SPECIAL PURPOSE CRAFT-SHALLOW WATER (SPC-SW) OPERATOR'S HANDBOOK

U.S. Department of Homeland Security

United States Coast Guard

COMDTINST M16114.44

MAY 2010

This page intentionally left blank.

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-731
Phone: (202) 372-2450

COMDTINST M16114.44
04 MAY 2010

COMMANDANT INSTRUCTION M16114.44

Subj: SPECIAL PURPOSE CRAFT-SHALLOW WATER (SPC-SW) OPERATOR'S HANDBOOK

1. PURPOSE. This Manual provides technical orientation, performance characteristics, and basic operating procedures for the Special Purpose Craft-Shallow Water (SPC-SW). It also standardizes boat outfit, storage and equipment layout.

2. ACTION. All Coast Guard unit commanders, commanding officers, officers-in-charge, deputy/assistant commandants, and chiefs of headquarters staff elements shall comply with the provisions of this manual. Internet release is authorized.

3. DIRECTIVES AFFECTED. None.

4. DISCUSSION. This Manual contains information necessary to safely and efficiently operate the SPC-SW. The operational capabilities, limitations, and emergency procedures are clearly stipulated. The fittings, outfit list, and physical characteristics of the boat are described in detail.

5. PROCEDURE. Operational commanders and unit commanders with a SPC-SW shall ensure the procedures and limitations detailed within this manual are followed. Forward any comments, corrections, recommendations, and questions regarding this manual to the SPC-SW Facility Manager in accordance with Chapter 1, Section C.1 of this manual. Design and structural change requests shall be submitted as outlined in the Naval Engineering Manual, COMDTINST M9000.6 (series).

DISTRIBUTION – SDL No.155

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A										2																
B	*	2	2						2					*												
C											2															
D																										
E																										
F																										
G																										
H																										

NON-STANDARD DISTRIBUTION LIST: *Ba: COMDT(CG-731) (10), Bn: Boat Forces Center (10)

6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. Environmental aspects and impact considerations were examined in the development of the manual and have been determined to be not applicable.

7. FORMS/ REPORTS. None.

PAUL E. WIEDENHOEFT/s/
Captain, U.S. Coast Guard
Acting Assistant Commandant for
Capability

RECORD OF CHANGES

CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	ENTERED BY

This page intentionally left blank.

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION 1-1
SECTION A. WARNINGS, CAUTIONS, AND NOTES 1-2
A.1. Warning 1-2
A.2. Caution 1-2
A.3. Note 1-2
SECTION B. FACILITY MANAGER 1-3
SECTION C. CHANGES 1-4
C.1. Time Compliance Technical Orders (TCTOs) 1-4
SECTION D. ACTION 1-5
D.1. Configuration control 1-5
CHAPTER 2 BOAT CHARACTERISTICS 2-1
SECTION A. GENERAL DESCRIPTION 2-2
A.1. Design 2-2
A.2. Manufacturer 2-2
A.3. Missions 2-2
A.4. Boat specifications 2-3
A.4.a. Physical characteristics 2-3
A.4.b. Operational characteristics and parameters 2-4
SECTION B. BASIC HULL AND DECK CONSTRUCTION (INTERIOR AND EXTERIOR) 2-5
B.1. Hull construction 2-5
B.1.a. Hull 2-5
B.1.b. Transverse bulkheads 2-6
B.2. Compartment arrangement/ description 2-6
B.2.a. Anchor locker 2-6
B.2.b. Console forward lockers. 2-7
B.2.c. Console locker 2-8
B.2.d. Transom lockers 2-9
B.2.e. Console 2-10
B.2.f. Bilge 2-10
B.2.g. Engine well 2-11
B.3 Fender 2-11
B.4. Deck construction 2-12
B.5. Ring buoy and strobe light 2-12
SECTION C. LOCATION OF INTERIOR AND EXTERIOR HULL FITTINGS (STRUCTURAL) 2-13
C.1. Bow eye 2-13
C.2. Standard cleats 2-13
C.3. Lifting eyes 2-14
C.4. Forward bitt 2-14
C.5. Tow bitt 2-14

C.6. Rescue recess 2-15
C.7. Deck tie downs 2-16
C.8. Deck cover/hatches 2-16
C.9. Gun mount attachments 2-16
C.10. Canopy top 2-17
C.11. Mast 2-17
C.12. Transom bitts 2-20
C.13. Transom steps 2-21
SECTION D. LOCATION OF MAJOR HULL SYSTEMS AND COMPONENTS 2-22
D.1. Batteries 2-22
D.2. Outboard engines 2-22
D.3. Hydraulic jacking plate 2-23
D.4. Fuel system 2-23
D.5. Center Console 2-24
D.6. Steering system 2-25
D.7. Navigation and communications 2-26
D.8. Antennas 2-27
D.9. Lightning rod 2-27
D.10. Anchor 2-28
D.11. Towline 2-29
D.12. Depth sounder transducer 2-30
D.13. Bilge pumps 2-30

CHAPTER 3 BOAT SYSTEMS 3-1

SECTION A. PROPULSION SYSTEM 3-2
A.1. Engines 3-2
A.1.a. Speed 3-2
A.1.b. Location 3-4
A.2. Engine fuel system 3-4
A.2.a. Fuel priming bulb 3-4
A.2.b. Fuel filter and water separator 3-5
A.2.c. Fuel Pumps 3-6
A.2.d. Injection system 3-6
A.3. Engine cooling system 3-6
A.3.a. Seawater cooling pump 3-6
A.3.b. Seawater strainer 3-7
A.3.c. Seawater discharge 3-7
A.4. Lubrication systems 3-8
A.4.a. Engine lube oil 3-8
A.4.b. Engine oil fill cap 3-9
A.4.c. Engine oil dipstick 3-9
A.4.d. Engine gear case oil 3-9
A.5. Ignition system 3-9
A.6. Starter 3-10

A.7. Engine key switch panel 3-10
A.7.a. Alarm lamp unit 3-10
A.7.b. Engine kill switch 3-11
A.8. Engine gauges 3-12
A.9. Engine controls 3-13
A.10. Outboard power trim/tilt 3-14
A.10.a. Power trim/tilt switch 3-14
A.10.b. Tilt lock lever 3-14
A.10.c. Manual relief valve 3-15
A.11. Fuse panels 3-16
A.12. Propellers 3-16
A.13. Engine exhaust 3-17
A.14. Sacrificial anodes 3-17
A.15. Hydraulic jacking plate 3-18
A.15.a. Controls 3-19
A.15.b. Hydraulic system 3-20
A.16. Steering system 3-20
A.16.a. Hydraulic steering cylinders 3-21
A.16.b. Steering helm 3-21
SECTION B. HULL FUEL SYSTEM 3-22
B.1. Principles of operation 3-22
B.1.a. Fuel tank 3-22
B.1.b. Fuel tank level sensor 3-22
B.1.c. Fuel fill 3-23
B.1.d. Tank vent fitting 3-23
B.1.e. Fuel lines 3-23
B.1.f. Fuel cut off valves 3-24
B.1.g. Primary fuel filters 3-24
B.1.h. Primer bulbs 3-24
SECTION C. HULL SYSTEM 3-25
C.1. Draft 3-25
C.2. Lifting strakes 3-25
C.3. Bilge access points 3-25
C.4. Fender 3-25
C.5. Scuppers 3-26
C.6. Trim tabs 3-27
C.7. Crew seats 3-28
C.7.a. Coxswain 3-28
C.7.b. Crewmembers 3-28
C.7.c. Passengers 3-29
SECTION D. ELECTRICAL SYSTEM 3-30
D.1. Alternator 3-30
D.2. Batteries 3-31

D.3. Starter 3-31
D.4. Battery switches 3-31
D.5. 12 VDC breaker panels 3-33
D.6. Console switch panels 3-33
D.7. Lighting 3-35
D.7.a. Cabin lights 3-35
D.7.b. Cockpit lights 3-35
D.7.c. Navigation Lights 3-35
D.7.d. Law enforcement light 3-36
D.7.e. Searchlight 3-36
D.7.f. Floodlight 3-36
D.8. Dimmer 3-37
D.9. Fuse locations 3-37
D.10. Electrical outlets 3-38
SECTION E. COMMUNICATIONS/NAVIGATION SYSTEM 3-39
E.1. Operator's console 3-39
E.2. Furuno 1834C/NT System 3-39
E.3. Magnetic compass 3-40
E.4. Heading sensor 3-41
E.5. RD-30 Multi-Display 3-41
E.6. DGPS 3-42
E.7. VHF-FM radio (Standard Horizon) 3-43
E.8. VHF-FM radio (Motorola XTL-5000) 3-43
E.9. UHF-FM radio (Motorola XTL-5000) 3-44
E.10. L3 ProTec AIS 3-44
E.11. Emergency Position Indicating Radio Beacon (EPIRB) 3-44
E.12. Loudhailer/intercom (Furuno) 3-45
E.13. Horn 3-46
SECTION F. FIRE EXTINGUISHING EQUIPMENT 3-47
SECTION G. BILGE SYSTEM 3-48
G.1. Bilge pumps and float switches 3-48
G.2. Bilge pump panel 3-48
SECTION H. WINDSHIELD WIPERS AND WASHERS 3-50
H.1. Wipers and washers 3-50
H.2. Defroster 3-50
H.3. Cabin fans 3-50
SECTION I. CATHODIC PROTECTION SYSTEM 3-53
I.1. Sacrificial anodes 3-53
SECTION J. TRAILER SYSTEM 3-54
J.1. Tow vehicle 3-55
J.2. Hitch 3-55
J.3. Ball mount and ball 3-56
J.4. Trailer coupler, safety chains and hydraulic brake actuator 3-57

J.5. Trailer construction and equipment 3-58
J.6. Hooking up the trailer 3-58
J.7. Securing the boat to the trailer 3-59
J.8. Towing precautions 3-61
J.9. Weather curtain stowage 3-62
J.10. Trailering checklist 3-63
J.11. Launching the boat 3-65
J.12. Recovering the boat 3-66
SECTION K. WEAPONS MOUNTING 3-67
K.1. Tri-pod mounting points 3-67
K.2. Pre-mission checks 3-67
K.3. Manning of the MAW mount 3-68
K.4. Security of the MAW during missions 3-69
K.5. Ammunition storage 3-69

CHAPTER 4 CREW REQUIREMENTS 4-1

SECTION A. MINIMUM CREW 4-2
A.1. Certified crewmembers 4-2
SECTION B. COXSWAIN 4-3
B.1. Authority and responsibility 4-3
B.2. Relief of responsibility 4-3
SECTION C. BOAT CREW MEMBERS 4-4
C.1. Certified Boat Crew Member 4-4
C.2. Additional Crewmembers 4-4
SECTION D. PASSENGERS 4-5
SECTION E. SAFETY EQUIPMENT 4-6
E.1. Personal protective equipment 4-6

CHAPTER 5 OPERATIONAL GUIDELINES 5-1

SECTION A. OPERATING PARAMETERS 5-2
A.1. Disabling casualties 5-2
A.2. Restrictive discrepancies 5-2
A.2.a. Reporting restrictive discrepancies 5-2
A.2.b. Discrepancy underway 5-3
A.3. Major discrepancies 5-3
A.4. Minor discrepancies 5-3
A.5. Responsibilities 5-3
A.5.a. Disabling casualty – underway 5-4
A.5.b. Restrictive discrepancy – underway 5-4
A.6. Environmental limits 5-5
SECTION B. PERFORMANCE DATA 5-6
B.1. Fuel consumption 5-6
B.2. Seakeeping 5-7
B.2.a. Operating in beam seas 5-7

B.2.b. Operating in following seas 5-7
B.3. Stability 5-7
B.4. Speed 5-8

CHAPTER 6 MISSION PERFORMANCE 6-1

SECTION A. STARTING PROCEDURES 6-2
A.1. Pre-Start 6-2
A.2. Engine starting 6-3
A.3. Energizing equipment 6-3
SECTION B. UNDERWAY 6-4
B.1. Personal protective gear 6-4
B.2. Communications 6-4
SECTION C. GOING ALONGSIDE 6-5
SECTION D. HANDING CHARACTERISTICS 6-7
D.1. Turning 6-8
D.2. Pivoting 6-8
D.3. Limiting factors 6-9
D.4. Buoyancy 6-9
D.5. Beam seas 6-9
D.6. Following seas 6-9
D.7. Maneuverability 6-10
D.8. Navigational orientation 6-10
SECTION E. OPERATING WITH HELICOPTERS 6-11
SECTION F. ANCHORING 6-12
F.1. Anchoring the boat 6-12
F.2. Weigh anchor 6-13
SECTION G. TOWING 6-14
G.1. Angular momentum 6-14
G.2. Alongside towing 6-14
G.3. Approaches 6-15
SECTION H. SECURING PROCEDURES 6-16

CHAPTER 7 EMERGENCY PROCEDURES 7-1

SECTION A. CAPSIZING 7-3
A.1. Symptom(s) 7-3
A.2. Actions 7-3
SECTION B. COLLISION WITH SUBMERGED OBJECT (OR BOTTOM) 7-4
B.1. Symptom(s) 7-4
B.2. Actions 7-4
SECTION C. STEERING CASUALTY (HYDRAULIC) 7-5
C.1. Symptom(s) 7-5
C.2. Actions 7-5
SECTION D. STEERING CASUALTY (ELECTRICAL) 7-6
Not applicable on this platform. 7-6

SECTION E. RUNNING GEAR FAILURE 7-7
E.1. Symptom(s) 7-7
E.2. Actions 7-7
SECTION F. ENGINE ROOM FIRE 7-8
F.1. Symptom(s) 7-8
F.2. Actions 7-8
SECTION G. FIRE IN THE AUXILIARY MACHINERY COMPARTMENT 7-9
Not applicable on this platform. 7-9
SECTION H. LOSS OF CONTROL OF ENGINE RPM 7-10
H.1. Symptom(s) 7-10
H.2. Actions 7-10
SECTION I. LOSS OF FUEL OIL PRESSURE 7-11
I.1. Symptom(s) 7-11
I.2. Actions 7-11
SECTION J. LOSS OF LUBE OIL PRESSURE 7-12
J.1. Symptom(s) 7-12
J.2. Actions 7-12
SECTION K. ENGINE HIGH WATER TEMPERATURE 7-13
K.1. Symptom(s) 7-13
K.2. Actions 7-13
SECTION L. LOW VOLTAGE ALARM/LOSS OF ELECTRICAL CHARGING SYSTEM 7-14
L.1. Symptom(s) 7-14
L.2. Actions 7-14
SECTION M.FLOODING 7-15
M.1. Symptom(s) 7-15
M.2. Actions 7-15
SECTION N. HARD GROUNDING 7-16
N.1. Symptom(s) 7-16
N.2. Actions 7-16
SECTION O. DAMAGE TO FOAM COLLAR 7-18
O.1. Symptom(s) 7-18
O.2. Actions 7-18
SECTION P. LOSS OF POWER TO COMMUNICATIONS/ NAVIGATION EQUIPMENT 7-19
P.1. Symptom(s) 7-19
P.2. Actions 7-19
SECTION Q. GENERATOR EMERGENCY PROCEDURES 7-20
Not applicable on this platform. 7-20

APPENDICES AND INDEX

APPENDIX A. OUTFIT LIST & STOWAGE PLAN A-1

APPENDIX B. TIME COMPLIANCE TECHNICAL ORDERS (TCTOS) B-1

APPENDIX C. MATERIEL INSPECTION CHECKLIST C-1

APPENDIX D. DISABLING CASUALTIES D-1

APPENDIX E. RESTRICTIVE DISCREPANCIES E-1

APPENDIX F. MAJOR DISCREPANCIES F-1

APPENDIX G. VEHICLE – TRAILER MATCHING CHECKLIST G-1

APPENDIX H. LIST OF ACRONYMS H-1

INDEX INDEX-1

LIST OF FIGURES

Figure 2-1 SPC-SW 2-2
Figure 2-2 Foam Flotation Blocks 2-5
Figure 2-3 Anchor Locker 2-6
Figure 2-4 Console Forward Lockers 2-7
Figure 2-5 Console Locker 2-8
Figure 2-6 Transom Lockers and Quick Acting Watertight Hatch (QAWTH) 2-9
Figure 2-7 Center Console 2-10
Figure 2-8 Engine Well Platform Lowered 2-11
Figure 2-9 Engine Well Platform Raised 2-12
Figure 2-10 Forward Hull Fittings 2-13
Figure 2-11 Aft Tow Bitt 2-14
Figure 2-12 Rescue Recess 2-15
Figure 2-13 Foredeck 2-16
Figure 2-14 Flag Mast Socket 2-18
Figure 2-15 Tow Mast and Navigation Light Mast Sockets 2-18
Figure 2-16 Tow Mast 2-19
Figure 2-17 Mast Stowage 2-19
Figure 2-18 Quarter Bitts 2-20
Figure 2-19 Boarding Steps 2-21
Figure 2-20 Honda Outboards 2-22
Figure 2-21 Hydraulic Jacking Plate Gauges 2-23
Figure 2-22 Fuel Fill Port 2-23
Figure 2-23 Center Console 2-24
Figure 2-24 Steering Cylinders 2-25
Figure 2-25 OHIP 2-26
Figure 2-26 Antennas 2-27
Figure 2-27 Anchor System 2-28
Figure 2-28 Hinged Bulkhead Fitting For Anchor Gear 2-29
Figure 2-29 Transducer 2-30
Figure 3-1 Honda Outboards 3-2
Figure 3-2 Honda Outboards Diagram 1 3-3
Figure 3-3 Honda Outboards Diagram 2 3-3
Figure 3-4 Engine Mount 3-4
Figure 3-5 Fuel Priming Bulb 3-5
Figure 3-6 Engine Mounted Fuel Filters 3-6
Figure 3-7 Engine Cooling 3-7
Figure 3-8 Engine Oil Drains 3-8
Figure 3-9 Engine Oil Filter 3-9
Figure 3-10 Engine Key 3-10
Figure 3-11 Engine Gauges 3-12
Figure 3-12 Engine Throttles 3-13
Figure 3-13 Engine Tilt 3-14
Figure 3-14 Engine Manual Tilt 3-15
Figure 3-15 Engine Fuses 3-16
Figure 3-16 Exhaust and Anodes 3-17
Figure 3-17 Hydraulic Jacking Plate 3-18
Figure 3-18 Hydraulic Jacking Plate Pump 3-20
Figure 3-19 Helm Pump 3-21
Figure 3-20 Fuel Tank Fittings 3-22

Figure 3-21 Tank Access 3-23
Figure 3-22 Racor Filter 3-24
Figure 3-23 Transom 3-26
Figure 3-24 Trim Tab Controls 3-27
Figure 3-25 Seats 3-28
Figure 3-26 Passenger Seat 3-29
Figure 3-27 Engine Alternator and Starter 3-30
Figure 3-28 Start Batteries 12 VDC Breaker Panel 3-32
Figure 3-29 12 VDC Breaker Panel 3-32
Figure 3-30 Console Switch Panels 3-34
Figure 3-31 OHIP Switch Panel 3-34
Figure 3-32 Canopy Lights 3-36
Figure 3-33 Fuse Block 3-38
Figure 3-34 Console Electronics 3-40
Figure 3-35 Heading Sensor 3-41
Figure 3-36 GPS Antennas 3-42
Figure 3-37 OHIP 3-43
Figure 3-38 EPIRB 3-45
Figure 3-39 Horn 3-46
Figure 3-40 Fire Extinguisher 3-47
Figure 3-41 Bilge Pumps 3-49
Figure 3-42 Bilge Pump Controls 3-49
Figure 3-43 Windshield Wipers 3-51
Figure 3-44 Wiper Fill 3-51
Figure 3-45 Defroster 3-52
Figure 3-46 Cabin Fans 3-52
Figure 3-47 Hull Anode 3-53
Figure 3-48 SPC-SW Trailer 3-54
Figure 3-49 Truck Hitch 3-56
Figure 3-50 Trailer Connected 3-57
Figure 3-51 Trailer Transom Tiedowns 3-60
Figure 3-52 Bow Safety Cable 3-60
Figure 3-53 Trailer Window Guard 3-61
Figure 3-54 Weather Curtain Stowage During Trailering 3-63
Figure 5-1 Fuel Consumption 5-6

Chapter 1
Introduction

Introduction

This handbook contains information necessary for the safe and efficient operation of the Special Purpose Craft – Shallow Water (SPC-SW). It defines operational capabilities, limitations, and emergency procedures. In addition, it shows or describes the fittings, outfit list, and physical characteristics of the boat.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Warnings, Cautions, and Notes	1-2
B	Facility Manager	1-3
C	Changes	1-4
D	Action	1-5

Section A. Warnings, Cautions, and Notes

Introduction

The following definitions apply to Warnings, Cautions, and Notes found throughout the handbook.

A.1. Warning

WARNING

To avoid personal injury or loss of life, operating procedures and techniques must be carefully followed.

A.2. Caution

CAUTION !

Operating procedures or techniques must be carefully followed to avoid equipment damage.

A.3. Note

NOTE

An operating procedure or technique is essential to emphasize.

Section B. Facility Manager

Introduction

Commandant (CG-731) is the facility manager for the SPC-SW. The SPC-SW is a standard boat as defined in the *Boat Management Manual*, COMDTINST M16114.4 (series) and the *Naval Engineering Manual*, COMDTINST M9000.6 (series). The Boat Forces Center, through the Standardization Team (STAN Team), provides expertise in all aspects of the boat's operation and maintenance. The STAN Team reviews the boat, its equipment, crew procedures, operational reports, casualty reports (CASREPS), Abstract of Operations (AOPS)/Training Management Tool (TMT), Rigging and Battery Logs, Boat Records and Hull History, etc., and technical manuals continuously to update this information.

Section C. Changes

Introduction

Commandant (CG-731), the Office of Boat Forces, promulgates this handbook and its changes. Submit recommendations for changes to Commandant (CG-731) via standard letter or electronic mail. The STAN Team assumes responsibility for receiving and implementing changes to this handbook. For more information, contact Commandant (CG-731), Special Purpose Craft-Shallow Water Boat Facility Manager at (202) 372-2458.

The address for CG-731 is:

COMMANDANT (CG-731)
U. S. COAST GUARD HEADQUARTERS
2100 2ND STREET SW
WASHINGTON DC 20593-0001

Attn: SPC-SW Facility Manager

C.1. Time Compliance Technical Orders (TCTOs)

All Time Compliance Technical Orders (TCTOs) issued since the SPC-SW has been in service are provided in *Appendix B* of this handbook. TCTOs issued after the date of the release of this manual supersede information in this handbook where applicable.

Section D. Action

Introduction

Operational, supervisory, maintenance support commands, and boat crews will comply with procedures and limitations specified in this publication and any duly issued changes.

D.1. Configuration control

Configuration control for the SPC-SW is critical for standardization of equipment and safety of operations.

To maintain fleet wide standardization, unit commanders shall not change or vary the type or location of equipment carried except where noted. Design or structural alterations are prohibited unless specifically authorized by the Commandant, Office of Naval Engineering (CG-45).

NOTE

Prototype testing of SPC-SW configuration changes may only be carried out with the specific authorization of the Commandant, Office of Naval Engineering (CG-45).

This page intentionally left blank.

Chapter 2
Boat Characteristics

Overview

Introduction

This chapter describes standard SPC-SW features. The systems described in this chapter are covered in more detail in *Chapter 3, Boat Systems*.

NOTE

All illustrations in this Boat Operator's Handbook are for familiarization only. The location of hull fittings and system components in these illustrations may not accurately reflect proper placement and installation on all hulls. Any discrepancies between the Boat Operator's Handbook and the SPC-SW shall be clarified by contacting the SPC-SW Asset Line Manager at the Small Boat Product Line (SBPL).

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	General Description	2-2
B	Basic Hull and Deck Construction (Interior and Exterior)	2-5
C	Location of Interior and Exterior Hull Fittings (Structural)	2-13
D	Location of Major Hull Systems and Components	2-22

Section A. General Description

A.1. Design

The SPC-SW (**Figure 2-1**) was designed by Metalshark Marine located in Jeanerette, LA.

A.2. Manufacturer

Metalshark Marine built the SPC-SW. The prototype craft Coast Guard 231383 and the first production craft Coast Guard 24500 entered service in 2008.

A.3. Missions

The SPC-SW is designed as a multi-mission capable boat. Missions include search and rescue (SAR), maritime law enforcement (MLE), and ports, waterways, and coastal security (PWCS).

Figure 2-1
SPC-SW

A.4. Boat specifications

The following provides a list of all SPC-SW boat specifications:

A.4.a. Physical characteristics

Hull Length	24 FT 10 inches
Length Overall (LOA)	27 FT
Beam Overall	8 FT 6 inches
Freeboard:	
Bow	2 FT 9 inches
Rescue Recess	1 FT 8 inches
Aft	1 FT 9 inches
Draft:	
(normal operating condition)	2 FT 6 inches
(shallow operating condition)	1 FT 5 ½ inches
Highest Points:	
Fixed	9 FT 2 inches (Searchlight)
Unfixed	16 FT (AIS Antenna)
Engines	Twin 150 HP 4-cycle outboard motors, counter rotating
Rated Horsepower	300 HP total
Fuel	Gasoline
Fuel Capacity:	
100%	100 gallons
95% (useable)	95 gallons
Electrical Generation	Engine Alternators
Propellers	Fixed pitch, 3-blade, 15¼ inch diameter, 19 inch pitch
Displacement:	
Hoisting condition (boat, full fuel, outfit; no crew or cargo)	6,920 lbs
Normal operating condition	7,360 lbs
Fully loaded condition (Normal operating condition + cargo)	7,800 lbs

Trailer Information:	
Highest Fixed Point when Trailered	12 FT 9 ½ inches (Searchlight)
Highest Unfixed Point when Trailered	19 FT 5 inches (AIS Antenna)
Trailer Load Capacity (tire load capacity)	10,800 lbs
Trailer Weight	2,040 lbs
Weight of Trailer, Boat (fully loaded w/o crew)	8,960 lbs

NOTE

Trailer heights were measured from ground on a properly loaded SPC-SW.

A.4.b. Operational characteristics and parameters

Crew Capacity (seated)	4
Maximum Personnel (including crew)	10
Maximum Seas	4 FT
Maximum Winds	25 KTS
Range Nautical Mile (NM) (at cruising RPM) in calm water	225 NM at 4,800 RPM
Maximum Operating Distance from Shore	5 NM
Top RPM and Speed	41 KTS at 6,000 RPM
Cruise Speed	30 KTS at 4,800 RPM
Towing Capacity	5 Displacement Tons
Ice Breaking Capability	None

NOTE

Unit commanders shall comply with the minimum boat crew requirements when dispatching boats for Coast Guard operations in accordance with the *U.S. Coast Guard Boat Operations and Training Manual, Volume I*, COMDTINST M16114.32 (series). See *Chapter 4* of this manual for additional Crew Requirements.

NOTE

SPC-SWs can operate with a minimum complement of two, a Coxswain and crewmember when transiting. Crew and passenger weights shall be 180 lbs per person when calculating weights for other loading configurations. Refer to *Chapter 4* of this manual for further information.

Section B. Basic Hull and Deck Construction (Interior and Exterior)

Introduction

The SPC-SW hull is made of aluminum. The hull contains a 100 gallon fuel tank. The decks are fabricated of aluminum.

B.1. Hull construction

The hull is a hard chine planing boat design. The hull and frames are marine grade aluminum alloy.

B.1.a. Hull

The hull is a centerline flat. The bottom plating is ¼ inch thick and has a 16 degree deadrise, measured at the transom. Forward and outboard voids in the hull are filled with 1 inch cube polyethylene foam blocks for flotation (**Figure 2-2**). The voids can be accessed through eight stainless steel watertight access covers in the deck.

Figure 2-2
Foam Flotation Blocks

B.1.b. Transverse bulkheads	Transverse bulkheads in the SPC-SW are aluminum. Forward bulkheads are ¼ inch thick and the aft bulkheads are 3⁄16 inch thick.
B.2. Compartment arrangement/ description	The SPC-SW is a partially-enclosed center console boat with an aluminum canopy. There are six weather tight storage lockers.
B.2.a. Anchor locker	An anchor locker, with fabricated hatch cover (**Figure 2-3**), anchor tie-downs, and anchor line reel, is located at the bow. The hatch is equipped with gas shocks which assist in opening and holding the hatch in a fully open position.

Figure 2-3
Anchor Locker

B.2.b. Console forward lockers.

Two storage lockers are located forward of the console (**Figure 2-4**). The lockers have hinged covers that fold downward. A foldable seat is attached to the forward side of the lockers.

Figure 2-4
Console Forward Lockers

B.2.c. Console locker

The door on the port side of the console provides access to the storage space within the console (**Figure 2-5**). This locker also provides access to the backside of all of the equipment mounted on the console. A white light with ON/OFF switch is on the inside of the locker to illuminate the space.

