply System. 2. Partial manual No-Load Operational test[5] if handcrank is repaired, overhauled or modified.	1. Failure of mechanism will not result in catastrophic lowering load. Quality of mechanism is ensured at time of procurement. 2. Quality assurance of component is unknown. Dynamic load test verifies handcrank can withstand maximum hoisting loads.
(4200) Handcrank	1. Partial manual No-Load Operational test[5] if handcrank purchased to MIL Spec or NAVSEA standard drawings and delivered through the Naval Supply System. 2. Dynamic load test[5] if handcrank is repaired, overhauled or modified.	1. Failure of handcrank will not result in catastrophic lowering of load. 2. Quality assurance of component is unknown. Dynamic load test verifies handcrank can withstand maximum hoisting loads.
(4300) Overrunning Clutch for Centrifugal Brake	1. No-Load Operational test if clutch is purchased to MIL Spec or NAVSEA standard drawings and delivered through the Naval Supply System. 2. Rated load test if clutch is repaired, overhauled or modified.	1. Quality of clutch is ensured at the time of procurement. 2. Quality assurance of clutch after reassembly is unknown.
(4400) Centrifugal Brake	Rated load test.	Rated load test required to ensure centrifugal brake controls lowering speed within design requirements.

Table 583-9-3. COMPONENT LOAD TESTING GUIDELINES - Continued

Component	Test Requirement(s)	Reason(s)
(4500) Manual Brake Assembly	System test.	Manual brake both regulates lowering and holds the load stationary and therefore is a critical control component.
(4550) Manual Brake Overrunning Clutch	System test.	Overrunning clutch is critical load bearing component that operates in conjunction with the manual brake.
(4600) Wire Rope Drum	System test.	Failure of wire rope drum can result in catastrophic lowering of load.
(4700) Centrifugal Clutch	Dynamic and rated load tests.	Dynamic and rated load tests ensure that the centrifugal clutch can perform lifting requirements.
(4800) Spooling Device	No-Load Operational test.	Failure of spooling device will not result in catastrophic lowering of load.
(4900) Mechanical Payout Mechanism with Overrunning Clutch	No-Load Operational test.	Failure will not result in catastrophic lowering of load.
(4920) Hydraulic Payout Mechanism	No-Load Operational test.	Failure will not result in catastrophic lowering of load.
(6100) Davit Arm(s)	1. No-Load Operational test if davit arm rollers are replaced, repaired, overhauled or modified (for trackway type davits only). 2. System test if davit arm load bearing parts, (bearing, pins, etc.) are replaced, repaired, overhauled or modified or if any structural repairs or replacement of the davit arm(s) are performed to restore strength integrity.	1. Failure of davit arm rollers will not result in catastrophic lowering of load. 2. Failure of davit arm load bearing parts or davit structural integrity will result in catastrophic lowering of load.
(6200) Deck Sheaves	1. No-Load Operational test if sheave or sheave component (pin, bearing, etc.) is a new replacement purchased to MIL Spec or NAVSEA standard drawings, delivered through the Naval Supply System and sheave mounting foundation to deck has not been repaired, overhauled or modified. 2. Static and dynamic load tests if sheave, sheave components, or sheave foundation do not meet the above requirements.	1. Quality of sheave or sheave component is ensured at time of procurement. 2. Quality of component or structural integrity of foundation is unknown.

Table 583-9-3. COMPONENT LOAD TESTING GUIDELINES - Continued

Component	Test Requirement(s)	Reason(s)
(6300) Shock Absorber Assembly	1. No-Load Operational test if the sheave is purchased to MIL Spec or NAVSEA drawings, delivered through the Naval Supply System, and the shock absorber foundation and spring assembly have not been repaired, overhauled or modified. 2. Static and dynamic load tests if components or foundation do not meet the above requirements.	1. Quality of component is ensured at time of procurement. 2. Quality of component or structural integrity of foundation is unknown
(6400) Davit Trackway(s)	Static and dynamic load tests if any structural repair or replacement of the davit trackway(s) is performed to restore strength integrity.	Structural integrity of trackway(s) after repair is unknown.
(6500) Davit Arm Sheaves	1. No-Load Operational test if sheave or sheave component (pin, bearing, etc.) is purchased to MIL Spec or NAVSEA standard drawings, delivered through the Naval Supply System, and sheave mounting foundation to davit arm has not been repaired, overhauled or modified. 2. Static and dynamic load tests if components or foundation do not meet the above requirements.	1. Quality of sheave is ensured at time of procurement. 2. Quality of component or structural integrity of foundation is unknown.
(6600) Stops	Static load test if any structural repair or replacement is performed to restore strength integrity.	Failure of stops will result in catastrophic lowering of load. Quality of stops structural integrity is unknown.
(6700) Falls Tensioner(s)	1. No-Load Operational test if components are purchased to MIL Spec or NAVSEA standard drawings, delivered through the Naval Supply System and no structural repair or replacement of the falls tensioner(s) was performed to restore structural integrity. 2. Static and dynamic load tests if replaced load bearing parts or fall tensioner(s) structure do not meet the above requirements.	1. Quality of replacement parts are ensured at time of procurement. 2. Quality of parts or structural integrity of falls tensioner(s) is unknown.
(6800) Heavy Weather Pendant	Pull test to 40 percent of the breaking strength of the wire rope if either of the following conditions apply: a. Wire rope and socket were not purchased to MIL Spec and delivered through the Naval Supply System. b. Socket was not poured by qualified personnel (refer to **NSTM Chapter 613** , paragraph 613-1.11.2.1).	Quality of wire rope and socket and the qualifications of the socket pourer are unknown.
(6850) Sheath Screw	Static and dynamic load tests.	Failure of sheath screw will result in catastrophic lowering of load.

Table 583-9-3. COMPONENT LOAD TESTING GUIDELINES - Continued

Component	Test Requirement(s)	Reason(s)
(7000) Strongback	1. No-Load Operational test if components are purchased to MIL Spec or NAVSEA standard drawings, delivered through the Naval Supply System and no structural repair of replacement of the falls tensioner(s) was performed to restore structural integrity. 2. Static and dynamic load tests if any of the following apply: a. Sheaves or sheave components do not meet the above requirements. b. Bearing blocks (including shaft and associated bearings) are replaced, overhauled, repaired or modified. c. Any structural repair to restore strength integrity is performed to the strongback.	1. Failure of sheaves will not result in catastrophic lowering of load. Quality of sheaves and sheave parts is ensured at the time of procurement. 2. Quality of sheave or sheave component is unknown. Failure of bearing blocks or strongback structure can result in catastrophic lowering of load.
(7030) Manropes	No system test is required.	Manropes are pull tested at time of manufacture.
(7050) Spanwire	1. No-Load Operational test if wire rope socket were purchased to MIL Spec or NAVSEA standard drawings and socket was poured by qualified personnel (refer to **NSTM Chapter 613** , paragraph 613-1.11.2.1). 2. Pull test to 40 percent of the breaking strength of the wire rope followed by an operational test if either of the above requirements are not met. 1. Quality of wire rope and socket ensured at time of procurement. Qualifications of socket pourer ensured by **NSTM Chapter 613** . 2. Quality of wire rope, socket, or socket pour is unknown.	
(7100) Latching Mechanism	No-Load Operational test.	Manual brake and boat gripes provide sufficient securing strength in the event of latching mechanism failure.
(7200) Hook Latch Assembly	1. No-Load Operational test if any assembly parts are purchased to MIL Spec or NAVSEA standard drawings delivered through the Naval Supply System 2. Dynamic load test if latch assembly is overhauled, repaired or modified.	1. Quality assurance of parts are ensured at time of procurement. 2. Quality of latch assembly after repair is unknown.
(8100) Keel Rests	No load test required. [6]	Ensure proper fit of boat.
(8200, 8225, 8250) Raise or Lower Mechanism (Manual, Hydraulic, Electrical)	Test operate Raise or Lower Mechanism.	Ensure proper operation of mechanism.

Table 583-9-3. COMPONENT LOAD TESTING GUIDELINES - Continued

Component	Test Requirement(s)	Reason(s)
(8300) Cradle	No load test required. [6]	Ensure proper fit of boat.
(8400) Platform or Cradle	No load test required. [6]	Ensure proper fit of boat.
(8500) Cradle Winch	Test operate Cradle Winch.	Ensure proper operation of Cradle Winch.
(8600) Boat Gripes	Pull test to 40 percent of the rated breaking strength of the rope used prior to placing gripe in service. Refer to paragraph 583-9.6.3.	Load carrying loose gear.
(8700) Dollies	No load test required. [7]	Ensure proper fit of boat.
(8800) Skids	No load test required. [8]	Ensure proper fit of boat.

NOTE: These footnotes provide additinal information regarding the testing guidelines provided.
1) Rated load test shall be conducted in accordance with paragraph 583-9.6.3.4 steps 1 through 4. The boat may be used in place of a test weight (support crane not necessary) for this particular test only.
2) For these particular components, an alternative to performing a static load test is to perform a pull test equal to 200 percent of the rated load of the davit. This pull test is to be performed on the boat falls.
3) No-Load Operational test shall be conducted in accordance with paragraph 583-9.6.3.5 with the following additional requirement:
a. During hoisting portion of operational test measure the motor RPM, input volts (phase to phase), and motor amps (phase to phase). Ensure measured values are in accordance with the motor nameplate data.
4) No-Load Operational test shall be conducted in accordance with paragraph 583-9.6.3.5 while actuating limit switch and checking for proper operation.
5) Partial manual No-Load and Dynamic load tests shall consist of handcranking the davit arm(s) from the full outboard position to the inboard stowed position. Dynamic test to include appropriate test weight.

Note

For SLAD, this specific dynamic load test shall either slew the davit arm (with the dynamic test weight) from outboard to the inboard position, or hoist the dynamic test weight a minimum distance of 15 feet, depending on the particular handcrank component.
Using the davit, the boat shall be placed in the keel rest to ensure proper fit of the boat within the keel rest.
7) Using a crane, the boat shall be placed on the dolly to ensure proper fit of the boat within the dolly.
8) Using the boom, the boat shall be placed in the skids to ensure proper fit of the boat within the skids.

583-9.7.3 DECK AND DOLLY STOWAGE. Deck and dolly stowages shall comply with standard or type drawings that apply to the particular boats involved. For hull type drawings refer to NS S0300-AO- IDX-010/ SATDI. For boats not covered by standard or type drawings, stowage designs shall be developed as required using the guidance contained in this section. Deck and dolly stowed boats shall have their weight supported at the keel rest running the full length of the keel. For boats not having structural type keels, full length support shall be installed under longitudinal strength members of the boat.

583-9.7.3.1 Double Banked Stowage (Crane or Boom). For double banked dolly and deck stowages, where the boats are handled by a crane or boom, the cradle for the upper boat shall be designed for quick removal to facilitate unstowing the lower boat. The upper boat and cradle of a double banked dolly stowage shall not require removal in order to transport the dolly to the launch area.

583-9.7.3.2 Double Banked Stowage (Davit). For double banked deck stowages where boats are handled by a davit, the upper boat shall be supported independently of the lower boat. The upper cradle shall pivot out of the way and stow without interfering with the handling of the lower boat. Means shall be provided to stop, latch, and prevent overtravel of the upper cradle when in the stowed position.

583-9.7.3.3 Dolly Stowage. Dollies shall be capable of being secured to prevent damage and movement due to ship's motion. They shall be located such that when moved to or from a launch area, adequate space for line handlers is available. Deck fittings necessary for proper control of the dolly en route to and from the launch area shall be provided.

583-9.7.4 DAVIT STOWAGE. Longitudinal hull support shall be provided for all davit stowed boats except the 26 MWB. The length of these supports shall extend over at least 40 percent of the boat's nominal length with at least 30 percent of the support length located aft of the boat's center of gravity. This support shall be a keel rest for boats having structural type keels. For boats with no keel, the supported length shall consist of rests located under longitudinal strength members in the boat. Bilge rests, when furnished in combination with centerline support, shall not be provided on the outboard side of the stowage.

583-9.7.4.1 26 MWB. No under-hull support shall be provided for stowage of a 26 MWB when suspended from two lifting points. Where stowage arrangements require the motor whaleboat to be suspended from a single lifting point, keel restraint shall be furnished to prevent pitching movement.

583-9.7.4.2 Gripes. Roll, heave, and surge gripes or other suitable means shall be employed to secure the boat against inboard chocks to prevent the boat from shifting in the stowage under any loading condition. Gripe releases shall be of the quick disconnect type and readily accessible.

583-9.7.4.3 Keel Rests and Restraints. Keel rests and restraints, when provided at stowages designated for rescue operations, shall be designed to quickly drop away from the keel. Rubber padding shall be provided at keel rest lower stops.

583-9.7.5 BOAT STOWAGE MODIFICATION. Modifications to boat stowage configurations must be in accordance with an approved Alteration Equivalent to Repair (AER) or Ship Alteration (SHIPALT) prior to starting work.

583-9.7.5.1 26 PE Stowage Modifications. Several ship classes with 26 PE allocations have experienced boat stowage interference problems when replacing 26 PE MK 3 and older boats with 26 PE MK 4 or later type boats. A general guidance plan has been distributed as enclosure (1) to COMNAVSEASYSCOM letter serial 300/10073 dated 19 April 1989 to assist commands planning replacement of 26 PE. Ships planning 26 PE replacement should contact a naval shipyard, SUPSHIP or SIMA to evaluate modifications required. The guidance plan does not relieve the requirement of obtaining an alteration approval (AER, SHIPALT) prior to starting work.

583-9.8 ILLUMINATION

583-9.8.1 Weather deck lighting for boat handling and stowage system operations should be positioned to illuminate critical areas. Those areas include the operator's control stand, all visual safety and operational aids (i.e. hoisting or slewing position stripes, latch indicators, etc.) and those positions where the hoisting hook is attached to or released from the boat. Glare conditions to the operator's normal field of view shall be avoided. The light-

ing fixtures should be located so as not to obstruct or be subject to damage during boat handling and stowage evolutions. Detailed requirements for fixtures, switches and control of lighting systems is contained in **NSTM Chapter 330, Lighting** .

SECTION 10.

PRESERVATION, STORAGE, AND DEPRESERVATION OF BOATS ASHORE

583-10.1 INTRODUCTION

583-10.1.1 STOCK BOATS. All stock boats, except LCM's, that are in repairable or issuable condition shall be provided with a shelter. It is imperative that there be no delay in affording shelter to repaired and repairable boats, to new boats received for stock, to boats awaiting shipment, or boats being held for ships. Boat shelters shall be of a design approved by PEO CLA (PMS 325).

583-10.1.2 REPAIRABLE OR ISSUABLE STOCK BOATS. All repairable or issuable stock boats, their equipment, and machinery shall be prepared for turn-in or storage according to the applicable procedures outlined in paragraphs 583-10.1.4 and 583-10.2.1 through 583-10.2.5. It is essential that there be no delay in accomplishing these procedures once a boat is received for storage. Deviations from the procedures described in this chapter shall not be undertaken without prior PEO CLA (PMS 325) approval.

583-10.1.3 REMOVAL OF ENGINES FROM STOCK BOATS. The removal of engines from boats in stock and from boats received for stock shall not be accomplished unless specifically directed by PEO CLA (PMS 325). The installation of engines in stock boats having unserviceable engines, or in stock boats having engines removed according to previous policy, shall be deferred until such time as the boats are scheduled for repair by PEO CLA (PMS 325).

583-10.1.4 STOCK BOATS CHECKOFF LIST. Applicable checkoff lists outlined in paragraphs 583-10.2.1 through 583-10.2.5 shall be used for each boat placed in storage and for conducting routine and preservation inspections. This checkoff list shall be used to ascertain whether a boat and the boat components are properly stored, and this should be entered on the boat record card. The boat checklist (Figure 583-1-5), a copy of the boat record and a copy of the boat inspection report (NAVSEA 9583/3, Figure 583-1-1) are to be placed in a watertight clear plastic bag and attached to the top of the engine by the custodian activity turning in the boat. Include available information indicating total operating hours on engine since installation or last major overhaul and all available maintenance record data.

583-10.2 PRESERVATION PROCEDURES

583-10.2.1 CUSTODIAN RESPONSIBILITIES FOR PRESERVATION. It is the responsibility of the custodian activity to comply with procedures for turn-in of boats as outlined in paragraphs 583-1.5.3 and 583-1.5.5 and provisions for preservation as outlined in paragraphs 583-10.2 through 583-10.2.5. Prior to delivery of a boat to a storage facility, the custodian activity shall ensure the following has been accomplished. Upon receipt of a boat (new or used), the storage facility should check the following items for all boats including wood, steel, aluminum, and fiber-reinforced plastic (FRP) construction:

a. Fuel tanks, drain tanks, expansion tanks, potable water tanks, and sanitary water tanks are dry or preserved for storage. If applicable, the connection to these tanks shall be broken at the lowest point and the system

completely drained. Waterproof tags shall be attached to all broken connections, closed or open valves, filling connections, and to the helm or tiller to indicate the necessity for reconnection or replacement of plugs before filling tanks. Secure openings to fresh water tanks after draining to prevent contamination.

b. The engine cooling and exhaust system has been drained and the engine and accessory equipment have been preserved. Refer to paragraphs 583-10.2.2 through 583-10.2.2.2 for procedures on preserving engines.

c. Bilges have been cleaned and limber holes and scuppers are unobstructed.

d. All fittings, piping, shafting, propellers, and bearings have been preserved with a coating of MIL-C-16173, grade 3 preservative (NSN 8030-00-244-1296).

e. All fresh water has been removed from piping, freshwater tanks, engines, pumps, exhausts, and bilges. All drain plugs have been removed and attached in a packet to the steering wheel or tiller. The boat is properly trimmed to facilitate drainage.

f. Check to be sure batteries have been removed after preservation is completed.

g. Propellers under 24 inches in diameter, and those whose blades protrude beyond the keel line, are removed and stored within the boat. Shaft keys, propeller nuts, cotter pins, and other parts shall be replaced on shaft and secured as necessary. Do not apply contact preservative to rubber. Propellers larger than 24 inches in diameter and not protruding beyond keel line, need not be removed from the shafts.

h. The hull registry number is either molded on the transom or otherwise legibly marked on the hull of the boat. If a hull registry marked on the hull of the boat. If a hull registry number which is only painted on the hull is removed during repairs, it shall be replaced immediately after repairs to that area are completed. Refer to paragraph 583-12.1.1.

i. All boats that PEO CLA (PMS 325) has declared excess or that PEO CLA (PMS 325) has advised are beyond economical repair, shall be plainly marked with the letter D either on the bow or on the transom. The letter shall be approximately 12 inches high and made with yellow paint.

j. All dunnage, lifejackets, and rope shall be removed. All canopies shall be removed, dried and stored separately in a dry secure location on the boat or packaged in water resistance packaging and stored in areas exposed to the weather on the boat.

583-10.2.2 BOAT ENGINE AND REVERSE GEAR PRESERVATION. The following instructions are issued as a general guide, which may be altered as the detailed design of a particular engine requires. The final procedure adopted shall be such that a sufficient quantity of the appropriate grade of preservative is brought into contact with the metal to be protected. The preservative shall displace any remaining trace of dirt, water, or oil, and leave a continuous protective film on surfaces. Excess preservative is to be drained off to prevent the formation of stagnant pools that may, with age, tend to solidify and complicate putting an engine back into service. Hereafter, when the word ″preservative″ is used, it is defined as MIL-L-21260, PE 30, (grade 30), or PE 10, (grade 10) for all fluid systems and internal surfaces of engines and an appropriate grade of MIL-C-16173 for the external surfaces of all engines.

583-10.2.2.1 Motoring Engine. If it is feasible to turn the engine over by motoring, the following steps are to be followed:

1. Thoroughly drain the engine and reduction gear of all water, lubricating oil, and fuel oil. Use forced air to blow-dry sea water and fresh water systems. In addition, completely drain and air dry the exhaust system.

2. Remove engine and reduction gear oil cartridge and spin-off type filter elements and clean the interiors of all strainer and filter housings. Install new oil filter elements.

3. Remove the raw water pump impeller, place in a plastic bag and affix to top of engine. Release tension on all belt-driven devices. Affix caution tag to steering wheel stating belts must be tightened and impeller installed prior to engine start-up.
4. Flush the engine sea water system with fresh water, air dry, fill the system with soluble oil and circulate throughout the system (soluble oil, Kutwell-40 may be obtained from Convoy Oil Corp. 1412 N. Front St. Philadelphia, PA 19122). Drain the entire system including block.
5. Fill fresh water system with P10, Grade 30 preservative by connecting a supply line to the drain connection for the system. Cause system to overflow from expansion tank vent to ensure that all surfaces are coated with preservative. Drain the preservative from the system and close drain connections.
6. Fill the engine and reduction gear lubrication system to normal capacity with P10, Grade 30 preservative.
7. Blank off air intakes or activate air shutdown valve, if installed, to keep the engine from firing.
8. Motor engine sufficiently to circulate the preservative through the engine lubrication systems. Several minutes (total time) should be adequate but visual checks should be made to ensure that the compound is reaching all points. If an electrical starting motor is used for turning the engine, runs should be limited to 30 seconds each to prevent overheating the motor, and at least 2 minutes should elapse between runs.
9. Disconnect the fuel inlet line at the strainer and circulate PE 10 preservative through the strainer, fuel supply pump filter, and injectors until undiluted preservative oil flows from the fuel return line. To lubricate valves, pistons and liners, and combustion chamber surfaces, place the throttle in full fuel position and motor the engine until vaporized oil emerges from the exhaust manifold or riser opening. If an electrical starting motor is used for turning the engine, runs should be limited to 30 seconds each to prevent overheating the starting motor, and at least 2 minutes should elapse between runs.

CAUTION

To prevent possible hydraulic lock, do not exceed 2 minutes of cranking total time.

10. Drain the preservative oil from all systems, paying particular attention to low spots, pockets, and exposed piping in which the compound could collect. Save drained compound for future use.
11. Reconnect all lines for normal operation.
12. Seal all openings into the engine to prevent entrance of dirt or water. A blank metal or other non-porous material plate shall be installed between the exhaust manifold or turbocharger outlet and exhaust hose fitting to prevent moisture from seeping back into the engine. Leave a minimum 1″ lip exposed on the blank plate. Install a waterproof tag on the blank plate with a warning stating ″remove blank plate prior to starting engine or equipment damage may occur.″
13. Using grade 2 compound, MIL-C-16173, spray or brush over all external unpainted areas. If the engine will be exposed to the weather, grade 1 compound should be used for this purpose. Spray or brush P10, Grade 30 preservative on internal surfaces of mild steel fuel tanks after all fuel and moisture have been removed.
14. Attach a waterproof tag to the top of the engine indicating that the fluid systems have been treated with preservative, raw water pump impeller removed, drive belts loosened and a blank plate installed in the exhaust outlet. Remove the engine start fuses and tag fuse box and fuses; enclose fuses with startup instructions. The tag shall include the date on which the engine was treated, a statement that the engine is not to be turned over until ready to be put into operation (as turning over may impair the protective film), a statement that the procedure specified in paragraph 583-10.4.3 shall be followed before placing the engine in service, and that the lubrication, cooling, and fuel systems shall be filled before operating.

583-10.2.2.2 Not Motoring Engine. Where it is not practical to motor an engine over to treat it with thin film rust preservative, application may be made as follows:

1. Thoroughly drain the engine and reduction gear of all water, lubricating oil, and fuel oil. Use forced air to blow-dry sea water and fresh water systems. In addition, completely drain and air dry the exhaust system.
2. Remove engine and reduction gear oil cartridge or spin-off type filter elements and clean the interiors of all strainer and filter housings. Install new oil filter elements.
3. Remove the raw water pump impeller, place in a plastic bag, and affix to steering wheel. Release tension on all belt-driven devices. Affix caution tag to steering wheel stating belts must be tightened and impeller installed prior to engine start-up.
4. Flush the engine sea water system with fresh water, air dry, fill with PE 30 preservative, and drain.
5. Fill fresh water system with P10, Grade 30 preservative by connecting a supply line to the drain connection of the system. Cause system to overflow from expansion tank to ensure that all surfaces are coated with preservative. Drain the preservative from the system and close drain connections.
6. Break open a fitting in the lubricating oil piping system of the engine and connect the discharge side of a separately driven pump to the disconnected engine lubricating oil system fitting.
7. Use this pump to circulate P10, Grade 30, preservative throughout the lubricating oil system of the engine while the engine is being barred over. The discharge pressure of this separately driven pump should approximate the operating pressure of the engine lubricating oil system. Where possible, access plates should be removed to determine that the compound reaches all points of the lubricating oil system.
8. Complete the process described in paragraphs 6 and 7 on the reduction gear lubrication system. If this is impractical due to equipment design, fill the gear casing with P10, Grade 30 preservative and drain.
9. Circulate PE 10 preservative through the strainer, fuel supply pump, filter, and injectors using a separately driven pump. Drain all preservative from the fuel system.
10. Spray or brush preservative on internal surfaces of steel fuel tanks.
11. Disconnect separately driven pump installed in step 6.
12. Seal all openings into engine to prevent entrance of dirt or water.
13. Using grade 2 compound, spray or brush over all external unpainted areas. If the engine is to be exposed to the weather, grade 1 compound should be used for this purpose. When engines are preserved and stored in a dehumidified space in a warehouse or aboard ship, no external preservation need be applied.
14. Tag the engine to indicate that the fluid systems have been treated with a preservative compound. The tag shall include the date on which the engine was treated, a statement that the engine is not to be turned over until ready to be put into operation (as this may impair the protective film), a statement that the procedure as specified in paragraph 583-10.4.3 shall be followed before placing the engine in service, and that the lubricating, cooling, and fuel systems shall be filled before operating.

583-10.2.3 WOOD BOATS. In addition to the general items, the following should be checked on wooden boats:

a. All ventilators, doors, and hatches have been secured open for ventilation.

b. The shelter permits adequate circulation of fresh air.

c. There is no source of artificial heat within the shelter.

d. The shelter has no large expanses of glass surfaces.

e. Two 1/2-inch drain holes have been drilled port and starboard at low points in boat compartments not capable of being drained by trimming the boat, existing drain plugs, or portable pump.

f. No equipment is stored in the forepeaks or lazarettes which interferes with thorough ventilation.

g. Exterior paint coats are maintained. Flaking paint has been removed by scraping on plywood hulls or by scraping or careful sanding on planked hulls. Bare spots have been touched up according to the following:

CAUTION

Vinyl paints are fire hazards until dry.

1 Above water line. Use one coat of aluminum paint prepared by mixing one gallon of varnish (FED Spec TT-V-119, NSN 8010-00-597-7856), with 2 pounds of aluminum paste (FED Spec TT- P-320, type II, class B, NSN 8010-00-247-4347).

2 Below water line. Use one coat of formula 117, DOD-P-15328 (NSN 8030-00-165-8577) at 0.3 to 0.75 mils dry film thickness followed by one coat of formula 120, MIL-P-15930 (NSN 8010-00-753-4714), vinyl zinc chromate primer.

583-10.2.4 STEEL HULLS. In addition to the general items, the following shall be checked for on steel hulled boats:

a. LCM's or other boats which are exposed to the weather when stored are to be protected from entrance of water, dirt, or contaminants into the interior spaces. Vents shall remain open for air circulation. Engine exhausts shall be plugged with damage control type wood plugs. Engines shall be preserved as detailed in paragraph 583-10.2.2 through 583-10.2.2.2.

b. Drainage has been accomplished by trimming the boat, opening the existing drain plugs, or drilling drain holes.

CAUTION

Drain bilges under guidance of local regulations for HAZMAT.

CAUTION

Vinyl paints are fire hazards until dry.

c. Exterior and interior paint coats are maintained. Loose paint has been removed and rusty surfaces wire brushed or sanded. Apply one pretreatment coat of formula 117, DOD-P-15328 (NSN 8030-00-165-8577) followed by two coats of formula 120, MIL-P-15930 (NSN 8010-00-753-4714), vinyl zinc chromate primer.

583-10.2.5 PLASTIC HULLS. In addition to the general items, special care shall be taken to make certain that the weight of the boat rests upon the keel support, not the side bunks (chocks).

583-10.3 STORAGE PROCEDURES

583-10.3.1 STOCK POINT RESPONSIBILITIES FOR STORAGE. It is the responsibility of the Stock point to certify that turn-in and preservation procedures have been accomplished by the custodian activity. Once a boat has been accepted for turn-in, it is the responsibility of the stock point to accomplish the following storage requirements.

a. Adequate shelter has been provided with sufficient side protection to prevent the access of rain or snow. There should be no leaks in the cover. Evidence of this is the absence of fresh water accumulation on the decks or in the bilges (CM's excepted).
b. Boat is rigidly supported by keel blocking timbers (6-inch by 8-inch) placed beneath the keel at maximum intervals of 6-feet, or by a cradle designed for the boat.
c. Side bunks (chocks) are used for preventing racking and not bearing weight as evidenced by absence of local hull deformation.
d. Deformation of the hull by overhang at the stem and the transom ends is prevented by rigid supporting timbers and adequate padding to prevent damage to the plating or planking.
e. Frost heaving or settling of the ground has not caused racking of the hull or deformation of the hull planking or plating at the side bunk (chocks).

583-10.4 DEPRESERVATION

583-10.4.1 STOCK POINT RESPONSIBILITIES FOR DEPRESERVATION. Prior to releasing a boat to a receiving activity, the stock point is responsible for preparing the boat for issuable condition.

583-10.4.2 CUSTODIAN OR RECEIVING ACTIVITY RESPONSIBILITIES FOR DEPRESERVATION. Once released from the stock point, the receiving activity shall ensure all depreservation procedures have been accomplished that the stock point is responsible, and, in addition, ensure that receipt procedures and depreservation procedures have been accomplished as detailed in paragraphs 583-10.4 through 583-10.4.3.3.

583-10.4.3 STARTING DIESEL ENGINES AFTER PRESERVATION

CAUTION

Prior to commencing depreservation procedures, install the raw water pump impeller and tighten loose drive belts.

583-10.4.3.1 Lubrication System. Before operating an engine that has been out of service and treated with rust preventive compound, an external circulating pump shall be used to circulate lubricating oil through the engine at normal operating pressure. If equipped, the lubrication system external to the engine should be properly cleaned. The engine should be bypassed during this procedure to prevent excessive flushing and possible contamination of the engine bearings and lube oil passages with material dislodged during the cleaning procedure.

a. **Checking Flow** . Jack or bar the engine over several revolutions during circulation of the lubricating oil. Inspection plates and covers should be removed and a visual check made to assure that the lubricating oil is

reaching all points of the system; all main and connecting rod bearings, camshaft, blower bearings, rocker arms, and wrist pins. If it is found that lubrication is not reaching all points following this procedure, it will then be necessary to heat the lubricating oil being circulated to approximately 180°F and follow the same procedure. If, after this has been done, it is evident that stoppages exist in the lubrication system, it will be necessary to disassemble the engine and determine the cause of the trouble.

b. **Prepare Engine for Starting** . When inspection shows that the lubrication system is functioning properly, the external pump can be secured, strainers cleaned, filter elements renewed, and the engine prepared for starting according to the engine technical manual for. Prior to starting, ensure that all loosened drive belts are tightened, install raw water pump impeller with new gasket, remove blank plate from exhaust system and fill engine and marine gear lube oil systems to correct operating levels with lubricating oil.

583-10.4.3.2 Fuel System. The compound will be removed from the fuel system during the normal operation of the engine.

583-10.4.3.3 Cooling System. The following procedure should be followed in removing rust preventive compound from the cooling system:

NOTE

The following procedure shall not be used in systems containing aluminum.

1. Fill with fresh water and operate the engine for 5 minutes to ensure that no leaks are present in the cooling system.
2. Secure engine and drain water.
3. Fill the cooling system with a 2 percent sodium metasilicate (NSN 6810-00-664-7062), 0.1 percent detergent (NSN 7930-00-282-9699) solution in clean fresh water. This solution may be made up by adding a concentration of 16.7 pounds of sodium metasilicate and 0.83 pounds (approximately 0.5 pint) of detergent for each 100 gallons of solution required.
4. Start engine and operate for 2 hours, keeping solution temperature at 160°F.
5. Drain cleaning solution from cooling system.
6. Flush four times with fresh water to remove all traces of cleaning solution. Break several hose connections and examine waterside to ensure that it is clean.
7. If the engine is not clean, reassemble, refill with cleaning solution, and repeat cleaning and flushing operations.

CAUTION

Dispose of waste water under guidance of local regulations for HAZMAT.

NOTE

Run engine for 5 minutes during each flushing. The lubricating oil and water should be checked for contamination after a few hours of operation, then drained and replaced, if necessary.

SECTION 11.

MAINTENANCE

583-11.1 INTRODUCTION

583-11.1.1 PLANNED MAINTENANCE SYSTEM. Where the Planned Maintenance System is installed, conduct preventive maintenance according to the applicable maintenance requirement cards.

583-11.2 WOOD BOATS

583-11.2.1 VENTILATION AND DRAINAGE. During active service, every effort should be made to provide thorough ventilation and drainage and to prevent fresh water leakage. All ventilation terminals should be kept open and mechanical ventilation systems kept in operation at all times, when practicable.

583-11.2.2 STANDING FRESH WATER. Standing fresh water, even in small amounts, is particularly hazardous. All drain pipes, scuppers, limbers, and holes in way of deck houses and toe rails shall be unobstructed. Deck seams, especially in the plank sheer area, shall be carefully caulked and maintained watertight. Sanding of decks shall be done carefully to retain the proper camber and to prevent areas that will allow fresh water to accumulate.

583-11.2.3 AIR CIRCULATION. In fair weather, hatches and deck plates of wooden boats afloat should be opened to supplement the air circulation provided by the stationary or mechanical ventilators. Wet dunnage in lockers should be removed and permitted to dry.

583-11.2.4 SALTWATER WASHDOWN. Washing a boat down with fresh water shall be avoided. Salt water has some preservative value and should be used. To remove salt accumulations from bright work, chrome fittings, and windows, a sponge or chamois lightly soaked in fresh water is recommended.

583-11.2.5 INSPECTION. Frequent inspections should be made to detect any leaks beneath the covering board and deck house areas. Thick coats of paint trap moisture and are to be avoided. Wood preservative solutions, rather than paint, shall be brushed on those hull areas purposely left unpainted.

583-11.2.6 OIL SOAKED BOTTOM PLANKING. Oil soaked bottom planking cannot be successfully painted or caulked. Grease and oil may be removed from bilges by use of powdered detergent (NSN 7930-00-249-8035), if necessary. Care should be taken when draining or filling fuel tanks or the engine crankcase to avoid spilling of diesel fuel or engine oil.

583-11.2.7 FENDERS. Fenders or rubber tires should always be placed between adjacent boats tied up at a dock, pier, or boom.

583-11.2.8 UNDERWATER INSPECTIONS. When a boat is removed from the water, check struts, propellers and sea suctions, and correct deficiencies.

583-11.2.9 ENGINE ALIGNMENT. Ensure that main engines and auxiliaries are maintained according to the manuals provided with the equipment. Check engine alignment monthly and change crankcase oil after each 100 hours of running time. Grease gear boxes, steering mechanism, and moving parts with medium lubricating grease (NSN 9150-00-235-5512).

583-11.2.10 VARNISHED SURFACES. Varnished surfaces should not be polished. When refinishing varnished or polished surfaces, however, polish must be removed with a petroleum solvent followed by soap and water rinsing, drying, and light sanding of the surface with fine sandpaper.

583-11.2.11 PERIODIC INSPECTIONS. Conduct periodic checks of fire extinguishers, life preservers, navigation lights, anchors, and anchor ropes.

NOTE

Insist on good housekeeping at all times.

583-11.3 ALUMINUM BOATS

583-11.3.1 GENERAL. Special requirements for maintaining aluminum boats are described in the following paragraphs.

583-11.3.2 ALLOYS. From a wide range of aluminum alloys available for many purposes, the U.S. Navy has selected those most suitable for naval use. The hulls of many naval aluminum boats are constructed of either alloy 5086-H32 or 5456-H321. Hulls of new aluminum boats are constructed with alloys 5086-H116 or H117 or 5456-H116 or H117. Alloys with these two tempers should also be used for replacement plates. Refer to paragraph 583-11.3.2.2 for clarification of the terms alloy and temper. Both alloys contain magnesium as the primary alloying ingredient but differ slightly in strength. These two alloys are not used in combination except when emergency repairs are needed.

583-11.3.2.1 General Purpose and Other Alloys. Alloy 6061 is a general purpose structure alloy using a combination of magnesium and silicon as the chief alloying ingredients. Its use in the Navy should be restricted to auxiliary systems such as piping, railings, and non-welded structures. Two other alloys that may be found in limited quantities are 5083 and 7039. These are used only for armor and are supplied especially for that purpose. They should not be utilized for other structural areas of an aluminum boat.

583-11.3.2.2 Tempers. Aluminum alloys are not identifiable by appearance and are usually appropriately marked with alloy and temper designations. The temper designation follows the alloy number and indicates the degree of tempering. Tempering is done in two ways depending on the alloy, either by strain hardening or by heat treatment process. An alloy that has been strain hardened has a designator consisting of the letter H and a number, while an alloy that has been heat treated has a designator consisting of T and a number. Thus, a plate labeled 5086-H116 has been strain hardened while one marked 6061-T6 has been heat treated. Any alloy will be one or the other. For example, all the tempers of 5086 begin with H. The exception is when aluminum is in the

soft or annealed condition which is indicated by suffix 0. Both 5086-0 and 6061-0 and others are available. The temper of material is of concern to the repairman since it is desirable to make replacement of damaged areas with the same alloy and the proper temper.

583-11.3.2.3 General Characteristics. Aluminum is a lightweight material. It is for this reason that it is used for boats and craft. It is strong, weldable, and has excellent general corrosion resistance when proper marine alloys are employed. In the past, most interior spaces of naval boats were left unpainted in aluminum construction. There are some precautions in the handling of aluminum, however, that shall be observed if the full corrosion resistance capability of aluminum is to be achieved. As with many materials, although mild acidic solutions cause slight damage, it is necessary to avoid caustic solutions of any sort, such as sodium hydroxide, sodium carbonate, or sodium phosphate as they cause severe etching of the aluminum, possibly resulting in perforation.

CAUTION

Stringent precautions shall be taken in the case of mercury. The presence of mercury, even in small amounts, causes severe corrosive attack and under no circumstances are the two metals to be permitted to come in contact with each other.

By observing these precautions, routine maintenance can be kept to a minimum.

583-11.3.2.3.1 Galvanic Corrosion. Galvanic corrosion caused by dissimilar metal contact with aluminum is a problem that can occur. In marine applications, aluminum and its alloys are frequently the anodic metal and could corrode in preference to most other common contacting metals except zinc and magnesium. For galvanic corrosion to occur, the following conditions must be satisfied:

a. A cell shall be present, consisting of at least two metals having different solution potentials and in electrical contact with each other (no matter how indirect).

b. A conductive medium (electrolyte) is present between the metals.

583-11.3.2.3.2 Galvanic Corrosion Locations. Galvanic corrosion normally occurs with different metals, while crevice corrosion (an other form of galvanic action produced by ion concentration) can take place with improper joint design involving only different members of the same alloy. In addition, the metallic compounds in a copper bearing or mercury bearing antifouling paint applied to an aluminum hull can result in a galvanic type of attack. Antifouling paints currently specified for aluminum boats do not contain copper or mercury. It is important to recognize that the amount of corrosion resulting from galvanic action is not a criterion of the metal's inherent resistance to corrosion. The extent of galvanic corrosion will vary greatly with the type of dissimilar metals involved and the nature of the corrosive environment. For example, the rate of galvanic corrosion in atmospheric exposures is far less than that under immersed conditions because of the substantial absence of an electrolyte or its low conductance when present. In immersed conditions, particularly in sea water, a strong electrolyte is present continuously and serious galvanic corrosion can result. For this reason, the use of dissimilar metals below the exterior and interior water line shall be avoided. Three applications account for most galvanic corrosion situations:

a. Connections of aluminum deck house bulkheads to a steel boundary bar.

b. Attachment of steel or brass fittings to an aluminum structure.

c. Dissimilar metal components such as rudders and propellers on an aluminum hull.

583-11.3.2.3.3 Cleanliness. Cleanliness is always important. Dirty, wet bilges or accumulations of dirt and water anywhere, are to be avoided. A fresh water rinse on a regular basis is generally sufficient. Adherent soil and greasy deposits can be removed using cleaners conforming to MIL-C-22230 (NSN 6850-00-965-2359). Painted areas retain a good appearance for a long period. Regular washdown is all that is needed to maintain appearance.

583-11.3.2.4 Metal Working. Cutting aluminum is more like cutting wood than steel. Oxyacetylene flame is not used because aluminum's oxidation resistance and excellent thermal conductivity carries heat away too fast to get a good cut. In repair work, all cutting should be done mechanically using a circular saw, a saber saw, or (in the shop) a band saw equipped with metal cutting blades. Use of a grease stick or lard oil will prolong blade life. Plasma arc cutting equipment is available for high speed production work but is not needed for repair work. Shearing or punching of strain hardened alloys should be avoided. Forming is done cold or hot. Aluminum does not change color with heat and doesn't glow red as does steel. Excessive heating can cause the metal to anneal to the soft condition or even melt without any warning. Hot forming is done by carefully heating the metal to no more than 450°F. The temperature can be estimated by the use of temperature sensitive crayons. Each crayon is formulated to melt at a different temperature. When the crayon markings on the metal melt, the heat source may be removed at the proper time.

NOTE

If field repairs are being made and no crayons are available, a small stick of pine may be used. The stick is touched to the metal and when it just begins to char, the metal is hot enough. This method is not suggested where more accurate means are available.

583-11.3.2.4.1 Forming Annealed Alloys. Forming 5086 and 5456 alloys at temperatures in the range of 150 to 400°F may lower resistance to corrosion and stress corrosion, particularly if the stock is being held at these temperatures for prolonged periods of time. If the starting stock is in the annealed temper, forming at temperatures in excess of 400°F or reannealing after forming at lower temperatures is recommended. The primary advantage to hot forming annealed stock is to reduce the rate of strain hardening.

583-11.3.2.4.2 Forming Strain Hardened Alloys. Forming the foregoing alloys in strain hardened tempers presents a little different problem, since the effects of temperature on mechanical properties as well as corrosion characteristics, shall be considered. A satisfactory compromise is to form in the temperature range of 400 to 450°F. Heating stock to 450°F for 30 minutes results in approximately 5 percent reduction in the tensile and yield strength. Hot forming is beneficial in processing the alloys in question in the strain hardened tempers.

583-11.3.2.4.3 Reforming Damaged Parts. Formed parts of a boat that have been damaged shall not be reformed using heat. When possible, it is suggested that the damaged part be replaced by new material formed for the job. Distorted plates whether caused by damage or the heat of welding, shall not be straightened by flame quenching (torch heating followed by spray cooling). The method does not work well and can result in overheating or melting as described previously. If the distortion does nothing more than detract from appearance, it should be left alone. Distortion in shapes should be straightened cold, using jacks as necessary. Distortion in plate panels may be relieved either cold or by making a saw cut in the center of the panel and rewelding it. The normal shrinkage associated with aluminum welding will tend to remove the distortion.

583-11.3.2.4.4 Facilitating Repair. The light weight of aluminum will facilitate repair by making handling easier. In addition, the preparation of subassemblies or repair sections in the shop is greatly facilitated.

583-11.3.3 PAINTING. Aluminum marine alloys under proper care are resistant to saltwater corrosion. In some cases commercial aluminum hull boats have been in saltwater service for several years with the hull left unpainted but with proper cathodic protection. Painting is normally required, however, for satisfactory corrosion resistance. Improperly applied paint systems may cause problems. Corrosion, from any source, will attack at the point of least resistance. It is important, therefore, that proper maintenance be given to painted systems. It should also be noted that properly applied paint films have excellent adhesion to aluminum and that problems of spalling, cracking, rust streaks, and chipping, prevalent in steel and wood construction, are greatly minimized with aluminum. Additional information can be found in **NSTM Chapter 631** .

583-11.3.3.1 Exterior Boottopping and Above. Pitting is the normal overriding factor for routine care and repainting. Chalking, crazing, or blistering are normal signs that repainting is required.

1. Remove all loose paint by light sandblasting, power brushing, or orbital sanding. Only abrasive impregnated nylon webbing, nonmetallic scouring pads, or abrasive sanding discs (A-A-1016) should be used. Steel wool, wire brushes, or coarse abrasive materials shall not be used. None of these materials should have been previously used on other metals or for removal of copper or mercury pigmented paint before being used on aluminum. The edges of the good paint around the bare areas shall be feathered.
2. Wash the surface with a liquid detergent (NSN 7930-00-282-9699) and thoroughly rinse with fresh water. The surface should be allowed to dry completely. Painting should take place as soon as practical after cleaning.
3. Touch up all bare areas with one coat of wash pretreatment coating (formula 117, DOD-P-15328, NSN 8030-00-165-8577). The primer should be applied to a dry film thickness of 0.3 to 0.75 mils. Two coats of either formula 84 zinc chromate alkyd primer (Fed Spec TT- P-645, NSN 8010-00-161-7419) or formula 120 zinc chromate primer (MIL-P-15930, NSN 8010-00-753-4714) shall be applied over the pretreatment within 24 hours. Allow a minimum of 8 hours drying time between primer coats and between prime coats and the top coat. Apply two coats of silicone alkyd no. 27 haze gray (Fed Spec TT-E-490, NSN8010-00-917-2256) to a minimum dry film thickness of 1.5 mils per coat.
4. As an alternative to use of formula 117 and formula 84 or 120, an epoxy system (MIL-P-24441) consisting of one coat of formula 150 (NSN 8010-00-410-8452) may be applied to produce a dry film thickness of 3 to 4 mils followed by a coat of formula 151 (NSN 8010-00-410-8458) at a dry film thickness of 3 to 4 mils. The silicone alkyd should be applied before the last coat of epoxy becomes hard (4 to 6 hrs).

583-11.3.3.2 Deck. Areas subject to heavy traffic can be coated with nonskid paint. When recoating is necessary, the following procedure should be used:

1. Scrape, clean, and apply formula 117 or epoxy formula 150 to bare areas as described in paragraph 583-11.3.3.1.
2. Apply finish coat of MIL-D-23003, type II or MIL-D-24483, type I, 30 mils thick.

583-11.3.3.2.1 Magnesium Castings. Castings of magnesium alloy, if onboard, should be painted as follows:

1. Prepare surface for painting by the dichromite treatment, type III, according to MIL-M-3171.

2. Apply two coats of MIL-P-23377 epoxy polyamide primer coating (NSN 8010-01-082-2450), each coat to a minimum dry film thickness of 1 mil.
3. Apply two coats of MIL-C-22750 (NSN 8010-00-896-1980) epoxy, each coat to a minimum dry film thickness of 1 mil (total dry film thickness of primer and topcoat shall be 4 mils minimum).
4. MIL-P-23377 (NSN8010-01-082-2450) and MIL-C-22750 (NSN 8010-00-896-1980) shall be applied according to manufacturer's instructions.

583-11.3.3.3 Underwater Hull on Boats That Require an Antifouling Coating System. The underwater hull should only be coated with an approved noncopper bearing antifouling system as directed by NAVSEA. Direct application of copper antifouling will severely damage the aluminum hull plating. Antifouling materials used in aluminum underwater hull coating systems are toxic. Personnel engaged in the application of antifouling coatings are cautioned to follow all safety procedures specified for the application of this material by the paint manufacturer and appropriate Maintenance Requirement Cards (MRC). Additional information can be found in **NSTM Chapter 631** .

583-11.3.3.3.1 Preparation. Before application of any coatings to the underwater hull, the entire area shall be scraped with wood or plastic scraper (exercising care not to gouge the aluminum), freed of fouling, and washed down with fresh water. All deteriorated paint shall be removed and corroded areas shall be sanded, primed, and the anticorrosion coats shall be built up before the application of the antifouling paint, if required.

583-11.3.3.3.2 Application. The successful application of coatings on aluminum requires special attention to some details of surface preparation and application. The procedure shall include the following:

a. All possible metal fabrication or repair should be accomplished before the surface preparation procedure.
b. No coatings will be permitted to be applied over metal splinters, delaminated areas, corrosion products, oil, grit, or other foreign matter. All sand will be removed from surfaces by brush or air-blast before applying first coat.
c. All welded areas or weld splash, either old or new, shall be given special attention. All rough welds, cutoffs, splash, and so forth, shall be removed by disc sanding or chipping.
d. All new surfaces to be coated shall be dry sand swept.
e. All surfaces to be coated shall be free of all grease or oil before the use of any abrasive or the application of refresher coats. Grease and oil should be removed with a detergent and thoroughly rinsed with fresh water.
f. Compressed air used for nozzle blasting shall be free of detrimental amounts of oil or water. Adequate separators or traps shall be provided and these shall be kept emptied of water and oil.
g. The grit size shall be 40 to 60 mesh glass abrasive. The maximum particle size shall not be larger than that passing through a 40 mesh screen, U.S. sieve size. Local sand fills this requirement. Do not reuse sand.
h. Sand sweeping shall be permitted only during daylight hours and on surfaces that will not be wet after blasting or before painting. The only exception to this will be for rough, initial sand sweeping which will be allowed during the night, providing the surface shall be swept clean and bright the next morning with fresh, light sandblasting to provide a contamination free, sand swept surface. Sand sweeping is permissible under an enclosed shelter at anytime providing the surface remains dry.
i. Sand sweeping is the technique whereby the surface is blasted, at a 60 degrees angle with 40 to 60 mesh sand. This is done lightly and thereby removes only paint and none of the surface metal.

j. The sand swept surface should be covered by the initial coating of the paint system before any visible or detrimental oxidation (aluminum hydroxide) occurs. When enclosed in a shelter, application of the initial coating can be delayed but shall be applied before detrimental oxidation occurs.

k. Observe carefully the paint manufacturer's instructions on shelf life, pot life, drying time, and cure time for each coat.

583-11.3.3.4 Bilges. Remove all grease, oil, and other contaminants with a solution of cleaning compound conforming to MIL-C-22230 (NSN 6850-00-965-2359). The solution should be agitated and then all residue flushed with hot fresh water.

1. Remove corrosion products by mechanical means (nonmetallic brushing, light disc sanding. or hand sanding with fine grit paper). Surfaces shall be clean and dry before painting.

2. After thorough cleaning, apply one coat of pretreatment primer, formula 117, DOD-P-15328, NSN 8030-00-165-8577) to 0.5 mils dry film thickness followed by two coats of MIL-P-23377 (NSN 8010-01-082-2450) to 2 mils dry film thickness. This shall be topcoated with one coat of MIL-C-22750 (NSN 8010-00-896-1980) to 3 mils dry film thickness.

3. As an alternate to the foregoing system, an epoxy system according to class 1 of MIL-P-23236 may be applied over the clean metal surfaces. Application shall be according to manufacturer's instructions.

583-11.3.3.5 Tank Cleaning and Maintenance. The fresh water system shall be thoroughly cleaned and disinfected in accordance with Manual of Naval Medicine, NAVMED P-5010-6. Interiors of aluminum fuel tanks, ballast tanks, bilges and voids need not be painted. Marine Sanitation Device tank interiors shall be painted as follows:

One coat MIL-P-24441 Formula 150 (NSN 8010-00-410-8452) 3 to 4 mils dry film thickness.