Figure 2-5
Console Locker

B.2.d. Transom lockers

Lockers are located at the transom on the port and starboard sides (**Figure 2-6**) and contain:

Port locker:

i) Port engine starting battery
ii) Starting battery switches and main breakers
iii) Port engine fuel priming bulb

Starboard locker:

i) Starboard engine starting battery
ii) Hydraulic jacking plate hydraulic pump
iii) Starboard engine fuel priming bulb

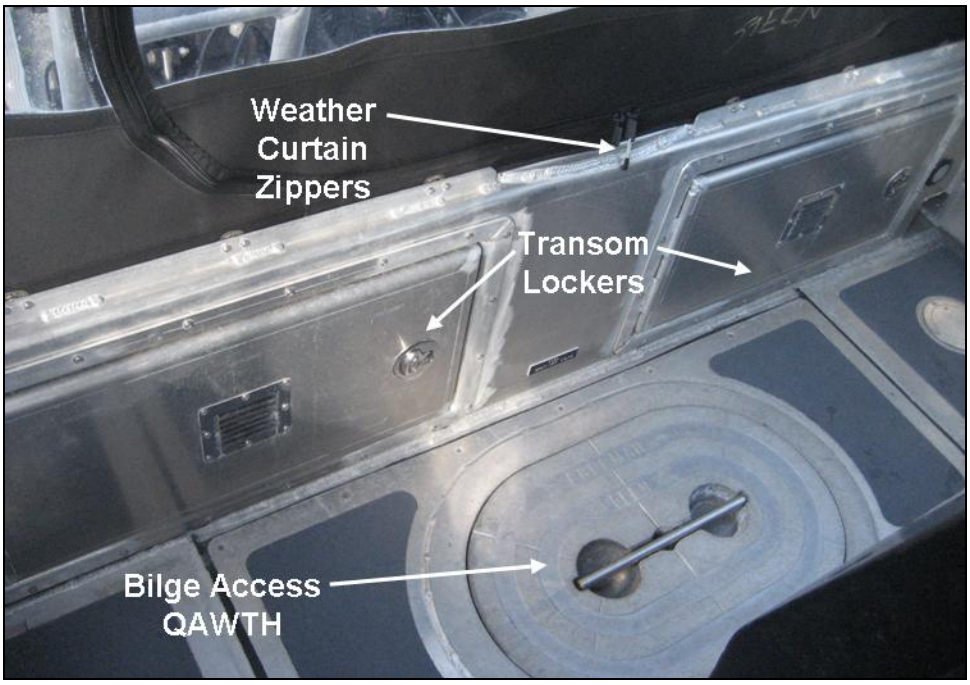

Figure 2-6
Transom Lockers and Quick Acting Watertight Hatch (QAWTH)

B.2.e. Console

The SPC-SW has a partially-enclosed center console with an aluminum canopy (**Figure 2-7**). The console can be fully enclosed with side and aft weather curtains. The weather curtains contain side and rear windows and can be removed completely or rolled up and secured. The weather curtains are attached to the console and hull with twist lock fasteners and curtain windows can be opened and closed using zippers with glow-in-the-dark grab loops (**Figure 2-6**). The forward facing windshield is fitted with a windshield wiper and washer system.

NOTE

The weather curtain window zippers should remain in the bottom center of the curtain so that they can be easily found and the windows opened quickly in an emergency.

Figure 2-7
Center Console

B.2.f. Bilge

The bilge access is through a flush mounted, quick acting watertight hatch (QAWTH) in the deck (**Figure 2-6**) on centerline, just aft of the rear crew seats. The bilge contains two 2,000 gph bilge pumps, bilge drain plug, and depth sounder transducer. The hatch also provides access to the primary water separating fuel filters and fuel cut off valves.

CAUTION !

Be careful when working near the engine well; hydraulic steering lines exit the back of the boat and can be easily stepped on/broken, causing a loss of steering.

B.2.g. Engine well

The engine well has a hinged grated work platform. The platform can be secured in the lowered or raised position (**Figure 2-8** and **Figure 2-9**). Below the platform, a four step dive ladder is stowed in brackets and engine remote control grommet, steering and hydraulic jacking plate hydraulic lines run.

CAUTION !

Petroleum products can damage the polyurethane fabric. The fabric is coated with a protectant but care must be taken not to spill oil or gasoline on the fender. Immediately clean any spills.

B.3 Fender

The hull is fitted with a fixed foam fender system and rub rails to protect the exterior hull surfaces (**Figure 2-7**). The fender is made of closed cell polyethylene foam covered with a polyurethane fabric. Rub rails made of half round rubber are mounted to the canopy, rescue recess, and the aft lower portion of the hull.

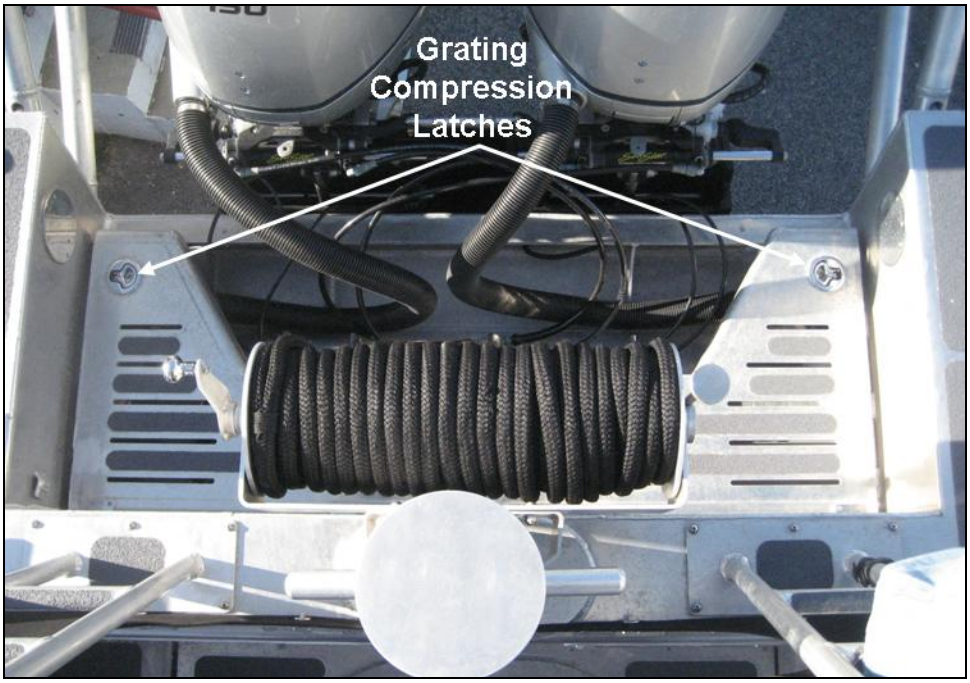

Figure 2-8
Engine Well Platform Lowered

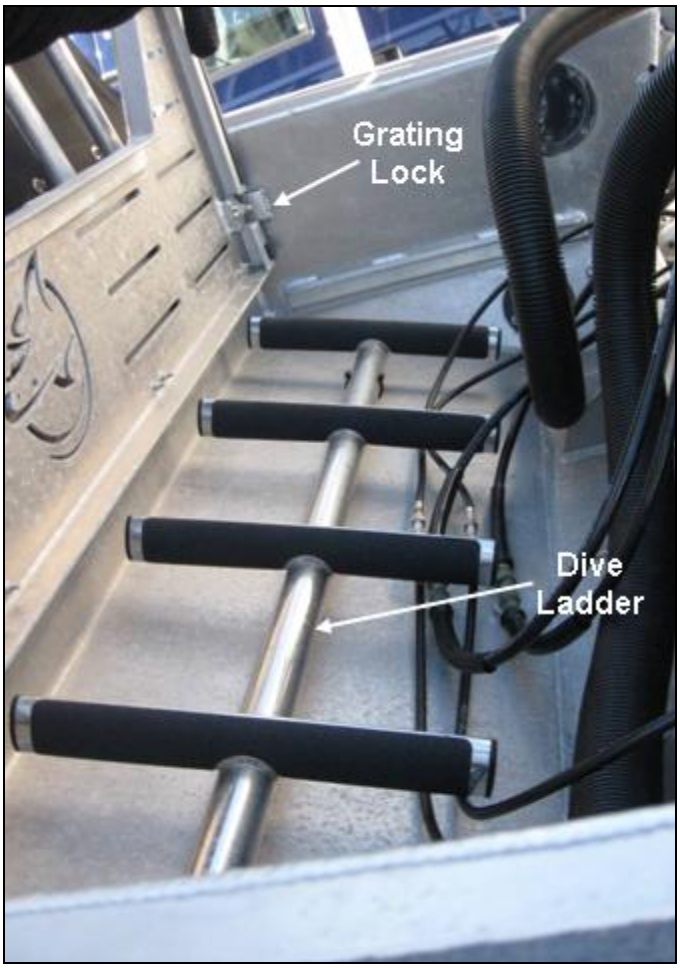

Figure 2-9
Engine Well Platform Raised

B.4. Deck construction

The SPC-SW deck consists of $^{3}/_{16}$ inch thick aluminum removable deck plates, secured using bolts and sealant. The deck is watertight and self bailing. All walking surfaces are covered with non-skid.

B.5. Ring buoy and strobe light

A 24 inch ring buoy and strobe light is mounted on the anchor locker aft bulkhead (**Figure 2-3**).

Section C. Location of Interior and Exterior Hull Fittings (Structural)

Introduction

This section describes the location of all interior and exterior hull fittings of the SPC-SW.

C.1. Bow eye

An aluminum padeye is welded to the stem (**Figure 2-10**). The bow eye has two holes, one for the trailer winch hook and one for the trailer safety wire.

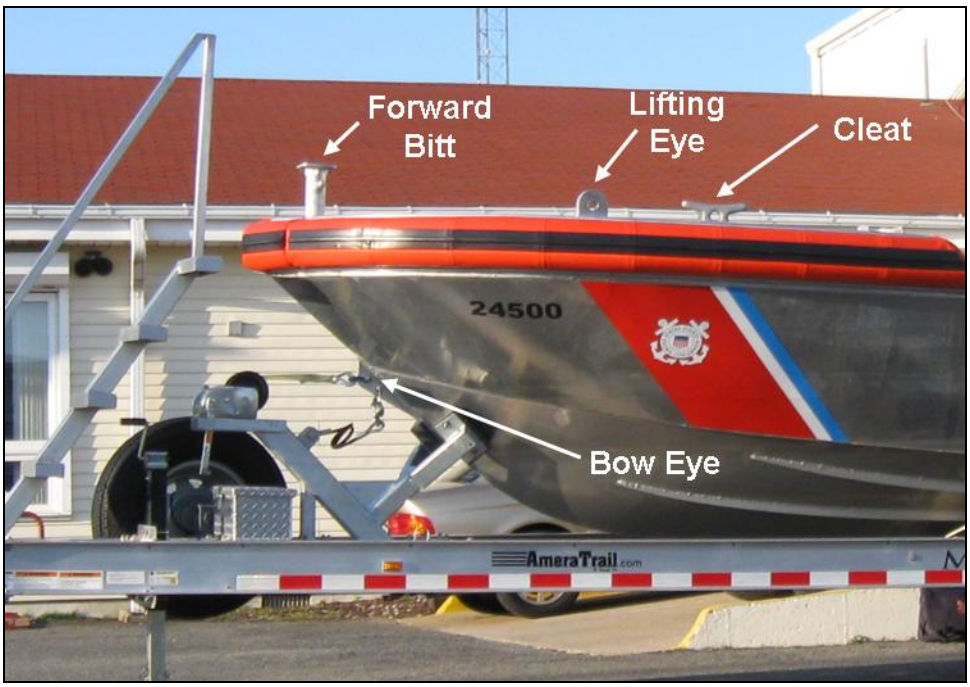

Figure 2-10
Forward Hull Fittings

C.2. Standard cleats

Four 10-inch aluminum standard cleats are welded on top of the gunwale (**Figure 2-10**). The cleats are positioned to facilitate mooring and assist along side towing. The cleats are located on the port and starboard sides; two forward, two amidships.

C.3. Lifting eyes

The SPC-SW is equipped with four welded aluminum lifting fittings (**Figure 2-10)** suitable for lifting the boat with a crane. Two lifting eyes are located forward on the gunwale, port and starboard, and two are located on the aft quarters. The lifting eyes are pull tested to just over 1.5 times the normal lifting load, which equates to a pull test of 2,000 lbs on the forward lifting eyes and 3,450 lbs on the aft lifting eyes.

C.4. Forward bitt

The forward bitt (**Figure 2-10**) can be used for anchoring, mooring, or when being towed.

C.5. Tow bitt

A tow bitt (**Figure 2-11**) fitted with two cross pins is located aft on centerline, to be used for towing. The tow bitt is capable of towing up to five displacement tons.

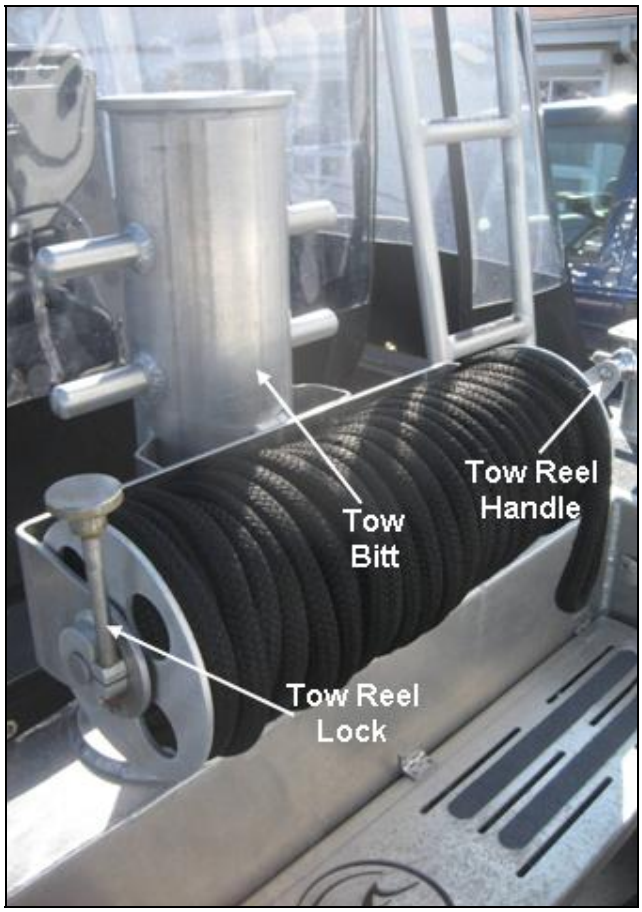

Figure 2-11
Aft Tow Bitt

C.6. Rescue recess

Two rescue recesses are provided in the gunwale on the forward deck, port and starboard (**Figure 2-12**). The dive ladder can be attached to the rescue recess to board the SPC-SW from in the water. The ladder is stowed in the engine well when not in use, (**Figure 2-9**). The dive ladder bracket is stowed in the lower console forward locker.

Figure 2-12
Rescue Recess

C.7. Deck tie downs

The boat incorporates four recessed tie downs located on the foredeck (**Figure 2-13**).

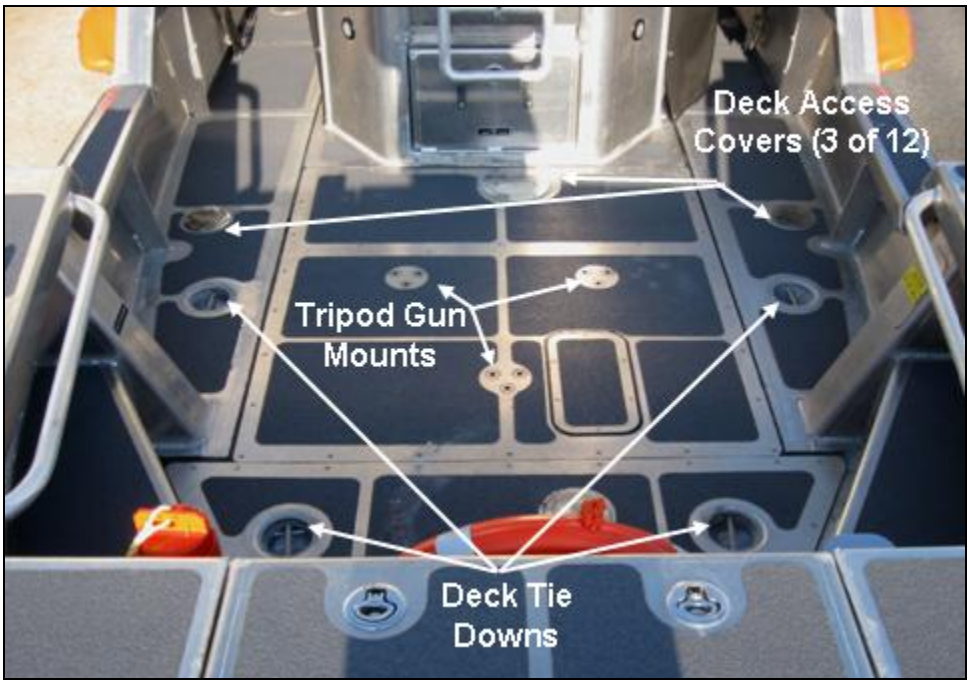

Figure 2-13
Foredeck

C.8. Deck cover/hatches

Twelve flush mounted, watertight, stainless steel access covers are fitted in the deck and sides (**Figure 2-13**). Two access covers on the foredeck, near centerline, provide access to fuel tank fittings. Two access covers in the engine well, provide access to the bilge pump hose through-hull fittings. All other access covers provide access to the hull voids filled with foam flotation blocks (**Figure 2-2**). The hatches are removed using a spanner wrench, stowed in the console locker. There are two cover sizes and two spanner wrenches of different sizes to accommodate each.

C.9. Gun mount attachments

Attachment points for a MK 16 Mod 9 tripod gun mount are located on the forward deck (**Figure 2-13**). Plugs are inserted into the mounting points to keep them free of dirt and debris. They are to be removed with an allen wrench when installing the gun mount.

WARNING

Personnel should not be allowed on the canopy top when the boat is making way. Extra caution must be used when accessing the canopy top when the boat is in the water as there are limited hand holds on the canopy top.

C.10. Canopy top

An aluminum canopy extends aft from the center console. Ladders at the aft end of the canopy provide access to the platform. The canopy top is covered with non-skid.

C.11. Mast

Three removable masts are mounted on the centerline of the canopy top. The masts are constructed of aluminum pipe and each mounts in its own socket.

1 – The socket for the removable flag mast is located on centerline at the aft end of the canopy. The mast is held in the socket by a thumb screw through the mast socket (**Figure 2-14**).

2 – The socket (**Figure 2-15**) for the removable, telescoping towing light mast (**Figure 2-16**) is located on centerline aft of the radar antenna. The mast is secured into the socket with a pin attached to the mast. A cable with power for the lights is located next to the socket and when not in use, connects to a plug mounted on the mast socket. Attached to the towing light mast are the following components:

a) Masthead light (white)
b) Lower masthead light (white)
c) Stern light (white)
d) Tow light (amber)

3 – The socket for the removable navigation light mast with a single all around white light is located on centerline between the towing light mast and the radar antenna (**Figure 2-15**). The socket has a plug for the navigation light in the base, and the mast is secured in the socket using a screw lock on the mast. A threaded cover protects the plug when the mast is not installed.

All three masts are stowed in brackets in the console locker when not in use (**Figure 2-17**).

Figure 2-14
Flag Mast Socket

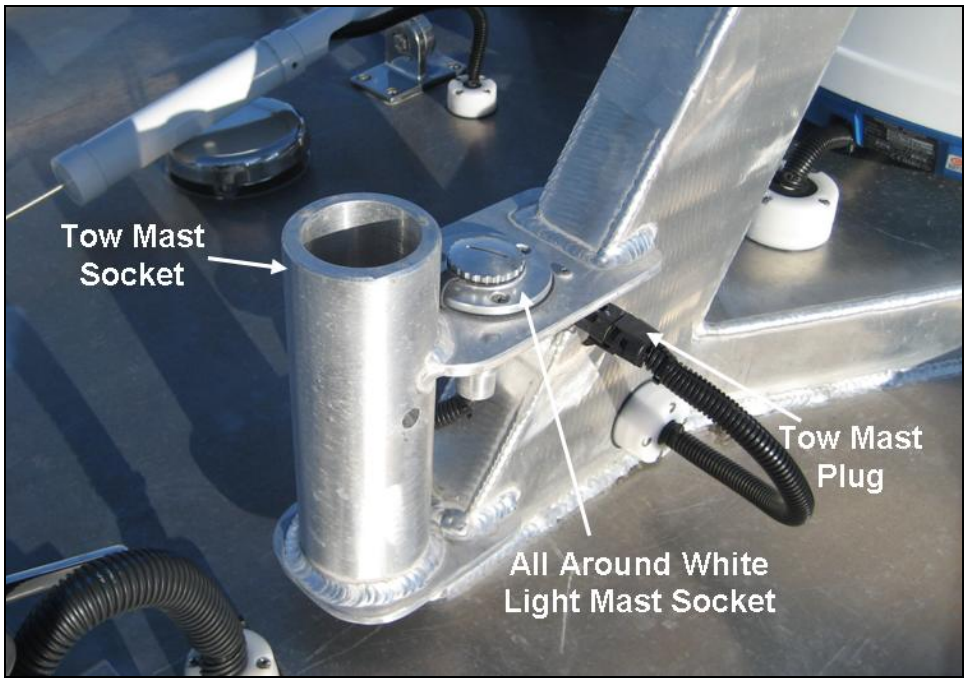

Figure 2-15
Tow Mast and Navigation Light Mast Sockets

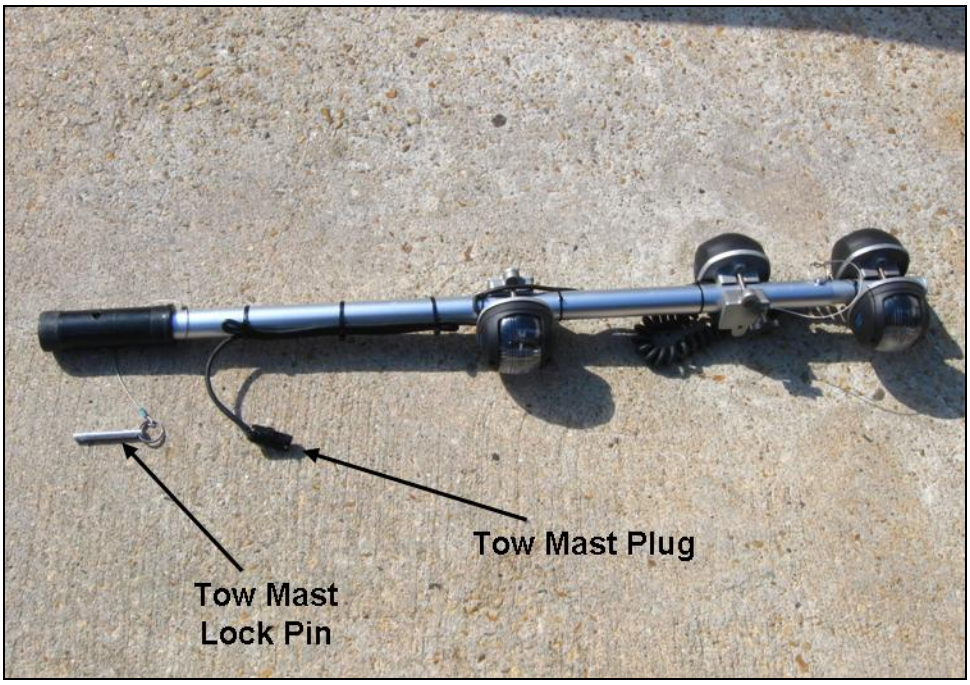

Figure 2-16
Tow Mast

Figure 2-17
Mast Stowage

C.12. Transom bitts

Aluminum quarter bitts, port and starboard on the transom, are used for mooring and alongside towing (**Figure 2-18**).

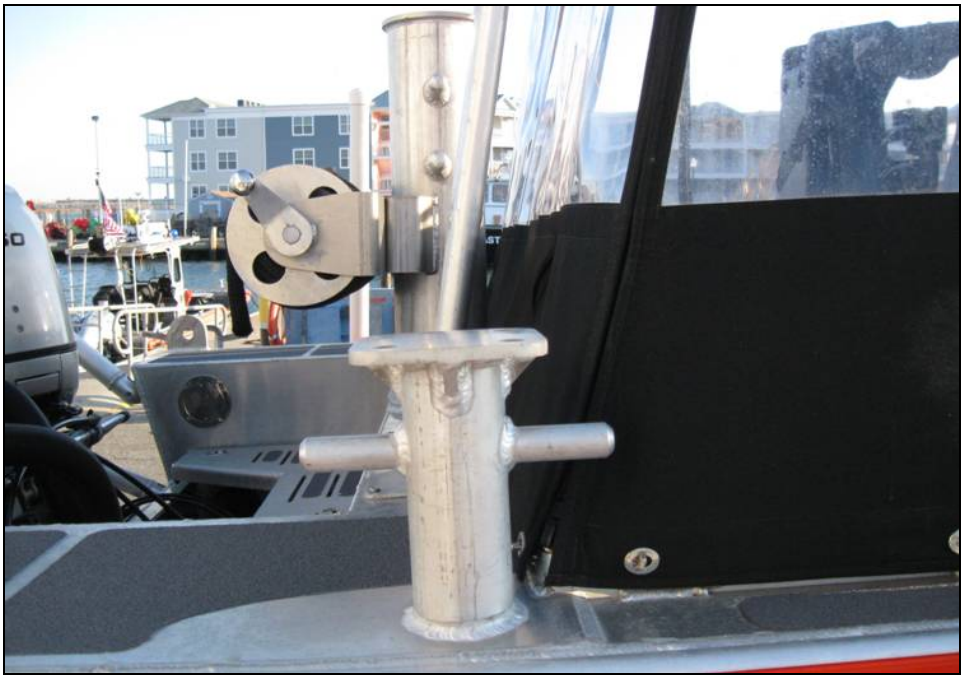

Figure 2-18
Quarter Bitts

C.13. Transom steps

Four folding boarding steps are mounted on the transom, two port and two starboard (**Figure 2-19**).

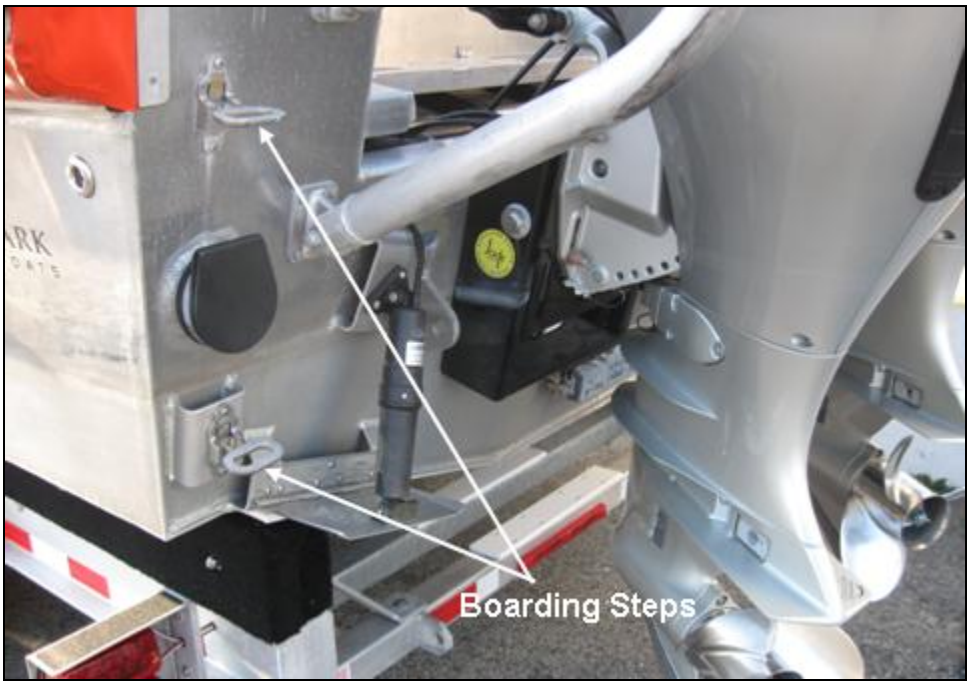

Figure 2-19
Boarding Steps

Section D. Location of Major Hull Systems and Components

Introduction

This section describes the location of the major hull systems and components installed on the SPC-SW.

D.1. Batteries

Three 12 VDC marine grade lead-acid batteries are installed on the SPC-SW. The port engine starting battery is located in the port transom locker and the starboard engine starting battery is located in the starboard transom locker. A dual-purpose battery for the boat's electronics electrical loads is located in the console locker.