One coat MIL-P-24441 Formula 151 (NSN 8010-00-410-8458) 2 to 3 mils dry film thickness.

One coat MIL-P-24441 Formula 156 (NSN 8010-00-410-8470) 2 to 3 mils dry film thickness.

One coat MIL-P-24441 Formula 152 (NSN 8010-00-410-8461) 2 to 3 mils dry film thickness.

Coat interior of lubricating oil tank with lubricating oil preservative, MIL-L-3150 (NSN 9150-00-231-2356) medium.

583-11.3.4 CATHODIC PROTECTION. Most aluminum boats are equipped with sacrificial anodes to offset adverse effects of dissimilar metal connections, stray electrical currents, improper grounding, and other sources of electrolytic corrosion. These anodes provide a continuous flow of protective current to corrosion susceptible areas but is sacrificed in doing so. In addition to external hull anode protection, some installations contain anodes which are provided for protection in bilge areas, ballast tanks, sea chests, and overboard discharges.

583-11.3.4.1 Zinc Anodes. Certified pure zinc anodes are installed on boats to provide cathodic protection. Aluminum and magnesium anodes are not approved for use on U.S. Navy boats. If sufficient anode material remains to provide protection until the next scheduled overhaul, the anode should be retained but the active surface should be power brushed to remove any calcareous buildup and improve the anode output. All coatings or plastic wrappings on anodes shall be removed.

583-11.3.4.2 Depleted Anodes. All depleted anodes shall be replaced with certified 100 percent pure zinc anodes only. If magnesium or aluminum anodes are identified on non-standard or standard U.S. Navy boats, they will be replaced in accordance with paragraph 583-11.3.4.3. Magnesium anodes are highly active chemically with a large electrical potential difference. Alkaline conditions can be generated which will attack aluminum hull welds and plating. Aluminum anodes frequently become passivated (inoperative) after installation.

583-11.3.4.3 Requirements. All depleted anodes shall be replaced with zinc anodes conforming to MIL-A-18001, unless specific NAVSEA approval is granted for other systems.

CAUTION

Magnesium and aluminum anodes shall not be used on aluminum hulls.

a. Corrosion protection of the hull and components, in addition to painting, is provided by type ZHS or ZHC (6-inches by 12-inches by 1-1/4-inches) zinc anodes.
   1 ZTS type anodes shall be used for small boats in place of ZHC or ZHS anodes if three or less ZHC or ZHS anodes are required.
   2 On small boat hulls, use four ZTS anodes in place of a ZHC or ZHS anode.
   3 Where three or less anodes are required, and the anodes must be kept out of the hull bottom water flow, ZHC or ZHS type anodes shall be mounted on the transom.
   4 More uniform protection can be attained with a wider distribution of anodes.

b. Where practical, calculate the quantity of hull anodes required by using the requirements of steel hull ships (**NSTM Chapter 633, Cathodic Protection**). If impractical, contact NAVSEA.

c. In addition to the hull anodes, one ZTS anode shall be provided for each 5 square feet, or proportion thereof, for each sea chest or area of dissimilar metals. Waster pieces shall be inspected at each overhaul and replaced, if necessary, with a new waster piece of the same alloy.

d. Internal bilge areas normally wet, shall be protected by 1 square foot of zinc surface for each 200 square feet of coated surface or 50 square feet of bare metal. Anodes of type ZHC, ZSS, or ZEP shall be used as best meet the requirements of the area to be protected.

583-11.3.4.4 Installation. The following instructions provide the necessary supplementation to Naval Sea Systems Command dwg 805-921865 for installation of zinc anodes on aluminum hull boats.

CAUTION

Anode faces shall not be coated or covered in any manner except for masking while painting adjacent surface or as noted in paragraph 583-11.3.4.1.

a. All anodes shall be installed directly on the hull, over the hull coating, and attached with aluminum studs

welded to the hull and CRES locknuts. To eliminate binding between the nuts and studs, use an acceptable antiseize compound (a compound consisting of equal parts by weight of petrolatum and zinc dust of 200 mesh fineness may be used).

b. Where thickness of the hull is not considered adequate to support the attaching studs and anodes, a double plate should be coated with the same paint system as the hull and installed before attaching the anodes.

c. Where stud installation is not practicable and special brackets have been installed previously to accommodate other anode types, these brackets can be modified to accommodate the recommended installation. If possible, direct installation to this bracket shall be made by drilling the anode straps and bracket for bolt attachment. The anode back (surface nearest the straps) shall be coated similar to the hull. If this cannot be accomplished, a 3/16-inch or similar aluminum plate, with holes or studs to accommodate the desired anode type shall be installed. The recommended anode (s) shall then be attached to this plate according to this instruction.

   1 Lock washers shall be utilized with all nuts; electrical continuity between anode and hull shall be maintained.

   2 The plate shall be completely coated with the hull anticorrosive coating system.

   3 Where bolting is required on this installation, stainless steel nuts, lock washers, and bolts shall be used and coated similar to the hull.

d. ZTS anodes can be modified for stud attachment by drilling a 3/8-inch hole centered 1/2 inch from each core end.

   1 An 11-inch center-to-center stud location is necessary.

   2 Aluminum studs, 1/4-inch minimum diameter should be used.

e. Distribute anodes about the hull similar to steel hull ships (see **NSTM Chapter 631**), one-third in the stern area, and the remaining anodes equally divided port and starboard approximately midships.

   1 ZHS and ZHC anodes shall be bolted with the long axis fore and aft.

   2 ZTS type anodes shall be bolted with the long axis fore and aft.

f. Anodes shall not be installed in locations interfering with the operation of struts, propellers, propeller shafts, or rudders. Installation in paths of high velocity waterflow should be avoided whenever possible.

   1 Anodes shall be installed in the vicinity of dissimilar metal junctions.

   2 Anodes shall be installed in locations always submerged (light ship condition) while the ship is not moving.

g. On aluminum high speed boats in which the bow rises from the water, anodes shall be installed in areas which rise out of the main flow. Anodes shall be installed so that they are submerged when the boat is moored.

h. Internal bilge anodes shall be installed in locations where the anode is submerged whenever water is present, generally near the bilge pump input. A zinc anode shall be installed in each area where water is held or trapped. All stringers shall be provided drain holes (large enough to avoid clogging) which drain into the immediate keel area.

583-11.3.5 PIPING SYSTEMS. Due to certain service conditions a wide variety of piping materials are used aboard aluminum craft. In general, complete systems of aluminum or PVC piping in proper service pose no problem. Attention should be given to all dissimilar metal systems.

583-11.3.5.1 Joint Corrosion. Due to availability, specifications, and service intended, valves and fittings in aluminum lines may be of other than aluminum alloy. These joints present a potential site for corrosion and should be checked periodically for corrosion damage and replaced when they will not last until the next overhaul.

583-11.3.5.2 Seacocks. Seacocks are usually bronze or aluminum. If bronze they will be fitted to the hull with some type of insulation such as neoprene gaskets and PVC ferrules and should be checked periodically for their integrity. If an insulation pad is used, it should be checked for signs of crazing or cracking. Some systems may incorporate a waster piece or an anode as part of the seacock installation. It should be routinely checked and replaced when necessary.

583-11.3.5.3 Valves and Fittings. The alloy composition of valves and fittings is normally selected to be compatible with the piping system. When replaced, use similar units.

583-11.3.5.3.1 Lubricating Aluminum Fittings. Aluminum body valves should be checked periodically for signs of freezing. Some assemblies use aluminum to aluminum moving parts which can gall. Where possible, moving aluminum parts should be lubricated or replaced with a compatible metal. Some aluminum fittings and valves may require periodic breakdown for inspection, replacement of anodic waster pieces, rerouting systems, and so forth. It is important that all aluminum fittings be reassembled with an approved thread lubricant. A mixture of 50 percent zinc dust in 50 percent mica flour in silicone grease or molybdenum disulfide is a suitable vehicle which will perform an antiseize function. The viscosity of the compound is such that it remains within the joint and forms a tight seal. It should also be non-hardening to facilitate disassembly. The product should be free of lead, tin, or graphite.

583-11.3.5.4 Pipe Hangers. Aluminum piping systems are normally supported by aluminum hangers and brackets and should pose no particular problem. If installed in areas such as ballast tanks, bilges, void spaces, and other areas of high humidity or contaminant concentrations, the hangers should be checked periodically for signs of crevice corrosion of the pipe under the hanger clamp. Some systems may be installed with a layer of rubber or fiberglass tape surrounding the pipe before being fastened to the hanger. Such installations minimize vibration with a subsequent reduction in sound levels. These should be checked for corrosion.

583-11.3.5.4.1 Insulating Dissimilar Metal Lines. All dissimilar metal lines are normally required to be fully insulated from the aluminum structure. This can be done by the application of rubber sleeves, rubber tape, fiberglass tape, or other dielectric. The insulation should extend a minimum of 1/2 inch on either side of the hanger support.

583-11.3.5.4.2 Steel Hangers. If steel hangers are used, then the point of attachment to the aluminum structure should be insulated. Insulation can be accomplished with a dielectric pad and a suitable bolting arrangement.

583-11.3.5.5 Bulkhead Penetration. Aluminum systems will penetrate non-watertight bulkheads through an oversized hole or large cutout for a group of pipes. These areas should be checked for chaffing or other signs of excessive wear to the pipe.

583-11.3.5.5.1 Watertight Bulkheads. Aluminum piping systems will penetrate watertight bulkheads normally through some type of stuffing box arrangement, a proprietary bulkhead penetrator, or through an oversized welded flanged spool piece connected directly to the bulkhead. The connection should be checked for signs of loosening or for possible leakage.

583-11.3.5.5.2 Dissimilar Metal Piping System. Dissimilar metal piping systems will penetrate non-watertight bulkheads either through an oversize hole or through an aluminum spool piece filled with a suitable insulating, resilient product. Such connections also tend to dampen vibrations and reduce sound levels. All dissimilar metal piping systems will penetrate watertight aluminum bulkheads through a stuffing box arrangement. Some of these

systems are proprietary and others are fabricated by the shipyard. In each instance, care should be taken to see that the dissimilar metal line does not contact the aluminum structure at any point and that the packing is maintained in sound condition.

583-11.3.5.6 Pipe Insulation. Thermal insulation is generally installed over hot water and exhaust lines. Although several types of insulation meet the requirements of MIL-STD-769, all are not suitable for aluminum lines. Insulation materials containing asbestos shall not be used. Preformed glass, MIL-I-22344, is recommended. The use of calcium silicate may result in some external pipe corrosion if the insulation gets damp. The adhesive (MIL-A-3316A, class II) used for attaching fire resistant thermal insulation to such components as exhaust pipes is corrosive to aluminum. A cloth should be placed in the bilges when this adhesive is being used. Any dropping not caught on the cloth shall be wiped up immediately.

583-11.3.6 MACHINERY, SHAFTING, AND PROPELLERS. Some engine installations are directly mounted to the aluminum foundation with fitted bolts and shims to maintain alignment. Such systems are subject to galvanic action due to the combination of engine, shafting, propellers, sea water, and the aluminum hull. Installations of this type should be broken electrically by the use of either a flexible coupling or by an insulated flange coupling. The details of this coupling will vary with the craft.

583-11.3.6.1 Shock Mounting. Some installations mount the engine on shock mounts. Shock mounting tends to reduce vibration and serves as an effective method of insulating the engine's dissimilar metal mass from the aluminum hull.

583-11.3.6.2 Stuffing Boxes. Stuffing boxes are generally of bronze construction attached to the shaft log by a heavy duty rubber hose. Some boats and craft use a specially fabricated aluminum stuffing box. In both cases the packing is generally a graphite impregnated flax. Depending on the combination of stuffing box material and packing and shaft material, corrosion may occur either on the shaft or in the stuffing box.

583-11.3.6.3 Shaft Logs. Shaft logs are generally heavy wall aluminum tubing.

583-11.3.6.3.1 Inspection. Frequently they will be of an alloy different from the basic hull structure. Because of the possible dissimilarity of weld metals, visual inspection should be made of the welds attaching the log to the hull. If the shaft is pulled, the interior of the shaft log should be inspected for corrosion, scouring, and so forth.

583-11.3.6.3.2 Shaft Buildup. In cases where a shaft has excessive scoring in way of the shaft strut bearings and shaft log seals, the deteriorated or worn area can be refurbished by a thermal spray process. After the worn areas have been machined to sound metal, the spray process applied according to MIL-STD-1687 (Thermal Spray Processes for Naval Ship Machinery and Ordnance Applications) can be used to build up the shaft to the required diameter. The buildup process does not replace the strength of the removed metal; therefore, the shaft shall not be machined below minimum diameter requirements.

583-11.3.6.3.3 Plasma Spray Heating Process. The plasma spray heating process fuses a ceramic coating (87 percent alumina/13 percent titania composite powder 30 + 15 micron mesh size) over a similarly fused bond coat (5.5 percent nickel, 5 percent molybdenum, balance nickel composite powder) applied first to fill the undercut area, after which the final ceramic coating is applied. The ceramic coating which is limited to .015 inch thick, results in an exceptionally hard surface that will extend the wear properties of the shaft in the area of bearing surfaces. The plasma spraying process can only be utilized using a Navy qualified procedure and operator.

583-11.3.6.4 Propeller Shafting. Propeller shafts are generally stainless steel or monel. If replacement is necessary, they should be replaced with equal type material. When pulled, the area within the shaft log and stuffing box should be inspected.

583-11.3.6.5 Shaft Bearings. Most shaft bearings are of a grooved synthetic rubber bonded to sleeves of either brass, bronze, or fibrous materials. The fibrous material sleeve bearings are recommended as a replacement. The bearing should be equal to Byron Jackson Byplex, that is, the fibrous material conforming to MIL-P-18324 and the rubber conforming to MIL-B-17901. If brass or bronze sleeves are used, a periodic inspection should be made of the installation. If corrosion is occurring between the shell and the strut barrel, they are to be replaced with the Byplex product.

583-11.3.7 TANKS. The following paragraphs apply.

583-11.3.7.1 Fresh Water Tanks. Potable water tanks may be integral or of independent construction. Independent tanks may be of monel or stainless steel construction. These tanks will be attached to the hull by straps, brackets, or clips. The installation should be insulated for optimum performance. In some instances smaller dissimilar metal compression tanks will feed off an integral aluminum fresh water tank. The connection between the aluminum tank and the dissimilar metal tank should be insulated and should be checked periodically.

583-11.3.7.2 Fuel Tanks. Periodically fuel tanks should be completely drained and all low points checked for signs of corrosion due to entrapped water condensate.

583-11.3.7.3 Collection Holding Tanks (CHT). Collecting and holding of all onboard waste of human origin from water closet and urinal equipped boats shall be provided. Shore connection for discharging holding tank contents shall be provided. Holding tanks shall be noncorrosive materials and of water-tight construction. Internal surfaces shall be free of obstructions to prevent pocketing of sewage.

583-11.3.8 MOORING AND TOWING DECK FITTINGS. Most aluminum naval craft have aluminum mooring and towing fittings. These are welded directly to an aluminum doubler pad or insert plate. Fittings and weld areas should be inspected periodically for beginning signs of cracking or other failures due to overload conditions.

583-11.3.8.1 Dissimilar Metal Fittings. If dissimilar metal fittings are used, they will be bolted through the deck. The bolting arrangement should consist of insulated bolts and insulation of the fitting base from the deck. If such a system has been installed, care should be taken to maintain the sealing bead around the outside of the fitting. A polysulfide product can be formed into a fillet around the outside to prevent sea water from seeping beneath the fitting.

583-11.3.9 DECK EQUIPMENT AND MACHINERY. Deck equipment, machinery, and other miscellaneous gear will normally be attached to the aluminum hull by bolting. Faying surfaces between these dissimilar metals will be insulated according to various Navy systems. Insulation shall be maintained for optimum performance and can be kept maintenance free by periodic checkups.

583-11.3.9.1 Deck Equipment Reinstallation. If it is necessary to remove a piece of deck equipment, care should be taken to reinstall it with proper insulation. If gasketing material is used between the faying flanges, it should be replaced with a similar kind. Under no circumstances should red lead, canvas, or any other wicking

type material be used as an insulation gasket. Synthetic rubber is acceptable; the material selected, however, should not be subject to cold flow, cracking, or creeping. A new gasket should be used whenever possible.

583-11.3.10 ADDITIONAL REQUIREMENTS. Additional requirements for maintenance of aluminum boats are contained in the following paragraphs.

CAUTION

The nature of aluminum hull boats merits special attention for mooring location, particularly next to steel ships, buoys, and piers. Under these conditions, it is essential that non-conducting mooring lines be used, as well as insulating camel sections, to prevent electrical contact of the aluminum hull with a steel structure, since this could result in galvanic corrosion of the aluminum hull.

583-11.3.10.1 Mooring. Since aluminum is more electrochemically active than other materials of construction used in marine hulls, it is necessary to avoid direct metal coupling of aluminum hulls to steel hulls, buoys, and docks. For example, when tying aluminum craft to a common buoy to which steel hulled craft are tied, lines or hawsers should be made of a nonconducting material such as nylon or manila hemp. In the event a metallic chain or cable is used, it is essential that there be an insulation line or break in the chain or cable. This can be effected by an insert of a nonmetallic nonconducting segment.

583-11.3.10.2 Shore Power. Shore power should be taken aboard through a 1:1 isolation transformer which is properly insulated from the boat. The system utilizes the transformer to conductively separate the shore feeder conductors from the electrical load circuits on the boat. The shore grounding conductor is used to ground the noncurrent carrying parts of the isolation transformer but is conductively separate from the boat ground. The isolation transformer effectively separates the aluminum hull from all other hulls on a common grounding circuit.

583-11.3.10.2.1 With Isolation Transformer. The transformer precludes the possibility of hull corrosion due to a direct grounding bond with all other metal hulls on the common shore power circuit.

583-11.3.10.2.2 Without Isolation Transformer. The use of shore based power without an isolation transformer while moored to other ships, docks, or when in repair yards, to provide electrical current or services to aluminum hull craft, shall be considered with care in order to avoid the possibility of corrosion of the aluminum hull resulting from stray currents [either alternating current (AC) or direct current (DC)]. This is commonly referred to as stray current corrosion or electrolysis.

583-11.3.10.2.3 Electrical Shore Facilities. Other potential causes of electrolysis or stray current corrosion are the electrical shore facilities such as railways and crane tracks. They may cause current discharge from the hulls if they are in metallic contact with these structures.

583-11.3.10.2.4 Gangways and Welding Machines. Gangways with metal runners can be a connecting path. They should be electrically insulated from the hull during docking. The electrolysis corrosion caused by welding and associated operations resulting from improper grounding, can be overcome by proper design in grounding of the welding machines and accessory equipment. These grounds should be as outlined in **NSTM Chapter 074, Volume 1, Welding and Allied Processes** .

583-11.3.10.2.5 Ground. The hull serves as a ground. This is quite proper, providing return current does not flow either wholly or in part, to a sea water path back to the current source.

583-11.3.10.2.6 Stray Current. Stray current corrosion is most likely to occur when DC electrical equipment is grounded to the hull and is frequently associated with turbo generators, electrical motors, weld generators, and electronic equipment. It shall not be forgotten, however, that AC systems do occasionally carry some DC components and can cause corrosion.

583-11.3.10.2.7 Isolating Welding Sets. All DC cable for welding motor generator sets including resistors, should be installed on the craft where the welding is to be done. A welding generator on one craft, grounded to that craft, shall not be used to perform welding on another craft. If it is not possible to install the welding machine onboard, it should be installed on shore in a location as close as possible to the craft. The generator shall be grounded directly to the craft in which the welding is being done. Care should be taken to ensure that no intermediate contact of the lead and ground cables is made between the generator and the craft. No ground connections shall be made between the craft and the shore or adjacent craft, for welding. Care should be taken to avoid cables hanging or sagging between the craft and shore.

583-11.3.10.2.8 Battery Chargers. Battery chargers shall be located aboard the boat being serviced during the charging operation, or the batteries should be removed and charged on shore.

583-11.3.10.3 Field Attachments. Care shall be taken in attaching metallic or nonmetallic components to the aluminum structure. Otherwise, corrosion of the aluminum may occur. Faying (adjoining) surfaces should be covered with protective coatings. Nonconducting materials should be used as an interleave to prevent direct metal to metal contact. All depressions and crevices should be filled with suitable caulking compounds.

583-11.3.10.4 Bilge Flush. Bilges and voids should be inspected periodically for signs of corrosion. Periodic fresh water rinsing and cleaning of bilges will minimize heavy concentration of undesirable contaminants. In the absence of fresh water rinsing, clean salt water rinses are acceptable. The bilges should be pumped dry after rinsing and kept as dry as possible thereafter.

583-11.3.10.5 Cavitation Corrosion. The most common areas where cavitation corrosion may be found are in the vicinity of the shaft, propellers, or other protruding underwater components. Corrosion can be controlled by cathodic protection through the use of zinc anodes. Where such damage is found, corrective actions consist of restoring the damaged metal by welding and grinding, or by replacement of the damaged part and installation of zincs, type ZHC or ZHS (approximately 1 square foot of zinc for every 200 square feet of structural surface); or as an interim measure, the damaged metal may be replaced with an aluminum filled epoxy cement. Use of epoxy shall be recorded in the boat's history cards with a positive requirement that the epoxy be replaced by welding at the first availability.

583-11.3.10.6 Drydocking. Inspection of aluminum boats for corrosion is usually confined to the interior structure, particularly the bilge area and the underwater outside surface of the hull.

583-11.3.10.6.1 Bilge Area. The bilge areas, unless properly protected and maintained by good housekeeping techniques, may be subject to pitting type corrosion where bilge water and sediment remain in long time contact with the aluminum. In the event corrosion does occur, it will probably be found in the area where the bilge water is retained for the longest periods of time.

583-11.3.10.6.2 Bilge Zinc Anodes. The condition of galvanic anodes used to suppress bilge area corrosion should be checked to assure continued protection by the anodes. Anodes that have been consumed should be replaced with new material, and those not consumed should be cleaned by stainless steel wire brushing at periodic intervals.

583-11.3.10.6.3 Exterior Hull Surface. The exterior surfaces of the hull should be examined to assess the condition of the antifouling paint systems and to look for localized corrosion resulting from galvanic attack between aluminum and non-aluminum components such as those found in the through hull fittings, the bearing housing, and struts for the shaft and propellers. Also check for pitting corrosion on the transom in the vicinity of the exhaust. Examine all structural welds, especially in the aft bottom area, to confirm there has been no cracking within the welds or in the plate adjacent to the welds as the result of vibration or fatigue.

583-11.4 STEEL BOATS

583-11.4.1 PAINTING AND SCRAPING. Painting and scraping of steel boats shall be done according to **NSTM Chapter 631** .

583-11.4.2 CATHODIC PROTECTION. Cathodic protection of steel boats shall be done according to paragraph 583-11.6.

583-11.4.3 STRAY CURRENT PROTECTION. Welding equipment hook up and grounding connections shall be done according to **NSTM Chapter 074, Volume 1** .

583-11.5 GLASS REINFORCED PLASTIC BOATS

583-11.5.1 GLASS REINFORCED PLASTIC BOAT HULLS. Glass Reinforced Plastic (GRP) (also referred to as fiberglass) boat hulls generally require little maintenance other than cosmetic painting, except in cases of severe damage. Maintenance of cathodic protection, if installed, is covered in paragraph 583-11.6.1.

583-11.5.2 GLASS REINFORCED PLASTIC BOAT CONSTRUCTION. The following is a brief description of procedures followed in fabricating GRP boats. The majority of the hulls are fabricated in female molds, the interiors of which are sprayed with a gel coat resin before lay-up of the hull commences. This results in a smooth, clear, outer hull surface. To this gel coat, layers of mat and layers of coarsely woven cloth (woven roving) are laid in the mold and impregnated with resin, which if properly laid up will result in a translucent hull. The translucency allows inspectors to check the quality of the lay-up utilizing a light in the far side of the laminate to determine if the layers have been properly impregnated. In some cases, a condition known as white laminate occurs signifying a resin starved area. Small sections of these areas can be removed and corrected.

583-11.5.3 GLASS REINFORCED PLASTIC BOAT CONSTRUCTION TYPES. There are two basic types of construction used in fabricating glass reinforced plastic (GRP) Navy boats: single skin and sandwich. Boats with single skin construction are generally laid up of one ply mat adjacent to the gel coat and varying numbers of woven roving to attain required design hull thickness. Sandwich construction is generally achieved by the use of mat and woven roving skins sufficiently strong and firmly bonded to a thicker, lightweight core such as foam or end grain balsa. This type of construction increases the strength and rigidity of the flat panel without the use of a solid laminate. The bond strength between the GRP skins and core is extremely important to the panel performance. Foam cored girders running the full length of the hull are bonded in to provide longitudinal strength. The

hull then cures (resin hardens) in the mold after which it is removed and placed in a supporting cradle for final assembly with its various components. Other parts of the boat such as decks, bulkheads, cabin tops, and engine boxes are molded in a similar manner. Attachment to a partially cured area of plastic using resin is called a primary bond which has a greater final strength than a secondary bond discussed in the following paragraph.

583-11.5.4 CONSTRUCTION BONDING. Decks, bulkheads, and other parts are bonded to the hull with resin impregnated strips of fiberglass material known as bonding angles. When the bonding is accomplished after the hull has completely hardened or cured, the bond is called a secondary bond. Such a bond is capable of strengths of up to 80 percent of that obtained by primary bonds.

583-11.5.5 ATTACHMENT AND SUPPORT OF L OR T SHAPES. The attachment and support of L or T shapes by which the decks, bulkheads, and other parts are attached to the hull using resin, are bonding angles. When these attachment supports are secured to the hull with resin after the hull is completely cured, the attachment is a secondary bond capable of perhaps 80 percent of that attained by primary bonding.