D.2. Outboard engines

Twin Honda Marine 150 HP 4-cycle outboard engines are installed (**Figure 2-20**). The outboards are mounted on a hydraulic jacking plate at the transom.

Figure 2-20
Honda Outboards

D.3. Hydraulic jacking plate

The outboard engines are mounted on a hydraulic jacking plate used to control engine draft during shallow water operations. The jacking control and indicator gauge is mounted on the console (**Figure 2-21**).

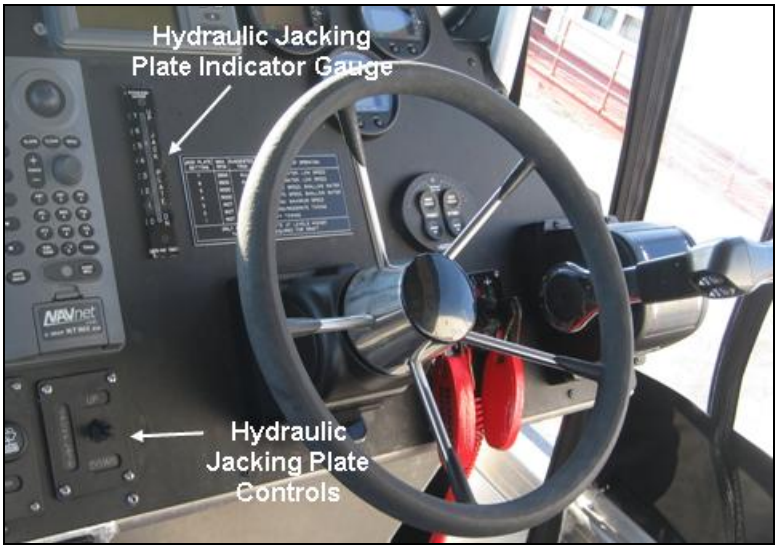

Figure 2-21
Hydraulic Jacking Plate Gauges

D.4. Fuel system

A single 100 gallon fuel tank is installed inside the hull beneath the foredeck, just forward of the console locker. The fuel fill port is located on the forward deck gunwale, port side (**Figure 2-22**).

Figure 2-22
Fuel Fill Port

D.5. Center Console

The SPC-SW is a center console boat (**Figure 2-23**). The console provides for engine and steering operation, boat systems control and monitoring, and communications and navigation equipment operation.

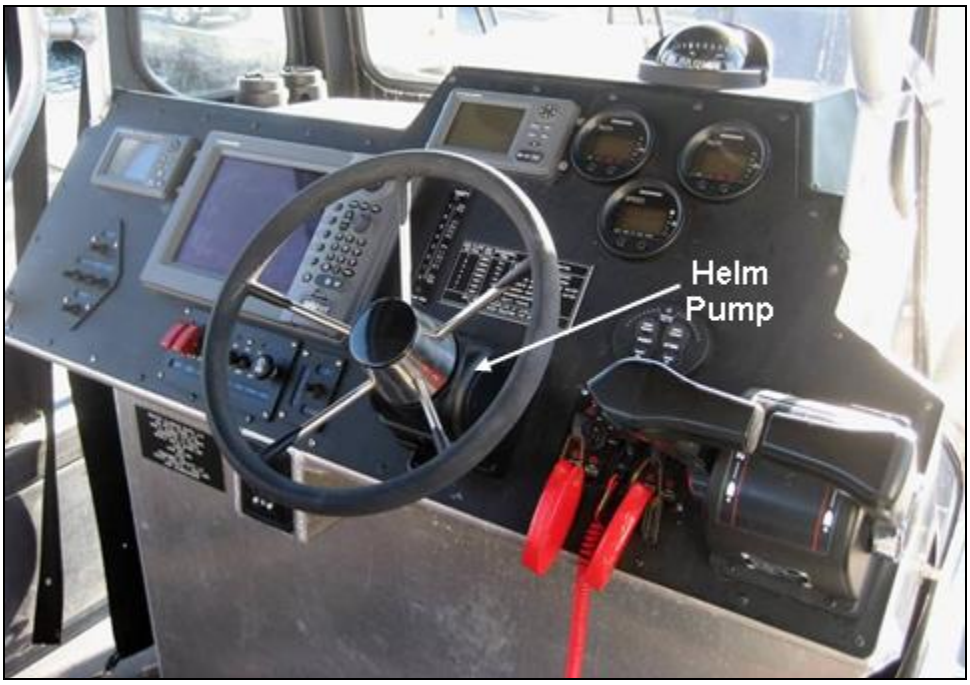

Figure 2-23
Center Console

D.6. Steering system

Hydraulic steering for the outboards consists of the following components (**Figure 2-23** and **Figure 2-24**):

a) Steering wheel
b) Helm pump
c) Interconnecting hydraulic hoses
d) Twin outboard steering cylinders
e) Tie rod

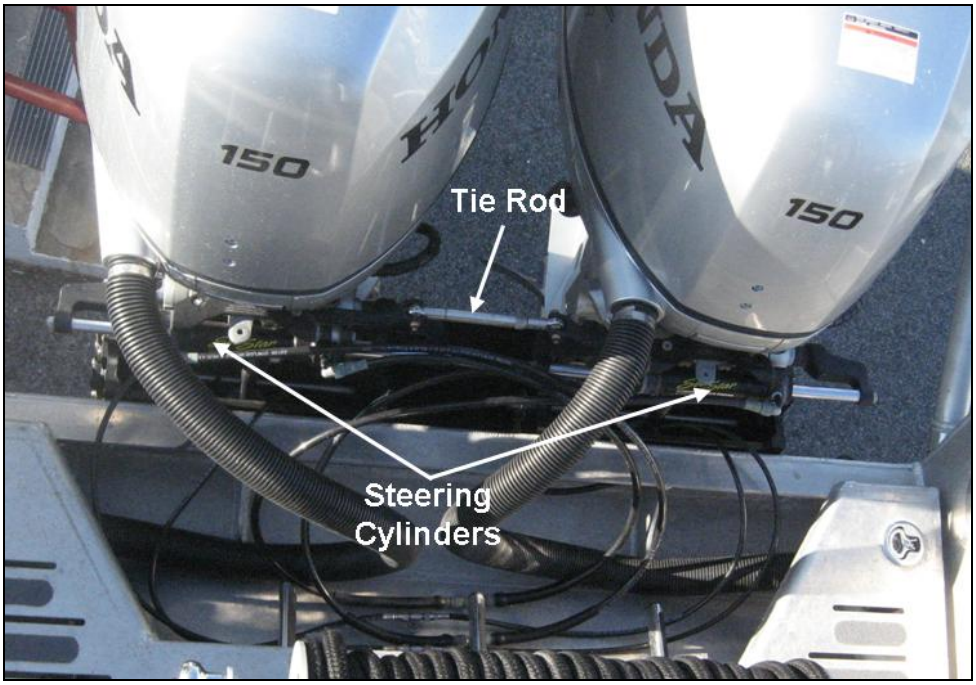

Figure 2-24
Steering Cylinders

D.7. Navigation and communications

The navigation and communications equipment are located on the Coxswain's console (**Figure 2-23**) and the overhead instrument panel (OHIP) (**Figure 2-25**).

Figure 2-25
OHIP

D.8. Antennas

All electronics' antennas are located on the canopy top (**Figure 2-26**). The AIS, UHF and two VHF antennas can be lower for trailering and when operating in areas with restricted vertical clearance.

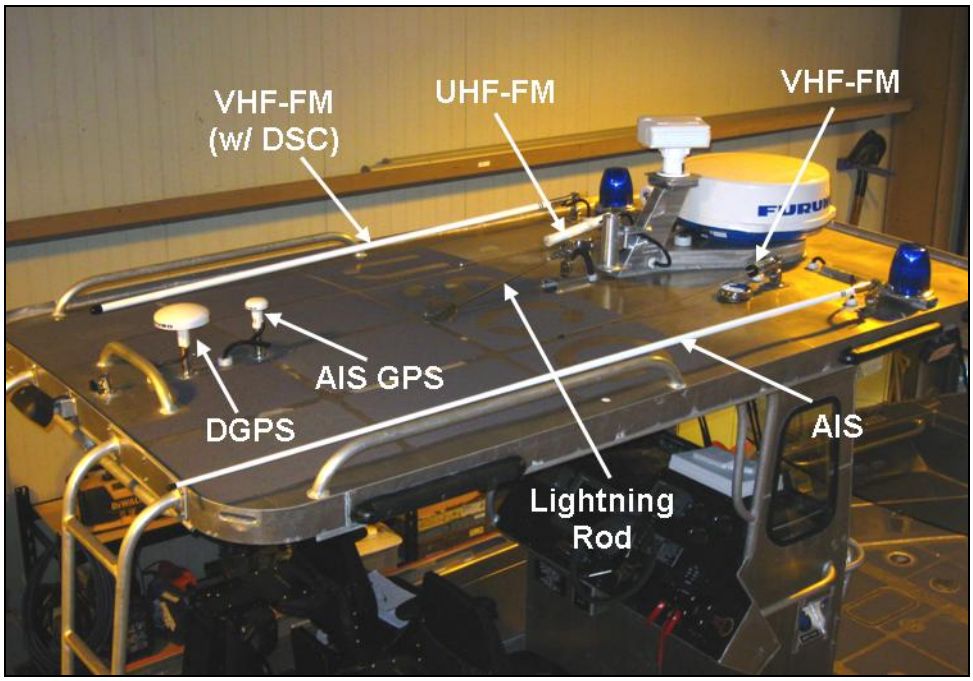

Figure 2-26
Antennas

D.9. Lightning rod

A lightning rod is mounted on the canopy top and is electrically connected to the boat's grounding system (**Figure 2-26**). The lightning rod folds down for trailering.

D.10. Anchor

The anchor is stowed in the anchor locker at the bow. The anchoring system is comprised of (**Figure 2-27**):

a) A Danforth type anchor, Fortress model FX-11
b) A ⅜ inch 316 stainless steel shackle with captive pin
c) 9 FT of ⅜ inch 316 stainless steel anchor chain
d) A ½ inch 316 stainless steel jaw-to-jaw swivel
e) 150 FT of 2¼ inch circumference double braided nylon line
f) ¾ inch 316 stainless steel anchor line thimble (spliced in eye)

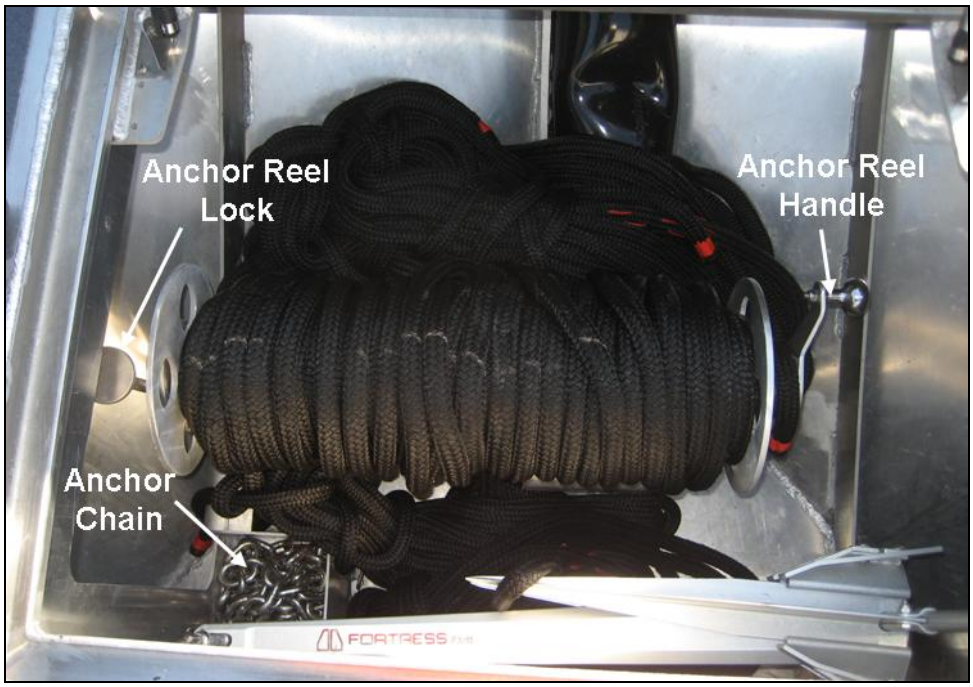

Figure 2-27
Anchor System

The anchor line is stowed on a reel that has a handle and a locking mechanism to prevent it from free wheeling when not in use. The bitter end of the anchor line is fastened to the anchor line reel. When anchoring, the anchor chain and line are routed through the hinged bulkhead fitting (**Figure 2-28**), on the aft bulkhead of the anchor locker.

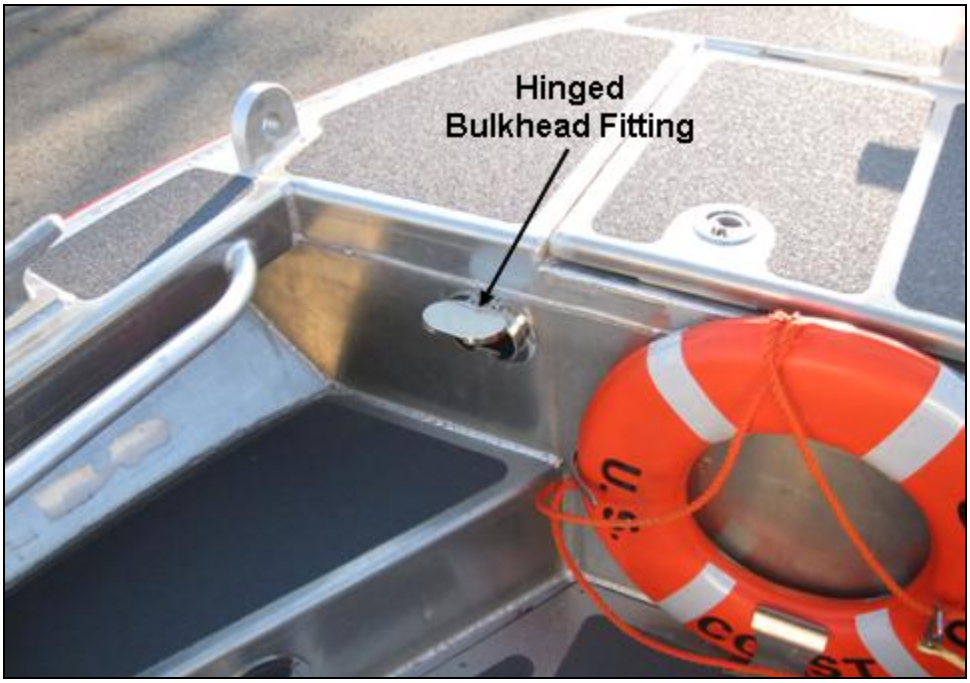

Figure 2-28
Hinged Bulkhead Fitting For Anchor Gear

D.11. Towline

A 2¼ inch towline (150 FT long) is stowed on the tow reel mounted on the aft side of the tow bitt (**Figure 2-11**). The towline reel has a handle and a locking mechanism to prevent it from free wheeling when not in use. The bitter end of the towline is fastened to the towline reel. A tow reel cover is used to protect the towline when not in use.

D.12. Depth sounder transducer

The depth sounder transducer is mounted through the hull in the bilge on centerline, below the crew seats (**Figure 2-29**). Access to the transducer is through the bilge QAWTH in the deck. A blank plug insert is connected to the transducer wiring. The blank plug can be installed in place of the transducer if the transducer is damaged or requires servicing.

Figure 2-29
Transducer

D.13. Bilge pumps

Two 12 VDC submersible bilge pumps are located in the aft portion of the bilge, one port and one starboard of centerline. Access to the bilge pumps is through the bilge QAWTH in the deck.

Chapter 3
Boat Systems

Introduction

This chapter discusses the SPC-SWs mechanical, electrical, and manual operating systems. Information contained in this chapter describes basic characteristics and provides information to assist boat crews in safe and efficient operations.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Propulsion System	3-2
B	Hull Fuel System	3-22
C	Hull System	3-25
D	Electrical System	3-30
E	Communications/Navigation System	3-39
F	Fire Extinguishing Equipment	3-47
G	Bilge System	3-48
H	Windshield Wipers and Washers	3-50
I	Cathodic Protection System	3-53
J	Trailer System	3-54
K	Weapons Mounting	3-67

Section A. Propulsion System

Introduction

The propulsion system for the SPC-SW consists of twin Honda, outboard engines, both mounted to a hydraulic jacking plate to allow for shallow water operations. This section provides a brief description of the subsystems and equipment comprising the propulsion system.

NOTE

All references to engine locations are taken standing behind the engine propeller looking forward.

A.1. Engines

The SPC-SW has two Honda Marine, four-stroke, in-line, four cylinder, sea water cooled outboard engines. Each engine is rated at 150 HP at 6,000 RPM (**Figure 3-1**, **Figure 3-2** and **Figure 3-3**). The dry weight of each engine is approximately 490 lbs.

A.1.a. Speed

The low idle speed is 750 +/-50 RPM in neutral.

The maximum engine speed is 6000 RPM.

Figure 3-1
Honda Outboards

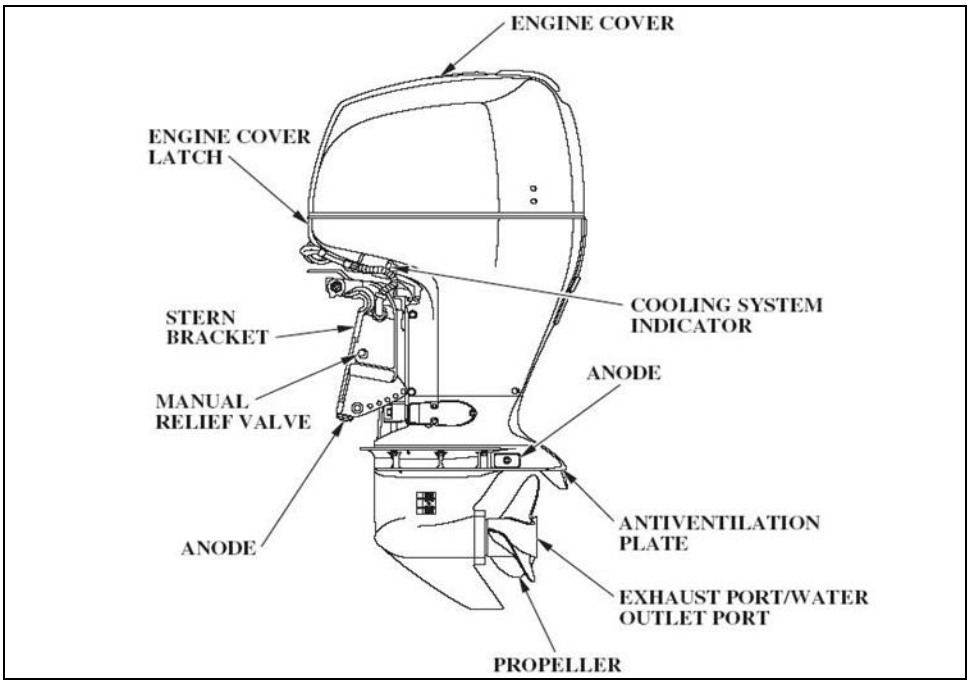

Figure 3-2
Honda Outboards Diagram 1

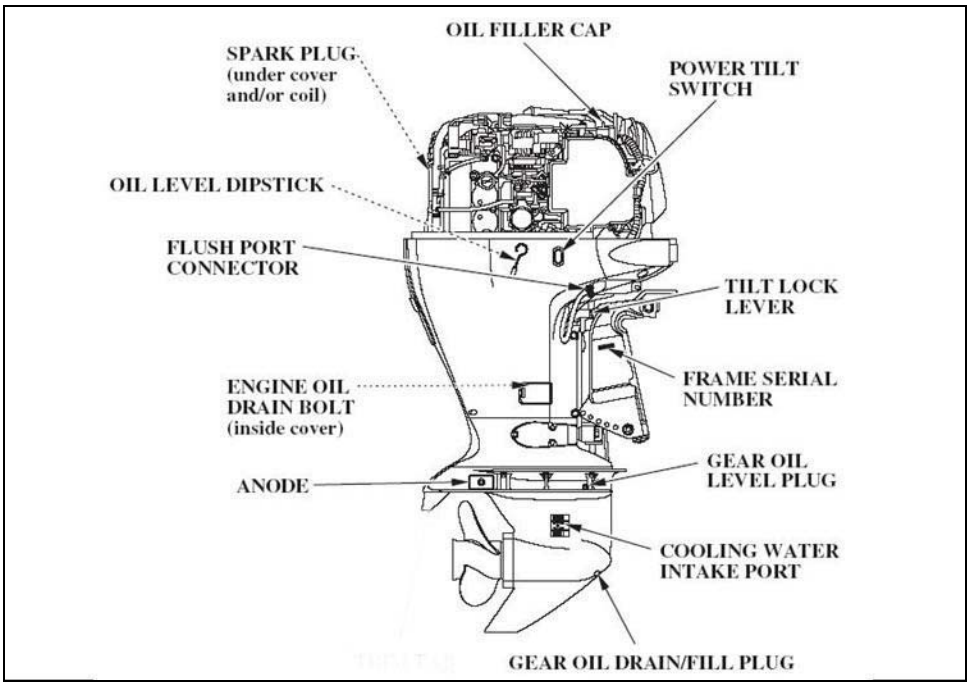

Figure 3-3
Honda Outboards Diagram 2

A.1.b. Location

The engines are each mounted on a hydraulic jacking plate located at the transom (**Figure 3-4**).

Figure 3-4
Engine Mount

A.2. Engine fuel system

The engine fuel system requires unleaded 86-octane gasoline or higher, containing no more than 10% ethanol (E10) or 5% methanol by volume.

A.2.a. Fuel priming bulb

A fuel priming bulb (**Figure 3-5**), located in the inlet line to each outboard engine, primes and pressurizes the outboard engine fuel system for starting. The fuel priming bulbs are located in the port and starboard transom lockers.

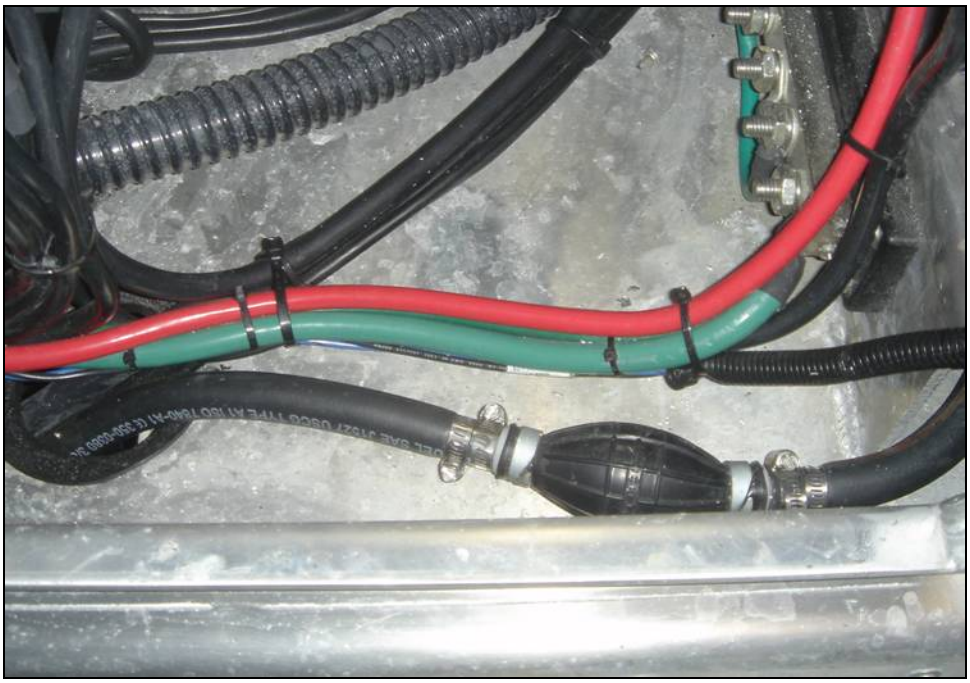

Figure 3-5
Fuel Priming Bulb

A.2.b. Fuel filter and water separator

A water separator with a translucent cup (**Figure 3-6**) is located under the engine cover on the port side, forward, of each engine and provides a visual indication of water in the fuel. Excess water also sets off a buzzer at the console. The water separator should be emptied and cleaned when excessive water is present.

A low pressure fuel filter is located adjacent to the water separator. The filter is mounted in a translucent cup to provide a visual indication of sediment or water. The filter is a disposable cartridge style filter and should be replaced periodically in accordance with the SPC-SW maintenance schedule.

A high pressure fuel filter is located just aft of the low pressure fuel filter and is mounted in the same metal housing as the high pressure fuel pump. This filter is a disposable cartridge filter and should be replaced periodically in accordance with the SPC-SW maintenance schedule.

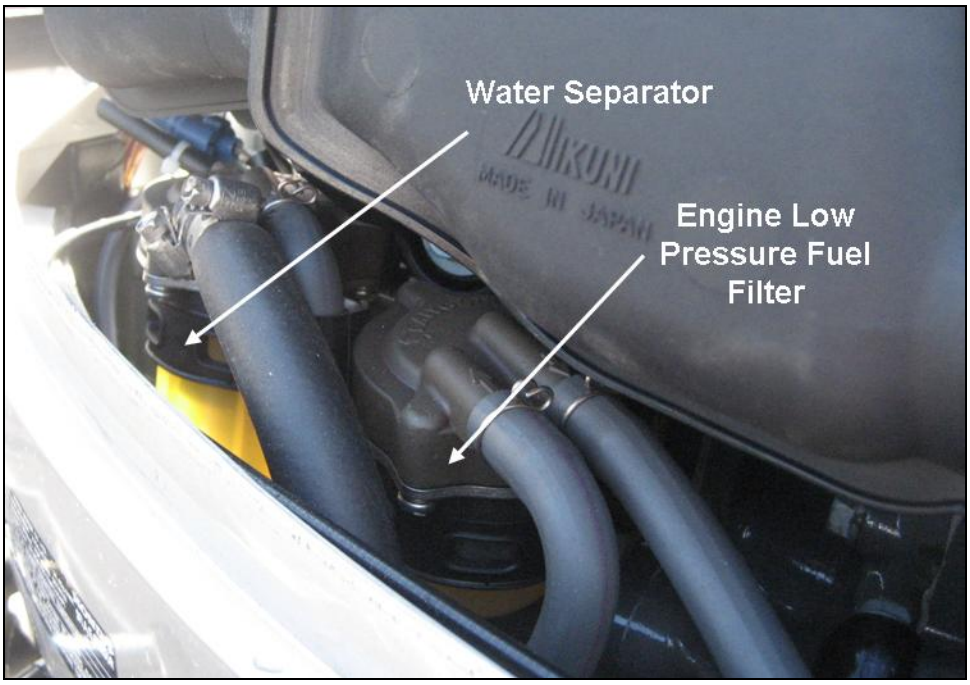

Figure 3-6
Engine Mounted Fuel Filters

A.2.c. Fuel Pumps	Low pressure and high pressure electric fuel pumps provide fuel to each cylinder as metered by an electronic fuel injection system.
A.2.d. Injection system	The engine incorporates an electronically controlled, multi-port fuel injection system. A common high pressure fuel rail provides fuel to each injector.
A.3. Engine cooling system	Each engine has a self contained raw water cooling system regulated by two engine thermostats. When operating in salt water, the engines must be flushed with fresh water after operation.
A.3.a. Seawater cooling pump	The engine cooling system pump is a rubber impeller pump located in the lower unit of the outboard. The impeller has a service life that is limited and must be inspected/replaced in accordance with the SPC-SW maintenance schedule.

A.3.b. Seawater strainer

Two cooling water intake ports (**Figure 3-7**) are located on the port and starboard sides of the lower outboard fairing directly above the horizontal propeller shaft. Each port has a removable intake screen to prevent debris from flowing into the cooling system.

A.3.c. Seawater discharge

Cooling water discharges in the engine exhaust through the hub of the propeller. A cooling system flow indicator (**Figure 3-7**) on the port side of the engine cover shows that water is circulating through the engine cooling system.

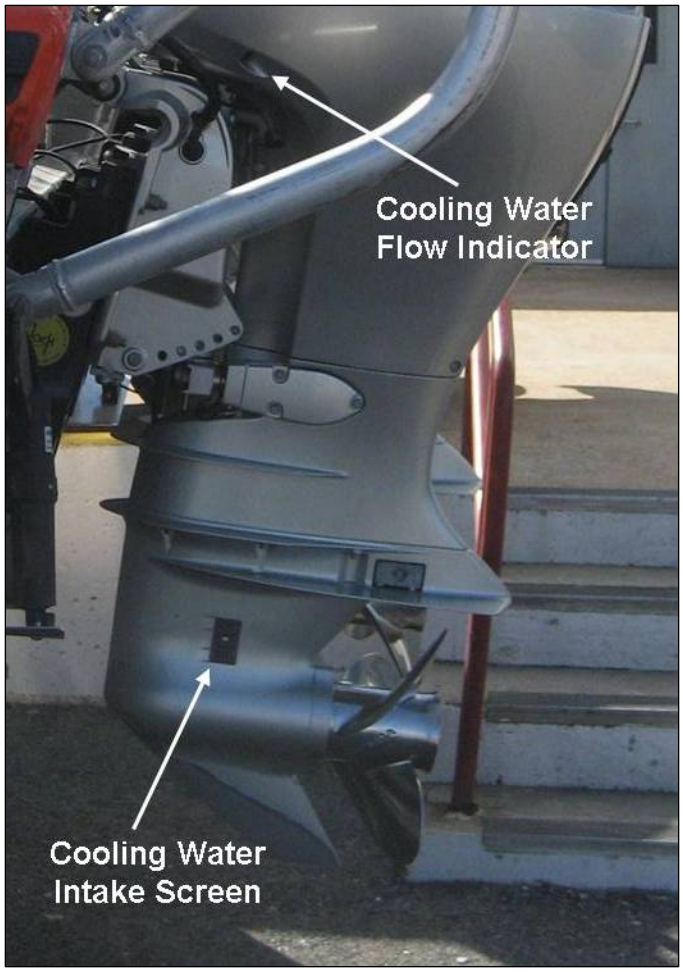

Figure 3-7
Engine Cooling

A.4. Lubrication systems

The engine oil lubrication system is a wet-sump, pressure system.

The engine gear case utilizes a splash lubrication system.

A.4.a. Engine lube oil

The engine oil system has a capacity of 7.1 quarts of SAE 10W-30, API standard (SG, SH, SJ). The oil drain plug (**Figure 3-8**) is located on the starboard side of the engine behind a small rectangular cover. A spin-on, disposable oil filter is mounted on the starboard side of the engine block directly above the engine oil dipstick (**Figure 3-9**).

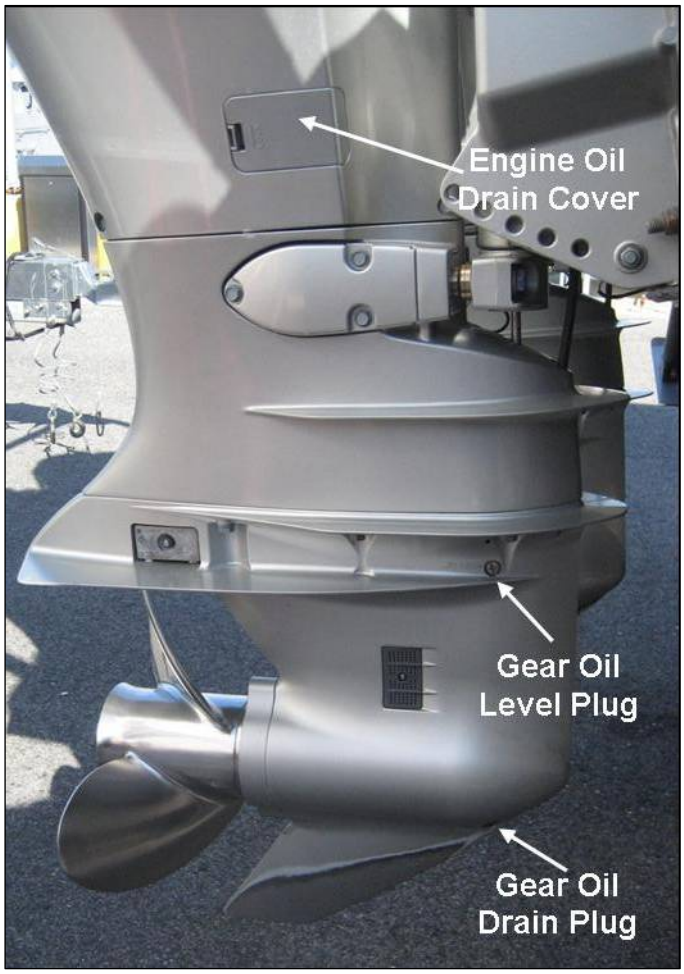

Figure 3-8
Engine Oil Drains

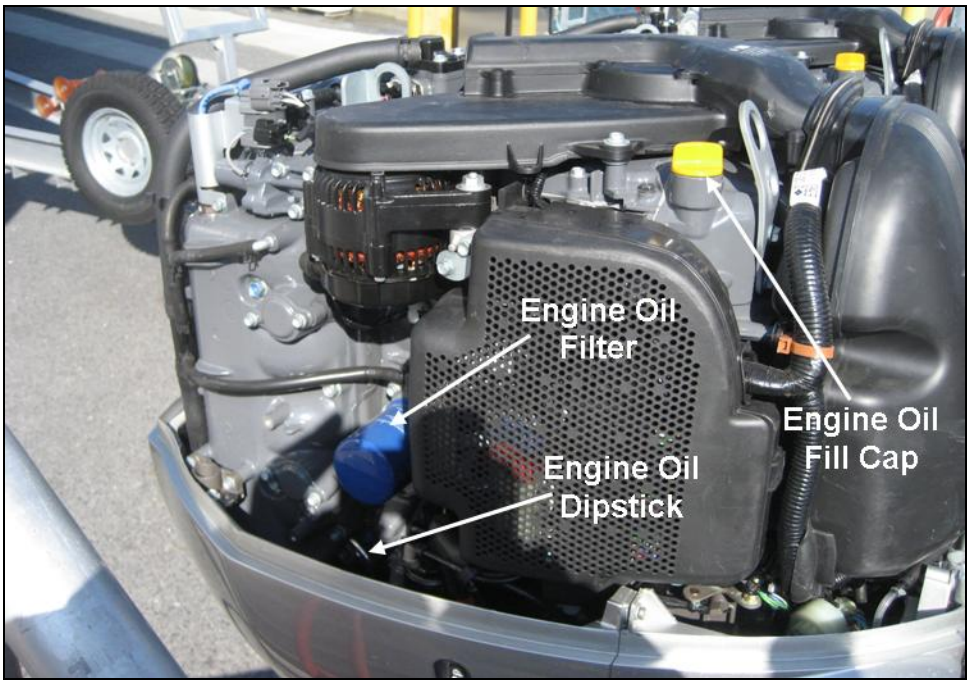

Figure 3-9
Engine Oil Filter

A.4.b. Engine oil fill cap	The engine oil fill cap (**Figure 3-9**) is located under the engine cover on the forward starboard side of each engine.
A.4.c. Engine oil dipstick	The engine oil dipstick (**Figure 3-9**) is located under the engine cover on the starboard side of each engine.
A.4.d. Engine gear case oil	The gear case requires 1.04 quarts of SAE 90 outboard motor gear oil, API standard (GL-4). A gear-oil-level plug (**Figure 3-8**) is located on the forward starboard side of the engine directly above the anti-ventilation plate. The gear oil drain/fill plug is located on the starboard side of the horizontal propeller shaft fairing.
A.5. Ignition system	The ignition system is a fully transistorized battery ignition system with four spark plugs and four ignition coils.

A.6. Starter

A direct cranking starter is mounted on the starboard side of each engine. The starter requires a 12 VDC starting battery with minimum of 80 ampere hours and 622 CCA.

A.7. Engine key switch panel

The SPC-SW has one engine key switch panel (**Figure 3-10**) mounted next to the throttles. Each engine has an ignition key switch for starting, labeled "OFF ON START". The key switch is interlocked to allow engine starting only with the throttle lever in the neutral position.

Figure 3-10
Engine Key

A.7.a. Alarm lamp unit

Engine warning lights are mounted above and below the key switches on the switch panel (**Figure 3-10**). A buzzer and visual indicator activate if any of the following conditions occur:

i) Low oil pressure (green oil pressure light turns off)
ii) Engine overheat (red high temperature light illuminates)
iii) Abnormality in charging system (red charging system light illuminates)
iv) Abnormality from any of the engine sensors (red check engine light illuminates)

NOTE

If the engine overheat alarm sounds, the engine speed will automatically be reduced and the engine will stop after 20 seconds.

NOTE

If oil pressure becomes low, the engine speed will gradually decrease. Engine RPM will not increase above idle until oil pressure returns to normal.

A.7.b. Engine kill switch

One engine kill switch is installed between the ignition key switches that controls both of the engines (**Figure 3-10**). The engine kill switch clip must be inserted in the engine kill switch before the engines start and run. The kill switch clip is attached to an 18 inch lanyard, which must be attached to the operator. Should the operator/Coxswain fall away from the controls, the engines will immediately stop. A spare engine kill switch lanyard is included in the boat outfit.

NOTE

The engine kill switch lanyard should be clipped to the operator below the waist to help prevent the lanyard from being entangled on the engine throttles and helm during boat operations.

A.8. Engine gauges

Each engine has a dedicated digital tachometer and share a single speedometer/multifunction gauge (**Figure 3-11**).

The speedometer/multifunction gauge displays the following functions:

a) Boat speed
b) Fuel level
c) Battery voltage (per engine)
d) Tripmeter
e) Fuel flow meter (per engine or total)
f) Water separator water accumulation alarm

The tachometers display the following functions:

a) Engine RPM
b) Engine hours of operation
c) Engine trim level indicator
d) Engine alarms

Figure 3-11
Engine Gauges

A.9. Engine controls

The gearshift and throttle controls (**Figure 3-12**) for both engines are located on the starboard side of the dash panel. Each lever controls engine RPM and ahead or astern movement. Moving the throttle lever 35° from neutral selects the gear, forward or reverse, and further movement increases engine speed. The port throttle lever contains the power trim/tilt switches for both engines. These rocker-type switches, labeled UP and DN, change the angle of the outboard motor to trim the boat for normal operations, shallow water operations, beaching, launching, and/or mooring.

A fast idle button is located on the side of each lever so that when pushed in, the lever can be moved forward or backward to increase engine RPM without engaging the propeller.

Figure 3-12
Engine Throttles

CAUTION! The engines must be up and locked for all trailering evolutions.

A.10. Outboard power trim/tilt

Each outboard engine can be angled to trim the boat for normal operations, shallow water operations, beaching, maintenance, launching, and/or mooring.

A.10.a. Power trim/tilt switch

The local power trim/tilt switch (**Figure 3-13**) is mounted on the starboard side of the engine, just below the cover. The power tilt switch will operate without turning the ignition on. The switch is used when the engine is stopped to raise the engine for mooring, trailering, or maintenance.

Remote power trim/tilt switches for both engines are mounted on the port throttle lever at the console dash panel (**Figure 3-12**).

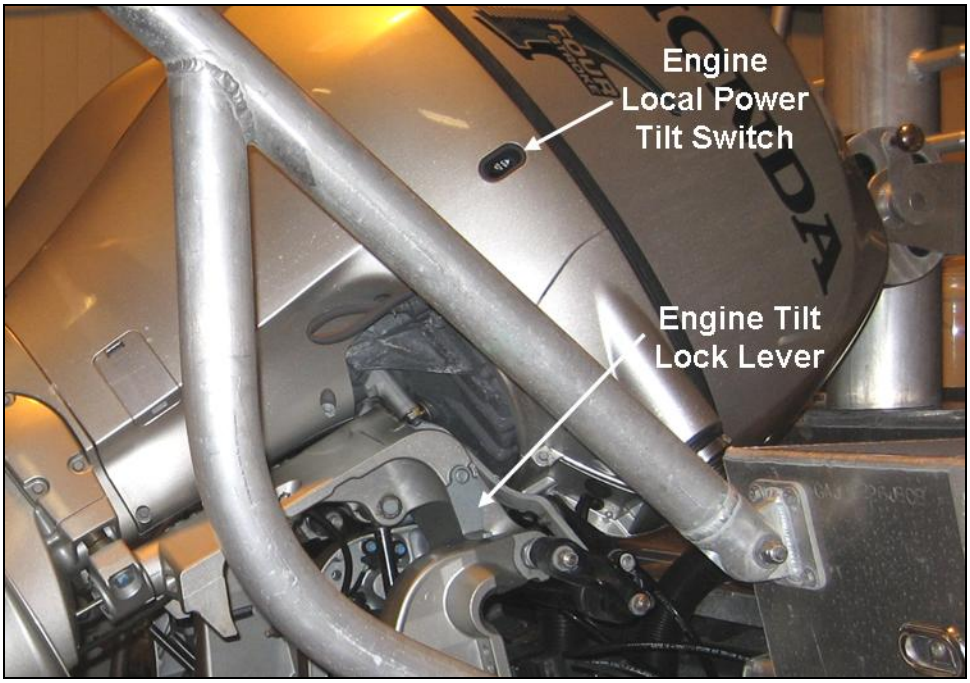

Figure 3-13
Engine Tilt

A.10.b. Tilt lock lever

The tilt lock lever (**Figure 3-13**) is used to support the engine in the *fully raised* position. The lever is manually activated and is located between the engine housing and the frame of the engine.

A.10.c. Manual relief valve

The manual relief valve (**Figure 3-14**) is located on the port side of the engine's stern bracket and is used in conjunction with the tilt lock lever (**Figure 3-13**). By inserting a screwdriver in the manual release valve and turning the screw counter-clockwise to release the pressure, the engine can be manually tilted and locked when battery power is not available.

Figure 3-14
Engine Manual Tilt

A.11. Fuse panels Two fuse panels are located under the outboard engine cover (**Figure 3-15**). The side-mounted fuse panel houses 10 amp, 15 amp, and 30 amp fuses for the ignition switch circuit, power trim/tilt switch circuit, and electric starter circuit. The top-mounted fuse panel houses the 90 amp alternator/charging circuit fuse.

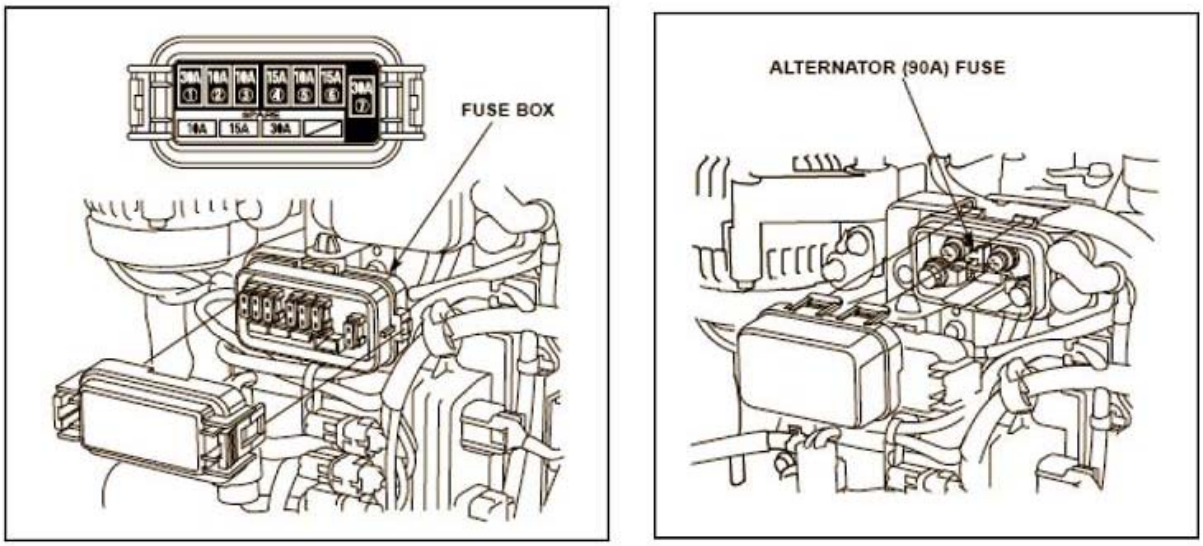

Figure 3-15
Engine Fuses

CAUTION ! The left- and right-hand propellers ARE NOT interchangeable.

CAUTION ! Changing the propeller configuration will change the operating characteristics of the boat. Any recommended changes must be submitted in accordance with the *Naval Engineering Manual*, COMDTINST M9000.6 (series).

A.12. Propellers SPC-SW utilizes a stainless steel, three-blade fixed pitch propeller with a 15¼ inch diameter and 19 inch pitch. The starboard outboard has a right-hand (spins clockwise) propeller and the port outboard has a left-hand (spins counter clockwise) propeller.

A.13. Engine exhaust

The engine exhaust gases discharge through the idle exhaust port located on the aft end of the engine (**Figure 3-16**) and around the propeller shaft out through the hub of the propeller.

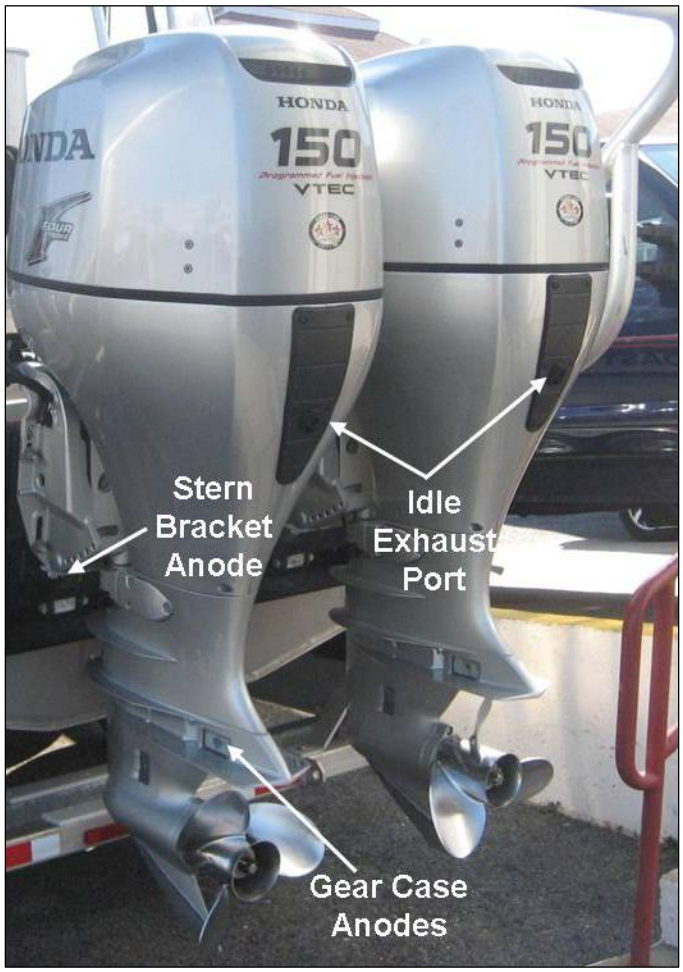

Figure 3-16
Exhaust and Anodes

A.14. Sacrificial anodes

Sacrificial anodes (**Figure 3-16**) are used to protect the outboard motor from corrosion. Two of the anodes are located on the gear case, one on the stern bracket, and two small anodes are located in the water passages of the engine block.

A.15. Hydraulic jacking plate

The outboard engines are mounted on a hydraulic jacking plate (**Figure 3-17**) used to control engine draft during shallow water operations.

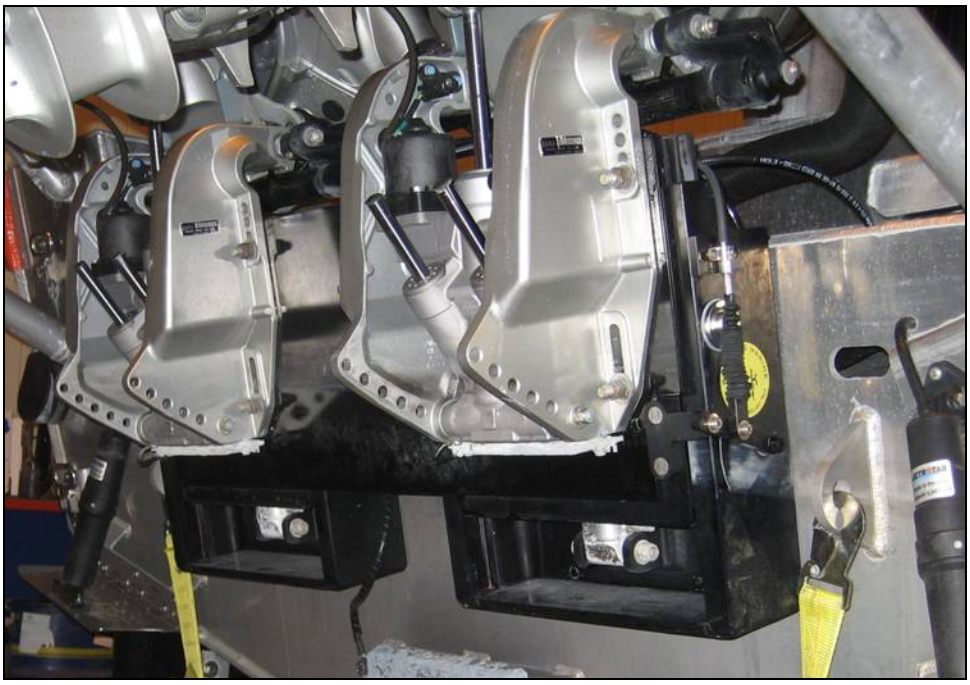

Figure 3-17
Hydraulic Jacking Plate

WARNING

A hard turn made with the boat on plane and jacking plate set at seven will cause the boat to spin out, and/or flip causing serious injury or death.

CAUTION !

Failure to follow the hydraulic jacking plate operational restrictions can lead to engine overheating.

A.15.a. Controls

The hydraulic jacking plate controls and indicator gauge are mounted on the console (**Figure 2-21**). The hydraulic jacking plate is controlled using a toggle switch. Pushing the toggle switch up raises the hydraulic jacking plate and the outboards. Pushing the toggle switch down lowers the hydraulic jacking plate and the outboards. The hydraulic jacking plate position indicator is labeled zero through seven, the higher the number, the higher the hydraulic jacking plate lifts the outboards out of the water.

NOTE

The indicator gauge may have a slight variation from the hydraulic jacking plate actual position.

Based on the level the outboards are raised out of the water, engine RPM must be limited to the following:

Table 3-1
Hydraulic Jacking Plate Operation

Hydraulic Jacking Plate Setting	Maximum Engine RPM	Type of Operation
7	2500	Shallow Water, Low Speed
6	3500	Shallow Water, Low Speed
5	5000	Moderate Speed, Shallow Water
4	5000	Moderate Speed, Shallow Water
3	WOT	Cruising/Maximum Speed
2	WOT	Cruising/Moderate Towing
1	WOT	Heavy Towing

NOTE

When using the hydraulic jacking plate system during boat high speed operations, the boat should be throttled up and brought onto plane with the hydraulic jacking plate fully lowered. Once on plane, the hydraulic jacking plate can be adjusted to the desired setting.

A.15.b. Hydraulic system

The electro-hydraulic jacking plate pump is mounted in the starboard transom locker (**Figure 3-18**). The pump has an integral reservoir for the hydraulic system. The pump receives power from the port engine starting battery through a 50 amp JACK PLATE circuit breaker located in the port transom locker.

Figure 3-18
Hydraulic Jacking Plate Pump

A.16. Steering system

The steering system is an integrated hydraulic system made up of the following major components:

a) Steering wheel
b) Helm pump
c) Interconnecting hydraulic hoses
d) Dual hydraulic steering cylinders
e) Tie rod

A.16.a. Hydraulic steering cylinders

A front mounted hydraulic steering cylinder is connected to each of the outboard tiller arms to control boat steering (**Figure 2-24**). The steering cylinders are connected with a tie rod to provide equal, uniform directional control of the engines, but does not interfere with independent engine trim, tilt, and throttle. The steering cylinders are located in the engine well.

NOTE

The SPC-SW does not incorporate any power steering or auto-pilot system.

A.16.b. Steering helm

A stainless steel steering wheel with rubber grips is mounted on a Sea Star 2.4 helm pump (**Figure 3-19**). The wheel can be tilted up and down by pulling on the tilt handle, adjusting the tilt and then locking the wheel in place using the tilt handle. The hydraulic lines connect to the rear of the helm unit and can be accessed inside the console locker. The steering system has a seven turn lock-to-lock response.

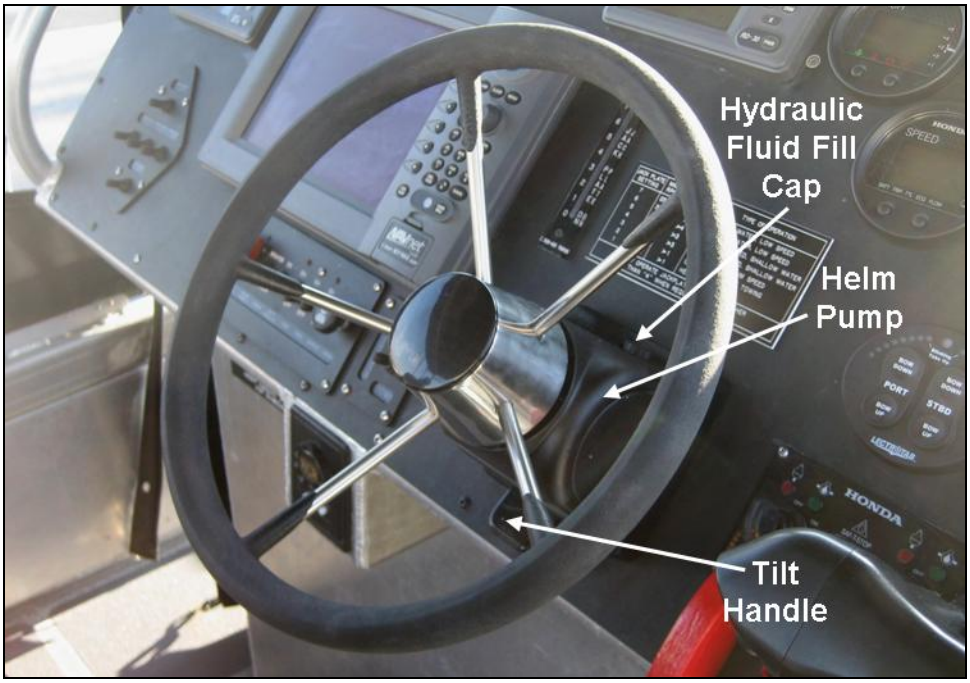

Figure 3-19
Helm Pump

Section B. Hull Fuel System

Introduction

The fuel system provides 100 gallons of gasoline for operating the two outboard engines.

B.1. Principles of operation

Fuel is stored in a 100 gallon aluminum fuel tank. Each outboard engine draws fuel from the tank using separate fuel pickup tubes and dedicated inline fuel filtering systems.

B.1.a. Fuel tank

The fuel tank for the SPC-SW is a single 100 gallon tank, fabricated from ¼ inch marine grade aluminum for the bottom and sides and 3⁄16 inch marine grade aluminum for the top and ends. Transverse and longitudinal baffles restrict free surface movement of the fuel. The tank is supported by rubber isolation pads and the hull's structure. The tank is not integral to the hull and is mounted under the foredeck, just forward of the console locker. The fuel tank can be fully inspected and/or removed by removing the forward deck plates.

B.1.b. Fuel tank level sensor

Access to the fuel tank level sensor (**Figure 3-20**) is accomplished through a stainless steel access cover located just forward of the console forward lockers on centerline. The fuel level is read on the speedometer/multifunction gauge mounted at the helm.

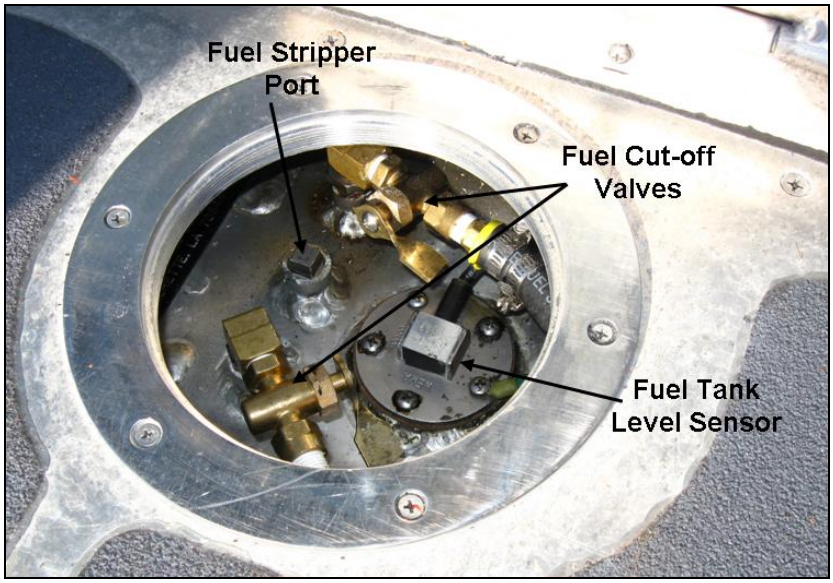

Figure 3-20
Fuel Tank Fittings

CAUTION !