583-11.5.6 PAINT REMOVAL. Old paint coats on plastic boats shall not be removed by use of a blowtorch. Details on painting are contained in applicable Boat Information Books (BIB's) and **NSTM Chapter 631** . Additional guidance on inspection and maintenance of plastic boats is contained in NAVSEA 0900-LP-006-0010, **Reinforced Plastics Preventive Maintenance and Repair Manual** .

583-11.5.7 PREVENTIVE MAINTENANCE. Preventive maintenance for all boats is imperative, particularly for GRP boats, since extensive deterioration can develop if delaminations, punctures, and cracks go uncorrected. For this reason the following guidance applies to GRP boats. Refer to Section 12 of this chapter for guidance on repairs.

583-11.5.7.1 Inspection. GRP hulls are normal smooth and fair. Abnormal indentations, bulges, cracks, or craze marks should be closely examined on both the exterior and interior of the hull, whenever possible.

583-11.5.7.1.1 Bolts and Fasteners. Bolts and fasteners used in some of the older GRP boats were not of corrosion resistant materials and even though they have been sealed may rust or otherwise corrode. Rust formation, for example, will break the secondary bond between the plugs and the cavity wall and force the plugs out.

583-11.5.7.1.2 Defective Fasteners. The plug should be lifted out and the fasteners carefully inspected. The condition of the nuts or locking devices on the inside should be determined. A protective coating should be applied. The cavities at the plug locations may then be temporarily refilled and refinished. In the event that no corrective action can be taken towards the fastenings (if defective), a PMS record shall be made noting the need for the repairs to be accomplished by a qualified activity at the earliest opportunity. Early repair is particularly important if the fasteners are part of the lifting fittings or other systems involving safety.

583-11.5.7.2 Craze Marks. These appear as a group of closed spaced lines usually covering a central area. Occasionally, only the paint will be crazed if applied excessively or buildup is too thick. Generally, however, craze marks indicate the area has been over-stressed by impact or overload damaging the gel coat and inner GRP structure, as at cleats or lifting fittings. Craze marks may also occur at bulkhead attachments to the hull and adjacent to hard spots in areas where impacts will impose severe shear forces.

583-11.5.7.3 Deformation. Fiberglass sections are unable to sustain permanent deformation. Therefore, any metal frames, struts, structures, or girders, that for any reason become deformed under some type of tension, should have their fasteners loosened as soon as possible (if not already torn from the fiberglass) to relieve stresses on the fiberglass and prevent further damage. The stem, gunwales, and transom corners are the areas most susceptible to damage being the outer-most and stiffest areas of the hull.

583-11.5.7.4 Flotation Material. Flotation material is installed in all Navy standard passenger carrying fiberglass boats. Normal installation locations are high up under the gunwales wherever possible throughout. Since these areas are subject to hard shock, inspections of the inner side of the hull are difficult due to the installation of foam. The newest flotation material of closed cell configuration does not normally absorb moisture. However, if subjected to an extreme impact or direct compressive forces, it will crush. Thus water can be introduced between the inner and outer shells of the hull and into spaces containing the flotation material. It is imperative therefore, that all gouges, punctures, cracks, and delaminations be sealed as soon as possible after detection to stop entry of water which in large amounts will add significant weight, reducing the safety factor of the lifting fittings. Entry of sea water will introduce marine organisms which will grow and cause unpleasant odors within the boat. These odors are extremely difficult to eliminate once the organisms permeate the flotation material spaces.

583-11.5.7.5 Loose Fastenings. Fastenings penetrating the GRP structure should be regularly checked for tightness. Loose bolts will result in elongated holes, sheared off fastener heads, and localized stresses causing cracks, fractures, or delaminations. Fastenings for cleats and handrails are particularly susceptible to loosening and should be checked and tightened regularly. Door hinges, deck plates, cabin fans, and machinery fastenings also have tendencies to work loose and should be checked regularly.

583-11.5.7.6 Propeller, Shaft, and Strut. While the boat is stowed in chocks (not waterborne) the propeller shaft should be checked for nicks, bends, and evidence of erosion, corrosion, or electrolysis. If necessary the propeller should be removed and repaired or replaced. Work the propeller shaft by hand to check its fit in the strut bearing. If side play is considered to be excessive and causing vibration, the strut bearing should be replaced.

583-11.6 CATHODIC PROTECTION OF BOATS

583-11.6.1 ZINC ANODES INSTALLATION. Zinc anodes shall be installed on all steel and aluminum boats and on some types of wood or plastic boats having large amounts of electronic equipment installed, such as torpedo retrievers, air rescue boats, and minesweepers. All zinc anodes shall conform to MIL-A-18001, and shall be installed according to NAVSEA dwg 805-921865. Instructions regarding anode quantities and installation are detailed in **NSTM, Chapter 633** . For aluminum hull boats, refer to paragraphs 583-11.3.4.1 through 583-11.3.4.4.

583-11.7 ENGINE MAINTENANCE

583-11.7.1 DIESEL ENGINE MAINTENANCE. Engines installed in Navy boats must be operated and maintained at the highest practical level to provide maximum reliability, readiness, and efficiency. The diesel engine is the predominant boat propulsion system. Diesel engine maintenance is covered in several publications which provide complete guidance.

a. The engine manufacturer’s technical manuals

b. **NSTM Chapter 233, Diesel Engines**

c. Applicable Boat Information Book

d. Allowance Parts List, Coordinated Shipboard Allowance List, or activity's allowance.

583-11.7.2 ENGINE MAINTENANCE RESPONSIBILITY. Engine maintenance is performed by the activity to which the boat is assigned. Daily maintenance checkoff by boat crews is of particular importance. Utilize the Planned Maintenance System (PMS) to properly maintain the engine.

583-11.8 GUIDANCE FOR FLEET PERSONNEL ON PREVENTIVE MAINTENANCE AND REPAIR OF BOATS AND LANDING CRAFT

583-11.8.1 INITIAL INSPECTIONS. On new boats in use, visual inspections should occur frequently during the initial 6 months' use period. As service experience is gained following this use period, periodicity between inspections should follow the PMS card requirements.

583-11.8.2 REFERENCE MATERIAL. Boat crews should reference the Boat Information Book (BIB), applicable U.S. Navy Technical Manuals, commercial technical manuals from the equipment manufacturers, and installed PMS for maintenance scheduling and repair techniques.

SECTION 12.

BOAT REPAIR

583-12.1 INTRODUCTION

583-12.1.1 GENERAL. The quality of repair, whether performed by a Navy activity, ship's force, or contracting shipyard, shall be first class in every respect. Any repair found to be defective, whether partially or wholly completed, shall be removed and satisfactorily replaced. The registry label, Boat Alterations (BOATALT) plates and registry number (refer to paragraphs 583-3.1.1 and 583-5.1.1.1), shall be replaced if removed during repair.

583-12.2 INTERIOR FINISH MATERIALS

583-12.2.1 NONCOMBUSTIBLE MATERIALS. The use of highly combustible interior finish materials shall be avoided. Materials for replacement or new installation in interior applications shall conform to MIL-STD-1623. Nonmagnetic and wood hull craft are permitted certain exceptions as noted in paragraphs 583-12.3.13.1 and 583-12.3.13.2.

583-12.3 WOOD BOATS

583-12.3.1 WOOD WORKMANSHIP. All wood members entering into the repair of boats shall be finished smooth on all sides. Uncaulked seams, joints, and faying surfaces shall be fair and in continuous contact when assembled. Caulked seams shall be fair and continuous and watertight when assembled with caulking compound. The outside of the hull shall be fair, free from tool marks, and sanded smooth. Wood members, when assembled in place, shall not be subject to stresses beyond their proportional limit as evidenced by any damage to the members. Any frames which show splitting or wrinkling shall be removed and replaced. Holes and loose knots shall

be eliminated from wood components and members. Care shall be taken to eliminate as many defects as possible from rough lumber when laying out wood members before manufacture.

583-12.3.1.1 Setting Fasteners. Fastenings shall be set snug but not so tight as to weaken the material by rupture of wood fibers adjacent to the fastening. Lead holes shall be drilled for all screws and fetter ring nails. Diameter of lead holes shall not exceed 70 percent of the root diameter of screws for soft woods and 90 percent for hardwoods. For screw shanks, the hole in the material to be fastened shall be 100 percent of screw shank diameter. Holes for fetter ring nails shall be prebored not to exceed 60 percent of the nail diameter. Maximum depth of lead holes should not exceed 90 percent of the length of the screws. Screws shall not impact driven. The last 1/8 inch of screws are to be hand-turned or may be mechanically set, provided that the machines are equipped with a properly adjusted clutch stop device to prevent overdriving. Bolt holes shall be drilled for a tight fit.

583-12.3.1.2 Cleanliness. During repair, all chips, shavings, refuse, dirt, and water should be removed frequently. Dutchmen shall not be used as fillers for improperly cut materials.

583-12.3.1.3 Training Films. Information on techniques of laminating and steam bending of wood members is available in training films DN 24021, Laminating Marine Timbers, and DN 20543, Bending Oak Techniques.

583-12.3.2 REPAIR DETAILS. Damage to wood boats is commonly caused by mechanical and marine borer damage or decay deterioration. The first two causes for repairs are usually obvious upon inspection, but under certain circumstances decay is not easily detectable. Knowledge of the basic causes of decay will afford a ready means of recognition.

583-12.3.2.1 Decay. Decay in wood boats results either from inadequate ventilation or fresh water leakage and poor drainage. Both are preventable. Decay resulting from fresh water leakage and poor drainage is practically always associated with poor ventilation.

583-12.3.2.2 Inspection for Decay. Decay occurs in those portions that are poorly ventilated and where fresh water has gained access. For the most part, these portions are confined to the stem, transom areas, the region directly beneath the plankshеer or cover board, and the bilge region in hulls having tight cargo flats. The headers beneath cabins and filler blocks also warrant careful inspection as does that portion of the frame and plank near the water line of hulls in fresh water service or storage. Chines, and the plywood beneath armor plating, bottom planking, and decking, should be closely inspected, particularly on hulls subjected to prolonged periods of uncovered storage.

583-12.3.2.3 Fungus Decay. Decay in boats by fungus growth usually is unrecognizable except in joints between faying surfaces. There are several aids to recognition that can be employed. For example, if paint coatings are discolored or the wood surface cupped, decay may be suspected. Tapping with a hammer will produce a dull sound in infected wood and is particularly useful in timbers which may have decayed interiors. A sharp ice pick or an oyster knife can be used to detect decayed wood by the ease of penetration and removal. Slivers turned up by picks or knife blade points tend to break off short instead of in long splintering breaks. Recognizable decay is most likely to be found near faying surfaces and joints. The condition of large timbers can best be determined by drilling with a 3/8-inch drill to two-thirds their depths. The ease with which the drill penetrates and the condition of the chips indicates advanced stages of infection. Thoroughly decayed wood is brittle when dry and breaks easily across the grain with a distinct brash fracture and may crumble into powder. Dry, sound wood breaks with more difficulty, giving an uneven, splintering fracture. Wet, sound wood merely bends. When prob-

ing with an ice pick or knife, it is well to remember that wet wood is softer than dry wood. It is also true that sound wood of low density is subject to brash failures. In doubtful instances, wood specimens can be submitted to a laboratory for positive determination.

583-12.3.2.4 Plugging Inspection Borings. Black stains spreading along the grain from ferrous metal fastenings are usually caused chemically by the iron contact instead of decay fungi and have much less adverse effect on strength. All holes bored for inspection purposes should be plugged with a dowel which has been soaked in preservative and allowed to dry. Dowels should be cut 1/64-inch undersize and coated with resorcinol glue before being driven the full depth of the drilled hole. Borings should never be of such a number or so located as to impair hull strength. Boring of chine, shelf, and clamp is not permissible.

583-12.3.2.5 Primary Cause of Repair. Decay is not a primary cause for repair in a hull that has been well built of naturally durable woods and afforded protection during active service and storage ashore. The following conclusions were made after analysis of several hundred reports submitted upon completion of repairs to different types of active and inactive boats subjected to various conditions of exposure:

a. Open boats and decked boats in active service showed little decay. The repairs required were mostly for mechanical damage.

b. Open boats in active service were practically devoid of decay repairs.

c. Boats in open storage or boats stored under other than raintight, ventilated shelters necessitated over 90 percent of decay repairs.

d. Boats that had always been in properly covered storage showed no decay.

e. Decked boats from active service sometimes showed decay in those areas listed in paragraph 583-12.3.2 if ventilation was not sufficient or if fresh water had gained entry.

583-12.3.2.6 Confining Inspections. Confining the examination being made to those hulls, conditions, and locations which are most questionable, the thoroughness of the examination necessary to detect decay can be regulated and a fairly accurate estimate of the repairs required can be provided.

583-12.3.2.7 Wood Repair Techniques. Further information on wood hull repair techniques is given in Naval Sea Systems Command NAVSEA 0900-LP-015-1020, Volume 2 and NAVSEA 0900-LP-015-1040, Volume 4, **Wood: A Manual for Its Use as a Shipbuilding Material** .

583-12.3.3 DETERMINING EXTENT OF REPAIRS. Methods for determining extent of repairs required for wooden boats are discussed in the following paragraphs.

583-12.3.3.1 Boats from Open Storage. The inspection shall be thorough and include probing in all the areas listed in paragraph 583-12.3.2. A strake of planking or decking shall be removed to inspect the condition of the frame heads and beam ends (if present). Often decay will also be found just above the level where fresh water has been standing in the bilges. Removal of a plank at the turn of the bilges is the only sure means of detecting decayed or cracked frames at that level in single-planked, round bottom hulls. It is advisable, and usually cheaper, to strip landing craft to the framework. In short, if a boat has been subjected to open storage and is to be repaired, sufficient planking should be removed to afford access for a thorough inspection of all structural framing.

583-12.3.3.2 Boats from Covered Storage. All boats from properly covered storage require no more than a superficial examination by probing, as far as decay is concerned, provided no decay was present when they were placed in storage.

583-12.3.3.3 Boats from Active Service. Open boats from active service will show practically no decay and a superficial examination by probing is all that is required. Decked boats require inspection in those areas listed in paragraph 583-12.3.2, particularly if it is evident that there is insufficient ventilation or that fresh water has access through opened deck seams or cabin moldings. It is advisable if decay is evident or if a small amount of probing reveals decay, to pull strakes of planking or decking to inspect the condition of the inner planking (if applicable) and the frame heads in the stem transom areas on one side of the hull. If decay is found, remove a midships strake at the same level and similar strakes on the opposite side.

583-12.3.3.4 Around Flotation Material. There is good reason to believe that flotation material will have no adverse effect on the hull structure provided it is properly installed (refer to paragraph 583-12.3.9). Until more evidence is accumulated, it is advisable to make a random check in the stemtransom areas, particularly at the frame head level, to ascertain that no deterioration has occurred. New and repaired boats from proper storage may be exempt from this examination.

583-12.3.4 DECAY PREVENTION AND REPAIR PRACTICE. Three fundamentals are to be observed in decay prevention:

a. Use dry lumber and correct any feature apt to increase the moisture content of the lumber after installation, such as insufficient ventilation or fresh water leaks. There is no such thing as dry rot; decay fungi require moisture and air. Lumber below 20 percent in moisture content will not decay. Submerged lumber will not decay. The misleading term dry rot was derived from the dry and powdery appearance of wood that had decayed while moist and subsequently had dried out.

b. Use all heartwood lumber of a decay-resistant species. Such species are necessary because of their dimensional stability, their slow rate of water absorption when submerged, and because of their usually lighter weight. Sapwood of any species has very low resistance to decay.

c. Use preservative chemicals and fortified bedding compounds as a supplementary precaution. Such materials and salt water prevent decay by making the wood poisonous to fungi.

583-12.3.5 CORRECTIVE MEASURES TO PREVENT DECAY. No corrective measures which alter design or include modifications other than those permitted by existing drawings, shall be made to wooden boats except the following. During repair, the following corrective measures should be taken into account to prevent the occurrence or recurrence of decay:

a. Add well-placed port and starboard ventilators or extend the existing mechanical ventilation system to unventilated compartments.

b. Alter tight cargo flats, ceiling, or filler blocks to permit air circulation to the bilges and between bays at the frame head level. (Cargo flats should terminate at the inboard faces of the frames and a strake of ceiling should be employed to prevent trash accumulating in the bilge.)

c. Correct any feature interfering with complete water runoff.

583-12.3.6 REPLACEMENT OF DECAYED WOOD. The most important consideration in the removal and the replacement of decayed wood is to find the cause for the decay and then correct it. In removing sections of wood, adding sister frames, or splicing, more end joints and faying edges are created providing additional places for moisture to collect. If the original cause of decay has not been removed, the chances for additional decay in the future will have been increased by the repair. Wood members that are extensively decayed should be removed entirely.

583-12.3.6.1 Preferred Repair Replacement Wood. Where decay is localized, removal of the decayed member should be to a distance of approximately 2 feet along the grain and 2 inches across the grain beyond the point where decay is evident. Heartwood of decay resistance species such as white oak, cypress, tropical American mahogany, teak, Douglas fir, longleaf yellow pine, Port Orford cedar, and Alaska yellow cedar are preferred for repair replacement. The selection must take into account the physical properties required for the member to be replaced. Alaska or Port Orford cedar may be substituted for any planking species except mahogany presently noted on the applicable drawings.

583-12.3.6.2 Other Repair Replacement Wood. Sapwood in any species should be excluded. When it is impossible to exclude all sapwood in the finished replacement member, the sapwood face or edge should not be placed at a faying surface. Red oak has inferior decay resistance and is not suitable as replacement material unless it is pressure-preservative treated. Distinguishing red oak from white oak and sapwood from heartwood is sometimes difficult. Guidance based on physical features and on the use of chemical indicators is given in NAVSEA 0900-LP-015-1010. In regard to plywood, paper overlayed panels, MIL-P-18066, class 3, are preferable for external painted components, especially horizontal ones where checking is normally a problem with conventional Douglas fir plywood. The moisture content of all replacement lumber shall be 13 + 3 percent at the time of installation. The moisture content of all replacement plywood shall be 10 + 5 percent at the time of installation.

583-12.3.7 PRESERVATION TREATMENT OF WOOD. Type A or B preservative solutions according to MIL-W-18142 (type A, NSN 6840-00-281-2724 or type B, NSN 6840-00-281-2718) shall be used for brush, dip, or soak treatments. The precautions listed in the specification shall be observed at all times.

583-12.3.7.1 Soaking Replacement Wood. All replacement lumber except cedar, teak, cypress heart-wood, and those items listed herein, should be soaked for 10 minutes in preservative after all boring, shaping, and fairing have been completed. Cedar, teak, and cypress heartwood require no treatment.

583-12.3.7.2 Plywood. All plywood subjected to a high decay hazard, such as that used for subdecking or such as that evidenced by decay during repair to active boats, shall be pressure treated according to MIL-P-l9550. All other plywood, except as noted herein, should be soaked 10 minutes in preservative solution. All lumber and plywood surfaces receiving a bright finish and those components not subject to decay, such as doors, tables, and cupboards, require no preservative treatment. Overlayed plywood should be brush treated on the edges and ends only if the particular application does not warrant pressure treatment.

583-12.3.7.3 Untreated Surfaces. The untreated exposed surfaces of any treated lumber or plywood which requires further cutting, boring, or fairing, shall be liberally brushed with preservative. Unpainted surfaces of original material exposed during repair are to be similarly treated. Retreatment of the outer hull up to the sheer line shall not be required directly beneath installed guardrails.

583-12.3.7.4 Drying Treated Surfaces. All treated surfaces should be allowed to dry thoroughly before painting. Drying time normally requires 24 to 72 hours depending on the treatment used and weather conditions.

583-12.3.7.5 Laminated Members. All laminated members should be end-coated with brush applications of wood preservative if their shape is such that they cannot be fully treated by soaking.

583-12.3.8 BEDDING COMPOUNDS. Bedding compounds should be used on all faying surfaces where watertightness is mandatory and on frame and stem ends, beneath guardrails, moldings, and armor plates after the initial preservation treatment. Heavy applications of bedding compound should be used and the resulting squeezeout should be sufficient to assure that no voids remain between faying surfaces. Comb spreaders with a tooth length twice the intended thickness of the compound layer and with a space between adjacent teeth equal to the intended thickness of the compound layer are helpful for correct application. Often, strands of cotton wicking, laid intermittently along the coated surface, will assure that some of the compound will remain after the faying surfaces are fastened.

583-12.3.8.1 Watertight Barrier Material. MIL-S-19653 type 1 (NSN 8030-00-579-8891) is an oil-based material which stays permanently tacky. It has given good service and is particularly useful for bedding items which may have to be removed or repaired often. 3M Co. Scotchseal 5200 is a synthetic rubber type that has good adhesive strength as well as water resistance. It forms a good watertight barrier and increase structural strength due to its adhesion (for example, double planking) but makes disassembly more difficult.

583-12.3.9 FLOTATION MATERIAL. Improper installation of flotation material in boats can accelerate and invite decay. In boats with side decks, slats should be installed on the underside of beams and the inboard face of the flotation material. Sheathing should stop outboard of the deck headers about 1-inch or a minimum of two 1-1/2- inch holes should be bored through the flotation material and its cover sheathing to the space between the beams.

583-12.3.9.1 Boats Without Side Decking. In boats without side decks, the flotation material should be fitted closely between frames and should be cemented firmly to the planking. A skin coat of adhesive should be applied to all wood surfaces before placement of flotation material. A heavy brush coat of adhesive shall be applied to the contact surfaces of the flotation material.

583-12.3.9.2 Securing Flotation Material. Suitable furring shall be installed for attachment of sheathing used to restrain flotation material. The sheathing should be 1/4-inch plywood or 1/8-inch masonite. Shoring or clamping of flotation material, while awaiting the bond to cure, is unnecessary with the proper adhesive, providing open assembly time requirements are followed (refer to paragraph 583-12.3.15.7 and 583-12.3.15.8).

583-12.3.9.3 Passenger-Carrying Boats. All fiber-glass passenger-carrying boats shall have flotation material installed. Copies of applicable drawings for such installation are available upon request.

583-12.3.10 MATERIALS FOR COVERING WOODEN DECKS AND CABIN TOPS. A tough flexible polyurethane rubber overlay coating is recommended for protection of wood decks (plywood or plank) and cabin tops from wear and leakage. Installation and repair shall be according to the materials and methods in **NSTM Chapter 634, Deck Coverings** . Other deck covering materials for plywood decks and cabin tops, as follows, are satisfactory but are not as durable as the polyurethane coating (see **NSTM Chapter 634** for instructions):

a. Polyester resin-glass cloth;

b. Canvas and deck paint:

1. Number 10 canvas should be laid in a thick heavy paint coat conforming to DOD-E-24635, formula 20 (NSN 8010-00-286-9083), and should be given a coat of canvas filler followed by two coats of deck gray formula 20.
2. Edges of canvas should be well covered and no portions should be subjected to sharp corners beneath moldings or elsewhere. Moldings should be screw-fastened, properly angled, and bedded in MIL-S-19653, type II (NSN 8030-00-579-8891) compound.

583-12.3.10.1 Glass Cloth Covering. The use of glass cloth coverings for hulls and caulked decks of wood boats is restricted and shall not be applied without prior PEO CLA (PMS 325) approval.

583-12.3.11 ELECTROLYTIC CORROSION. Dis-similar metals should not be joined, but where this is unavoidable, electrolytic corrosion shall be prevented, as far as practical, by insulating the metals from each other (refer to **NSTM Chapter 631, Volume 2, Preservation of Ships in Service - Surface Preparation and Painting**). It is important to remember, as far as wooden hull fasteners are concerned, that wood builds up a certain amount of salt concentration over a period of years. Salt affords decay protection but increases the conductivity of the wood. Many reports show that both galvanized and brass fasteners deteriorate rapidly. This deterioration is especially noticeable beneath fenders and in some woods such as white oak, Douglas fir, and mahogany. For wood boats, silicon-bronze fasteners shall be used. The foregoing applies only to fasteners for items, such as engines or winches, to wood components for which fasteners of other material may be required to provide the necessary strength. For non-magnetic minecraft, fasteners used for the hull structure and attaching engines and other equipment, shall meet the nonmagnetic requirements noted in applicable drawings.

583-12.3.12 PAINTING AND SCRAPING. Instructions regarding scraping and painting of wooden boats are contained in **NSTM Chapter 631, Volume 2** , and paragraph 583-12.3.14. Plywood surfaces shall not be prepared for painting by sandblasting. Sanding shall be done with care to avoid destruction of outer ply. Plywood having resin-impregnated paper faces shall not be sanded.

583-12.3.12.1 Bottom Paint. Shipborne or non-shipborne type boats assigned to shore activities shall have antifouling bottom paint renewed at 6-month intervals in northern waters and at 4-month intervals or more often, in tropical waters.

583-12.3.12.2 Exposed Wood in Machinery Spaces. To prevent oil from being absorbed into wood in bilges and to provide fire retardancy, all exposed wood in machinery spaces should be coated with an intumescent paint. Surfaces should be cleaned to remove grease, oil, dirt, fuel, and other contaminants. Solvent emulsion (NSN 7930-00-249-8036) is recommended.

WARNING

Solvent fumes from epoxy paint systems are potentially hazardous during application. Suitable precautions should be taken to prevent fires and to protect personnel from fumes and fume inhalation. Refer to NSTM Chapter 631, Volume 2 .

When surfaces are dry, apply one coat of epoxy primer formula 150, NSN 8010-00-410-8452 (1 gallon); NSN 8010-00-437-6757 (5 gallons) approximately 4 mils wet film by brush, spray, or roller. After approximately 18 hours, apply two coats of intumescent paint, conforming to MIL-C-46081, to a minimum dry film thickness of 10 mils.

NOTE

Intumescent paint, when exposed to a fire expands or puffs up forming an insulation barrier to the flammable surface.

583-12.3.13 INTERIOR FINISH MATERIALS AND FURNISHINGS. Data contained in the following paragraphs refer to the repair of interior finish materials and furnishings.

583-12.3.13.1 Nonmagnetic Minecraft. Because of non-magnetic requirements applicable to these craft, generally metallic materials shall not be installed on-board minecraft. Nonmetallic approved materials that are authorized for interior finish applications shall be used in all instances and will afford substantial reduction in associated fire hazards. The following materials are approved for use on wooden hull boats only.

a. Decorative sheathing systems:
   1 Bulkhead sheathing:
      (a) Nonmetallic material cited in MIL-STD-1623.
      (b) Nonmetallic sheathing or paneling material that are listed by and bear the label of Underwriters Laboratories (UL) certifying compliance with the following test acceptance criteria:
         (1) Test method-ASTM-E-84, Tunnel Test;
         (2) Flame spread rating less than or equal to 25;
         (3) Smoke density rating less than or equal to 50.
   2 Backing Material:
      (a) Wood panels conforming to MIL-L-19140.
      (b) Nonmetallic panels that are listed by and bear the label of UL certifying compliance with the following test acceptance criteria:
         (1) Test method-ASTM-E-84, Tunnel Test;
         (2) Flame spread rating less than or equal to 25;
         (3) Smoke density rating less than or equal to 50.

NOTE

Requirements for fire resistance may be satisfied by chemical treatment of certain types of decorative plywood, hardboard, particle board, and by backing materials of plywood, hard-board, and mineral or cellulose fiber boards. Only nonleaching or non-water-soluble fire retardant treatment shall be acceptable and shall be specified. Intumescent paint over combustible paneling shall not be acceptable as a treatment for fire resistance.

   3 Overhead Sheathing:
      (a) Nonmetallic materials cited in MIL-STD-1623.

NOTE

When overhead sheathing is not installed, the overhead shall be painted with an intumescent coating conforming to MIL-C-46081 and according to instructions in **NSTM Chapter 631, Volume 2** .

4 Framing and furring materials and exposed ceiling grid framework: Wood products treated according to MIL-L-19140 and dried to a moisture content of 12 + 3 percent.

5 Trim: Untreated wood may be used in minimal amounts where it will be exposed to view, such as mouldings.

b. Furniture:

1 As listed in FSC 2090, Illustrated Shipping Guide, for miscellaneous ship and marine equipment.

2 Optional furniture may be purchased if cushioning and upholstery materials conform to MIL-STD-1623.

NOTE

In general, wood frame furniture shall be used.

583-12.3.13.2 Other Wood Hull Craft. Materials in either of the following categories shall be used on wood hull boats not covered in paragraph 583-12.3.13.1. Basis for selection shall be overall superiority in terms of aesthetics, moisture transmission, cost, method of installation, and improved fire safety.

a. All materials approved for minecraft.

b. All materials approved for steel hull surface ships and submarines. Refer to MIL-STD-1623.

583-12.3.14 ADDITIONAL CONSIDERATIONS. During repair, all ventilators, doors, hatches, and drains should be opened to facilitate drying of the hull. Floorboards should be removed or placed in an upright position and all scuppers, drains, and limbers should be freed of debris. The use of forced air heaters within or nearby wooden craft under repair is to be avoided. Heavy buildup coats of paint are to be avoided.

583-12.3.14.1 Areas Left Unpainted. In new construction of all decked boats and landing craft, the area directly beneath the cargo deck is intentionally left unpainted. This area and any other area found unpainted, should be brushed or sprayed with preservative and shall not be painted.

583-12.3.14.2 Planking Seams. When feasible, planking seams of repaired boats going into storage should be hardened with cotton only and a prime coat of paint applied to planking. Final caulking and painting should be accomplished when the boat is readied for service.

583-12.3.14.3 Butt Block Drainage. All butt blocks should be fitted in such a manner that a space remains between adjoining frame members to facilitate water runoff.

583-12.3.14.4 Repaired Boat Storage. A small boat once repaired shall not be placed in uncovered storage ashore. Section 10 provides instructions for boat storage.

583-12.3.15 MATERIAL FOR WOOD HULL REPAIRS. Material used for repair shall be at least equal to the material used for construction of the hull. Where it is positively known or obvious that the material used during

construction is deficient, PEO CLA (PMS 325) should be informed in order that satisfactory substitutes can be made. Most material for repair is standard stock conforming to applicable specifications. Material for repair by private contractors should be in conformance with applicable specifications.

583-12.3.15.1 Requirements. Lumber shall be of the types and species required by applicable drawings, specifications, or approved alternates. In all cases it shall be satisfactory to NAVSEA whose decision shall be final. For repairs performed by private contractors and where commercial lumber association grades are specified, the provisions of FED Spec MM-L-736 and MM-L-751 shall apply and shall be considered a requirement in ordering lumber.

583-12.3.15.2 Moisture Content. Moisture content specified in ordering data shall be that which is stipulated herein except in those cases where satisfactory evidence is offered that facilities and schedules will permit further seasoning of lumber of the proper moisture content before installation.

583-12.3.15.3 Graded or Inspected Lumber. Lumber graded under Lumber Association Rules shall be grade marked and trademarked or accompanied by a inspection certificate issued by one of the Lumber Inspection Agencies approved by the Board of Review, American Lumber Standards Committee. Such grading and inspection shall be at the expense of the contractor. Government inspection shall be made for all requirements not covered by the association inspection.

583-12.3.15.4 Ordering and Inspecting Lumber. Lumber procured under a military specification shall conform to all the requirements of the specification unless otherwise stated herein. Ordering data shall include all information listed in the ordering data paragraph of the military specification. Inspection of lumber procured under a military specification shall be made by a government inspector.

583-12.3.15.5 Exemptions. Contractors may, with the permission of the cognizant Navy Field Office, use small quantities of lumber, obtained from local dealers, that is not grade marked or trademarked or for which inspection certificates cannot be furnished. Such quantities shall be limited and of the species called for by the specifications or applicable plans.

583-12.3.15.6 Military Specification Lumber. Green lumber is not to be used. All lumber, except bending oak and lumber for laminating shall be air or kiln dried to a moisture content of 13 ± 3 percent when measured with a resistance type moisture meter according to the procedure described in MIL-STD-1363. When solid lumber within the foregoing moisture content limitations cannot be obtained, laminated material shall be used. For bending oak, plywood, and lumber for laminating, applicable specifications shall govern the allowable moisture content.

a. Mahogany shall conform to type II, MIL-L-254 9.

b. Solid white oak shall conform to Class A, Grade 1 of MIL- L-2037 except, that end splits, shakes, sapwood, and wane will not be permitted in the finished member.

c. Red oak lumber may be used only where specifically designated by PEO CLA (PMS 325).

d. Laminated white oak conforming to MIL-W-15154, Grade B, Class 2, is permitted as an alternate to solid white oak.

e. Bending oak shall be Class E, Grade I or II, as applicable, according to MIL-L-2037, except that sapwood will not be permitted in the finished member. Bending oak stock may be laminated and steam- bent or lami-

nated to shape according to MIL-W-15154. The grade of laminations shall be Grade AA, Type 2 or 3, Class 2 or better except that when installed, no sapwood shall appear at the surface faying with the hull planking.

f. Laminated white oak members required to be laminated shall comply with MIL-W-15154, Grade B, Type 2 or 3, Class 2 or better.

g. Laminated Douglas fir members required to be laminated shall comply with MIL-W-2038, Grade B, Type 2 or 3, class 2 or better.

h. Solid Douglas fir lumber shall conform to the following grades of the West Coast Lumber Inspection Bureau (WCLIB) as applicable:

NOTE

Laminated Douglas fir, Grade B, Type 2 or 3, Class 2 or better, according to MIL-W-2038 is permitted as an alternate to solid Douglas fir.

1 Solid Douglas fir for structural uses under 2 inches in thickness shall conform to paragraph 151.b of WCLIB Standard Grading Rules (SGR) No. 16, except that end splits and sapwood will not be permitted in the finished member, and slope of grain shall not be steeper that 1 in 12. For non-structural used, solid Douglas fir shall conform to paragraph 101.c of WCLIB SGR.

2 Solid Douglas fir 2 to 4 inches in thickness shall conform to paragraph 123.a of WCLIB SGR No. 16, except that end splits, sapwood, and wane will not be permitted in the finished member and the entire piece shall be graded as the middle third.

3 Solid Douglas fir over 4 inches in thickness shall conform to paragraph 131.a of WCLIB SGR No. 16, except that end splits, sapwood, and wane will not be permitted in the finished member.

i. Yellow pine shall be dense Industrial 72 conforming to paragraph 322 of the 1970 Standard Grading and Dressing Rules for Southern Pine Lumber, except that end splits, sapwood, and wane will not be permitted in the finished member. Solid Douglas fir of the foregoing grades may be considered an alternate if yellow pine is not available.

j. Cedar shall conform to MIL-L-2594 grade A or B, except that sapwood shall not be permitted in the finished member.

k. Spruce for structural use shall be Sitka, conforming to paragraphs 151.b, 152,b, 178 of WCLIB SGR No. 16, except slope of grain shall not exceed 1 in 12. Eastern spruce graded to the same rules may be used. For non-structural use, spruce shall conform to paragraph 101.c of WCLIB SGR No. 16 or National Hardwood and Pine Manufacturer's Association Grade C and Better Select.

l. Cypress shall conform to Tank and Boat Stock Grade according to National Hardwood Lumber Association (NHLA) Grading Rules. Cedar of the above mentioned grade may be substituted for cypress.

m. Fir plywood shall be Class 1, conforming to MIL-P-18066.

n. Mahogany plywood shall be Class 2, conforming to MIL-P-18066.

o. Overlayed plywood shall be Class 3, conforming to MIL- P-18066.

583-12.3.15.7 Wood Adhesives. Wood adhesives for laminated members shall be according to the requirements of MIL-W-15154 and MIL-W-2038, as applicable. For scarfs, gussets, and other wood components which require assembly gluing, the adhesive shall conform to MIL-A-22397, which is listed on Qualified Products List-22397 to cure at 15°F for a minimum of 48 hours before any stress is placed on the glue bond by handling, machining,

or moisture content changes. Curing shall continue at 75°F or more for at least 6 days before bonds are exposed to wetting. If manufacturer's instructions require curing at temperatures above 75°F, those instructions shall be followed.

583-12.3.15.8 Flotation Material Adhesives. For cementing flotation material to wood and to itself, the following adhesives have been tested and found to be satisfactory. No other adhesive shall be used without prior PEO CLA (PMS 325) approval.

a. HuGlue No. 4024, Hughes Glue Co., 3500 Aubin Ave., Detroit, MI.

b. Rez-N-Glue, Schwatz Chemical Co. Inc., 326 West 70th St., New York, NY.

c. X-421A and X-421B, Haveatex Corp., Goodyear Ave., Melrose, MA.

583-12.3.15.9 Flotation Material. Flotation material shall conform to Class 1, MIL-P-21929, except the nominal density shall be not less than 2.0 lb/ft^3 and shall have a fire resistance rating of non- burning. (The rating of non-burning refers only to performance in a laboratory test and is not meant to imply incombustability under actual enduse conditions.)

583-12.3.15.10 Wood Preservatives. Wood preservatives shall be type A or B according to MIL-W-18142. (Refer to paragraphs 583-12.3.7 through 583-12.3.7.5).

583-12.3.15.11 Wood Bedding Compounds and Cements. Wood bedding compounds and double planking cements shall conform to MIL-S-19653 (NSN 8030-00-579-8891), type I or 3M Co. Scotch-Seal 5200.

583-12.4 WELD REPAIR

583-12.4.1 GENERAL. Repair work, including all welding and inspection criteria, does not warrant going beyond the requirements of the original building specifications. Repairs to structure in areas noted below should be accomplished according to original fabrication documents.

- Main deck
- Bottom and Side Shell
- Sheer Connection
- Skeg
- Chine

Repair of welds shall be subject to all specification requirements that applied to original welds and shall be subject to the same inspection requirements. Inspection shall be limited to area of repair and shall not include existing surrounding areas. In the absence of original documentation, the following can be used as a guide to repairs.

583-12.4.1.1 Welding procedures and welding personnel shall be qualified as required by **NSTM Chapter 074, Volume 1, Welding and Allied Processes** . NAVSEA 0900-LP-060-4010, **Fabrication, Welding, and Inspection of Metal Boat and Craft Hulls** , should be used for guidance. It is recommended that immediately prior to commencement of each day's production welding, that the welder perform an individual weld quality

break test. This is done by welding a ″T″ joint of metal with thickness similar to those to be welded. The weld should be a single side fillet. Once completed, the welder is to visually examine it for excess porosity. If acceptable, the welder can continue; if not acceptable, the welding process should be checked and the field test repeated until the visual inspection shows acceptable welds.

583-12.4.2 BUTT-WELDS. All butt welds in the above areas shall be 100 percent efficient. Full penetration welds, where compatible weld metal of equivalent or greater ultimate tensile strength is used are considered to be 100 percent efficient welds, except those welds made from one side without backing shall have a maximum efficiency of 80 percent.

583-12.4.3 INSPECTION CRITERIA. Full-penetration butt welds in or to inserts or closure plates in plating in the above areas shall be RT and UT inspected. Where RT is used, a 9-inch radiograph shall be made for each closure plate or insert. The shot shall be made at a weld intersection. If there are no weld intersections, the shot shall be made at a corner. RT inspection personnel shall be qualified in accordance with MIL-STD-271. All welds shall meet acceptance standards of MIL-STD-2035. UT may be substituted for RT. UT inspection personnel shall be qualified in accordance with MIL-STD-271. All welds shall meet acceptance standards of MIL-STD-2035.

583-12.4.4 WEIGHT HANDLING, LIFTING, MOORING AND TOWING FITTINGS. Repairs to welds in or to weight handling, lifting, mooring and towing fittings and their foundations supporting over 500 pounds shall be MT or PT inspected, depending on the material involved. A minimum of ten percent of the length of each weld shall be inspected. Upon detection of defective welding, the inspection shall be expanded as required by the authorized representative of NAVSEA. MT and PT inspection personnel shall be qualified in accordance with MIL-STD-271. Welds shall be free of cracks and shall not exhibit any linear indications in excess of those permitted in NAVSEA 0900-003-8000. Records of inspections of hoisting fittings and slings shall be according to paragraph 583-7.4.1.

583-12.4.5 INSERTS, PATCHES, & SMALL ACCESS PLATES. The minimum dimension of an insert, patch or small access plate shall be the larger of 3 inches or 4 times the thickness of the penetrated plate. Corners of inserts, patches, or small access plates shall have a minimum radius as shown in Figure 583-12-1.

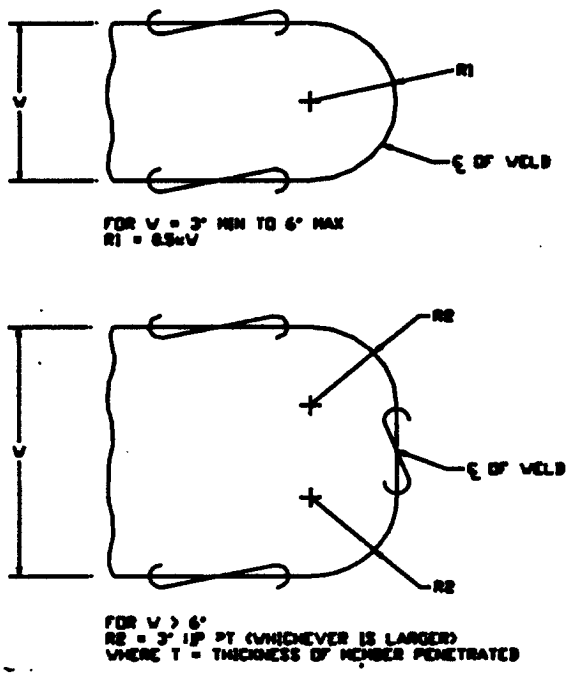

Figure 583-12-1. Inserts, Patches and Small Access Plates in Plating

583-12.4.6 ACCESS & CLOSURE PLATES. Access and closure plates shall be located between principal framing or bulkheads, and shall be at least 3 inches from any of these members. The boundaries of access and closure plates should land on existing butts or seams. Welding closer than 6 inches to a mechanically fastened joint should be avoided. Corners of access or closure plates shall have a minimum radius of 6 inches, except when a boundary lands on an existing hull longitudinal or transverse butt joint. Then the corner shall intersect the weld at an angle of 90 ±15 degrees (see Figure 583-12-2). Closure plate weld joints shall be full-penetration, 100 percent efficient welds.

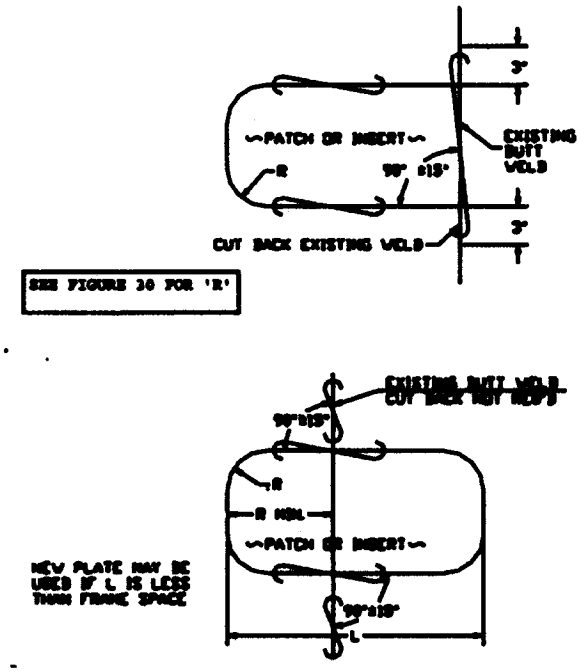

Figure 583-12-2. Relationship of Inserts, Patches, and Small Plates to Existing Butt Welds

583-12.4.7 HOLES. Holes may be welded closed provided the original hole does not exceed 2-1/2 inches in diameter and the material is 3/16 inch or greater in thickness. The opening shall have an included angle of 20 degrees minimum and shall be open at the root greater than 1/2 inch. Full-penetration welds shall be used. Through thickness holes welded against a backing bar shall have the backing bar removed (if accessible) and the back surface inspected in accordance with applicable specifications. Holes greater than 2-1/2 inches or in material less than 3/16 inch thick shall be repaired by expanding the hole size for a patch, in accordance with dimensions for an insert above. Partial penetration holes greater than 2-1/2 inches diameter may be welded closed to above requirements provided the depth of the hole does not exceed 20 percent of the base material thickness. Repair area shall not exceed 48 times the thickness of the parent metal. See Figure 583-12-3 for alternative methods of repair of holes where tightness is the only consideration.

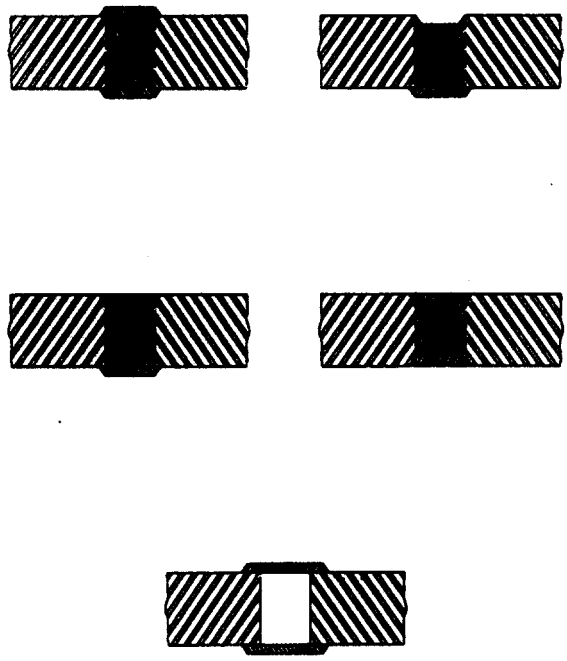

Figure 583-12-3. Alternative Methods of Repairing Holes Where Tightness Is the Only Consideration

583-12.4.8 PITTING. Scattered pits, i.e., partial penetration holes less than 2 inches in diameter, up to 15 percent of the depth of the parent metal need not be repaired. Scattered pits between 15 percent and 45 percent of the depth of the parent metal may be repaired by welding. The pit shall be ground out and faired to allow for proper deposition of weld metal. Pits exceeding 45 percent depth of the parent metal shall be repaired by drilling through and repairing as a hole, as described above. All repair welding shall be ground smooth and faired evenly into base metal.

583-12.5 ALUMINUM BOATS

583-12.5.1 ALLOY IDENTIFICATION. Most Navy hulls built before 1970, were constructed of either plate alloy 5086-H32, of FED Spec QQ-A-250/7, in combination with 5086-H111 extruded shapes of FED Spec QQ-A-200/5; or of plate alloy 5456-H321, of FED Spec QQ-A-250/9, in combination with alloy 5456-H311 extruded shapes of FED Spec QQ-A-200/7. It is recommended that all repairs be made with identical alloys, and except for plates, identical tempers.

583-12.5.1.1 Replacement Plate Alloys. Alloy 5456-H321 plate replacement shall be with alloy 5456-H116 or H117, and alloy 5086-H32 plate replacement shall be with alloy 5086-H116 or H117, ASTM B209.

583-12.5.1.2 Aluminum Identification. All aluminum produced by American fabricators sold to the U.S. Navy should be stenciled. To identify the aluminum, locate an area that has not been painted and check the stenciling on the material. Extrusions should be similarly stenciled.

583-12.5.1.3 Not Able To Identify Alloy. If stenciling does not exist, aluminum may be identified by referring to applicable drawings or by chemical analysis. If it is impossible to identify or determine the alloy used during construction, replacement alloy plates and shapes should be of alloy 5086. (Most Navy hulls, built in 1970 or later, should be constructed of the 116 or 117 tempers of plate material.)

583-12.5.1.4 Casting. Castings such as deck fittings, mooring bits, and chocks are of casting alloy 356.0-T6, ASTM B26/B26M. Should cast fittings need replacement they should be cast of the same alloy.

583-12.5.1.5 Suppliers. Procurement of repair material may be through Navy stock, local distributors, or through one of the aluminum producers.

583-12.5.2 YARD REPAIR. Supervised yard repair should be equal to original construction. Original specifications and amendments plus a set of as-built drawings should be available to the repair yard. The yard should have up-to-date, modern welding equipment capable of welding material of the thickness involved. Normally, air-cooled Metal Inert Gas (MIG) guns can be used for 3/8-inch plate or thinner. Heavier plates should be welded by water-cooled MIG guns properly set for voltage and amperage. Recommended settings are available from various aluminum industry and welding equipment publications.

583-12.5.2.1 Weld Wire. Weld wire shall be compatible with base metal. The wire should be stored to avoid exposure or contact with grease, oil, excessive moisture, and other contaminants. Weld wire reliability can be enhanced by proper rotation of stock on hand. Wire with a white oxide coating, or otherwise suspected of being contaminated, shall be checked by running a bead on a plate and grinding the crown of the bead to check for excess porosity. Wire that proves unsatisfactory shall be replaced. No other filler wires except those listed in Table 583-12-1 should be used with the base metal.

Table 583-12-1. FILLER WIRE

Base Metal	Filler Wire
5456 to 5456	5556 of MIL-E-16053
5456 to 5454	5554 of MIL-E-16053
5456 to 5086	5356 of MIL-E-16053
5086 to 5086	5356 of MIL-E-16053
5086 to 5454	5554 of MIL-E-16053
5454 to 5454	5554 of MIL-E-16053
356 T-6 to 5086	*5356 of MIL-E-16053
*Contrary to existing specifications	

583-12.5.2.2 Cutting Plates and Shapes. Most cutting of aluminum plates and shapes will be done by mechanical means. Electric or pneumatic saws, routers, nibblers, planers, sanders, and so forth, can be used for aluminum construction. Bevels can be prepared with routers, saws, planers, or sanders.

CAUTION

Oxyacetylene torches should not be used since they will leave a molten, irregular cut requiring a recut by mechanical means.

CAUTION

Avoid hot forming of aluminum alloys because of increased chances for sensitization to corrosion. Where hot forming must be accomplished, procedure shall be approved by PEO CLA (PMS 325).

CAUTION

Lubricants on cutter blades and binders on abrasive wheels can contaminate weld joints. Cutting and grinding tools should be clean and free of all lubricants. Prior to welding the joint it should be thoroughly cleaned using a suitable liquid solvent.

a. Cutouts for repair work can be made with a circular or all-purpose saw.

b. Plasma arc cutting can be used for aluminum and is recommended whenever feasible.

583-12.5.3 FIELD REPAIR. If there is a reasonable facility in the area, such as a mother ship, small yard, or other ships, a welding unit should be available for field repairs.

583-12.5.3.1 Air-Cooled MIG Gun. An air-cooled MIG gun would take care of the majority of repair work. It should be noted, however, that this gun is normally limited to a maximum thickness of 3/8-inch where continuous welding is involved. This is due to its current rating of 230 amps for a short duty cycle. Temporary repairs can be made on heavier plate. For high quality repairs or for work equivalent to original construction, a heavy duty, water-cooled unit is needed.

583-12.5.3.2 Availability of Aluminum and Gases. Availability of marine aluminum can be a problem. Some basic plate sizes and extrusions can be stored aboard a mother ship or carried aboard individual boats. The previously specified compatible welding wire, along with argon, helium, or argonhelium shielding gas, should be carried with the base material.