Be careful not to spill fuel onto the foam fender when refueling. Immediately clean any spills.

B.1.c. Fuel fill

The fuel tank is filled from the fuel fill station on the forward deck gunwale, port side (**Figure 2-22**). The fuel fill is fitted with a watertight 1.75 inch fuel fill cap.

B.1.d. Tank vent fitting

A fuel tank vent is fitted to the forward end of the tank. The tank is vented back into the fuel fill at the fuel fill station. The vent hose tank fitting can be accessed through a stainless steel access cover located just aft of the anchor locker near centerline (**Figure 3-21**).

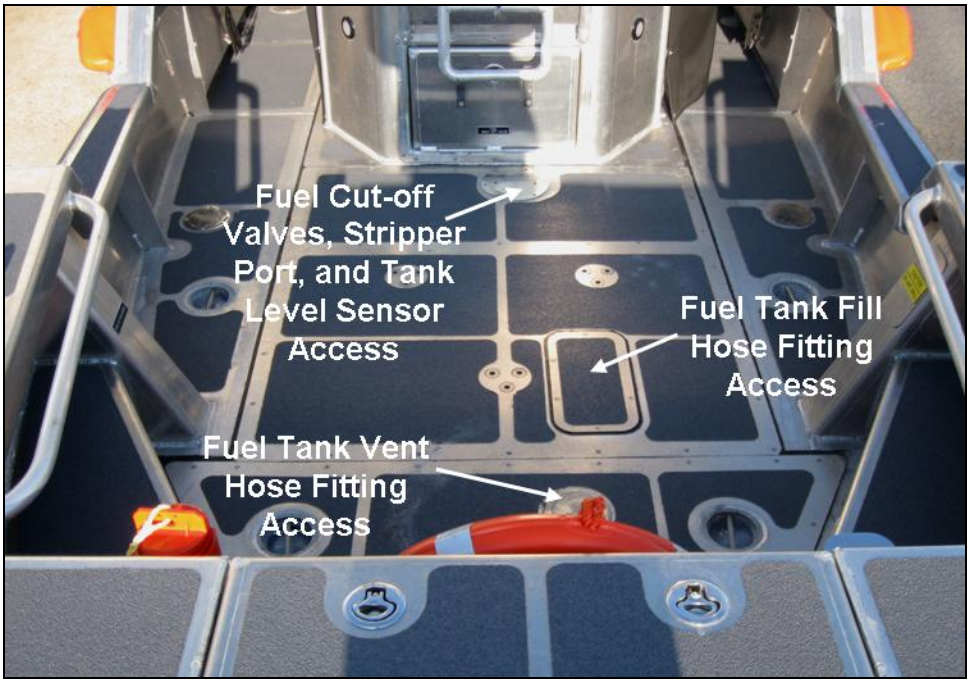

Figure 3-21
Tank Access

B.1.e. Fuel lines

Fuel flows from the tank to the engines through ⅜ inch USCG Type A1 fuel lines. Each engine has its own fuel pick up at the fuel tank. Fuel lines are routed from the tank aft in the port side below deck raceways.

B.1.f. Fuel cut off valves

Fuel cutoff valves are installed on the inlet and outlet ports of the primary fuel filters (**Figure 3-22**) to isolate the fuel filter and stop fuel flow to the engines. Access to the fuel cutoff valves is through the bilge QAWTH in the deck. Additional fuel cutoff valves (**Figure 3-20**) are located at the tank in each of the fuel lines and can be accessed through a stainless steel access plate located just forward of the console forward lockers on centerline (**Figure 3-21**).

B.1.g. Primary fuel filters

In addition to the engine mounted fuel filters, each outboard engine has a separate water separating fuel filter (**Figure 3-22**), installed inline in the fuel lines. Each filter has a ten micron disposable filter element and a clear bowl with a drain valve at the bottom of the filter element to visually check for water in the fuel and drain water and contaminates. Access to the primary water separating fuel filters is through the bilge QAWTH in the deck.

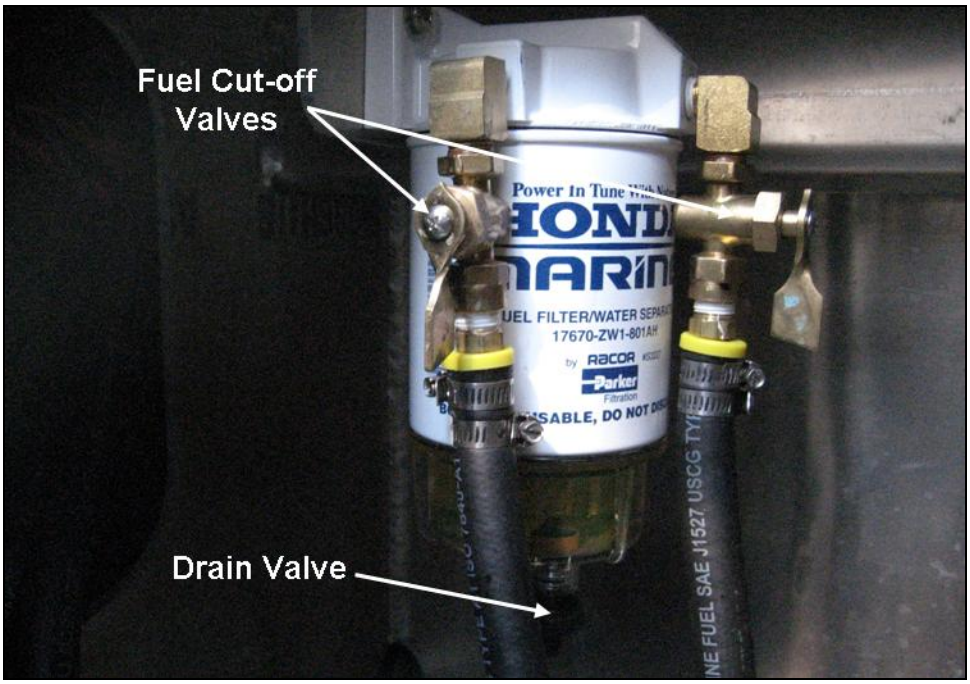

Figure 3-22
Racor Filter

B.1.h. Primer bulbs

A fuel priming bulb (**Figure 3-5**), located in the inlet line to each outboard engine, primes and pressurizes the outboard engine fuel system for starting. The fuel priming bulbs are located in the port and starboard transom lockers.

Section C. Hull System

Introduction

The hull of the SPC-SW is fabricated from 5086 marine aluminum with an attached foam fender. The hull is a hard-chine planing boat design with a centerline flat and 16 degree dead rise at the transom.

The SPC-SW hull is comprised of a single watertight, welded compartment. The hull consists of a ¼ inch bottom and 3⁄16 inch side and transom shell. The forward and outboard voids in the hull are filled with 1 inch cube polyethylene foam blocks for flotation (**Figure 2-2**). Foam floatation blocks can be accessed through eight stainless steel, water tight access ports in the deck.

The boat's hull has sufficient buoyancy and stability to float upright if swamped.

CAUTION !

To prevent galvanic corrosion of the aluminum hull, the outboard engines should be raised out of the water when the boat is moored for prolonged periods of time.

C.1. Draft

The hull's deepest draft with the engines raised is 17 ½ inches at the keel.

C.2. Lifting strakes

The hull contains two lifting strakes on each side of the hull bottom to improve seakeeping, directional stability, and planing performance.

C.3. Bilge access points

The bilge access is through a flush mounted, QAWTH in the deck, on centerline, just aft of the crew jump seats.

CAUTION !

Petroleum products can damage the polyurethane fabric. The fabric is coated with a protectant but care must be taken not to spill oil or gasoline on the fender. Immediately clean any spills.

C.4. Fender

The hull is fitted with a fixed foam fender system to protect the exterior hull surfaces from impact while alongside piers and other boats. It is made of durable materials which are highly resistant to puncture, tearing, and sunlight degradation.

C.5. Scuppers

Two self-bailing deck drains (**Figure 3-23**) penetrate the transom on the port and starboard sides. The deck drains are one-way scuppers with rubber flaps to hinder the back flow of water.

NOTE

If the SPC-SW backs down hard, it is possible for the scupper rubber flaps to bend in and allow water to flow onto the deck while backing.

Figure 3-23
Transom

C.6. Trim tabs

The hull is outfitted with trim tabs on the transom (**Figure 3-23**) to allow the operator to adjust the running trim of the boat to optimize performance and to offset different craft loading scenarios. The trim tabs receive power from the TRIM TABS circuit breaker located inside the console locker. The trim tabs are independently controlled from a control pad on the console (**Figure 3-24**), just below the engine gauges. The control pad contains indicator lights to show the position of the trim tabs. The trim tabs can only be activated when the engine key switch is on.

Figure 3-24
Trim Tab Controls

C.7. Crew seats

Two Shockwave patrol seats, each with a folding jump seat, provide seating for a crew of four.

C.7.a. Coxswain

Patrol seats (**Figure 3-25**) are equipped with folding armrests, cup holder, folding footrest, and adjustable seat belts.

Figure 3-25
Seats

C.7.b. Crewmembers

Jump seats (**Figure 3-25**) are mounted behind the patrol seats and can be folded up to stow when not in use. The jump seats are equipped with a grab rail, folding foot pegs, cup holder, and adjustable seat belts.

C.7.c. Passengers

One fold down seat is located on the console forward locker to accommodate a passenger (**Figure 3-26**). If additional passengers are embarked, they should be seated on the deck, forward of the console. They should be evenly distributed port and starboard of the centerline.

Figure 3-26
Passenger Seat

Section D. Electrical System

Introduction

A 12 VDC electrical system is installed on the SPC-SW.

D.1. Alternator

Each outboard has a belt driven alternator driven by the crankshaft (**Figure 3-27**) located under a protective cover on the top of the engine. Each alternator is rated at 12 VDC, 20 amps at 750 RPM, and can produce 40 amps at 2000 RPM and over.

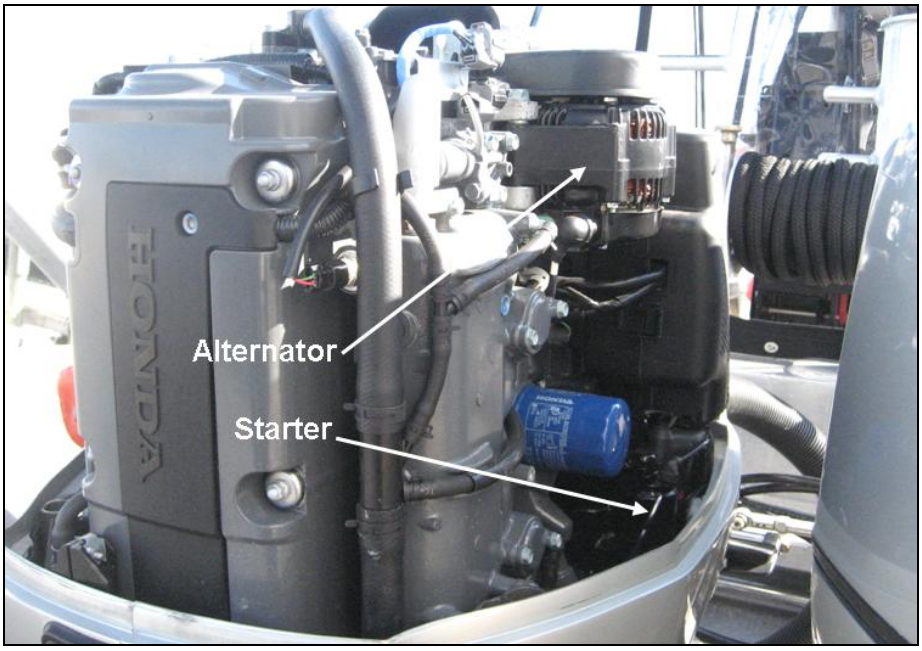

Figure 3-27
Engine Alternator and Starter

D.2. Batteries

Three 12 VDC marine grade lead-acid batteries are installed on the SPC-SW. The port engine starting battery is located in the port transom locker and the starboard engine starting battery is located in the starboard transom locker. Both starting batteries have 800 CCA each. A dual-purpose battery for the electronics electrical loads is located in the console locker. Each engine is responsible for charging its own engine starting battery. The electronics battery is connected to the starboard engine charging circuit using a charge relay. Low or high battery charge is shown on the alarm lamp unit on the console dash panel. All batteries are secured in plastic battery trays with a battery strap.

D.3. Starter

A direct cranking starter is mounted on the starboard side of each engine (**Figure 3-27**). The starter requires 12 VDC and an 80 ampere hours starting battery. The starter receives power from the 50 amp ENGINE CONTROL circuit breaker located at the battery switch panel.

NOTE

The bilge pump circuit breakers are wired directly to the starboard engine starting battery and remain energized when the battery isolation switches are in the OFF position.

D.4. Battery switches

The engine start battery isolation switches are located on the start batteries 12 VDC breaker panel in the port transom locker (**Figure 3-28**). The electronics battery isolation switch is located on the 12 VDC breaker panel in the console locker (**Figure 3-29**). The switches have an OFF and ON position. The start batteries can be paralleled using the BATTERY PARALLEL toggle switch on the console switch panel. The battery parallel solenoid receives power from the BATTERY PARALLEL circuit breaker located inside the console locker.

Figure 3-28
Start Batteries 12 VDC Breaker Panel

Figure 3-29
12 VDC Breaker Panel

D.5. 12 VDC breaker panels

12 VDC breakers for equipment powered from the engine start batteries are located on the start batteries 12 VDC breaker panel (**Figure 3-28**) in the port transom locker. Each breaker is labeled on the front with the circuit name, breaker rating, and has an indicator light that illuminates when the circuit is energized.

The 12 VDC breaker panel (**Figure 3-29**) is mounted inside the console locker. The panel is protected with a 100 amp master breaker. Each breaker is labeled on the front with the circuit name, breaker rating, and has an indicator light that illuminates when the circuit is energized.

D.6. Console switch panels

The console auxiliary equipment switch panel (**Figure 3-30**) is located near centerline on the console and contains switches for the following system component:

a) Bilge pump 1
b) Bilge pump 2
c) Dimmer
d) Battery parallel
e) Horn
f) Siren
g) Window defroster
h) Wiper controls

The lights are controlled from three switch panels. The main light switch panel is located in the OHIP (**Figure 3-31**) and contains switches for all navigation, cabin, and deck lights. A console mounted light switch panel (**Figure 3-30**) controls floodlight and the law enforcement blue strobe lights. The searchlight control panel is located on centerline on the lower portion of the console.

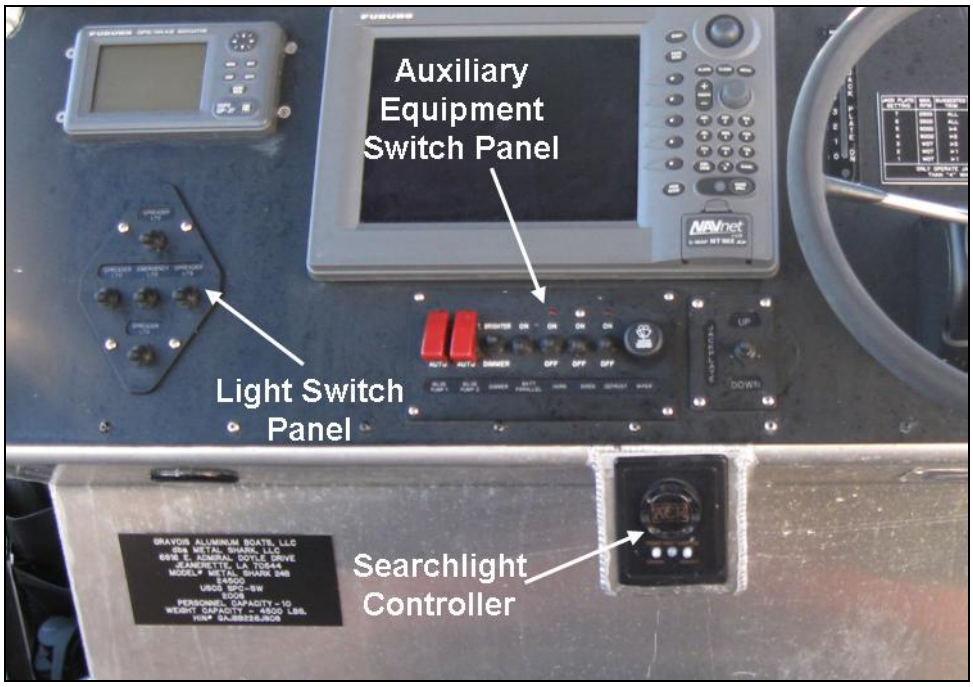

Figure 3-30
Console Switch Panels

Figure 3-31
OHIP Switch Panel

D.7. Lighting

The lighting systems on the SPC-SW provide cabin, cockpit, navigational, flood, law enforcement lights, and a searchlight.

D.7.a. Cabin lights

White and red cabin lights are mounted under the canopy over the forward crew seats. White lights are controlled by the WHITE CABIN LT toggle switch and the red lights are controlled by the RED CABIN LT toggle switch located in the OHIP light switch panel. The cabin lights receive power from the CABIN LIGHTS circuit breaker located in the console locker.

D.7.b. Cockpit lights

Two white lights are located under the console and two white lights are located port and starboard in the transom locker bulkhead. These lights are controlled by the AFT CKPT LTS switch in the OHIP switch panel. Two blue lights are located on the side bulkheads of the console, facing forward. These lights are controlled by the FWD CABIN LTS switch in the OHIP light switch panel. The cockpit lights receive power from the COCKPIT LIGHTS circuit breaker located in the console locker.

D.7.c. Navigation Lights

The navigation lights are controlled from the OHIP light switch panel. Toggle switches provide for lighting configurations based upon the boat's operating configuration; underway, anchor, towing (inland).

The normal underway running lights are:

i) Red light – port side of canopy top
ii) Green light – starboard side of canopy top
iii) All around white light – canopy top, centerline, on a removable mast

The underway running lights and the anchor light configurations are controlled by the NAV ANCHOR switch on the OHIP light switch panel.

Towing lights are provided on a removable, telescoping mast that mounts on the canopy top. The towing lights are set up for inland rules towing astern and consist of two white masthead lights, one white stern light, and one stern facing amber tow light. The towing lights are controlled by the TOW CKPT LTS switch on the OHIP light switch panel. The red and green side lights illuminate along with the tow lights on the mast.

The navigation lights receive power from the NAV LIGHTS circuit breaker located in the console locker.

D.7.d. Law enforcement light

Two blue strobe lights (**Figure 3-32**) are mounted on the canopy top. The lights are controlled by the EMERGENCY LTS toggle switch located on the light switch panel on the console. The lights receive power from the EMERGENCY LT circuit breaker located in the console locker.

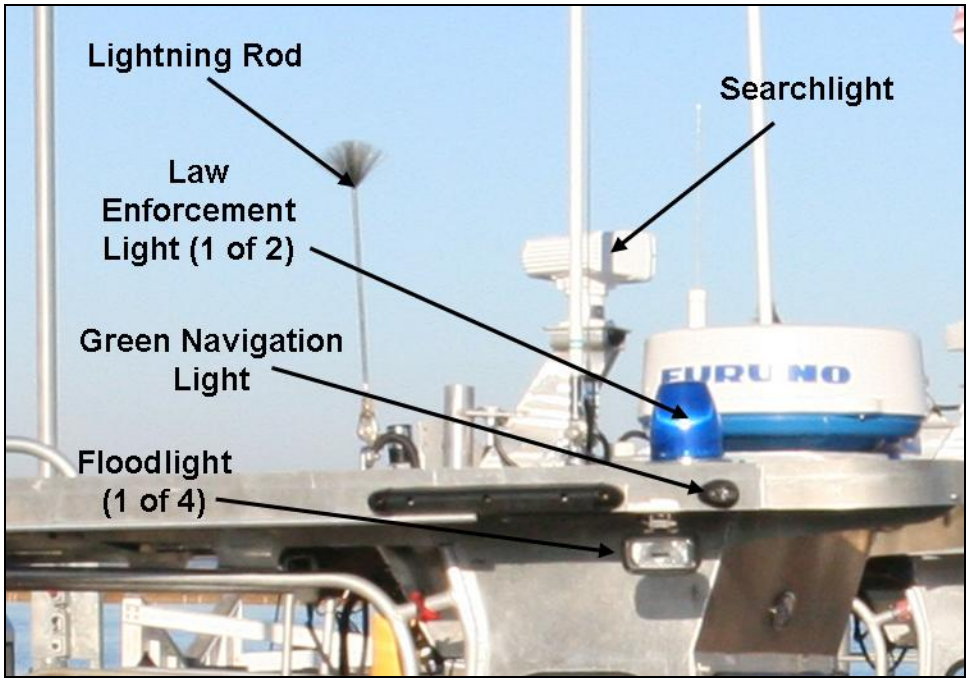

Figure 3-32
Canopy Lights

D.7.e. Searchlight

One, 200,000-candlepower, remotely operated narrow beam searchlight is mounted on a raised foundation (**Figure 3-32**) on the canopy top. The searchlight is controlled from an ACR point pad controller (**Figure 3-30**) mounted on the console and receives power from the SEARCH LIGHT circuit breaker located inside the console locker. The controls allow for on, off, speed adjustment, and directional control of the search light.

D.7.f. Floodlight

Four floodlights (**Figure 3-32**) are mounted on the canopy top, one on each side. They are each controlled by the SPREADER LTS toggle switches on the console light switch panel (**Figure 3-30**) and receive power from the SPREADER LIGHTS circuit breaker located inside the console locker.

D.8. Dimmer

A dimmer toggle switch labeled DIMMER is located on the auxiliary equipment switch panel on the console (**Figure 3-30**). The dimmer is connected to the following lights:

a) All switch panel label backlights on the console and OHIP
b) Compass light

The electronics each have individual dimmers in the equipment. The trim tab indicator lights automatically dim at night.

D.9. Fuse locations

Electronic equipment that is normally protected by in-line fuses provided by the manufacturer (OEM) also have in-line fuses installed between the circuit breakers and the component. This provides and additional measure of protection for those items. The in-line fuses are located in the fuse block installed in the console locker locate on centerline, next to the 12 VDC breaker panel (**Figure 3-33**). A list of the fuse size and equipment they serve is as follows:

a) 10 Amp – Standard Horizon VHF-FM Radio
b) 10 Amp – Loudhailer
c) 5 Amp – PG-500 Heading Sensor
d) 5 Amp – RD-30 Display Unit
e) 10 Amp – AIS (Automatic Identification System)
f) 5 Amp – GP-37
g) 15 Amp – Motorola UHF-FM Radio
h) 15 Amp – Motorola VHF-FM Radio
i) 15 Amp – Radar

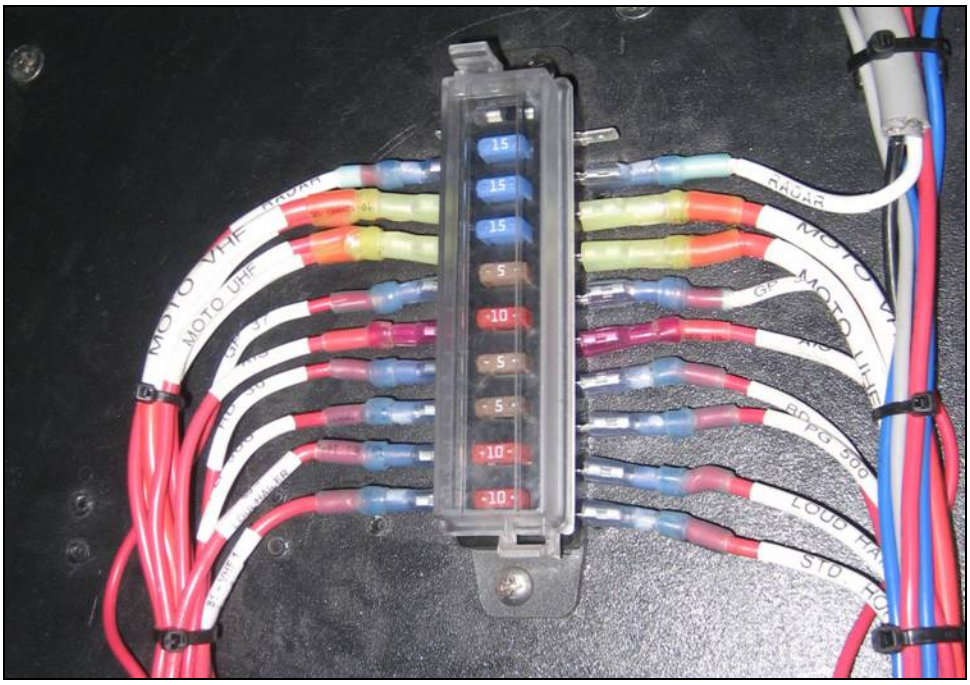

Figure 3-33
Fuse Block

D.10. Electrical outlets

Two electrical outlets located port side of the console, facing the windshield, are provided for 12 VDC power. The outlets receive power from the DC OUTLETS circuit breaker located inside the console locker.

Section E. Communications/Navigation System

Introduction

All of the standard marine communications and navigation equipment is mounted on the console of the SPC-SW. The radio communications system consists of three radios:

1) Standard Horizon GX5500S VHF-FM radio
2) Motorola XLT-5000 VHF-FM radio
3) Motorola XLT-5000 UHF-FM radio

The SPC-SW has a Furuno LH-3000 loudhailer for on board and ship-to-ship communications and for sounding navigation horn signals.

The SPC-SW utilizes a Scalable Integrated Navigation System (SINS) that is built around the Furuno NavNet2 radar/chart plotter system. The SINS system on the SPC-SW includes the following:

1) 1834C/NT Radar/Chart Plotter
2) PG-500 Heading Sensor
3) RD-30 Multi Display Unit
4) Depth & Temperature Transducer
5) GP-37 Differential Global Position System (DGPS) System
6) Automatic Identification System (AIS)

E.1. Operator's console

All of the standard marine communications and navigation equipment is mounted on the console and the OHIP of the SPC-SW.

E.2. Furuno 1834C/NT System

The Furuno 1834C/NT system contains a 10.4 inch NavNet2 radar/chart plotter multi-function display unit (**Figure 3-34**) and a 24 inch radome (**Figure 3-32**). The display unit is mounted on the center of the console and the radome is mounted on the centerline of the canopy top. The display unit is capable of displaying radar information, heading, depth, charts, and GPS data. The system receives power from the RADAR circuit breaker located inside the console locker.

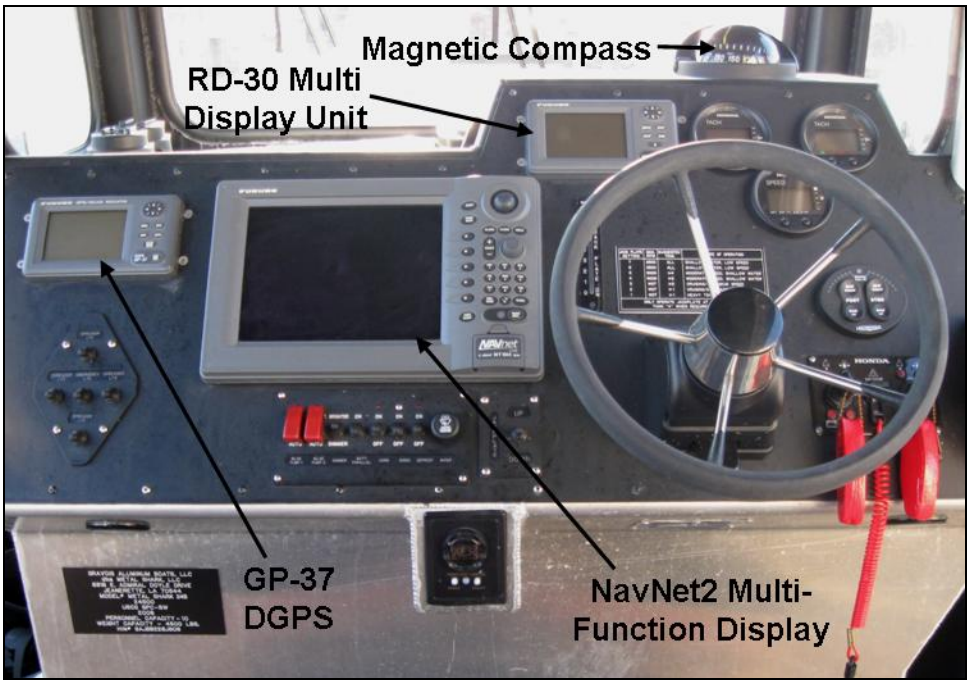

Figure 3-34
Console Electronics

E.3. Magnetic compass

The SPC-SW has a 4½ inch diameter magnetic compass mounted on the console in front of the Coxswain (**Figure 3-34**). The compass has a built in green light. The light is dimmable from the DIMMER switch located on the console auxiliary equipment switch panel.