583-12.5.3.3 Bolted Patches. If welding is impractical or impossible, used bolted aluminum alloy patches. This type of repair requires a saw and a good metal-cutting saw blade for cutting plate to size and for fairing out any jagged edges in the hull penetration. After the patch plate is cut to size, it can be connected to the hull by means of aluminum or stainless steel bolts or other fasteners. In an emergency any type of bolt will do. This shall be considered a temporary repair since dissimilar metals cause galvanic corrosion. For bolting the patch to the hull, a sealing material should be inserted around the periphery. If a number of repairs of this type are anticipated, then it might be wise to provide several rolls of the sealing type tapes used by aluminum small boat manufacturers. Most major tape manufacturers supply this tape in various thicknesses and widths. These are the tapes used on modern day aluminum small boats and they do a good job in not only sealing the seam but also in keeping rivets from leaking. The holes for the bolted assembly will, of course, be made by a rotary drill.

583-12.5.3.4 Bolted Steel Patches. If the boat is operating in remote areas, where no facilities for welding aluminum are available and damage is incurred, temporary repairs can be made with steel patches. Some type of insulation, such as neoprene, should be used between the aluminum and steel if possible. Large, temporary hull repairs can be made in this manner. The damaged area can be cropped out. The steel repair plate, including structural framing members, can be prefabricated by welding, leaving sufficient lap for mechanical fastening. The unit can then be bolted to the aluminum hull with insulation between. Splices can be made across the structural members. If tapes or neoprene are not available for insulating the steel and the aluminum, material such as butyl rubber, polysulfide, or any heavy bodied flexible type coating will do. Avoid wicking type materials such as flax, canvas, and the use of lead pigmented compounds such as red lead. All areas to be repaired, using either

mechanical or welded attachments, should be power wire brushed (using a stainless steel brush) before the application of sealant or welding. The temporary steel repair should be replaced with the proper aluminum repair as soon as possible.

583-12.5.4 EXPOSED EDGES. All bare edges of aluminum alloy plate (edges of faying pads in frame-to-shell connections) that are located below the water line inside the hull or on the external hull shall be buttered for corrosion resistance. Buttering may be performed using any weld process qualified for aluminum fabrication. If edge buttering results in protrusion of the weld bead which could interfere with a flush fit patch, all excess weld material should be removed. The bare edges of aluminum alloy material in all areas should be inspected for edge splitting and any defective areas should be repaired or replaced and the edges similarly buttered.

583-12.5.5 ADDITIONAL REQUIREMENTS. Welding procedures, welding personnel, and non-destructive testing personnel shall be qualified as required by **NSTM Chapter 074, Volume 1, Welding and Allied Processes** . Fabrication, welding, and inspection shall be accomplished as required by a BOATALT or applicable repair, or by alteration drawings. NAVSEA 0900-LP-060-4010, **Fabrication, Welding, and Inspection of Metal Boat and Craft Hulls** , should be used for guidance. Records of inspections of hoisting fittings and slings shall be according to paragraph 583-7.4.1. It is recommended that immediately prior to commencement of each day's production welding, that the welder perform an individual weld quality break test. This is done by welding a ″T″ joint of metal with thickness similar to those to be welded. The weld should be a single side fillet. Once completed, the welder is to visually examine it for excess porosity. If acceptable, the welder can continue; if not acceptable, the welding process should be checked and the field test repeated until the visual inspection shows acceptable welds.

583-12.6 GLASS REINFORCED PLASTIC (GRP) BOATS

583-12.6.1 GENERAL INSTRUCTIONS. Several instruction manuals are available covering plastic repairs. These include separate guides for minor and extensive repairs. The Boat Information Book (BIB) for each boat includes general information similar to that in the instruction manuals.

583-12.6.1.1 Vinylester Resin. Until the eighties, all U.S. Navy fiberglass craft were constructed of glass reinforced plastic (GRP), a laminate made up of a matrix of glass rovings and polyester resin. The craft have withstood the rigors of service extremely well. During the eighties, extensive testing in the lab and eventually in Naval craft showed that vinylester boat-building resin possesses superior strength and stiffness characteristics when compared to polyester resin. Although vinylester resin is more expensive than polyester resin, its utilization permits a reduction of laminate thickness without reducing strength. In an effort to reduce craft weight, especially for shipborne boats, vinylester resin was used in the fabrication of selected ″weight critical″ craft. The following is a list of craft fabricated of vinylester resin:

a. 24-foot Rigid Inflatable Boat, (all MK's) and 7 meter

b. 26-foot Motor Whaleboat, MK11, 12

c. 26-foot Personnel Boat, MK6, 7, and 8 meter

d. 33-foot Utility Boat, MK4 and 10 meter

e. 33-foot Personnel Boat, MK6, 7, and 10 meter

f. 36-foot Landing Craft Personnel (Large), MK13 and 11 meter

g. 40-foot Personnel Boat, MK5, 6, 7, and 12 meter

h. 12 meter Utility Boat

i. 15 meter Utility Boat, MK1

583-12.6.2 MINOR REPAIRS. Methods for accomplishing minor repairs to plastic boat hulls are detailed in NAVSEA 0900-LP-006-0010, **Reinforced Plastics Preventive Maintenance and Repair Manual, together with U.S. Navy Training Film entitled Reinforced Plastics-Repair of Single Skin Failures (DN24354)** . Repair kits for these repairs are provided in the Navy Supply System under NSN 2090-00-372-6064 at the NAVICP. Instructions are provided with each kit. Because of possible differences in the resins supplied by different manufacturers, care should be taken to follow the instructions applied with the kit being used.

583-12.6.3 EXTENSIVE REPAIRS. Restoration procedures for extensive hull damage are detailed in NAVSEA 0982-LP-019-0010, **Repairs to Glass Reinforced Plastic Boats, and U.S. Navy Training Film, Major Structural Repairs of Plastic Boats (DN25725)** .

583-12.6.4 SATURATED BUOYANCY FOAM REPAIR METHOD

583-12.6.4.1 Introduction. The purpose of this paragraph is to address the repair methodology for boats containing water saturated buoyancy foam. The following topics will be discussed:

a. Purpose of buoyancy foam;

b. The problem with saturated buoyancy foam;

c. Tips for prevention of buoyancy foam saturation;

d. Detection of saturated buoyancy foam;

e. Removal and repair of saturated buoyancy foam.

583-12.6.4.2 Purpose of Buoyancy Foam. Buoyancy refers to hydrostatic forces acting on a floating body. An object which floats is referred to as buoyant. The buoyancy force is determined by multiplying the under-water volume of a craft by the density of water. For a floating object, the buoyancy force is equal to the object weight. U.S. Navy requirements dictate that small craft must have enough reserve buoyancy to remain afloat when the craft is swamped or damaged. Buoyancy foam is used to meet this requirement. The buoyancy foam occupies volume in a craft, thereby preventing flooding of that volume when the craft is submerged. The volume occupied by the foam provides a buoyant force which helps keep the craft afloat when it is swamped or damaged. The buoyancy foam currently used in U. S. Navy craft must meet the requirements of MIL-P-21929, with the restriction that the minimum allowable density of nominal 2 pound per cubic foot buoyancy foam is 1.8 pounds per cubic foot. The foam is a rigid, unicellular, polyurethane material which is foamed (or formed) in place. The foam is produced by mixing two liquids and pouring or injecting this mixture into the void to be filled. The mixture expands in place and fills the void. A fill hole and several vent holes must be drilled in the laminate surrounding the void before the foam is mixed. Complete filling of the void space is extremely important, and is indicated by emergence of foam from the vent holes.

583-12.6.4.3 The Problem with Saturated Buoyancy Foam. As stated previously, buoyancy foam provides reserve flotation that ensures a craft will float when the craft is swamped or damaged. Portions of the craft occupied by buoyancy foam are sealed to prevent water from entering. When water penetrates into these spaces,

buoyancy is reduced and craft weight is increased. For this reason, it is vitally important that saturated buoyancy foam be replaced as soon as it is discovered. Wet foam cannot be repaired; it must be replaced because it is virtually impossible to completely dry out wet foam.

583-12.6.4.4 Tips for Prevention of Buoyancy Foam Saturation. Saturated buoyancy foam is, at best, laborious to replace. Repair work is difficult to perform because access is difficult due to buoyancy foam locations. Therefore, prevention of foam saturation should be a high priority. Most buoyancy foam is located in the sides of the craft, directly beneath the deck. Deck hardware is usually installed with self-tapping screws or through-bolts. Holes for these fasteners, as well as any other openings, must be sealed with catalyzed laminating resin or epoxy to prevent moisture from entering the deck laminate. Self-tapping screws must be dipped in catalyzed laminating resin or epoxy before they are installed to seal the drilled holes. Hull through fittings and fittings attached to deck structure must be set in bedding compound to form a watertight joint. The bedding compound should be Products Research Corporation PR-365, 3M 101, Sikaflex 241 or an equivalent brand. In addition to more extensive damage, cracks that develop in exterior paint or gel coat should be repaired immediately to limit the amount of moisture that seeps into the laminate. Moisture that enters the laminate will eventually penetrate into the buoyancy foam. Extra time is required to properly seal holes in laminates and to properly fix minor damage, but replacing saturated foam is much more costly and time consuming.

583-12.6.4.5 Detection of Saturated Buoyancy Foam and Its Extent. There are several indicators of the existence of saturated buoyancy foam. In older craft, laminates that are spongy or soft are generally saturated with water. Decks cored with balsa are the prime example of this type of deterioration. If a deck is saturated, it is probable that the buoyancy foam beneath the saturated area is also wet. The existence of multiple large blisters on a laminate indicates that water has been absorbed into the laminate, and may indicate that water has penetrated into the foam. A laminate that has had multiple repairs or multiple holes drilled in it for hardware installation has probably allowed water to penetrate into the buoyancy foam.

NOTE

Hull thinning caused by paint preparation sanding of the hull results in moisture migration through the laminate.

If saturated buoyancy foam is suspected, it should be repaired immediately. The repair process consists of removing the saturated foam, drying out the foam compartment, and replacing the buoyancy foam. The repair operation should be completed in accordance with the directions given in NAVSEA T9008-B4-MAN-010, **Inspection and Repair Manual for Fiber Reinforced Plastic Boats and Craft** .

583-12.6.4.6 Repair of Buoyancy Foam. Buoyancy foam is used in most Navy GRP craft to prevent sinking in the event of craft damage or swamping. Buoyancy foam is usually installed around the sides of the craft between the outer hull and the liner or seat laminate, by pouring or injecting a liquid mixture into the space which expands and cures to form a light weight, rigid polyurethane foam. The as-built drawings for the craft should be studied to identify the location of the buoyancy foam compartments and structure used to seal off these areas. The location and amount of buoyancy foam is carefully designed to allow the craft to float in a level, stable condition when swamped to maximize the safety of the occupants. If the buoyancy foam loses effectiveness due to damage or saturation with water, the craft may not float upright or may sink if damaged or swamped.

583-12.6.4.6.1 Replacement Requirements. Buoyancy foam must be replaced when it is damaged by penetration of the enclosing laminate, removed to provide access to repairs, or when it becomes saturated with water. Water saturated buoyancy foam cannot be repaired by drying with heat, vacuum, or other means. Replacement buoyancy foam must meet the requirements of MIL-P-21929. The qualification testing need not be performed for

buoyancy foam used in repairs, since the qualification process is expensive and time consuming. However, the foam manufacturer must certify that the buoyancy foam meets the requirements of MIL-P-21929. In addition, samples of the buoyancy foam must be tested to verify that it is of the correct density. Note that the density of nominal 2 pound per cubic foot foam must be at least 1.8 pounds per cubic foot rather than the minimum of 1.5 pounds per cubic foot specified by MIL-P-21929. Where buoyancy foam of 4 pounds per cubic foot density is specified, it must use the same materials as buoyancy foam meeting the requirements of MIL-P-21929.

583-12.6.4.6.2 Determining Damage Extent. Before beginning repair of buoyancy foam, the extent of the damage must be determined. The extent of damage to buoyancy foam damaged during collision or during repair of the enclosing laminate is easily determined by visual inspection. However, many craft, particularly older craft, have buoyancy foam which has absorbed water, and the determination of the extent of this problem is more difficult. In some cases, the only indication that the buoyancy foam has absorbed water is that the craft has gained a substantial amount to weight which cannot be accounted for by the weight of added equipment. The only method of verifying that buoyancy foam has become water saturated is to cut through the laminate and expose the buoyancy foam. The buoyancy foam may be inspected by using a 2-inch hole saw to remove a plug of laminate and expose the foam.

583-12.6.4.6.3 Repair Procedures. The following procedures shall be followed in repairing buoyancy foam.

583-12.6.4.6.3.1 Equipment and Materials Requirement. Assemble equipment and materials consisting of:

a. Large metal or plastic funnel
b. Power drill
c. Jiffy mixer
d. Drill bit, 1/2″ diameter, with extension (length as required)
e. Hole saw, 2″ diameter, with pilot drill
f. Tubular foam drill
g. 1/2″ wood chisel
h. Respirator and personal protective gear
i. Chalk or permanent felt marker
j. Containers for mixing foam
k. Foam-in-place buoyancy material 2 lb/ft^3 , Part A
l. Foam-in-place buoyancy material 2 lb/ft^3 , Part B

583-12.6.4.6.3.2 Removal of Foam and Repair of Laminate.

1. Start by cutting a hole near the bottom of the foam space. Use the hole saw for this purpose.
2. If water flows from the hole, or if a strong chemical odor is present, cut into the foam to check for wet foam.
3. Cut additional holes higher in the space as required to determine the extent of the water saturation.
4. Buoyancy foam may be wet only on the surface that is in contact with the laminate, or the saturation may extend into the foam. In either case, the wet material must be removed before the laminate can be repaired.

This is best accomplished by removing a section of the enclosing laminate large enough to reach into the foam compartment with a trowel or similar tool. The laminate cut for foam access should be in an area that can easily be repaired, and, if possible, not part of the hull or deck to avoid compromising the strength of the craft.

5. Ensure all of the wet foam removed to prevent contamination of the repair laminate and replacement buoyancy foam.
6. The space must be allowed to completely dry before proceeding with repairs. If space heaters or heat lamps are used to speed the drying process, the laminate must not be permitted to become hotter than can be touched. An electronic moisture meter may be helpful in determining the progress of the drying process.

583-12.6.4.6.4 Determining Fill and Vent Hole Locations. When the damaged buoyancy foam has been removed, determine locations for filling and vent holes. These should usually be located on the deck or flat above the foam space.

1. Using the drill and the 2-inch hole saw, cut through the deck laminate to make a fill hole. Retain the cutout to determine thickness of the laminate replacement. If required, use the 1-1/2-inch tubular foam drill to cut down through the existing buoyancy foam into the cavity to be filled.
2. Locate at least two locations for vent holes in the corners of the cavity. Using the 1/2-inch diameter drill bit and extension with the power drill, drill vent holes through the deck above at the chosen locations.
3. Remove any loose materials from the cavity, making sure that the vent holes are in the highest points of the cavity. Measure the cavity to determine the required volume of replacement foam.
4. Proceed with repair of the damaged laminate as described in NAVSEA, T9008-B4-MAN-010, **Inspection and Repair Manual for Fiber Reinforced Boats and Craft** . Tape over the pour and vent holes until just before mixing the components of the buoyancy foam. If the replacement buoyancy foam is to be used to provide a surface on which to laminate the repairs, continue with the installation of the foam, using temporary backing plate to contain the foam in way of the damaged area of laminate.
5. Use the measurements of the foam cavity to estimate the volume of foam required to fill the cavity, allowing two pounds of foam weight for each cubic foot of volume in the foam cavity, plus 20 percent for waste, or a total of 2.4 pounds of foam per cubic foot of cavity volume.

583-12.6.4.6.5 Replacing Buoyancy Foam. Replacement buoyancy foam may be mixed from liquid components and poured into the cavity or injected into the cavity using foam frothing equipment. Foam frothing equipment mixes the foam components and applies the mixed foam through a nozzle, which simplifies the application procedure and avoids the problem of attempting to pour mixed foam before it expands. Use of foam frothing equipment is recommended if buoyancy foam repairs totalling more than 6 cubic feet are undertaken.

a. Poured Foam. Attach the large funnel to the pour hole and mix a quantity of the material sufficient to fill the cavity after expansion. Use the Jiffy mixer to mix the foam components.

CAUTION

The buoyancy foam expansion may be rapid and produce a large amount of pressure and force. Caution must be used to assure that sufficient vent area

Caution - *precedes*

is provided in any space that will be filled with foam. If the size of the vents is inadequate, the foam expansion may damage the craft structure.

The mixing and pouring of the foam must be accomplished before the foam begins to expand. If the temperature is above 80 degrees, the rate of expansion will be more rapid; therefore, be prepared to work quickly.

1 Pour the mixed buoyancy foam into the funnel over the pour hole, removing the funnel from the hole as soon as the foam has been poured. When foam begins rising from the pour hole, block the pour hole with a block of wood or other object and verify that foam is rising out of the vent holes.

2 If no foam rises out of the vent and fill holes, it may be necessary to add more buoyancy foam to the cavity. Reopen the fill hole with the tubular foam drill if required. Repeat the steps above as required until foam emerges from all the fill and vent holes, indicating that the cavity is completely filled.

b. Foam Frothing Equipment. Inject the foam through the fill hole. Large spaces (over 6 cubic feet) should be foamed in two stages to prevent excessive pressure buildup due to the expansion of the foam. In the last step of the foaming, foam should rise from the vent and fill holes. If necessary, use the foam drill to open the fill hole.

c. Using a chisel, carefully remove the foam that emerged from the vent and fill holes. Remove the foam in the vent and fill holes to the inside surface of the laminate.

d. Repair the vent and fill holes in accordance with NAVSEA T9008-B4-MAN-010.

583-12.6.4.6.6 Finishing. If the damaged laminate or access hole used to remove the wet or damaged buoyancy foam was not repaired prior to foam replacement, repair the laminate in accordance with NAVSEA T9008-B4-MAN-010. Carefully shape the buoyancy foam to provide a form for laminating the repair laminate.

583-12.7 POLYURETHANE (POUR-IN-PLACE) SHEER FENDER

583-12.7.1 POLYURETHANE SHEER FENDER INSTALLATION. The polyurethane sheer fender is a one piece, poured-in-place casting. The sheer fender adhesively bonds to the craft without the aid of mechanical fastening. The polyurethane fender is less susceptible to damage than traditional metal capped wooden fendering and should help to reduce life cycle maintenance costs. Repair of the polyurethane fendering is discussed in paragraph 583-12.7.2. This paragraph describes the fabrication process of polyurethane fendering. See the applicable BOATALT for required fender dimensions.

583-12.7.1.1 Safety and Health Precautions.

WARNING

PRC Primer #4-Marine contains flammable and volatile solvents. Keep away from heat, sparks, and open flame. Proper precautions used with flammable material shall be taken when applying this product. Comply with all applicable safety regulations.

PR-1539-U and required primers are safe materials to handle if reasonable care is observed. Uncured PR-1539-U, PRC Primer #4-Marine, and PRC Primer #420 Marine and its components contain a mixture of solvents and isocyanates, vapors of which may cause irritation to the skin, eyes, nose, and throat. Avoid breathing

of vapors. Either natural ventilation or mechanical exhaust ventilation is required to remove vapors and to dilute them in enclosed working spaces to a concentration which is safe for the entire work period. In work areas with limited ventilation, respirators approved by NIOSH or the Bureau of Mines to protect against organic vapors shall be used. Individuals with chronic respiratory problems or prior respiratory reaction of isocyanates should not be exposed to vapors. In cases of extreme exposure or adverse reaction to any of the products mentioned above, remove affected personnel to fresh air and obtain immediate medical attention. The use of rubber gloves and disposable coveralls is recommended when mixing or applying solvents, primers, and polyurethane. Skin contact with these materials may produce irritations. If a rash develops consult a physician. Ordinary hygienic principles, such as washing hands before eating or smoking, shall be observed. For additional information, consult a Material Safety Data Sheet which is available upon request from the manufacturer.

583-12.7.1.2 Materials and Tools. Table 583-12-2 lists materials required for the installation of a polyurethane sheer fender. Refer to applicable BOATALTS for quantities of materials required. A mold is required for the installation of the fender. Contact PEO CLA (PMS 325) for possible availability of a mold. Otherwise, fabrication of a mold will be required as described in paragraph 583-12.7.1.3. Table 583-12-2 also lists materials required for mold fabrication.

PEO CLA (PMS 325) Telephone:

Commerical	703-602-8401
Defense Switch Network (DSN)	332-8401

583-12.7.1.3 Fender Mold. A mold is required for the fabrication of the polyurethane sheer fender. The mold is temporarily secured to the craft and the polyurethane is poured into it. If an existing mold is not available, one will have to be manufactured in accordance with the following procedure. Remove any interferences from the hull such as toe rails and existing fendering.

583-12.7.1.3.1 Full Scale Model. The mold construction process begins with the making of a full scale model of the fender out of a material that is easy to shape such as polystyrene. The polystyrene is first templated to the shape of the fender where it will be attached to the hull. The model is then shaped to the specified dimensions of the finished fender. See Figure 583-12-4.

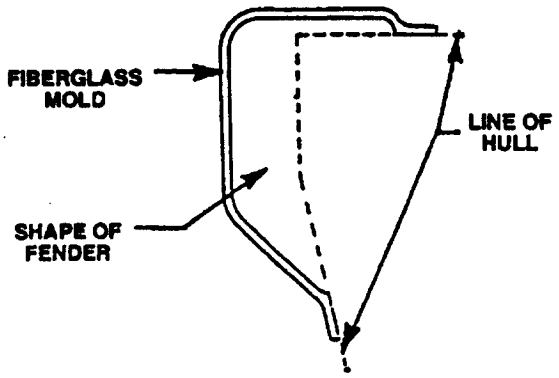

Figure 583-12-4. Typical Mold Cross Section

583-12.7.1.3.2 Fiberglass Mold. A fiberglass mold is then fabricated from the model. Typical fiberglass construction techniques shall be used to make a mold that is strong enough to support the weight of the polyurethane (about 91 pounds per cubic foot). One-inch flanges should be provided for attachment of the mold to the hull for applying a sealing bead of caulk and double sided adhesive tape. Refer to Table 583-12-2 for materials required for mold fabrication.

583-12.7.1.3.3 Stand-Pipe Arrangement. The mold can be made in easily handled sections. See Figure 583-12-5. To allow for a more even distribution of polyurethane when poured into the mold, 1-1/2-inch PVC pipes should be inserted into the top of the mold. Since the pipes will also allow air to escape, pipes should be located at the high points of the mold, typically at the bow and center of the transom. Additional pipes are recommended at each stern corner, and additionally spaced about every six feet. Top of pipes shall be located at the same distance above the ground or shop floor to prevent overflowing from one tube while pouring into another. See Figure 583-12-6.

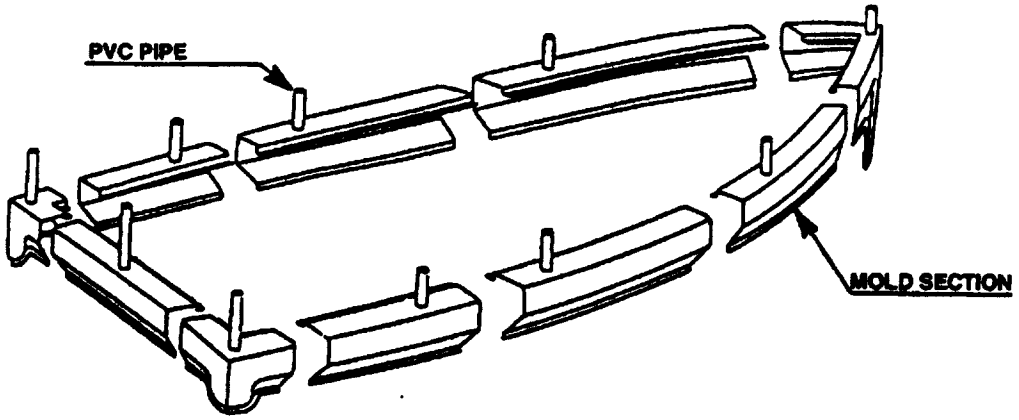

Figure 583-12-5. Typical Mold Arrangement

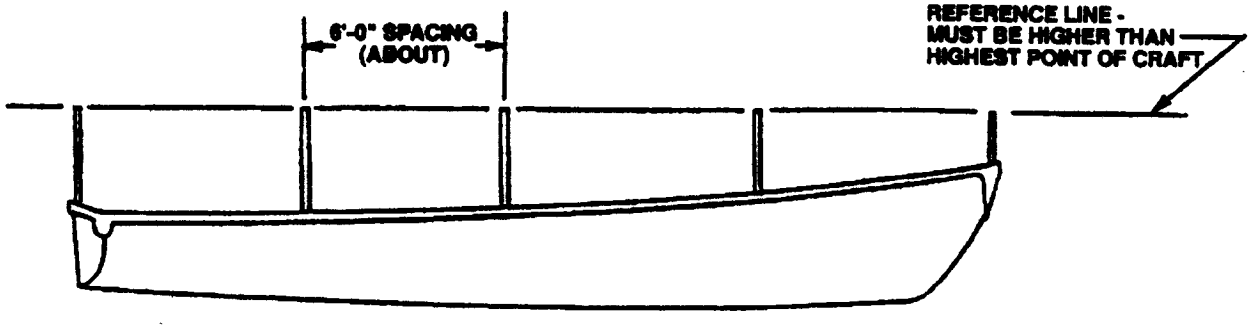

Figure 583-12-6. Typical Stand Pipe Arrangement

Table 583-12-2. MATERIAL FOR POLYURETHANE SHEER FENDER AND MOLD FABRICATION

FENDER MATERIALS	
ITEM	**SOURCE**
PolyurethanePR-1539-U Non-Camber Grade512 Kit (4 Gallons-Yields about 0.53 Cubic Feet)	International Paint6001 Antoine DriveHouston, Texas 77210-4866Tel: 1-800-654-7692
Primer (for Metal and Fiberglass Surfaces)PR #420 Marine112 Kit (112 Ounces-Yields about 250 Square Feet)	International Paint
Primer (for Wood Surfaces)PR #4 Marine112 Kit (112 Ounces-Yields about 250 Square Feet)	International Paint
Paint. PolyurethanePR-1141112 Kit (112 Ounces-Yields about 220 Square FeetPer Coat)	International Paint

Table 583-12-2. MATERIAL FOR POLYURETHANE SHEER FENDER AND MOLD FABRICATION - Continued

FENDER MATERIALS	
ITEM	**SOURCE**
PolyurethanePR-1539-U Chamber Grade112 Kit (112 Ounces)	International Paint
Resin, LiquidPer MIL-R-19907	
Hardener, LiquidPer MIL-R-19907	
Silicone Mold Release4% SiliconeMcMaster-Carr 3311K1620 Ounce Can	McMaster-Carr Supply Co.P.O. Box 440New Brunswick, NJ 08903-0440
Rubber Caulk(Proreco Marine Rubber Caulk)	International Paint
Polystyrene or Similar Material to serve as Mold Model. (Refer to paragraph 583-12.7.1.3.1).	
MOLD MATERIALS	
Double Coated Foam Tape, 3/16 in. thick	
1-1/2 in. PVC Standard Pipe	
Cargo Securing Straps	Kinedyne CorporationP.O. Box 12882901 Lakeview RoadLawrence, KS 66044

583-12.7.1.4 Fender Mold Support. The fender mold will require support to prevent it from losing its shape from the weight of the polyurethane. One method to prevent this is by encircling the entire boat including fender molds with cargo securing straps. Straps should be placed at approximate 8-foot intervals. Wood blocks should be shaped to be inserted beneath the mold and between the hull and the strap to prevent mold deformation. See Figure 583-12-7. Other methods of support may be used based on availability of materials.