E.4. Heading sensor

The SPC-SW is equipped with a PG-500 heading sensor mounted in the console locker, port side, over the light fixture (**Figure 3-35**). The PG-500 can output true heading as well as magnetic heading. The heading sensor receives power from the RADAR circuit breaker located inside the console locker.

Figure 3-35
Heading Sensor

E.5. RD-30 Multi-Display

The RD-30 (**Figure 3-34**), is a multi-functional display that can display any of the following information:

a) Boat's position in LAT/LONG coordinates
b) Boat's speed
c) Boat's course
d) Water depth

The display can be set up to display any, or combinations of the above type of information. The display format can also be selected by the operator in digital, graphical, analog, or highway formats.

The through hull transducer has a processor built into the transducer housing and outputs depth and water temperature to the SPC-SW NavNet2 system.

The RD-30 receives power through the RD 30 circuit breaker located inside the console locker.

E.6. DGPS

The GP-37 DGPS display is located on the port side of the console (**Figure 3-34**). The DGPS antenna is mounted on the centerline and aft on the canopy top (**Figure 3-36**). The DGPS interfaces with the Furuno NavNet2 system and the Standard Horizon VHF-FM Radio. The GP-37 receives power from the GP-37 circuit breaker located inside the console locker.

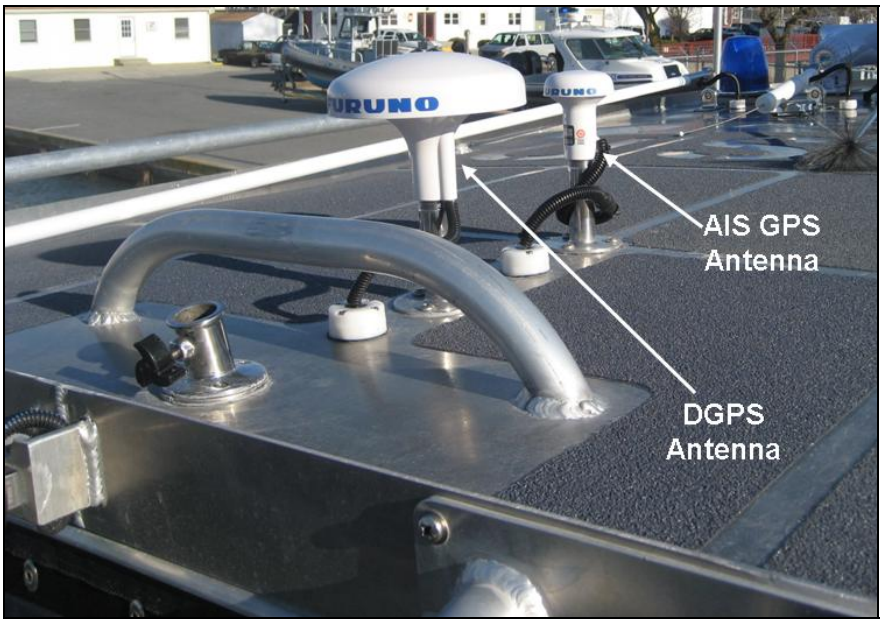

Figure 3-36
GPS Antennas

E.7. VHF-FM radio (Standard Horizon)

A VHF-FM radio with Digital Selective Calling (DSC) and power output selection between 25 watts high power and 1 watt low power is flush mounted in the OHIP (**Figure 3-37**). A whip antenna for the unit is mounted on the canopy top, port side (**Figure 2-26**). The radio receives power from the VHF-1 circuit breaker located inside the console locker.

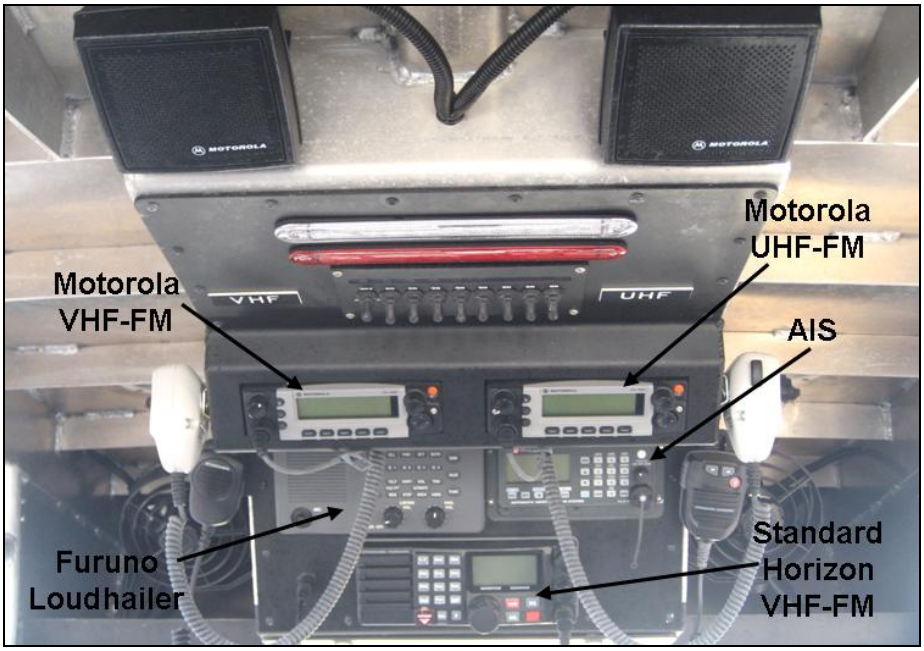

Figure 3-37
OHIP

E.8. VHF-FM radio (Motorola XTL-5000)

A Motorola XTL-5000 VHF-FM radio with output selection between 50 watts high power and 1 watt low power is mounted inside the console locker. The remote head is flush mounted in the OHIP (**Figure 3-37**). A whip antenna for the Motorola VHF-FM is mounted on the canopy top, starboard side (**Figure 2-26**). The radio has Over the Air Re-keying (OTAR) and multi-key format options. It is capable of encrypted operations in the Advanced Encryption Standard (AES), Digital Encryption Standard (DES), DES-XL and DES-OFB modes. The radio is connected to an external Motorola speaker mounted above the radio remote head. The radio receives power from the VHF-2 circuit breaker located inside the console locker.

E.9. UHF-FM radio (Motorola XTL-5000)

A Motorola XTL-5000 UHF-FM radio is mounted inside the console locker. The remote head is flush mounted in the OHIP (**Figure 3-37**). A Morad UHF-FM antenna is connected to the radio and mounted on the cabin top, port side (**Figure 2-26**). The radio is connected to an external Motorola speaker mounted above the radio remote head. The radio receives power from the UHF-1 circuit breaker located inside the console locker.

E.10. L3 ProTec AIS

An L-3 ProTec-M Automatic Identification System (AIS) is installed on the OHIP (**Figure 3-37**). A Shakespeare antenna is connected to the radio and mounted on the canopy top, starboard side (**Figure 2-26**). A Furuno GPA017S/S global positioning system (GPS) antenna is also connected to the unit and mounted on the aft edge of the canopy top (**Figure 3-36**). The AIS receives electronic data messages from AIS equipped ships with position, and course/speed data. The AIS has a dedicated GPS channel which, when activated, transmits the SPC-SW's position and course/speed information. The AIS receives power from the AIS circuit breaker located inside the console locker.

E.11. Emergency Position Indicating Radio Beacon (EPIRB)

A manually deployable, self-buoyant, 406MHz CAT II EPIRB with a built-in GPS location transmitter is located in the canopy top overhead, starboard side (**Figure 3-38**). The EPIRB will automatically activate if it is out of the mounting bracket and in the water or can be manually activated using the switch on top of the unit.

To deactivate the EPIRB if it was manually activated, return the thumb switch to the original OFF position.

If the EPIRB was automatically activated, remove the unit from the water. The EPRIB normally takes up to 12 seconds to deactivate, or place the unit back into the mounting bracket.

Figure 3-38
EPIRB

E.12. Loudhailer/ intercom (Furuno)

The Furuno LH-3000 loudhailer is flush mounted in the OHIP (**Figure 3-37**). There are two volume controls, one for hail and one to listen. The ON-OFF switch is part of the LISTEN volume control on the face of the unit. The hailer speaker is located on the canopy top, port side. The hailer speaker provides the siren controlled by the SIREN toggle switch on the auxiliary equipment switch panel. The loudhailer can provide the following audible signals:

a) YELP – Yelp Siren
b) UNWY – Vessel underway in reduced visibility
c) SAIL – Vessel under sail in reduced visibility
d) TOW – Vessel under tow in reduced visibility
e) STOP – Stationary vessel in reduced visibility
f) ANCH – Vessel at anchor in reduced visibility
g) AGND – Vessel aground in reduced visibility

The loudhailer receives power from the HAILER circuit breaker located inside the console locker.

E.13. Horn

One horn (**Figure 3-39**) is mounted on the front of the console over the windshield. The horn is controlled by a momentary contact HORN toggle switch on the console auxiliary equipment switch panel. The horn receives power from the HORN circuit breaker located inside the console locker.

Figure 3-39
Horn

Section F. Fire Extinguishing Equipment

Introduction

Two 2¾ lbs dry chemical portable fire extinguishers for class A, B, and C fires are installed on the SPC-SW. One extinguisher is located under the starboard gunwale, forward of the rescue recess (**Figure 3-40**). The other is located under the forward portside crew seat at the console.

Figure 3-40
Fire Extinguisher

Section G. Bilge System

Introduction

The bilge system consists of two installed bilge pumps, each with a float switch, and separate bilge pump control switches. The system is designed to remove small amounts of water that occur due to condensation, small leaks, or water used to clean decks and other surfaces.

G.1. Bilge pumps and float switches

The bilge has two fixed, submersible bilge pumps (**Figure 3-41**) that operate on 12 VDC. The pumps are located beneath the bilge QAWTH in the deck. Each bilge pump is rated at approximately 2,000 GPH. Pump number one is the primary bilge pump while the second pump is mounted aft of and slightly higher than the first pump and is intended to be a safety back up. A float switch is installed next to each pump. The bilge pumps discharge at the sides, above the waterline, near the transom. A check valve is installed in the overboard discharge lines to prevent backflow through the pump.

G.2. Bilge pump panel

The bilge pump toggle switches, labeled BILGE PUMP 1 and BILGE PUMP 2, are located on the console auxiliary equipment switch panel (**Figure 3-42**). Each bilge pump switch is protected to prevent the pump from being turned on inadvertently. The switch should remain in the AUTO position. The bilge pumps are each wired directly to the starboard starting battery through the respective BILGE PUMP and BILGE PUMP 2 circuit breakers so the pumps can activate even when the battery selector switches are turned OFF. A light illuminates above the toggle switch when the bilge pump is operating. The bilge pump circuit breakers are located on the start batteries 12 VDC breaker panel located in the port transom locker.

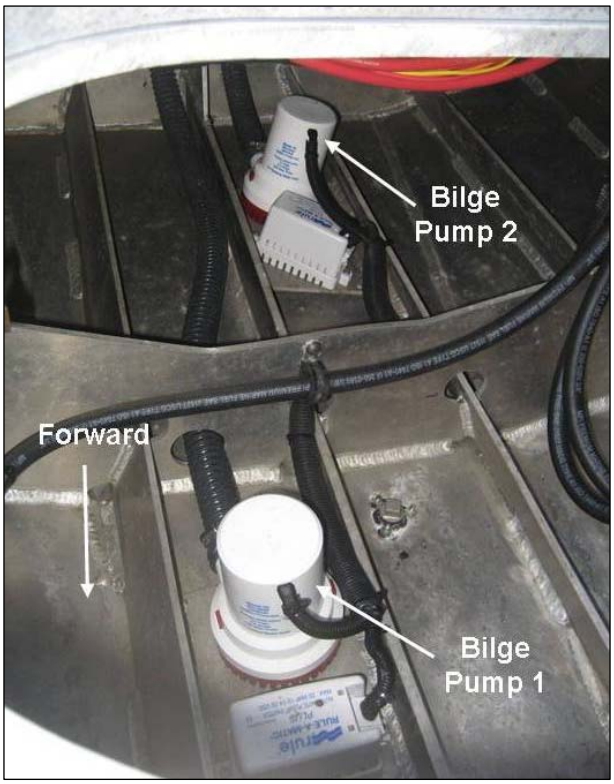

Figure 3-41
Bilge Pumps

Figure 3-42
Bilge Pump Controls

Section H. Windshield Wipers and Washers

Introduction

Windshield wipers, washers, and a window defroster are installed on the forward facing windshield (**Figure 3-43**).

H.1. Wipers and washers

The wipers utilize a 12 VDC motor. The wiper/washer control is a knob located on the auxiliary equipment switch panel on the console (**Figure 3-42**). The wipers receive power from the WIPERS circuit breaker located inside the console locker. The wipers have a high and low speed setting and return to the park position when shut off. The washer fluid bottle holds approximately ½ gallon of fluid. The bottle is within the console and the fill is located on the starboard outboard side of the console (**Figure 3-44**).

H.2. Defroster

The defroster (**Figure 3-45**) is located on the console dash, centerline and forward. The heater rotates to help defrost the entire forward window. The defroster is controlled by a toggle switch DEFROST located on the auxiliary equipment switch panel on the console.

WARNING

Fans do not have a guard on the back of them; use caution when adjusting while fan is in operation.

H.3. Cabin fans

Two 12 VDC fans (**Figure 3-46**) are mounted in the overhead of the console. The fans are controlled by rotary switches on the fan hub. The fan receives power from the FAN circuit breaker located inside the console locker. A manually operated mushroom vent is located over each fan.

Figure 3-43
Windshield Wipers

Figure 3-44
Wiper Fill

Figure 3-45
Defroster

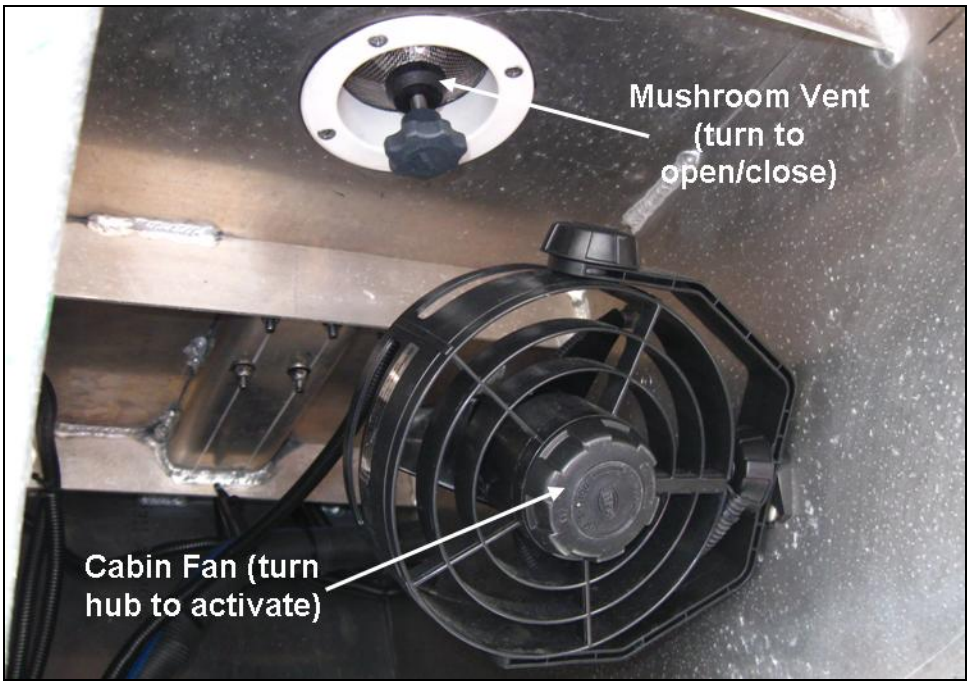

Figure 3-46
Cabin Fans

Section I. Cathodic Protection System

Introduction

The hull cathodic protection system (**Figure 3-47**) helps to reduce corrosion on exterior hull surfaces.

CAUTION !

To prevent galvanic corrosion of the aluminum hull, the outboard engines should be raised out of the water when the boat is moored for prolonged periods of time.

I.1. Sacrificial anodes

The cathodic protection system installed on the boat consists of a single sacrificial zinc anode bolted to mounting tabs, centerline on the transom, below the waterline. Each engine contains several anodes to reduce corrosion on engine components, see section Chapter 3, Section A.14, for more details.

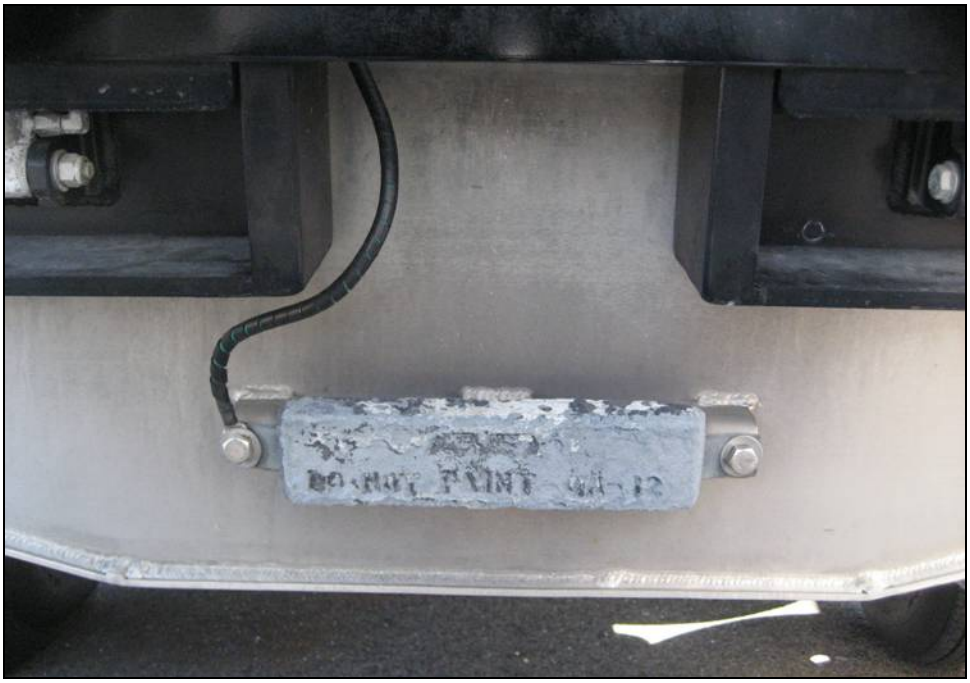

Figure 3-47
Hull Anode

Section J. Trailer System

Introduction

The trailer that accompanies the SPC-SW is custom built by AmeraTrail (**Figure 3-48**). It is designed to transport the SPC-SW on public roadways.

WARNING

Lack of preventative maintenance contributes to a significant amount of trailering mishaps each year. In fact, poor maintenance endangers the safety of the boat crew, you, and the public.

NOTE

The only trailer authorized for the SPC-SW is the AmeraTrail Trailer designed for this class of boat.

Figure 3-48
SPC-SW Trailer

J.1. Tow vehicle

The tow vehicle must be capable of handling the weight of the trailer (including boat and equipment), as well as the weight of the passengers and equipment carried inside the vehicle. This may require that the tow vehicle be specially equipped with the following:

a) Engine of adequate power.
b) Transmission and rear-end designed for towing.
c) Larger cooling systems for the engine and transmission.
d) Heavy-duty brakes.
e) Load bearing hitch attached to the frame, not the bumper.
f) Heavy duty suspension.

NOTE

The towing vehicle must be rated at the combined weight of the boat and trailer. The vehicle's towing limitations can be found in the owner's manual.

NOTE

If the combined weight of the boat, trailer, personnel, and equipment are too close to the tow vehicle's rating, consider using a second vehicle to transport some of the extra personnel and equipment to provide an additional safety margin.

J.2. Hitch

The trailer hitch is attached to the tow vehicle's frame providing a secure fitting from which to attach the receiver and ball mount (**Figure 3-49**).

The hitch must be capable of carrying 10,500 lbs or greater. The hitch must be stamped (by the manufacturer) or have a manufacturer sticker stating the class and the rated towing capacity (10,500 lbs or greater).

J.3. Ball mount and ball

The ball mount attaches to the trailer hitch, which provides a secure fitting to mount the trailer ball.

The trailer coupler must be secured on the hitch ball using the safety latch mechanism. If the safety latch does not easily slide into place, reposition the trailer coupler to ensure proper fit.

The ball mount must have a capable trailer weight of 10,500 lbs or greater. The ball mount must be stamped by the manufacturer, or have a sticker affixed from the manufacturer stating the rated towing capacity is 10,500 lbs or greater. Should a ball mount require hardware (bolts and nuts), the hardware must have a rating of 10,500 lbs or greater.

The ball size must be $2\frac{5}{16}$ inch and have a rating of 10,500 lbs or greater. It shall be stamped and clearly legible. The ball should be inspected often for cracks, abnormal wear, and proper lubrication.

The height of the ball mount should be positioned so that the trailer will be pulled level. Adjusting the height of the ball mount is critical to ensure this condition is met. The tongue weight should be approximately 950 lbs when the trailer is level.

Figure 3-49
Truck Hitch

J.4. Trailer coupler, safety chains and hydraulic brake actuator

The trailer coupler attaches to the ball of the tow vehicle (**Figure 3-49**). The coupler engages the ball and provides a positive mechanical lock between the trailer and tow vehicle. The coupler must be for a 2⁵⁄₁₆ inch ball and have a rating of 10,500 lbs or greater. It shall be stamped and clearly legible.

Two safety chains or cables attached to the trailer provide trailer retention to the vehicle should the coupler disengage from the ball. The safety chains or wire cables must be rated for 10,500 lbs or greater. One end of the safety wire cables is bolted directly to the trailer. The bitter ends are attached to the tow vehicle's hitch with ½ inch galvanized safety hooks that are rated for 2 tons.

The breakaway lever actuating wire (Hydraulic Brake Actuator) is attached to the vehicle during towing operations. Should the coupler disengage from the ball, the actuator wire will be pulled forward, actuating the breakaway lever automatically, thus applying the trailer's brakes. The actuator wire must be attached to the hitch by using a ¼ inch shackle plus an additional ½ inch shackle. The breakaway lever actuating chain is a standard length and should not be altered in any way (**Figure 3-50**).

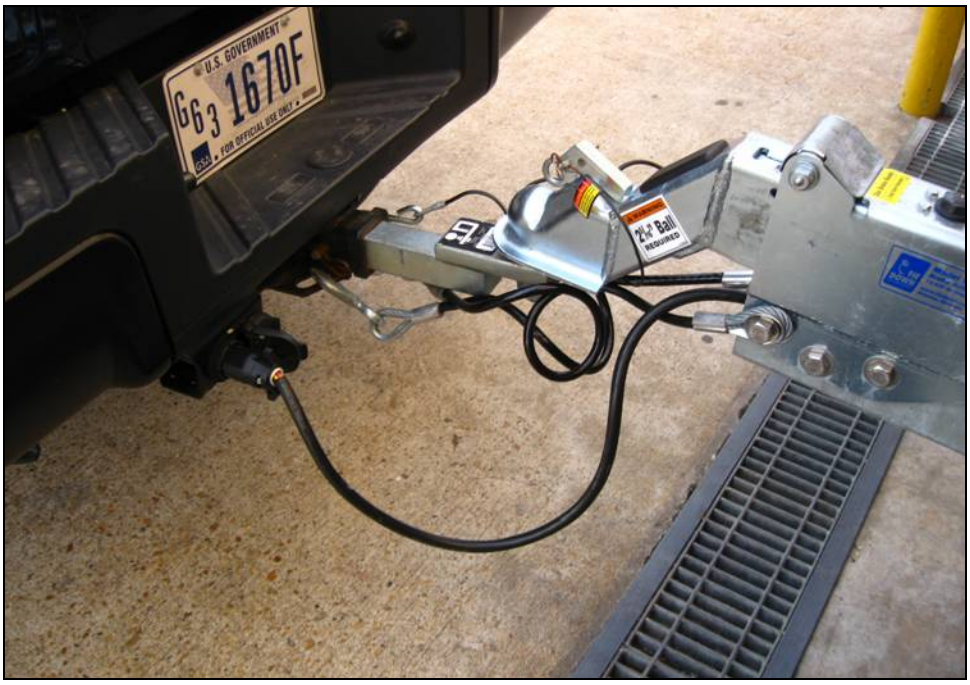

Figure 3-50
Trailer Connected

J.5. Trailer construction and equipment

The primary frame of the trailer is made up of 7½ inch aluminum "I-beam". The suspension is a torsion axle system that contains dual axles, four tires (two per axle), and one spare. Two tie-down straps are provided to secure the boat to the trailer. The wheels are attached to the hub system.

The trailer lights are LEDs, which include: braking, tail and clearance lights.

CAUTION !

Always use a designated "spotter" when hooking up the trailer. The spotter can provide detailed instructions to the tow vehicle operator when backing up, which will prevent damage to both the tow vehicle and trailer.

J.6. Hooking up the trailer

When attaching the tow vehicle to the trailer, the same procedures should be performed every time. Whether you are transiting to a local boat ramp just down the road or going on a long trip, the trailer should always be completely attached to the tow vehicle.

Follow these steps for attaching the trailer to the tow vehicle:

Step	Action
1	Using a spotter, carefully back the tow vehicle so that the trailer ball is aligned under the trailer's coupler.
2	Using the hand-crank jack, lower the trailer coupler until it is completely seated on the trailer ball.
3	Engage the coupler latch and insert the coupler latch pin to ensure it does not come undone during transit.
	NOTE The coupler latch pin should have a lanyard long enough to facilitate insertion and removal.
4	Attach the safety wire cables. They shall be crisscrossed and have enough slack to allow for sharp turns in both directions, yet short enough to not drag on the ground.
5	Attach the breakaway lever actuating wire. Ensure there is enough slack in the safety and actuator cables to allow for sharp turns in both directions, yet short enough to not drag on the ground.
6	Connect the wiring harness to the tow vehicle. The wiring harness (pigtail) should have enough slack to allow sharp turns in both directions, and be short enough as to not drag on the ground.
7	Check trailer lights to ensure they are operating properly.

CAUTION !

Once connected to the tow vehicle, ensure the trailer is being towed level to the ground. If the trailer is not level to the ground, a drop bar/ball mount of a different height may be necessary and/or the trailer coupler may need adjustment.

CAUTION !

Do not exceed the maximum weight rating on the trailer. Exceeding the maximum rating voids the manufacturer's warranty and may lead to failure of the trailer, causing damage to the boat and creating an unsafe towing condition.

J.7. Securing the boat to the trailer

Before taking the trailer and boat into tow, you must first ensure that the boat is properly secured to the trailer. **Damage to the boat and trailer could result if the two are not properly connected.** Strap down the SPC-SW in the following manner:

a) Tie-down straps must be attached and tightened between the transom tie down fittings and the trailer (**Figure 3-51**), one on each side of the transom.

b) Tie-down straps must be attached and tightened between the bow eye and the trailer (**Figure 3-52**), on each side.

c) The forward safety cable must be connected to the lower hole in the bow eye (**Figure 3-52**).

Tie-downs shall be rated for at least 6,000 lbs and be the same style and model as the issued tie-downs that came with the AmeraTrail.

The winch strap shall not be used as a tie down and must not exceed light strain (**Figure 3-52**).

The SPC-SW is outfitted with a window guard/screen, and should be in place before trailering (**Figure 3-53**).

Figure 3-51
Trailer Transom Tiedowns

Figure 3-52
Bow Safety Cable

Figure 3-53 Trailer Window Guard

WARNING

Do not overload the trailer by carrying additional equipment or personal gear in the boat.

WARNING

The boat and trailer will hinder the driver's ability to judge distances and negotiate turns.

J.8. Towing precautions

Pulling a trailer presents several problems: more time is required to brake, accelerate, pass, and stop. The presence of the boat on the trailer will increase the size of the vehicle's blind spots, especially when using rear view mirrors for backing. The turning radius is also much greater; curbs and roadside barriers must be given a wide berth when negotiating corners.

Prior to operating on the open road, the vehicle operator should practice turning, backing up, and other maneuvers at a level, non-congested parking area. Backing a trailer is a challenge, even to the most experienced drivers, and requires considerable practice.

The SPC-SW and trailer are closely matched to the minimum trailer-truck-hitch requirements. Safe trailering requires that the trailer be properly balanced and loaded. Overloading a trailer on the highway is as dangerous as overloading your boat on the water. Carrying additional equipment (beyond the boat outfit) or personal gear on the boat may add substantially to the trailer's gross weight and play havoc with the load distribution.

Vehicle speed shall not exceed posted speed limit or 60 mph (whichever is less) in ideal weather and road conditions. For wet road surfaces, speed should be reduced by 30%. While towing a boat, following distance should increase to five seconds rather than the normal three seconds following distance.

NOTE

Many units require tow vehicle operators to complete a unit generated Performance Qualification Standard (PQS) before they tow a trailer.

CAUTION !

The canopy weather curtains must be removed before trailering at speeds greater than 5 mph. The cover will not withstand trailering speeds. Trailering with weather curtains in place will void the warranty if damaged during over the road transits.

J.9. Weather curtain stowage

All canopy weather curtains must be removed before trailering at speeds greater than 5 mph. The weather curtains shall be rolled up and tightly secured to the crew seat foundations using bungee cords (**Figure 3-54**).

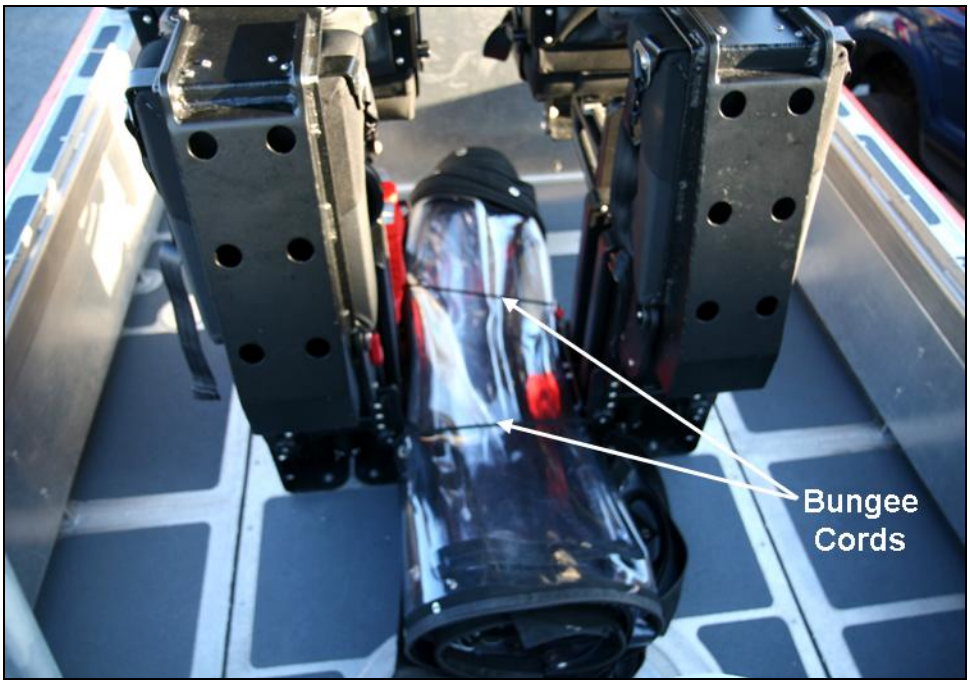

Figure 3-54 Weather Curtain Stowage During Trailering

J.10. Trailering checklist

Before your trip, ensure the following items have been checked:

Step	Action
1	Check intended routes for restrictions on bridges and tunnels, and low overhead clearances. All antennas must be rotated to the down position and all masts must be removed. With the antennas in the down position and the masts removed, the highest point of the trailered boat becomes the top of the searchlight, at 12 FT 7 inches above the ground.
2	The tow ball and coupler must be the same size, and tow balls with nut/washers have to be tightly secured (the vibration of road travel can loosen trailer hardware).
3	Confirm the coupler is completely over the ball, and the latching mechanism is locked down and secured with the locking pin.
4	The safety wire cables are securely attached, crisscrossing under the coupler to the hitch. Should the hitch fail, the trailer's tongue would be held up by the wire cables, allowing the trailer to follow in a straight line, thus preventing the coupler from dragging on the road.

5	Ensure the hydraulic brake actuator safety wire is attached to the hitch.
6	Ensure the jack is fully cranked up.
7	Vehicle side-view mirrors should be large enough and adjusted for the driver. This will provide an unobstructed rear view on both sides of the vehicle.
8	Check all vehicle and trailer lights' signal operation. When trailer lights are submerged during launching/recovery, they have a greater chance of failure. Always disconnect the trailer-wiring harness before submerging the trailer's lights.
9	Test the brakes before getting on the road. Drive forward and apply the brakes several times at slow, safe speeds; this will help determine a safe stopping distance.
10	Check all tires, including the trailer's spare tire and towing vehicle tires, for condition and proper air pressure. Improper air pressures will cause difficulties in steering. Read the tire sidewall and trailer specifications to determine tire pressure required. Furthermore, check for tire wear, cracks, bubbles, or foreign objects imbedded in the tire. When trailer wheels are immersed in water (especially salt water), the bearings should be inspected and greased on a regular basis in accordance with Preventive Maintenance Schedule (PMS) procedures.
11	Inspect areas for standing water. Remove water and inspect for source.
12	Ensure the trailer is loaded evenly, from front to rear as well as side-to-side. Too much weight on the hitch will cause the rear of the tow vehicle to sag and will make steering more difficult.

CAUTION !

Always use a spotter when backing a trailer! Windows should be open and tow vehicle radio should be off.

J.11. Launching the boat

Once at the boat ramp, use the following procedures to launch the boat:

Step	Action
1	Use a spotter to help back the trailer down the boat ramp to the water's edge. Remember to set the parking brake.
2	Remove all tie-down straps that secure the boat to the trailer. DO NOT disconnect the trailer winch connection.
3	Disconnect trailer-wiring harness from tow vehicle.
4	Visually inspect the boat's hull and engines for any damage that may have occurred during transit.
5	With a crew member in the boat, have another crew member stand-by to release the trailer winch connection once in the water.
6	Carefully back the trailer into the water until approximately three-quarters of the boat is floating free of the trailer. Set the towing vehicle's parking brake.
7	Check spaces for flooding.
8	Lower engines into the water and start. Ensure the water level in the vicinity of the outboards is sufficient for operation and clear of hazards.
9	If crew is satisfied with condition of boat/engines and is ready to get underway, release the trailer winch connection and carefully push/power the boat back off the trailer.
10	Carefully pull tow vehicle forward, clear of boat ramp.

NOTE

After launching or recovering the boat, always rinse down the trailer with fresh water and check the trailer lights for proper operation.

CAUTION ! During recovery, ensure the bow is in contact with the trailer bow stops. This will ensure proper loading and weight distribution.

CAUTION ! Trailer chafing skids or "bunks" must be kept in good condition to prevent scratching and gouging of the hull.

CAUTION ! During recovery, when pulling the boat onto the trailer, if the boat is being pushed by wind or current, the foam collar just aft of the recovery recess may snag on the trailer guide post and over time can tear the collar.

J.12. Recovering the boat

When finished with boat operations, use the following procedure to recover the boat:

Step	Action
1	Disconnect trailer-wiring harness from tow vehicle.
2	Using a spotter, carefully back trailer down the ramp until approximately three-quarters of the trailer is submerged. Set parking brake.
3	Align the center of the boat with the center of the trailer and carefully maneuver the boat onto the trailer. Check water level in the vicinity of the trailer and trim engines up or secure as needed.
4	Attach trailer winch to top hole in bow eye of boat and pull boat forward onto the trailer. Always ensure boat stays centered on trailer.
5	Secure engines on boat (if still running).
6	Raise both engines.
7	Slowly pull the tow vehicle forward until the trailer is clear of the water.
8	Attach all tie-down straps securing the boat to the trailer. Attach window guard/screen. Lower antennas, remove masts, and remove and stow weather curtains before transporting on roadways.
9	Ensure trailer lighting is operating properly.
10	Do a complete visual inspection of the tow vehicle, trailer, and boat before transiting on highway.

Section K. Weapons Mounting

Introduction

This section describes the proper tripod location and mounting of the mounted automatic weapon (MAW) as well as the tether points for the gunner.

WARNING

Prior to operating MAW, temporarily remove forward console seat and mount to increase personnel movement when manning weapon.

K.1. Tri-pod mounting points

Attachment points for a MK 16 mod 8 stand with adjustable mechanical stops are located on the forward deck (**Figure 2-13**). Plugs are inserted into the mounting points to keep them free of dirt and debris. They are to be removed with an allen wrench when installing the gun mount. The forward bitt and aft quarter bitts shall not be used as weapon mounting points given their location and unsuitability to perform safely.

WARNING

Do not use the forward and aft bitts for MAW operations. The MK 16 mod 8 must be mounted to the deck prior to affixing MAW.

The forward mechanical stops **shall** be set so that the line of site for the gunner is adequate to allow the gunner proper site picture and insure the center axis of the bore does not come within 6 inches of any portion of the vessel. A bore laser sight or a gun barrel reflector shall be used to establish this distance.

K.2. Pre-mission checks

Prior to every mission all mechanical stops MUST be checked and verified to insure that the MAW cannot be trained within 6 inches of the vessel. Small boats are required to have a gun bag in the immediate vicinity of the mount with the following items:

a) Basic operating instructions per the FM 3-22.68 Crew-Served Machine Guns 5.56-mm and 7.62-mm, and unit Machine Gun Standard Operating Procedure.

b) Misfire Procedures per Operator's Manual for M240B, FM 3-22.68 Crew-Served Machine Guns 5.56-mm and 7.62-mm and in conjunction with Clearing Live Ammunition from Guns, SW 300-BC-SAF-010.

c) Unit Machine Gun Standard Operating Procedure. Follow the format available in Enclosure 14 of the COMDTINST M8000.2 (series).

d) The Extra Barrel. The M240B barrel(s) are head-spaced to a specific receiver and test fired by the manufacturer. The manufacturer does not mark the barrel to the receiver it was test fired on. When receiving M240B machine gun, both barrels and the receiver must be kept together until the barrels are permanently marked to the receiver.

1. All M240B barrels MUST be head-spaced and permanently marked to the specific receiver by (stamping or etching) the last four numbers of the receiver serial number on the flat part of the barrel carrying handle assembly.
2. If you receive a barrel and it has not been permanently marked to the receiver, contact your servicing armory to have the headspace checked and the barrel permanently marked to the receiver.

K.3. Manning of the MAW mount

Upon manning the mount, the TBCM and the TCOXN shall ensure that all pre-fire checks have been performed as listed below:

a) Place gun in the mount and align rear mounting hole with the rear push/pull pin hole in the cradle. Insert rear push/pull pin through the cradle and the weapon until the pin detent balls are secure and clearly visible.

b) Upon the installation of the weapon, the train and elevation (T&E) stops shall be checked to verify that the weapon's firing line does not intersect with the vessel or any object associated with the vessel. If the line of fire is obstructed in any manner the mount is unusable and needs to be removed from service.

c) Ensure that the gun bag is in the immediate area and that it contains the correct (stamped) additional barrel assembly and the correct manuals as listed in section (K.2 Pre-mission checks).

d) Conduct prefire checks and verify the safety functions correctly, this shall be conducted from the manual and not from memory.

e) Prior to mounting the ammunition and prepping the MAW for employment the TBCM **SHALL** inspect the ammunition for corrosion, damage, projectile "fitment" in the cartridge case, the cartridge case, and primer to ensure there is no seepage, corrosion or missing or inverted primers. If ammunition is found to be serviceable but "salty" a fresh water rinse is authorized.

f) Before firing the MAW, the TBCM manning the MAW shall be tethered in accordance with the *U.S. Coast Guard Boat Operations and Training (BOAT) Manual, Volume III* COMDTINST M16114.42 (series). The MAW mount shall be used as a tethering point for the SPC-SW.

K.4. Security of the MAW during missions

When the situation arises where the PWCS vessel is required to move to a pier for refueling (the off load or on load of equipment etc.), the TBCM must remain at the weapons mount and maintain positive control of the MAW.

Prior to the vessel tying up to a pier the TBCM must down load the MAW and secure all ammunition. If the MAW is to remain in the mount the TBCM will keep positive control of the weapon. The MAW is normally stowed in the ready air position however if the ready air bracket is missing or broken the TBCM must insure the weapon is pointed in a safe direction at all times.

Positive control is the physical contact of the TBCM with the MAW, even when the MAW is in the "ready air" position the gunner must maintain physical control of the MAW to prevent it from being exposed to the general public and to dissuade theft of an unsecured weapon.

K.5. Ammunition storage

Ready service ammunition for the forward gunner shall be stowed in the upper forward console locker.

This page intentionally left blank.

Chapter 4
Crew Requirements

Introduction

The *U.S. Coast Guard Boat Operations and Training (BOAT) Manual, Volume II*, COMDTINST M16114.33 (series) provides minimum standards and guidelines for competence on board the SPC-SW. Each crewmember should be familiar with the duties of the other crewmembers in addition to his/her own duties. It is important for a crewmember to know and commit to memory all important characteristics of the boat and its equipment, and which procedures to follow in the event of a casualty.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Minimum Crew	4-2
B	Coxswain	4-3
C	Boat Crew Members	4-4
D	Passengers	4-5
E	Safety Equipment	4-6

Section A. Minimum Crew

Introduction

Units shall comply with the minimum boat crew requirements prescribed in the *U.S. Coast Guide Boat Operations and Training (BOAT) Manual, Volume I*, COMDTINST M16114.32 (series).

A.1. Certified crewmembers

All crewmembers shall meet the qualification requirements prescribed in the *U.S. Coast Guide Boat Operations and Training (BOAT) Manual, Volume II*, COMDTINST M16114.33 (series).

Section B. Coxswain

Introduction

The U.S. Coast Guard places great trust in each Coxswain and his or her ability to accomplish the assigned missions in a safe and professional manner even under adverse conditions. The position of Coxswain is one of high regard and great responsibility.

The Coxswain is responsible for the boat, its crew, and passengers during every mission. The Coxswain assigns and directs all onboard functions during each operation.

B.1. Authority and responsibility

The extent of the authority and responsibility of the Coxswain is specified in *United States Coast Guard Regulations*, COMDTINST M5000.3 (series), as follows:

"The Coxswain shall be responsible, in order of precedence, for the safety and conduct of passengers and crew; the safe operation and navigation of the boat assigned; and the completion of the sortie or mission(s) assigned or undertaken pursuant to USCG policy and regulations. An underway Coxswain will at all times respond, within the limits of capabilities and legal authority to observed hazards to life or property, and violations of law or regulations."

The Coxswain is the direct representative of the Commanding Officer or Officer-in-Charge and as such (subject to *Articles 88-89* of the *UCMJ*), has the authority and responsibilities that are independent of rank or seniority in relation to other personnel embarked. The authority and responsibility of the Coxswain exist only when the boat is engaged on a specific sortie or mission.

B.2. Relief of responsibility

The only person embarked in the boat who may relieve the Coxswain of the responsibility as described above is:

a) Commanding Officer,

b) Officer in Charge,

c) Executive Officer (XO), or

d) Executive Petty Officer (XPO).

e) A senior officer at the scene of a distress emergency, or other abnormal situation, who exercises authority under the provisions of *USCG Regulations*, whether or not other units are involved.

Section C. Boat Crew Members

Introduction

Under direct supervision of the Coxswain, the crew is responsible for line handling, acting as lookout, and assisting the Coxswain as required during all evolutions or maneuvers.

C.1. Certified Boat Crew Member

The Boat Crew Member must be certified in accordance with the *BOAT Manual, Volume I,* COMDTINST M16114.32 (series) and *BOAT Manual, Volume II,* COMDTINST M16114.33 (series).

Additionally, the Boat Crew Member may be responsible for operating the communications/navigation equipment when directed by the Coxswain.

C.2. Additional Crewmembers

Additional crewmembers are assigned by the Coxswain and certified by the CO/OIC based upon mission requirements.

Section D. Passengers

Introduction

The SPC-SW is designed to carry a Coxswain, Boat Crew Member, and up to two additional crewmembers or passengers while carrying out high-speed mission activities. Additional passengers can be carried for other missions, not to exceed designed weight capacity (see *Chapter 2, A.4.*). Passengers shall be seated as directed by the Coxswain.

Section E. Safety Equipment

E.1. Personal protective equipment

During all SPC-SW operations, crewmembers shall wear personal protective equipment (PPE) as required by the *Rescue and Survival Systems Manual*, COMDTINST M10470.10 (series).

WARNING

The use of the kill switch is required whenever the boat is started or has way on. The kill switch is located next to the throttles (**Figure 3-10**). The clip for the kill switch MUST be inserted into the switch body before the engines are started. The 18 inch lanyard MUST be properly attached to the operator at all times during boat operation. The engine kill switch lanyard should be clipped to the operator below the waist. A second kill switch lanyard MUST be carried onboard to enable remaining crewmembers to operate the boat in the event the operator is ejected.

NOTE

The Coxswain is responsible for ensuring that all required personal safety equipment is worn, and worn correctly.

Chapter 5
Operational Guidelines

Introduction

This chapter describes how to use the SPC-SW in the safest and most efficient manner. These policies and performance criteria should be used as guidelines for SPC-SW operations. Within these guidelines, consider local operating conditions, district regulations and the skill of the crew to determine how the SPC-SW capability is to be used. These factors must be considered prior to each sortie or mission.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Operating Parameters	5-2
B	Performance Data	5-6

Section A. Operating Parameters

Introduction

The readiness of the SPC-SW shall be continuously monitored to ensure that it is capable of unrestricted operations. This monitoring is accomplished through a variety of programs, including daily boat checks, the boat PMS schedule, engineering inspections, and Ready for Operations (RFO) evaluations and Standardization Team inspections.

Operating parameters for the SPC-SW and crewmembers include the following areas:

1) Disabling casualties
2) Restrictive discrepancies
3) Major discrepancies
4) Minor discrepancies
5) Responsibilities
6) Environmental limits

A.1. Disabling casualties

Disabling casualties are those that make the boat not serviceable. *Appendix D* contains a listing of disabling casualties. If a disabling casualty is identified, the boat shall not get underway until the casualty is corrected.

Disabling casualties shall be reported immediately to the Operational Commander. The boat shall be immediately placed in "Charlie" status and repaired. If the casualties cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the casualty.

A.2. Restrictive discrepancies

Restrictive discrepancies are those which restrict the operations of the boat such that it can perform some missions, but not all missions safely. *Appendix E* contains a listing of restrictive discrepancies.

A.2.a. Reporting restrictive discrepancies

Restrictive discrepancies shall be reported to the Operational Commander if the discrepancy cannot be repaired within one hour. The boat shall be immediately placed in a "Charlie" status and shall not get underway until the discrepancy is corrected, or a waiver has been received. If the discrepancy cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the discrepancy. The Operational Commander is responsible for monitoring the progress of repairs to these discrepancies.

A.2.b. Discrepancy underway

In the event the boat sustains a restrictive discrepancy while underway, the Coxswain should not normally proceed without authorization, unless aborting the mission would increase the level of risk. The situation and recommendations must be effectively communicated to the Operational Commander to allow for prudent risk assessment by all levels.

The reporting procedure is as follows:

Step	Procedure
1	The Coxswain shall immediately notify the Operational Commander with all pertinent information and a recommendation as to whether to continue or abort the mission.
2	The Operational Commander shall notify the Coxswain as to whether or not continuing the mission is authorized, and the conditions under which the boat may be operated.

A.3. Major discrepancies

Major discrepancies are those that degrade the effectiveness of the boat to perform one or more missions. *Appendix F* contains a listing of major discrepancies. The occurrence of major discrepancies shall be documented. A plan to correct these discrepancies shall be formulated and carried out. The Operational Commander is responsible for monitoring the status of repairs to these discrepancies.

A.4. Minor discrepancies

Minor discrepancies do not affect the operational readiness of the boat. However, a boat with minor discrepancies does not meet the standardization criteria established for the boat. The occurrence and repair of minor discrepancies shall be documented and monitored at the unit level.

In the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs, units are authorized to temporarily carry this extra equipment. This authorization is on a case-by-case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

A.5. Responsibilities

The Coxswain is always responsible for the safe operation of the boat. The Coxswain must decide if the mission warrants subjecting the crew and boat to the danger defined by the mission, weather and sea conditions anticipated.

A.5.a. Disabling casualty – underway

In the event that the boat sustains a disabling casualty while underway, the boat shall immediately contact the base and return, if possible.

A.5.b. Restrictive discrepancy – underway

In the event the boat sustains a restrictive discrepancy while underway, the Coxswain should not normally proceed without authorization, unless aborting the mission would increase the level of risk. The situation and recommendations must be effectively communicated to the Operational Commander to allow for prudent risk assessment by all levels. The following is the procedure for communicating the discrepancy while underway:

Step	Procedure
1	The Coxswain shall immediately notify the Operational Commander with all pertinent information and a recommendation as to whether to continue or abort the mission.
2	The Operational Commander shall notify the Coxswain as to whether or not continuing the mission is authorized, and the conditions under which the boat may be operated.

Casualty/Discrepancy	Consequence	Required Action
Disabling Casualty "Boat is not serviceable."	Not authorized to get underway. Notify the Operational Commander immediately.	Assign "Charlie" status to the boat, and commence repairs immediately. Submit CASREP if applicable.
Restrictive Discrepancy "Boat and crew cannot perform all missions safely."	Operations restricted. Notify Operational Commander if repairs cannot be made in one hour.	Create repair plan and set deadline for completion of repairs. Operational Commander shall monitor progress of repairs. Any operations before restrictive discrepancies are repaired require written waiver. Submit CASREP if applicable.
Major Discrepancy "Boat and crew can perform all missions but some degradation in effectiveness or readiness should be expected."	Operations unrestricted. Discrepancy occurrence and repair is documented.	Maintenance plan is carried out. Operational Commander shall monitor status of repairs to the discrepancies.
Minor Discrepancy "Boat and crew readiness not affected nor impaired. Boat does not meet standards."	Operations unrestricted. Discrepancy occurrence and repair is documented.	Maintenance plan is carried out. Operational Commander monitors completion of maintenance/repair.

A.6. Environmental limits

The following warnings apply to operation of the SPC-SW.

WARNING

The following is a critical operational and environmental limitation:
A thorough risk assessment shall be conducted prior to employing the SPC-SW in seas greater than specified in *Chapter 2, Section A* of this handbook.

WARNING

Do not operate in breaking seas or surf conditions.
A thorough risk assessment shall be conducted prior to employing the SPC-SW in seas greater than specified in *Chapter 2, Section A* of this handbook.

Section B. Performance Data

B.1. Fuel consumption

Fuel consumption and operating range is affected by engine tuning, weather conditions, trim, type of evolution and operating area. **Figure 5-1** shows typical fuel consumption at full load condition.

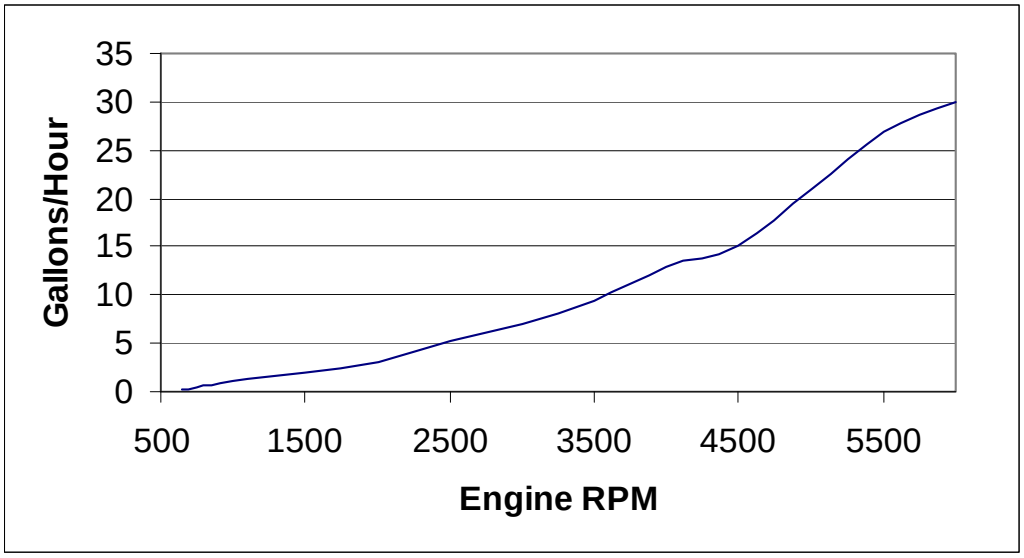

Figure 5-1
Fuel Consumption

B.2. Seakeeping

Positioning the vessel with respect to the wind, seas, and other craft, is essential to prevent damage to the hull or injuries to the crew.

B.2.a. Operating in beam seas

Operating with the seas on the beam is more uncomfortable than dangerous when following basic small boat handling guidelines. Use the following techniques to minimize danger:

i) Tacking - With large seas on your beam, tack across the seas at a slight angle in a zigzag fashion. This prevents exposure of the beam to heavy swells.

ii) Changing Course - To change course heading, allow the boat to lose headway, turn the wheel hard over, and apply power to come smartly to the new heading.

WARNING ✋

The position of the boat in relation to a breaking wave crest is critical. Severe wave slap will occur in the area approximately two boat lengths in either direction of the breaking water, however, this area presents less danger of capsize.

CAUTION !

When operating in beam seas, do not allow the boat to become “dead-in-the-water” and be hit broadside by a wave.

B.2.b. Operating in following seas

Following seas present the greatest dangers to the SPC-SW. The boat does not have the balanced buoyancy or ability to lay-to in a following sea. The operational limitations are the controlling guideline and must be followed at all times. Consider the following point and technique when operating under these conditions:

Do not power the boat over the crest of a wave and into the trough of the next wave or bury the bow into the back of the next wave.

B.3. Stability

By virtue of hull design and equipment placement, the SPC-SW displays positive buoyancy. Ensuring the bilge areas are always free of water and eliminating the free surface affect of liquids in the bilges are essential to maintaining stability of the SPC-SW.

CAUTION !

Do not use rapid accelerations from dead-in-the-water (DIW) to full speed except when necessary. This conserves fuel and helps prolong engine life.

B.4. Speed

The SPC-SW achieves a maximum speed of approximately 41 KTS.

NOTE

Maximum speed/power should be used only when operationally necessary. Under non-urgent conditions, proceed at cruise speed.

Chapter 6
Mission Performance

Introduction

The actions and techniques described in this chapter are products of field experience. They are intended to give boat crewmembers information on how the SPC-SW performs and reacts in various mission scenarios. The information is not intended to provide the "only way" to perform an action or complete a mission. Boat crews should use effective communications and teamwork skills along with this general information to adapt their actions to each unique mission scenario.

Information in this section alone does not qualify a crewmember. Observe these procedures and apply skills developed through practice to effectively use the SPC-SW to perform missions.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Starting Procedures	6-2
B	Underway	6-4
C	Going Alongside	6-5
D	Handing Characteristics	6-7
E	Operating with Helicopters	6-11
F	Anchoring	6-12
G	Towing	6-14
H	Securing Procedures	6-16

Section A. Starting Procedures

Introduction

A number of checks and procedures must be performed prior to, during, and after engine start.

CAUTION!

The SPC-SW should not be started until it is in the water or until water is provided to the water pump from another source. Serious damage to the engine will occur if no cooling water is provided.

A.1. Pre-Start

The following pre-start checks must be accomplished before the first mission of the day and prior to engine start:

Step	Action
1	Ensure bilge area is free of all liquids.
2	Turn battery switches to the ON position.
3	Ensure fuel tank is full, verify fuel level gauge as required.
4	Ensure the port and starboard cooling water intakes on the lower engine shaft housing are free of debris.
5	Check outboard engine cover gasket for damage. Check that outboards are secure to the jacking plate and all mounting hardware is tight.
6	Trim engines down until lower unit is submerged (ensure full tilt/trim travel on each engine).
7	Ensure engine oil level is filled to ‘FULL’ mark.
	Check hydraulic steering system for leaks at helm and at steering cylinders by outboards.
8	Check jacking plate hydraulic oil reservoir for proper level.
9	Squeeze fuel primer bulbs until firm.
10	Ensure the engine kill switch clip is installed and lanyard attached.
11	Install start keys and turn key to ON position. Ensure the engine alarm system is operating.

A.2. Engine starting

The following procedures must be followed for starting the engines:

Step	Action
1	Ensure that the throttle levers are in the *neutral* position.
2	Ensure electronics, antennas, and speakers are secured.
NOTE	Engines must be started before turning on the electronics to prevent faults from occurring in the electronics.
3	Ensure the engine kill switch clips are installed and lanyards attached. One spare clip and lanyard must be onboard and stored at the console.
4	Turn the key to *start* position until engine starts.
5	Check outboards for nominal or adequate cooling water output at telltale discharge on each engine.
CAUTION!	If cooling water output is not evident, immediately secure engine and investigate.
6	Check crew and passengers for appropriate PPE including helmets (if required).

A.3. Energizing equipment

The following steps must be completed prior to getting underway:

Close (turn ON) all of the remaining switches on the 12 VDC breaker panels.

Energize and test all installed electronic components in the following order.

a) NavNet2 multi-function display unit (wait until it boots up)

b) GP-37 DGPS system

c) RD-30 display unit

d) all other electronics

Conduct a test of the hydraulic steering ensuring that motors respond appropriately.

Test jacking plate ensuring the engines are raised and lowered smoothly.

Test throttles operation in *forward* and *reverse*.