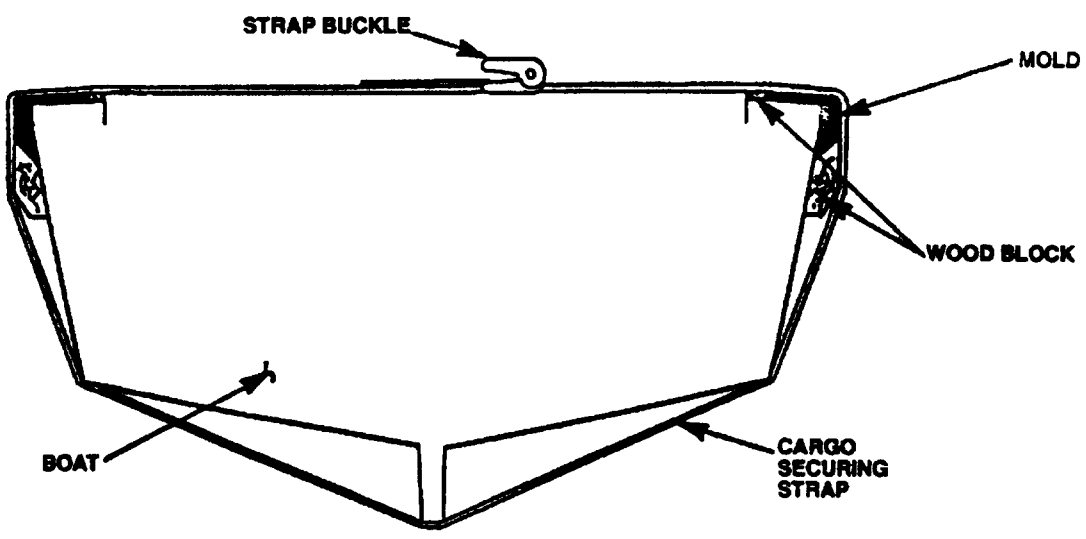

Figure 583-12-7. Cargo Strap Supporting Mold

583-12.7.1.5 Hull Preparation

1. Fill all fastener holes from removed equipment with liquid resin and hardener or other approved filler.

CAUTION

Ensure that all bolt holes remaining after removal of existing fender are plugged to prevent water intrusion into the interior of the hull which will damage the buoyancy foam.

2. Prepare the hull in accordance with the following instructions for the appropriate hull material.
   a Fiberglass: Clean contamination from fiberglass surfaces by wiping with cyclohexanone and clean rags, and allow to dry. Roughen the cleaned surfaces by sanding, or by grinding.
   b Steel and Aluminum: Surfaces shall be dry, clean, and free of corrosion, mill scale, rust, oil, tars, paint, and other surface contamination. The surface shall be cleaned by using an electric grinder, or an electric sander with 50- to 60-grit paper. Immediately after cleaning and before a new attack of corrosion begins, prime the cleaned surface by brushing a uniform, complete hiding coat of PRC Primer #420-Marine (refer to paragraph 583-12.7.1.6 for primer mixing instructions).
   c Wood: Cut back weathered or treated wood surfaces to clean, dry, solid wood. New wood with smooth surfaces shall be sanded lightly to ensure penetration.

583-12.7.1.6 Priming

a. Surfaces shall be blown, brushed, or wiped dry before priming. One coat of primer will suffice.
b. Metal and Fiberglass Surfaces: PRC Primer #420-Marine shall be used to prime metal and fiberglass surfaces. It is a two-part synthetic resin solution of thin syrup consistency and orange in color when mixed, specifically developed for use with PR-1539-U. It is packaged in kits with the correct amount of part A and part B packed individually. It is prepared for use by mixing the entire contents of part A with the contents of part B. The mixed primer shall be used within 2 hours when air temperature is between l00°F and 120°F, 4 hours between 76°F and l00°F, and 8 hours between 35°F and 75°F. Allow the primer to dry at least 4 hours, but not more than 24 hours.
c. Wood Surfaces: PRC Primer #4-Marine shall be used to prime wood surfaces. It is a one-part, brown colored solution of thin syrup consistency ready to use as packaged. Apply to previously prepared wood by brush or spray and allow to dry at least 4 hours or until tack free, but not more than 24 hours.
d. If primers are allowed to dry more than 24 hours, surface shall be reprimed.

NOTE

PRC Primer #4-Marine and PRC Primer #420-Marine are moisture sensitive and containers shall be kept tightly closed if not in use.

583-12.7.1.7 Fender Mold Attachment

1. Attach double coated foam tape to flanges of mold.
2. Coat inside surface of mold with silicone mold release.
3. Add a bead of caulk to mold flanges to prevent leakage.
4. Install mold sections to **h**
5. Install mold supporting devices.

583-12.7.1.8 Pouring

CAUTION

Do not mix material until ready to use. Mix together only parts A and B of the same kit. Do not mix part of one kit with that of another.

1. Remove all of the PR-1539-U (non-camber grade) polyurethane part A from part A container and pour into the part B container. Mix together parts A and B for 5 minutes with a Jiffy Mixer blade (model ″HS″ for gallon containers and model ″PS″ for 5-gallon containers. See Figure 583-12-8) and an electric drill. Remove mixer blade and scrape down the bottom and sides of the mixing container to be sure that all of the part B has been removed from the container wall. Replace the mixer blade and mix for an additional 5 minutes. Avoid mixing air into the material as this will result in air bubbles in the material.
2. Begin pouring polyurethane into mold through PVC pipes. Start at lowest point of mold and work toward highest point. Cap pipes as they are filled.
3. When mold is filled, allow to cure for 72 hour

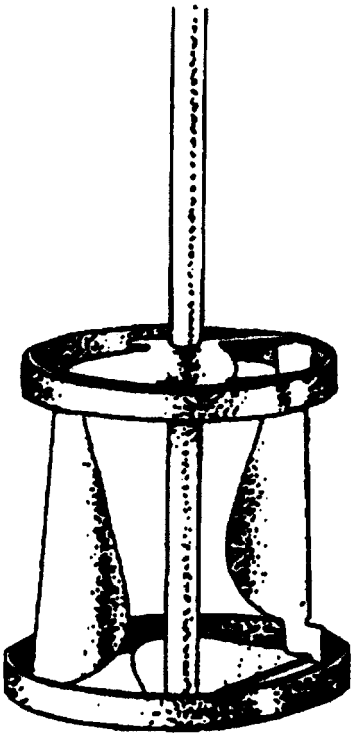

Figure 583-12-8. Jiffy Mixer Blade

583-12.7.1.9 Fender Mold Removal

1. Remove mold support devices.
2. Cut off PVC tubes at base.

3. Remove mold.
4. Clean any mold release agent from fender with butyl alcohol.
5. Remove remainder of PVC tubes from mold.

583-12.7.1.10 Fender Inspection

1. Inspect for complete bond between fender and hull at all points.
2. Identify any indentations or bumps.
3. Confirm dimensional requirements of BOATALT or other specification are met to a tolerance of ±1/8 inch.

583-12.7.1.11 Touch-Up

1. Trim any excess polyurethane and sand smooth.
2. Sand smooth any bumps.
3. Indentations shall be sanded smooth and filled with PRC-1539-U (camber grade). Refer to paragraph 583-12.7.2.
4. In areas of inadequate bond, repair fender in accordance with the following:
   a Grind fender back to an area where there is an acceptable bond.
   b Prepare a mold for the area that is being repaired.
   c Spot clean the hull in accordance with paragraph 583-12.7.1.5 and reprime with appropriate PRC Primer.
   d Roughen fender in the area to be repaired with an electric sander using 50-60 grit paper. Remove rubber particles with a dry, oil-free brush. Fender shall be dry, clean and free of all surface contamination including primer.
   e Attach mold and mix and pour PR-1539-U (camber grade) into the mold in accordance with manufacturers instructions. See paragraph 583-12.7.2.3.
   f Allow the polyurethane to cure 72 hours and remove mold.
   g Reinspect area to insure there is now an acceptable bond. If the bond is unacceptable, repeat the repair procedure.

583-12.7.1.12 Painting

a. No paint primer is required.
b. Mixing: Mix part A and part B of PRC-1141 kit together thoroughly and until a uniform color is attained (about 3 to 5 minutes).
c. Painting Fender. Paint fender with 2 coats of PRC-1141. Wet film thickness of each coat shall be 5 to 6 mils. Measure film thickness with a wet film thickness gauge.
d. Spraying Procedure: PR-1141 can be readily sprayed using standard cup gun, pressure pot or any airless unit having a minimum pressure of 2000-2400 psi. Tip size should be 0.013 inch to 0.015 inch. Apply the material in multiple passes.
e. Equipment Cleaning: Equipment should be cleaned immediately with methyl-ethyl-ketone, 1,1,1 - trichloroethylene or xylene.

583-12.7.2 POLYURETHANE SHEER FENDER REPAIR

583-12.7.2.1 Sheer Fender. Though the sheer fender is tough, it can be damaged. This section describes repair procedures.

583-12.7.2.2 Safety and Health Precautions. PR-1539-U and required primers are safe materials to handle if reasonable care is observed.

WARNING

PRC Primer #4-Marine contains flammable and volatile solvents. Keep away from heat, sparks, and open flame. Proper precautions used with flammable material shall be taken when applying this product. Comply with all applicable safety regulations.

Uncured PR-1539-U, PRC Primer #4-Marine, and PRC Primer #420 Marine and its components contain a mixture of solvents and isocyanates, vapors of which may cause irritation to the skin, eyes, nose, and throat. Avoid breathing of vapors. Either natural ventilation or mechanical exhaust ventilation is required to remove vapors and to dilute them in enclosed working spaces to concentration which is safe for the entire work period. In work areas with limited ventilation, respirators approved by NIOSH or the Bureau of Mines to protect against organic vapors shall be used. Individuals with chronic respiratory problems or prior respiratory reaction of isocyanates should not be exposed to vapors. In cases of extreme exposure or adverse reaction to any of the products mentioned above, remove affected personnel to fresh air and obtain immediate medical attention. The use of rubber gloves and disposable coveralls is recommended when mixing or applying solvents, primers, and polyurethane. Skin contact with these materials may produce irritations. If a rash develops consult a physician. Ordinary hygienic principles, such as washing hands before eating or smoking, shall be observed. For additional information, consult a Material Safety Data Sheet which is available upon request from the manufacturer.

583-12.7.2.3 Material. The material used in the sheer fender original fabrication is PR-1539-U (non-camber grade). However, PR-1539-U (camber grade) shall be used in repair as it is thicker and easier to use for repair purposes. The parts within the kit are a hardener, a resin, and a thickener.

583-12.7.2.4 Fender Preparation. Several methods for repair are shown in Figure 583-12-9 and Figure 583-12-10. Ensure the following steps are performed prior to repairing the sheer fender.

1. Clear the damaged area of any loose or contaminated debris by cutting it out with a knife or disc sander. Use a 36-grit disc with a disc sander.

2. Ensure the damaged area is cleaned and roughened before installing the plate and dam.

3. Wash down damaged area with butyl alcohol. Install plate and dam.

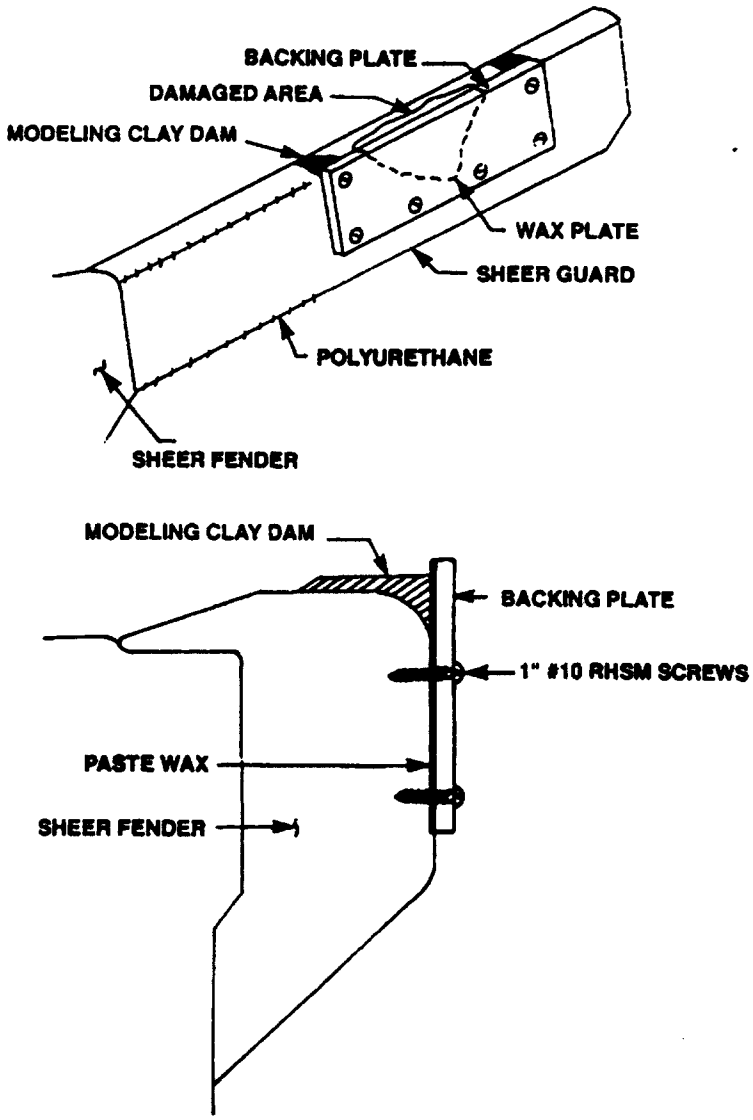

Figure 583-12-9. Repairs to Sheer Fender

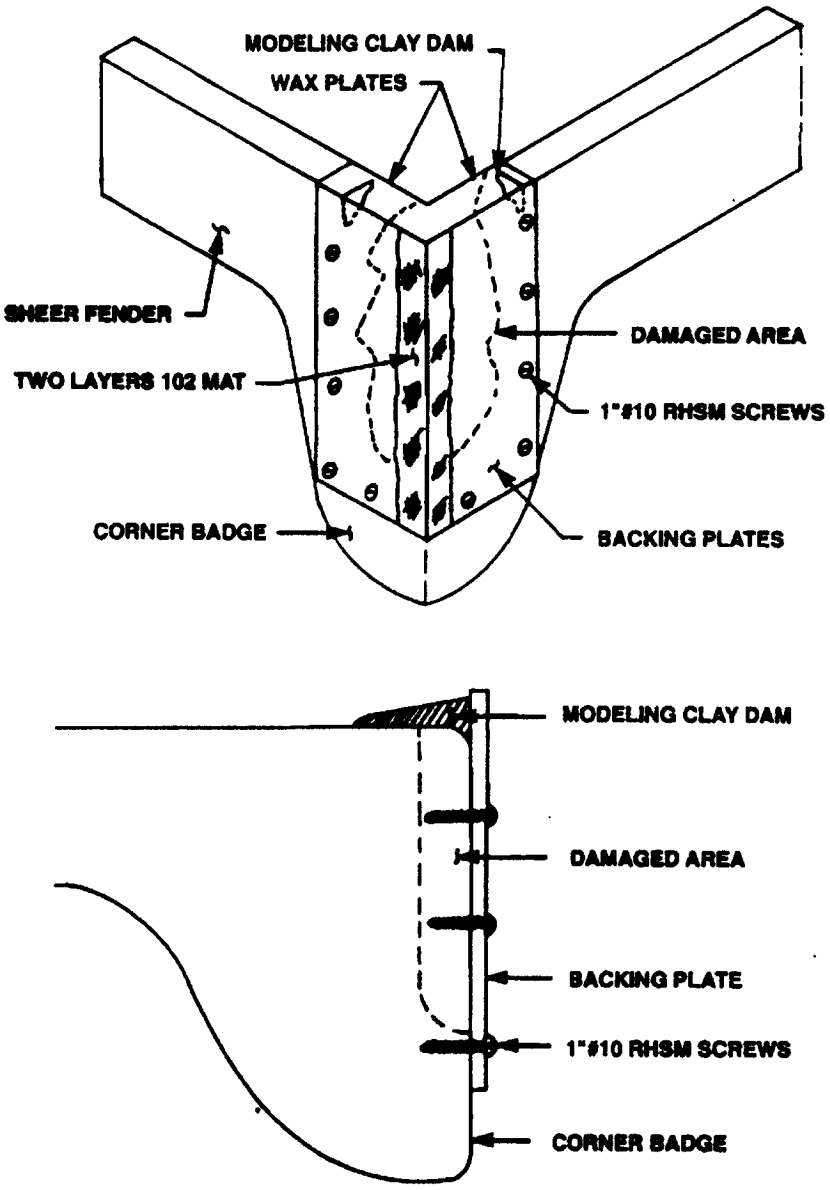

Figure 583-12-10. Repairs to Transom Corner

583-12.7.2.5 Mixing Instructions

CAUTION

Do not proportion material and do not mix until ready to use. Mix together only parts A, B, and C of the same kit. Do not mix part of one kit with that of another.

1. Remove rim from part A can with a can opener to assure accessibility to the material for removal from the can.

2. Add part A to part B. Be sure to scrape down the sides of the part A container so that all of the part A is added to the part B.
3. Mix together parts A and B for 5 minutes with a Jiffy Mixer blade (model ″HS″ for gallon containers and model ″PS″ for 5-gallon containers) and an electric drill. Remove mixer blade and scrape down the bottom and sides of the mixing container to be sure that all of the part B has been removed from the container wall. Replace the mixer blade and mix for an additional 4 minutes.
4. Avoid mixing air into the material as this will result in air bubbles in the coating.
5. Add entire contents of part C container and mix for 45-60 seconds. Do not exceed 60 seconds.
6. Allow mixture to stand for 5 minutes before applying.

583-12.7.2.6 Pouring

CAUTION

To prevent damage to equipment, do not pour all the PR-1539-U in at once.

1. Slowly pour the PR-1539-U into the cavity. Do not pour too fast or air will be trapped in the mixture.
2. Fill mixture to top of dam and let it sit for 72 hours.
3. After 72 hours remove the plates. Repairs shall be faired in with the rest of the sheer fender using a disc sander with 60- or 80-grit disc.

NOTE

If the material is brittle or breaks, wait 2 more days before sanding.

4. PR-1539-U Camber Grade takes 7 days to cure. After the sheer guard is faired in, coat the damaged area with PR-1141, using specified or desired color. (Refer to paragraph 583-12.7.1.12).

583-12.7.2.7 Paint Repair. Should PR-1141 become damaged, it can be repaired by abrading, power scrubbing with a scouring powder slurry, or cleaning with PRORECO Marine Cleaner or ethylene glycol monobutyl ether (FSN 6810-00-281-2001) the area surrounding the damaged portion and applying a new, liberal coat of PR-1141.

583-12.8 OAK FENDER REPAIRS

583-12.8.1 GENERAL INSTRUCTIONS. Determine if an authorizing Boat Alteration has been issued for replacement of the white oak fendering system by an approved urethane fendering system that covers the damaged boats. If not, inspect the fender for damage. Most of the damage to the fender occurs around the bow and transom corners. This damage must be repaired before the boat is put back into service; otherwise, delaminations and fractures in the fiberglass will occur. When it becomes evident the fender is in need of repair, perform the following steps.

WARNING

To prevent injury or death, do not repair fender by working from the deck of the boat. Ensure staging is used.

CAUTION

To prevent damage to the boat, never replace less than 8 feet of fender. Short runs of fender will not bend to the contour of the hull.

1. After the fender has been removed, perform any repairs to the fiberglass that may have occurred from the damage. Ensure the deck to hull flathead screws are tight.
2. To install oak fender, perform the following steps.

NOTE

When installing fender be sure to keep the mismatched areas of beading on top, and, if possible, keep the bottom flush.

3. Pick out enough oak pieces (8 to 10 feet long) for the repairs. The oak should be straight grained and free of knots in the area that will make the bend.

CAUTION

To prevent damage to the boat, do not force fender around the bow.

4. Take the base piece of fender holding one end about 2 inches back from the bow at the sheer, and try to bend it around the bow from the stem back. Do not force. Use enough pressure to judge whether or not it will bend.
5. If the oak won’t bend (tends to break), it will have to be soaked in water for 8 hours or overnight. If the oak can be steamed, steam one hour for every inch of thickness.
6. After the oak has been soaked or steamed, ensure it is flexible enough to bend. Then take the oak beading and hold in place l-inch back from the stem.

NOTE

Ensure the screw holes that have been screwed in the base plate have been staggered.

7. Drill and counterbore a 1/4-inch hole through the inner oak fender (Figure 583-12-11). Use a size 11/16 bit. (If the bit is too small, the screw will twist off; if the bit is too large, the threads will not catch and the screw will not pull the material up to the boat.) Use carbide-tipped drills, if possible. Fiberglass will dull the drill after a few holes are drilled, therefore, a good supply of bits should be available.
8. Apply bedding compound to the fiberglass. Fasten the inner oak in about 3 places, 6 inches apart using no.

14 x 2-1/2-inch flat head, self-tapping screws. Bend the fender around the boat and fasten it off. The fender will have to be twisted to conform to the shape of the boat.

9. Establish a length on the oak and cut the same bevel on the base beading according to the bevel on the existing fender. Then finish fastening the fender.

10. Apply bedding compound to the inner oak fenders. Install the outer oak fender using No. 10 X 1-1/2-inch flat head woodscrews instead of sheet metal screws. Drill holes as before; ensure the screws are staggered.

11. Cut butts same as original, but not in the same place. Let the top piece overlap the base fender at least 24 inches. When both pieces are on and fastened, clean up using a hand scraper and sandpaper.

12. After the fender is cleaned and sanded, put on at least three coats of varnish. Then install the stainless steel beading with no. 10 X 1- 3/4-inch oval head wood screws.

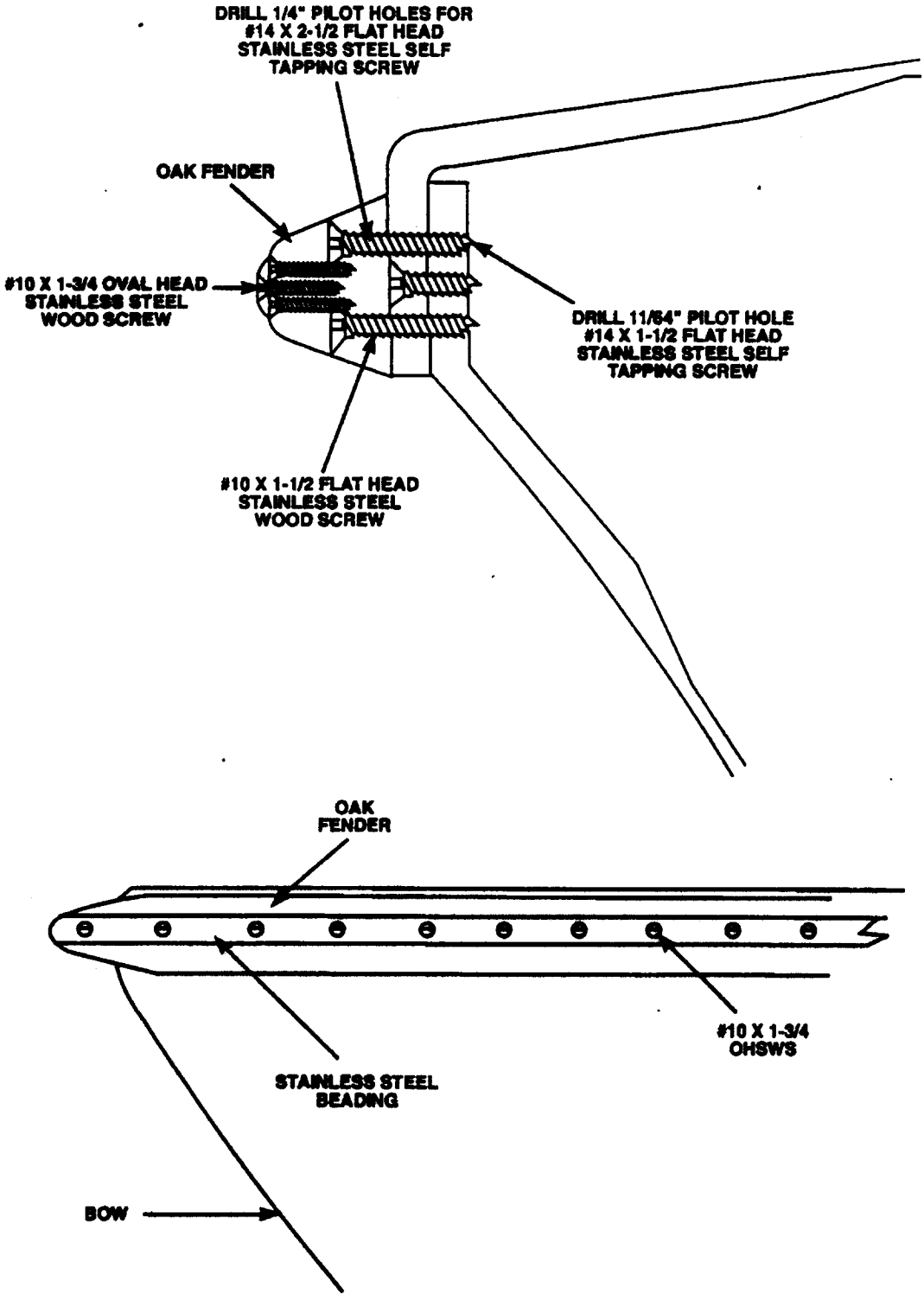

Figure 583-12-11. Oak Fender Repair

583-12.8.2 FENDERS AND FENDER BOARD. Oak fenders are more susceptible to damage than most other fendering systems. A fender board should be utilized to protect the fender in certain mooring locations. It can be made of wood with stainless steel beading or any available material (Figure 583-12-12).

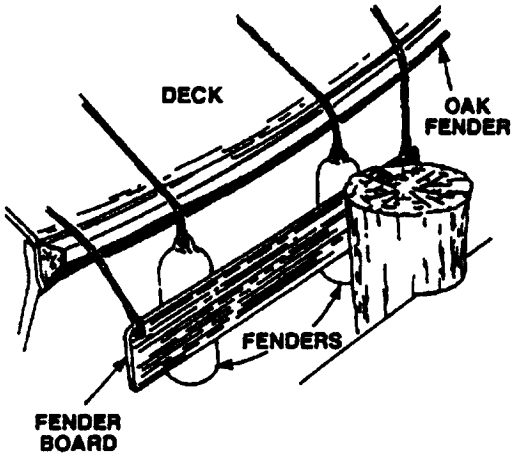

Figure 583-12-12. Fenders and Fender Board

583-12.9 ENGINE OVERHAUL

583-12.9.1 ENGINE OVERHAUL SCHEDULE. Boat engines should be overhauled at the operating hour interval recommended by the engine manufacturer and by a qualified repair activity, shipyard, or commercial contractor. In the event engine overhaul is performed commercially, monitoring may become necessary to ensure quality. Where possible, the original engine manufacturer's parts should be used. Guidance for efficient overhaul is usually provided in the Engine Technical Manual for each boat.

SECTION 13.

INFLATABLE LIFE RAFTS

583-13.1 INTRODUCTION

583-13.1.1 GENERAL. An inflatable life raft is one constructed of a coated fabric and inflated to its design shape by air or other gas. The raft is stowed aboard ship for use only as a life raft, when and as directed by the Commanding Officer.

583-13.1.2 TYPES OF INFLATABLE LIFE RAFTS. There are two basic Navy type inflatable life rafts for use throughout the fleet:

a. MK6, 25 person, air inflated

b. LRU 12/A (former MK4), 4 person, CO_2 inflated, for use with submarine only.

583-13.1.3 LIFE RAFT SPECIFICATIONS. The following military specifications and instructions apply for the construction of these rafts:

a. MK6, MIL-L-24489. which includes:
   1 Inflation Equipment, MIL-I-24490.
   2 Rigid container, MIL-C-24491.
   3 Inflation cylinder MIL-C-24604.

b. LRU 12/A (4 person), MIL-L-5567

583-13.2 ALLOWANCES AND ISSUES

583-13.2.1 CORRESPONDENCE. All correspondence related to inflatable rafts shall cite type (for example, MK6) and Mod number. Whenever the status of a life raft changes, the life raft database must be updated. Report all changes to Naval Surface Warfare Center, Detachment Norfolk, Carderock Division.

583-13.2.2 STANDARD SHIPBOARD ALLOWANCE. The allowance of inflatable life rafts for in service ships is as follows:

a. For ships with total accommodations greater than 295, life rafts shall be provided for 110 percent of accommodations (including surge) or 110 percent of Manpower Authorization (MPA) whichever is greater. The number of rafts provided in excess of the number of rafts required to satisfy 100 percent of accommodations shall not exceed 12.

b. For ships with total accommodations less than 295, life rafts shall be provided for 100 percent of accommodation (include surge) or 100 percent of MPA whichever is greater. The total number of life rafts shall be sufficient to retain life raft capacity for 100 percent of accommodations in the event that the largest cluster of life rafts is destroyed. A cluster is defined as life rafts being supported by a common structure. In calculating the number of life rafts required, any fractional value shall be increased to the next higher unit value.

583-13.2.3 CHANGES IN ALLOWANCE. Changes in allowance will be considered by Naval Sea Systems Command (NAVSEA) only upon presentation of information documenting a Chief of Naval Operations directed change to ship's mission, or an official revised Ship's Manning Document, OPNAV-INST 5320 (series) causing a change in the ship's accommodations.

583-13.2.4 HOW RAFTS ARE OBTAINED. Except to satisfy replacement of a unit of inflatable raft allowance, issue of inflatable life rafts shall be approved by NAVSEA. Replacement of an inflatable life raft of ships allowance for reasons of loss, survey, or deferral for repair shall be by current requisition procedures to the Navy Inventory Control Point (NAVICP), Mechanicsburg, PA. The following National Stock Numbers (NSN) or Activity Control Numbers (ACN) apply:

a. MK6, NSN 1940-01-015-7346 (includes survival gear and rigid container).

b. MK6, NSN 1940-00-148-9176 (raft only).

c. Rigid container (for MK 6 rafts) NSN 4220-00-148-8603.

d. LRU 12/A, Survival gear covered on Allowance Equipment List (AEL) 2-820393001.

583-13.3 REPORTS

583-13.3.1 MAJOR REPAIR REPORTS. Major repair actions on and MK6 life rafts shall be reported by certified repair facilities on an approved NAVSEA Form. The repair shall be described briefly; it shall be identified and the date of release from shipboard and return to shipboard, shall be noted. The replacement raft number shall be provided if the raft is replaced. These completed forms shall be kept on file at the repair facilities for review by the NAVSEA certification team.

583-13.3.2 LIFE RAFT TURN-IN OR EXCHANGE. Copies of all turn-in documents for rafts and survival gear shall be forwarded to NAVICP. MK6 life rafts being turned in to supply do not require an inventory taken of their survival gear unless the container has been opened and survival gear bag inventory is questionable.

583-13.3.3 RECEIPT OF NEW LIFE RAFT REPORT. Ships receiving new type life rafts will submit allowance Change Request/Report, NAVSUP Form 1220 to NAVSUP Form 1220 to NAVICP and NSWC Detachment Norfolk according to NAVSEAINST 4441.1.

583-13.4 DISPOSALS AND SURVEYS

583-13.4.1 DISPOSAL OF LIFE RAFTS. An inflatable life raft shall not be disposed of or surveyed by ships' force except as noted in the following paragraph. Rafts that are determined to be unrepairable by designated repair and certified facilities shall be disposed of or surveyed in accordance with NAVSEA S9008-AA-PRO-010.

583-13.4.2 LOSS OF LIFE RAFT AT SEA. A raft lost at sea is considered surveyed.

583-13.4.3 CERTIFIED and REPAIR FACILITIES' DISPOSAL OF LIFE RAFTS. Disposals shall be made only by those designated repair and certified facilities listed in paragraph 583-13.11.1.1, in which case, all salvageable parts in good condition shall be removed and retained in local stock to be used again. The raft shall then be destroyed. The life raft database shall then be updated with an entry of the destruction.

583-13.4.4 LIFE RAFTS FROM SHIPS BEING DEACTIVATED. For ships being deactivated, refer to paragraph 583-13.3.2.

583-13.5 STOCK CLASSIFICATION, LEVELS, AND DISTRIBUTION

583-13.5.1 CLASSIFICATION. Stock rafts are divided into categories listed in paragraphs 583-13.5.1.1 through 583-13.5.1.4.

583-13.5.1.1 Condition A - Any raft ready for issue. The following may be in this category:

a. MK6 in stock, ready for issue

b. LRU 12/A, in stock, ready for issue

c. Any shipboard raft that continues to pass presently authorized shipboard inspections

583-13.5.1.2 Condition F - Any raft economically repairable but not issuable without repair.

583-13.5.1.3 Condition H - Any raft that is uneconomical to repair. Rafts in this category are considered unserviceable and shall be surveyed according to paragraph 583-13.6 when directed by NAVICP.

583-13.5.1.4 Condition M - Any raft in process of repair, in transition from Condition F to Condition A. Stock rafts shall be placed in the foregoing categories only as a result of inspection by qualified personnel of designated repair and certified facilities. Refer to paragraph 583-13.11.1.1 for designated repair and certified facilities.

583-13.5.2 STOCK LEVELS. Based on demand, minimum stock levels of issuable rafts, by types, will be established at stocking activities.

583-13.5.3 DISTRIBUTION. Selection of rafts shall be on a first in and first out basis of Condition A rafts only, of the type and Mod to suit the individual ship requirements. Types and Mods shall be approved by NAVSEA if different from existing ship's rafts.

583-13.5.3.1 Repair Priority. Selection of rafts for repair to Condition A shall be from existing stocks of Condition F rafts determined to be most economical to repair, whenever possible.

583-13.5.3.2 Estimated Repair Costs. Estimated repair cost shall be reported on an approved NAVSEA Form and shall include (though separately identified from) costs to open and inspect.

583-13.6 IDENTIFICATION

583-13.6.1 LIFE RAFT REGISTRY NUMBER. Each raft is assigned a registry number for purposes of identification. The number is molded into the raft's identification label attached to the hull tube.

583-13.7 CAPACITIES, WEIGHTS, AND DIMENSIONS

583-13.7.1 LIFE RAFT CHARACTERISTICS. Normal operation of the Mark 6 life raft is accomplished by applying tension to the painter line which actuates the primary inflation cylinder. As inflation occurs, the brass securing bands on the container are broken as the life raft emerges. The secondary inflation cylinder is actuated by the unfolding life raft thereby completing the deployment sequence. Should circumstances impede the normal operation of the life raft, the life raft can still be deployed. Any cutting instrument, for example the scissors from the first aid kit of a deployed life raft, can be used to sever the brass securing bands of the containerized life raft. Remove the upper container half and locate the primary or secondary inflation cylinder. The inflation cylinders can be actuated manually by extracting the inflation cable. Should the secondary cylinder be actuated first then the primary cylinder will have to be actuated manually. Table 583-13-1 lists characteristics for inflatable life rafts.

583-13.7.2 RIGID CONTAINER. The rigid container (27 inches in diameter, 56 inches long) is fabricated of glass reinforced plastic (GRP) in two halves, with a gasketed seam. The lower half is identified by lifting handles molded into the shell.

583-13.7.3 CONTAINER DESIGN. The container design is detailed on NAVSEA dwg 803-4382176. The container is capable of withstanding a freefall drop of 65 feet from stowage into the water.

583-13.7.4 MK6 LIFE RAFTS. MK6 rafts are shipped ready for installation into stowage cradles aboard ship. They are packed complete, survival gear contained within, and banded with two brass bands. Care should be exercised to ensure that the two brass sealing bands are not cut or damaged.

Table 583-13-1. CHARACTERISTICS FOR INFLATABLE LIFE RAFTS

RAFT TYPE	CAPACITY	WEIGHT(LBS)	DIMENSION INFLATEDL W	DIMENSION CONTAINERH W L
Mark 6	25 Person	500	17’ - 10″ 8’ - 10″	27″ Dia. 56″ Lg.
LRU 12/A	4 Person	42	(See MIL-L-5567)	Fabric Valise

583-13.8 EQUIPMENT AND REPAIR PARTS

583-13.8.1 SURVIVAL GEAR AND REPAIR PARTS FOR MK6 LIFE RAFTS. With the installation of encapsulated life rafts MK6, the survival gear and repair parts become raft allowance (stowed within the fiberglass container, inaccessible to the ship’s crew until deployed).

583-13.8.2 LIST OF SURVIVAL GEAR FOR EACH TYPE LIFE RAFT. Table 583-13-2 lists the survival gear provided for each type of raft.

Table 583-13-2. SURVIVAL GEAR

ITEM	DESCRIPTION	SPECIFICATION	NSN	QUA(MA)
1	Food Packet (Individual Ration) or Food Packet, Survival Abandon Ship	MIL-F-16895CID (A-A-20247)	8970-00-299-13958970-01-434-3192	12
2	Water, Plastic Container (500ml)		8960-00-000-0170	2
3	Manual Reverse OsmosisDesalinator (MROD)		4610-00-319-5337	
4	Storage Bag, Drinking Water, Size A	MIL-B-8571	8465-00-485-3034	
5	Flashlight (2 Cell) Type II Style I, or Type III Style I	MIL-F-3747	6230-00-269-30346230-00-299-3035	
6	Battery, Dry, Flashlight Alkaline ″D″	W-B-101	6135-00-835-7210	
7	Sea Marker, Fluorescent	MIL-S-17980	6850-00-270-9986	
8	Mirror, Signalling, Type II	MIL-M-18371	6350-00-261-9772	
9	Sponge, Cellulose Type II Size 3, Porosity A	L-S-626	7920-00-240-2559	
10	Knife, General Purpose, Pocket	MIL-K-818	5110-00-162-2205	
11	Whistle, Signaling, Plastic, Type II	MIL-W-1053	8465-00-254-8803	
12	Motion Sickness TabletsDimenhydrate, 50mg		6506-00-116-9660	3
13	Bailer, Plastic, 2 Qt. Capacity	Commercial		
14	Kit, First Aid		6545-00-168-6893	
15	Kit, Abandon Ship Signal		1370-01-366-0344	
16	Kit, Fishing Survival	MIL-F-6218	4220-00-125-8751	
17	Flashlight Bulb (PR6)		6240-00-155-8675	
18	Blanket, Combat Casualty(84″ x 55″)	Commercial		1
19	Hand Pump, Air with Hose and Adapter	MIL-P-12647	4320-00-299-2229	
20	Sealing Clamp, 3 inch	MIL-R-52255	5340-00-720-8864	
21	Sealing Clamp, 5 inch	MIL-R-52255	5340-00-720-8863	

Table 583-13-2. SURVIVAL GEAR - Continued

ITEM	DESCRIPTION	SPECIFICATION	NSN	QUA(MA)
22	Sealing Clamp, 7 1/2 inch	MIL-R-52255	5340-00-720-8858	
23	Container, equipment	Dwg. 805-4382177	4220-00-138-7118	
24	Oars	MS26529-2	2040-00-268-9261	
25	Sea Anchor with Line Type 2Size 1	MIL-A-3339	2040-00-368-2880	
26	Rescue Line		4220-01-006-6103	
27	Floatable Knife		4220-01-006-6102	
28	Inflatable Floor (2 Sections)	Dwg. 805-4382177	1940-01-168-9483	
29	Operation Manual		S9008-BZ-INS-010	
* Items of survival gear are covered in AEL 2-820393001. Life raft is used aboard submarines.				

583-13.9 STOWAGE AND HANDLING

583-13.9.1 STOWAGE. Inflatable life raft stowages should be located to permit ready manual overboard launching into the water without hitting obstructions; to be clear of overhead obstructions; to avoid adverse effects of gun, missile and jet blasts and heavy seas; and to interfere as little as possible with normal shipboard activity. They shall be located, longitudinally, where they will provide the maximum practical distribution of life-saving facilities. The perferred orientation of the life raft in the stowage is with the seam of the upper and lower halves of the container positioned approximately parallel to the baseline of the ship and the sea painter line exiting the life raft container facing the aft end of the ship. Furthermore, all caution labels shall be plainly visible. They shall be provided and stowed in accordance with appropriate NAVSEA standard drawings.

583-13.9.1.1 Hydrostatic Release. Equipment for securing the rafts in their stowages shall include a can-type hydrostatic release device, NAVSEA dwg 803-5959322, NSN 1H-4220-01-279-7287 or a diaphragm-type hydrostatic release MIL-R-15041, NSN 1H-4220-00-269-7950 with spring tensioner that permits automatic and manual release. This provides for quick release of the raft from its stowage for hand launching, or release from its stowage from hydrostatic pressure, resulting from a sea water depth of 10 to 40 feet in the event of a sinking.

583-13.9.1.2 Sea Painter. The sea painter line for MK6 shall be attached directly to the ship structure adjacent to the stowage.

583-13.9.2 HANDLING. Care should be taken in handling inflatable life rafts during shipping in and out of stowage, inspection, and transportation to and from repair facilities. To minimize damage to the life raft during transportation each life raft should be banded to a wooden pallet. Furthermore, encapsulated life rafts MK6 should never be rolled or tipped on end. They should be lifted and carried using the molded handholds in the fiberglass container or an approved NAVSEA lifting sling as shown on Norfolk Naval Shipyard drawing 4712507. Care shall be exercised to ensure that the two brass sealing bands are not inadvertently cut or damaged.

583-13.9.2.1 Covered Storage. Storage areas for Condition A rafts shall be dry and free from effects of weather and from heat concentrations such as steam pipes. Warehouses or other covered storage spaces shall be utilized wherever possible.

583-13.10 INSPECTION

583-13.10.1 TYPES OF PERIODIC MAINTENANCE. Inspections shall be made at the following levels of responsibility to ensure that rafts, stowages, handling equipment, survival gear, and rations are satisfactory for emergency use:

a. Organizational level (shipboard). Container, minor repairs (paragraph 583-13.11.1.3), raft stowages, and handling equipment (paragraphs 583-13.10.2 through 583-13.10.2.1.6 apply).

b. Intermediate level (Ship Intermediate Maintenance Activity (SIMA)) LRU 12/A only. Open, inspect, minor repair (paragraph 583-13.11.1.3), update survival gear and rations, test and repack.

c. Depot level (repair facility). Open, inspect, minor and major repair, update survival gear and rations, test, and repack (paragraph 583-13.10.3 applies).

583-13.10.2 ORGANIZATIONAL (SHIPBOARD) LEVEL. Inflatable life rafts and life raft stowages aboard ship shall have periodic Planned Maintenance System (PMS) according to the appropriate Maintenance Index Page (MIP).

583-13.10.2.1 MK6. Container banding and rubber sealing band shall be examined to ensure that both bands are intact. In event that the bands have parted or been tampered with or the container has been damaged extensively, the raft shall be inspected by a representative of a certified repair facility (paragraph 583-13.11.1.1) to determine the level of repair that is required on the life raft.

583-13.10.2.1.1 Stowage Securing Harness. The stowage securing harness shall be checked to ensure proper tension. On stowages with the can-type hydrostatic or the diaphragm-type hydrostatic, without the spring tensioner, the harness shall be torqued 8 to 10 lb-ft. On stowages with the diaphragm-type hydrostatic, with the spring tensioner, the harness shall be tightened until the life raft is securely seated in its cradle, but not so as to damage the life raft container.

NOTE

In some instances, nylon straps or stainless steel wire rope may be installed. Replace with nylon-covered, galvanized steel wire rope as detailed on NAVSEA drawings 803-5001024, 803-6397272, 803-6397273 or 803-6397275.

583-13.10.2.1.2 Hydrostatic Release. The hydro-static release assembly shall be visually checked. Correct tightness of the securing harness (refer to paragraph 583-13.10.2.1.1) shall be ensured. The release assembly shall not be painted. In event the release assembly is painted, it shall be removed and replaced. Removed release assemblies shall be turned in to a repair facility for refurbishing and testing.

583-13.10.2.1.3 Hydrostatic Release Installation. The can type hydrostatic release device shall be installed with the end bracket having the hair pin connected to the retaining harness and the open end of the can shield facing the aft end of the ship. The hair pin shall be installed in a direction to facilitate removal. The diaphragm-type hydrostatic release device shall be installed with the smaller end bracket connected to the retaining harness. The pushbutton shall face away from traffic to prevent inadvertent release.

583-13.10.2.1.4 Securing Sea Painter. The MK6 sea painter line from the container shall be checked to ensure that it is securely tied directly to ship's structure, and accessible to the person launching the raft (refer to paragraph 583-13.9.1.2).

583-13.10.2.1.5 Checking Stowage. The rigid container and stowage interface shall be visually inspected to ensure that the stowed raft is sitting snug in the cradle and not subject to shifting. (Refer to paragraph 583-13.10.2.1.1).

583-13.10.2.1.6 Inspection and Test. With the periodicity stated in the appropriate MIP, the rafts shall be turned in to a certified repair facility for inspection and test according to paragraph 583-13.11.

583-13.10.3 DEPOT LEVEL. Inspection, major, or minor repair of the various rafts (paragraph 583-13.10.1) shall be accomplished by an approved certified repair facility (paragraph 583-13.11.1.1).

a. Conduct all applicable tests and inspections (raft, equipment, and systems) listed in the appropriate technical manuals.

b. Make any major and minor repairs as necessary. Refer to paragraphs 583-13.11.1.3 and 583-13.11.1.4.

583-13.11 REPAIR AND MAINTENANCE

583-13.11.1 DEFINITIONS. Terms used in this section are defined in the following paragraphs. Reference to NAVSEA S9008-AA-PR0-0l0/MK6 include all appropriate Maintenance Bulletins issued by NAVSEA.

583-13.11.1.1 Certified Repair Facility. A repair facility is any NAVSEA approved activity designated to accomplish minor and major repairs, inspection, maintenance, and survey of inflatable rafts. A certified facility is a facility approved by NAVSEA to inspect, test, pack, and certify MK6 life rafts. These facilities are annually certified by a NAVSEA certification team. The following designated activities are presently certified repair facilities:

a. Norfolk Shipyard Naval

b. SRF Yokosuka, Japan

c. SIMA Activities
   1 SIMA Mayport
   2 SIMA San Diego

d. Original Equipment Manufacturer (OEM)
   1 SMR Technologies Inc., Fenwick, WV

583-13.11.1.2 Repair. A repair is the correction of a problem which, when completed, will restore a raft to a reliable condition.

583-13.11.1.3 Minor Repairs. Minor repairs that may be accomplished by ships' force and IMAs only if material and spare parts are available.

a. Repairs on LRU 12/A include specifically:
   1 Small holes, tears, punctures, or abrasions in bottom or canopy fabric.
   2 Replacement of parts of valves or manifolds.

b. Repairs on MK6 life rafts that may be accomplished is limited to replacement of canister bands only.

583-13.11.1.4 Major Repairs. Those repairs that require service by certified repair facilities. They include:

a. Repairs to damaged inflatable components (hull tubes, canopy bows, inflatable floors). All these repairs require vulcanizing.

b. Manifold or valve assembly replacement. All these repairs require vulcanizing.

c. Other repairs requiring vulcanizing.

d. For MK 6 life rafts, all repairs other than only replacement or repair of canister bands.

583-13.11.1.5 Maintenance. Maintenance is essentially the opening, inspecting, reinspecting, and replacing of consumables (batteries, water, and so forth) of a Condition A raft. Maintenance may be accomplished by ships' force only on LRU 12/A rafts. Maintenance on MK 6 rafts may be accomplished only by certified repair facilities (see paragraph 583-13.11.1.1), and according to NAVSEA S9008-AA-PRO-OlO/MK 6 and the various appropriate Maintenance Bulletins issued by NAVSEA.

583-13.12 RAFT RECERTIFICATION AND EXCHANGE

583-13.12.1 INSPECTION AND RECERTIFICATION OR REPAIR. Upon receipt of a ship's inflatable life rafts for inspection and recertification or repair:

a. Intermediate level activities shall accomplish the inspections and repairs authorized in paragraphs 583-13.10.1 and 583-13.10.2, returning the rafts as Condition A and arrange for delivery to the ship for return to stowage.

b. Depot level activities shall accomplish the inspections and repairs authorized in paragraph 583-13.10.3, returning the rafts as Condition A and arrange for delivery to the ship for return to stowage.

583-13.13 TEST OF HYDROSTATIC RELEASE DEVICE.

During each ship's regular overhaul, only the diaphragm type hydrostatic release devices shall be tested as follows: A load equal to the capacity of the device, 800 pounds or 2,500 pounds, shall be applied by means of actual weights or applied tension. The device shall then be submerged in water or subjected to an equivalent air pressure in a chamber. The device should automatically release at a depth of 25 ft plus/minus 15 ft of water or at the equivalent pressure.

WARNING

The can type hydrostatic release device shall not be tested as noted above. The can type hydrostatic device is a non-testing device and will self-destroy if pressure tested.

583-13.13.1 The can type hydrostatic release device shall be inspected by dimensional checks. Measure the overall dimension of the can at two places approximately 90 degrees apart along the longitudinal axis of the can.

CAUTION

Use micrometer dial indicating calipers, or other appropriate machinists' methods. Using rulers, yardsticks, or tape measures do not have the required accuracy and are not appropriate.

NOTE

The end cap of the can protrudes slightly beyond the open end of the shield. Ensure that the overall can length is measured and not the stainless steel shield.

583-13.13.2 If the can measures less than 4.16 inches from end-to-end, it is outside acceptable limits and should not be used. Cans measuring 4.16 inches or greater are acceptable. Locally dispose of any device that is dimensionally unsuitable.

REAR SECTION

NOTE

TECHNICAL MANUAL DEFICIENCY/EVALUATION EVALUATION REPORT (TMDER) Forms can be found at the bottom of the CD list of books. Click on the TMDER form to display the form.