Ensure gear is properly stowed.

Section B. Underway

Introduction

It is the responsibility of the Coxswain and crewmembers to ensure that once the boat is underway, the boat and its systems are operated in a safe and efficient manner. The safety of the crew and any embarked personnel is also incumbent on all crewmembers.

After getting underway, monitor all appropriate machinery gauges. If an abnormal condition develops, take corrective action to prevent further damage in accordance with the *U.S. Coast Guard Boat Operations and Training (BOAT) Manual, Volume I*, COMDTINST M16114.32 (series). Report any abnormal conditions to the Coxswain.

B.1. Personal protective gear

Always observe requirements of this manual, the *Rescue and Survival Systems Manual*, COMDTINST M10470.10 (series), and the *Boat Crew Seamanship Manual*, COMDTINST M16114.5 (series) for wearing protective clothing, personal flotation device (PFD), seat belts, and boat crew signal kits.

CAUTION !

The enclosed steering station can create a sense of isolation from the elements and other marine traffic. Crewmembers should use all available means to maintain awareness of wave action, winds, currents, and traffic.

NOTE

When operating the boat with minimal crew, effective crew communications are critical. Speak loud enough to be heard over the background noise. Ensure the receiver hears and understands the message being passed. A common strategy is to have the receiver repeat back the message that was sent.

B.2. Communications

Crew communications and coordination is the key to safe operations. Crewmembers should inform the Coxswain of their location when moving about the deck. Engine noise can make crew communications difficult on SPC-SWs. Speak loudly and clearly and repeat as necessary until acknowledged.

Section C. Going Alongside

Introduction

The following is a generic procedure for going alongside. The SPC-SW crews must be familiar with the applicable U.S. Coast Guard instructions and the command's Standard Operating Procedures (SOP) for going alongside a vessel of interest.

The height of the cabin and the width of the canopy make the SPC-SW's canopy vulnerable to damage when coming alongside another vessel. Sea state, location of installed rub rails, and the flare of the other vessel's hull increases the likelihood of damage if the two vessels roll towards each other. A thorough risk assessment, including asset selection, is essential to reduce the potential of personnel injury and property damage.

Step	Action
1	Ensure that communications between the SPC-SW and the Operational Commander are established and reliable.
2	Attempt to make and establish contact with the vessel of interest on designated marine band frequencies.
3	Make approach preparations and inform the crew. Coxswain determines where to make contact with the vessel.
WARNING	Pick a contact point well clear of a larger vessel's propeller (including in the area of suction screw current), rudder, and quarter wave. Forces from these could cause loss of control.
4	Conditions permitting, match your speed to the other vessel, and then start closing in from the side.
5	Close at a 15° to 30° angle to the other vessel's heading. This should provide a safe rate of lateral closure at no more than one-half the forward speed.
NOTE	If your initial heading was parallel to the other vessel, you will have to increase speed slightly when you start to close at an angle.
WARNING	Applicable U.S. Coast Guard instructions and SOP must be strictly adhered to when/if the SPC-SW is in close proximity of any vessel that fails to identify itself.
6	If contact had been made with the vessel of interest, determine if a boarding ladder (if necessary) is available and rigged.

NOTE	When sheering in or out, apply helm slowly and be prepared to counteract the tendency of the boat to close or open quickly.
NOTE	As both the SPC-SW and vessel of interest have headway, the pressure of the water on the boat's bow will cause it to sheer away from the ship. Use the force by touching on the helm to control sheer, in or out, by catching the current on one side of the bow or the other side.
7	Come along side of the vessel, matching its course and speed.
8	Use helm to hold the boat at the desired position alongside or at some distance off the vessel.
CAUTION!	Use care when going alongside a vessel of interest so as not to damage the boat's hull.
9	Make contact with the forward sections of your boat (about halfway between the bow and amidships). Use helm and power to hold the bow into the other vessel at the same forward speed. Do not use so much helm or power that you cause the other vessel to change course.
10	Ensure that communication with the Operational Commander is established to update the status of the assigned mission. If personnel are to be embarked/disembarked on the vessel of interest, utilize a boarding ladder as provided. Minimize the time alongside. If necessary and following U.S. Coast Guard instructions and the command's SOP, "make-up" to the other vessel rather than relying on helm and power to maintain contact.
11	When the mission is complete, embark all personnel. Sheer the stern in with the helm to get the bow out. Avoid getting set toward the side or stern of the vessel.
CAUTION !	Never back down when clearing alongside, parallel to another vessel that is making way. Outboard powered vessels with a large portion of weight aft are susceptible to shipping water while backing particularly in a chop.
12	Apply gradual power to gain slight relative speed. Maneuver the SPC-SW away from the vessel of interest. Continue to update position and status of the mission with the Operational Commander.

Section D. Handing Characteristics

Introduction

Boat handling is a complex skill that requires knowledge and practical, underway experience to build confidence and skill level. Always use forethought and finesse when handling the SPC-SW. Know the boat's handling features, monitor weather conditions and be aware of the operating limitations of the boat.

In this section

This section contains the following information:

Topic	See Page
Turning and Pivoting	6-8
Head Seas	6-9
Beam Seas and Following Seas	6-9
Effects of Wind	6-10
Station Keeping	6-10

Turning and Pivoting

D.1. Turning

Because the SPC-SW incorporates outboard engines that use propulsion thrust for directional control, the boat can make a much tighter turn than the same craft with a shaft, propeller and rudder.

When operating at high speed, it is critical that the engines be trimmed down (in) before making hard turns or maneuvers. Trimming the engines down (in) causes the bow of the boat to be pushed down by the thrust of the engines and is considered the safest position when accelerating, performing hard maneuvers, and heading into wind and waves.

Performing high-speed turns and maneuvers with the engines trimmed out (up) or level can result in hooking a chine, where the chine of the boat abruptly catches the water. The result can be violent in nature, the physical forces of which may cause personnel in the boat to be thrown in the direction of momentum.

WARNING

High-speed turns while "trimmed out" (up) or "trimmed level" can result in "hooking a chine", causing a violent reaction which may create immediate loss of control of the boat and sufficient force to pitch crewmembers overboard.

WARNING

A hard turn made with the boat on plane and jacking plate set at seven will cause the boat to spin out, and/or flip causing serious injury or death.

CAUTION !

The SPC-SW is sensitive to changes to the Longitudinal Center of Gravity (LCG). These changes can occur by adding or subtracting weight, or through simple crew movements. These changes will change the way the boat handles in any given situation. The Coxswain must assess any LCG change and may have to make many trim adjustments during a sortie.

Prior to making turns at higher speed, crew and passengers must be forewarned and given the opportunity to prepare themselves for the maneuver. The forces created as the boat turns at high speeds will result in injury and ejection if crews are not properly restrained.

D.2. Pivoting

The SPC-SW rotates in a transverse direction about a vertical axis at approximately the front of the console when engines are fully trimmed in. Because of this characteristic (which provides other benefits such as straight-line tracking and planning), Coxswains must be aware of the boat's turning capabilities

NOTE

High-speed maneuvers utilized in pursuit operations require advanced skills to perform safely. These skills are a requirement for the Non-Compliant Vessel Pursuit Coxswain Competency.

Head Seas

D.3. Limiting factors

Traveling into head seas does not present any problems to the SPC-SW if the boat is properly trimmed and being operated within its operational parameters.

D.4. Buoyancy

The primary consideration when advancing in head seas is to maintain forward momentum and keep the bow into the swell. The buoyant construction of the boat allows it to ride up over oncoming seas.

When operating at or near the maximum sea limiting factor, the Coxswain must use both hands to operate the steering and throttle to keep the bow from burying into the seas. SPC-SW Coxswains shall avoid breaking seas.

Taking larger head seas slightly off of either bow can create a more comfortable ride, as the boat may proceed more gently off the back of the wave instead of slamming violently. The speed and angle of approach will have to be adjusted as needed for the optimum ride. This is sometimes referred to as quartering the seas, which is not to be confused with taking a following sea on the quarter.

Beam Seas and Following Seas

D.5. Beam seas

Whenever possible, the Coxswain should avoid steering a course parallel (broadside) to heavy swells. Tack across the swells at a 30° to 40° angle. If necessary, steer a zigzag course, making each leg as long as possible, and adjust the boat speed for a safe and comfortable ride. Seas directly off the beam of the boat can cause adverse rolling conditions.

When transiting parallel to the seas, the boat will tend to ride the contour of the wave surface. This means that the boat's vertical axis will remain perpendicular to the surface on which the boat is operated. A wave face of 20° will cause a 20° heel.

D.6. Following seas

Following swells up to 4 FT can be safely negotiated as long as the boat remains stable as it travels down the front of the swell. Powering over the crest of a wave can cause the bow to bury into the back of the next wave and cause extensive damage. In bad weather, SPC-SWs are relatively safe running before the sea due to their speed. If caught in breaking seas, this advantage is used to ride the back of the waves while adjusting speed as required.

NOTE

Extreme caution should be exercised when operating in following swells (Refer to: *Section 5.B.2.b, Operating in Following Seas*).

Effects of Wind

D.7. Maneuverability

In calm or negligible wind and seas, the SPC-SW responds well using standard twin-screw operating practices. In stiff winds, several design features combine to make handling this boat challenging. With the majority of weight and the deepest draft aft, the bow is very susceptible to the effects of the wind. When weather curtains are down, the boat is highly susceptible to the effects of the wind. Moderate winds may have an effect on maneuverability and can often be the predominant environmental factor in maneuvering situations. In some cases, it can be difficult to recover and turn the bow into the wind at slow speeds.

Station Keeping

D.8. Navigational orientation

The SPC-SW is capable of keeping station on an object or vessel utilizing the installed radar and GPS systems. However, the Coxswain of the craft must manage the effects of environmental forces to keep station. The Coxswain should be aware of:

a) Maintaining distance, position and aspect with respect to another vessel or object.

b) Formulating a technique for matching craft drift rate with other vessel and then overcoming that vessel.

c) Developing a safe escape route to get clear of a vessel or object.

d) Utilizing techniques to safely pace the SPC-SW to another vessel and maneuver around it.

e) The boat tends to work well with its stern to the wind. If stern-to station keeping is not an option, the operator must use extra care to counteract environmental factors.

Section E. Operating with Helicopters

Introduction

The SPC-SW was not designed to conduct helicopter hoisting operations and presents many safety obstacles. Therefore, conducting helicopter training on this platform is **prohibited**.

In the event of an extreme emergency requiring helicopter hoists from a SPC-SW, crewmembers shall rely on knowledge gained from qualification tasks associated with boat crewmember training and appropriate operational risk management (ORM).

In the event of an emergency requiring a helicopter hoist, the on-scene helicopter pilot shall provide appropriate instruction for a safe hoisting evolution.

NOTE

Crewmembers on boats less than 40 FT in length are only required to possess knowledge of helicopter operations for qualification purposes. Always refer to the *U.S. Coast Guard Boat Operations and Training Manual, Volume II*, COMDTINST M16114.33 (series) for current qualification requirements.

Section F. Anchoring

Introduction

The SPC-SW does not often drop anchor. However, the boat is fitted with an anchoring system designed for use when the boat must stand by a location or in an emergency.

WARNING

If the anchor line fairlead is from any point other than the bow, there is the potential for a tripping hazard and possible capsize. Never anchor from the stern.

WARNING

Standing on top of the anchor locker while working the anchor bitt may cause a person to fall overboard. Personnel should stand on the forward deck when working the anchor bitt.

NOTE

Anchoring procedures are described in the *Boat Crew Seamanship Manual*, COMDTINST M16114.5 (series).

F.1. Anchoring the boat

The anchor locker at the bow contains a 7-lbs Fortress anchor, 9 FT of ⅜ inch stainless steel chain and 150 FT of 2¼ inch circumference double braided nylon line.

Take the following steps to safely anchor the boat:

Step	Procedure
1	Open the anchor locker hatch and release the anchor line reel locking mechanism.
2	Lead the chain through the hinged bulkhead fitting on the aft bulkhead of the anchor locker and shackle the chain to the anchor.
3	As directed by the Coxswain, the anchor should be dropped over the side well clear of the boat.
4	Once the anchor is tending “up and down”, the Coxswain should back down until the desired amount of scope is attained. Secure the anchor line to the forward bitt. The Coxswain can now back down to set the anchor.

F.2. Weigh anchor

Take the following steps to safely weigh anchor:

Step	Procedure
1	Position one crewmember at the forward bitt. As the Coxswain moves the boat slowly forward, the crewmember take up the slack in the line.
2	Once the anchor is at “short stay”, the anchor line should be secured at the forward bitt.
3	Crewmembers can then attempt to manually break the anchor free from the bottom. If unable to do so, the Coxswain should move the boat slowly forward until the anchor breaks free.
4	Once free, crewmembers can pull the remaining anchor line and the anchor onboard.
5	When the anchor is onboard, the Coxswain should take up a stable course so that the crewmembers can safely stow the anchor and ground tackle.
6	Once the line is stowed, tighten the anchor line reel lock and secure the anchor locker hatch and hinged bulkhead fitting.

Section G. Towing

Introduction

Towing a vessel requires a high degree of awareness of all potential hazards, as well as full knowledge of the capabilities and limitations of the particular components within the towing operation. The safety of your crew and the crew of the towed vessel is more important than property.

WARNING

Due to their limited size and hull design, SPC-SWs are more susceptible to tripping. A boat is said to be tripping when it is towed sideways by an opposing force on its own towline. There is imminent danger that a boat will capsize when in a tripping situation. If your boat is caught in a tripping situation, the Coxswain must attempt to maneuver to position the stern back under the towline; or sever the towline at the bitt.

CAUTION !

Weather curtains must be rolled up for towing operations.

NOTE

Towing procedures are described in the *Boat Crew Seamanship Manual*, COMDTINST M16114.5 (series).

G.1. Angular momentum

Overcoming angular momentum can be far more hazardous on smaller non-displacement hulls such as the SPC-SW. When changing the direction of the tow, the towed vessel will develop angular momentum; the vessel's heading begins to change and it wants to keep changing in that same direction. Attempts to correct angular momentum can create a tripping hazard. Coxswains need to anticipate how the momentum will affect the towed vessel's motion and apply an offsetting force early and gradually.

G.2. Alongside towing

The height of the cabin and the width of the canopy make the SPC-SW canopy vulnerable to damage when coming alongside another vessel. Sea state, location of installed rub rails and the flare of the other vessel's hull increases the likelihood of damage if the two vessels roll towards each other. A thorough risk assessment, including asset selection, is essential to reduce the potential of personnel injury and property damage.

CAUTION

When going alongside a vessel with a high freeboard, rig fenders along the cabin's handrail to prevent damage to the cabin.

G.3. Approaches The prevailing winds and seas can greatly affect the ability to safely approach and take another vessel in tow. Moderate winds may have an effect on maneuverability and can often be the predominant environmental factor in maneuvering situations. In some cases, it can be difficult to recover and turn the bow into the wind at slow speeds.

Section H. Securing Procedures

Introduction

Once a mission is complete, it is essential that boat equipment be correctly secured to enhance subsequent equipment performance and equipment longevity. Take the following steps, in the given order, to secure the boat properly and to prepare it for the next mission:

Step	Procedure
1	Secure all non-essential electrical and electronic gear.
2	Ensure all equipment necessary to moor the boat is available on deck.
3	If necessary, remove masts and lower the antennas.
4	Idle and stop engines.
5	Secure all non-essential breakers and switches on the 12 VDC power panel.
6	Raise the engines out of the water when the boat is moored for prolonged periods of time.
7	Turn the electronics battery and starting battery switches OFF.
8	Secure all pyrotechnics, weapons and ammunition as directed by U.S. Coast Guard instruction or station operating requirements.
9	Check and refill all machinery fluid levels.
10	Refuel the boat.

NOTE

Keeping the boat clean and neat is very important to control corrosion. Having aluminum in contact with dissimilar metal, particularly a copper alloy, can cause major corrosion problems. Something as small as a penny left in the bilge can cause serious damage. Maintaining corrosion control is the responsibility of everyone in the crew.

NOTE

The mission is not complete until the boat is ready for the next mission.

Chapter 7
Emergency Procedures

Introduction

Responding to equipment casualties and emergencies aboard the SPC-SW should be second nature to all members of the crew. The ability of crewmembers to take immediate action to control emergency situations is critical to prevent a bad situation from getting worse. While every event is different, step-by-step procedures help gain control of the casualty and aid in troubleshooting. Each crewmember should mentally rehearse the procedures each member of the crew would follow during any operational casualty. Teamwork is the common thread that allows the crew to succeed.

The first step in responding to all casualties is to protect the immediate safety of all crewmembers and to communicate the nature of the casualty to the crewmembers. It is the Coxswain's responsibility to keep the Operational Commander informed of all emergencies encountered during the operation of the boat.

The Coxswain and crew should work together to determine if equipment casualties can be safely repaired while underway. The Coxswain must decide whether a casualty has impacted the ability of the boat and crew to complete the mission. The Coxswain should not make the decision in a vacuum; input from other crewmembers and the Operational Commander should be used to determine whether to continue with the mission. The following factors should be considered:

	Factors
1	The safety and physical condition of the crew and boat.
2	Equipment limitations due to the casualty.
3	Current and forecasted weather and sea conditions.
4	The urgency of the mission.

In this chapter This chapter contains the following sections:

Section	Topic	See Page
A	Capsizing	7-3
B	Collision With Submerged Object (or Bottom)	7-4
C	Steering Casualty (Hydraulic)	7-5
D	Steering Casualty (Electrical)	7-6
E	Running Gear Failure	7-7
F	Engine Room Fire	7-8
G	Fire in the Auxiliary Machinery Compartment	7-9
H	Loss of Control of Engine RPM	7-10
I	Loss of Fuel Oil Pressure	7-11
J	Loss of Lube Oil Pressure	7-12
K	Engine High Water Temperature	7-13
L	Low Voltage Alarm/Loss of Electrical Charging System	7-14
M	Flooding	7-15
N	Hard Grounding	7-16
O	Damage to Foam Collar	7-18
P	Loss of Power to Communications/ Navigation Equipment	7-19
Q	Generator Emergency Procedures	7-20

Section A. Capsizing

A.1. Symptom(s)

The SPC-SW is a fast, highly maneuverable platform, capable of performing a variety of missions. With proper boat handling and by avoiding operating in surf and extreme seas, it is unlikely the boat would capsize.

A.2. Actions

If the boat is bottom side up, take the following actions:

Step	Action
WARNING	The canopy and weather curtains provide protection in a maritime environment. However, they also raise concerns of crew safety and egress in the event of capsizing. Even with the curtains closed, water will immediately fill the area under the canopy.
1	Egress by cutting the side curtain with a knife.
2	Ensure personnel flotation device is secure.
3	Inflate personnel flotation device, if required
WARNING	Depending on the situation it may require crewmembers to get clear of the boat prior to inflating their PFD.
4	Swim clear of the boat.
5	Activate Personal Locator Beacon (PLB).
6	If nighttime, activate strobe/Personnel Marker Light (PML).
7	Account for all crewmembers.
8	Try to determine if the EPIRB has floated clear of the hull and has deployed.
9	Stay as close to the boat as possible. If possible, climb back atop the capsized hull to aid in search and rescue efforts.
NOTE	After capsize, if possible climb atop the hull. The boat is inherently buoyant even after capsize. Boat is designed to remain afloat with crewmembers on it in capsize position.

Section B. Collision With Submerged Object (or Bottom)

B.1. Symptom(s)

The boat strikes a submerged object or temporarily runs aground.

B.2. Actions

Take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Determine what was hit, where the object is located, and if it can still be seen.
4	Verify current position, depth of water, evaluate situation and notify the Operational Commander.
5	Crewmember checks bilges for flooding or obvious damage.
6	Crewmember rig the anchor, if directed by Coxswain.
7	Crewmember checks outboards for obvious damage.
8	Crewmember checks for proper cooling water circulation at each of the outboard cooling water flow indicator.
9	Coxswain conducts steering checks for damage or limitations.
10	Coxswain will check engine RPM in both neutral and engaged at various speeds while crewmember is checking for vibration/flooding and to assess damage to propulsion system.
11	Return to unit at reduced speed and/or single engine, if warranted, to prevent additional damage or vibration.
12	Coxswain coordinates with the Operational Commander for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operation.
NOTE	The boat should be trailered to determine extent of damage; especially if there is a vibration.

Section C. Steering Casualty (Hydraulic)

C.1. Symptom(s)

The helm turns in either direction with sluggish or no response of the outboards.

C.2. Actions

When a partial or complete loss of steering control occurs, take the following actions.

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Verify current position, evaluate situation and notify Operational Commander.
4	Check for steering fluid leaks at the two outboard steering cylinders, in the engine well and the bilge, and the front and back sides of the helm pump.
5	Crewmember rig the anchor, if directed by Coxswain.
6	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section D. Steering Casualty (Electrical)

Not applicable on this platform.

Section E. Running Gear Failure

E.1. Symptom(s)

Engine RPM increases but does not correspond to an increase in the hull's speed.

E.2. Actions

When the outboard engine gear fails, take the following action:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Verify current position, evaluate situation and notify Operational Commander.
4	Crewmembers should check the sea aft of the transom for any visible oil sheen.
5	Trim up engines and check lower units and props.
6	Coxswain attempt to put engine in gear while crewmember listens for grinding or vibrations.
7	Coxswain report status of casualty to the Operational Commander.
8	Return to unit at reduced speed and/or single engine, if warranted, to prevent additional damage or vibration.
9	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section F. Engine Room Fire

F.1. Symptom(s)

Smoke is sensed by sight or smell coming from the outboard engine.

F.2. Actions

When presence of fire is confirmed, take the following actions.

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Verify current position, evaluate situation and notify Operational Commander.
4	Coxswain secure engines, verify position.
5	Stop fuel to both engines using the fuel cutoff valves at either the fuel filters in the bilge or at the cutoff valves at the fuel tank.
6	Combat fire using portable fire extinguisher.
7	Crewmember secures all non essential electrical power breakers (all except VHF-FM radio) with Coxswain concurrence.
8	Crewmember rig the anchor, if directed by Coxswain.
9	Establish fire watch, with portable fire extinguisher.
10	Coxswain coordinate with Operational Commander for tow or other assistance, emphasizing crew safety.

Section G. Fire in the Auxiliary Machinery Compartment

Not applicable on this platform.

Section H. Loss of Control of Engine RPM

H.1. Symptom(s)

Engine fails to respond properly to throttle control.

H.2. Actions

Identify the cause, prevent further damage, and take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	If engine RPM can not be reduced, secure engine while in gear by pulling the engine kill switch.
4	Verify current position, evaluate situation and notify Operational Commander.
5	Check throttle and shift control cable runs.
6	Check throttle cables and arm on engine.
7	If engine fails to secure, stop fuel to both engines using fuel cutoff valves.
8	Crewmember rig the anchor, if directed by Coxswain.
9	Return to unit at reduced speed and/or single engine, if warranted, to prevent additional damage or vibration.
10	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section I. Loss of Fuel Oil Pressure

I.1. Symptom(s)

The SPC-SW experiences erratic or unstable RPM or engine stops completely.

I.2. Actions

Take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Verify current position, evaluate situation and notify Operational Commander.
4	Crewmember rig the anchor, if directed by Coxswain.
5	Check fuel tank level.
6	Crewmember check bilge for fuel.
7	Check all fuel cutoff valves to ensure that they are open.
8	Secure engines.
9	Check the primary fuel filters for accumulated sediment and water in the bowls. Drain water or sediment, if required.
10	Check engine mounted fuel filter and water separator for signs of contamination.
11	Check the entire fuel system for obvious leaks.
12	Return to unit at reduced speed and/or single engine, if warranted, to prevent additional damage or vibration.
13	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section J. Loss of Lube Oil Pressure

J.1. Symptom(s)

The alarm sounds and the green lube oil pressure light turns OFF on the ignition control panel.

J.2. Actions

Take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
NOTE	If oil pressure becomes low, the engine speed will gradually decrease automatically. Engine RPM will not increase above idle until oil pressure returns to normal.
NOTE	The lube oil alarm is variable, which means that at any given engine RPM, the oil pressure must be within a certain range or the alarm will sound. The lube oil alarm may be directly related to engine temperature; an overheating engine may set the lube oil alarm off.
2	Coxswain immediately secure the affected engine.
3	Notify crew of casualty.
4	Verify current position, evaluate situation and notify Operational Commander.
5	Crewmember rig the anchor, if directed by Coxswain.
6	Crewmember should check the sea aft of the transom for any visible oil sheen.
7	Allow oil to drain to sump for several minutes, then crewmember check the engine lube oil level.
8	If the cause is not correctable, do not restart the engine.
9	Return to unit at reduced speed on a single engine, if warranted, to prevent additional damage.
10	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section K. Engine High Water Temperature

K.1. Symptom(s)

The alarm sounds and the red engine high temperature light illuminates on the ignition control panel.

NOTE

If the engine overheat alarm sounds, the engine speed will automatically be reduced and the engine will stop after 20 seconds.

K.2. Actions

Take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Determine which engine overheated and check for cooling water flow at the cooling water flow indicator.
4	Secure the engine that has overheated.
5	Verify current position, evaluate situation and notify Operational Commander.
6	Crewmember rig the anchor, if directed by Coxswain.
7	Check engine cover with the back of the hand to ascertain any abnormal temperature.
8	Check around engine cover for evidence of steam.
9	Tilt engine forward and check cooling water intake screen for obstructions.
10	Return to unit at reduced speed on a single engine, if warranted, to prevent additional damage.
11	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section L. Low Voltage Alarm/Loss of Electrical Charging System

L.1. Symptom(s)

A low voltage reading on the voltmeter and/or the alarm sounds and the red abnormality in charging system light illuminates on the ignition control panel.

L.2. Actions

Take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty.
3	Verify current position, evaluate situation and notify Operational Commander.
4	Secure effected engine, prior to checking alternator belt.
5	Check condition of alternator belts for damage, slippage and proper tension.
6	Check electrical connections at the alternator.
7	Check electrical connections at all battery connections.
8	Secure all non-vital equipment at the 12 VDC breaker panels.
9	Establish secondary communications with station (handheld portable VHF-FM radio) in case primary power is lost.
10	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section M. Flooding

M.1. Symptom(s)

Bilge pump(s) automatically activate and/or degraded boat handing from added weight.

M.2. Actions

Take the following actions:

Step	Action
1	Notify crew of casualty.
2	Verify current position, evaluate situation and notify Operational Commander.
3	Crewmembers should attempt to find the cause and take corrective actions necessary to control or stop the flooding.
4	Crewmember rig the anchor, if directed by Coxswain.
5	Activate bilge pump(s) as required.
6	After damage has been assessed, determine whether it is safe to proceed with the mission or return to the unit.

Section N. Hard Grounding

N.1. Symptom(s)

The SPC-SW hits bottom and becomes hard aground (unable to initially float free).

N.2. Actions

Assess the resulting damages; take the following actions:

Step	Action
1	Reduce engine RPM on both engines, and place engines in neutral.
2	Notify crew of casualty and assess condition of crew.
3	Verify current position, evaluate situation and notify Operational Commander.
4	Crewmember inspect bilge for obvious flooding or damage.
5	Crewmember check for proper engine cooling water circulation. Secure engine if cooling is inadequate.
6	Crewmember rig the anchor, if directed by Coxswain.
7	Crewmember takes depth sounding all around the boat. Coxswain determines deepest water, extent of grounding, and potential for underwater damage.
8	Consider present and future state of tide, current or other weather conditions with regard to re-floating or salvage operations.
9	Coxswain determines safest direction to deep water and method for extracting boat safely with least damage.
10	Conduct checks of propulsion system integrity prior to attempting re-floating or salvage. Take caution to reduce further damage.
11	Conduct check of steering system integrity. Check for limitations. Take caution to reduce further damage.
12	Coxswain maneuver into safe water and conducts steering check. Identify limitations and isolate areas of damage.

13	Coxswain will check engine RPM in both neutral and engaged at various speeds.
14	Return to unit or appropriate haul-out facility at reduced speed to prevent additional damage, if necessary.
15	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section O. Damage to Foam Collar

O.1. Symptom(s)

Obvious rips and tears to collar.

O.2. Actions

If damage to the collar occurs, take the following actions:

Step	Action
1	Notify crew of casualty.
2	Verify current position, evaluate situation and notify Operational Commander.
3	Crewmembers check for obvious damage to the collar and the hull and report findings.
4	After damage has been assessed, determine whether it is safe to proceed with the mission or return to the unit.

Section P. Loss of Power to Communications/ Navigation Equipment

P.1. Symptom(s)

VHF-FM, Radar, or GPS system(s) fail to operate properly.

P.2. Actions

If there is no power to operate the communications/navigation equipment, take the following actions:

Step	Action
1	Notify crew of casualty.
2	Verify current position, evaluate situation and notify Operational Commander using a handheld portable VHF-FM radio.
3	Coxswain direct crewmembers to investigate for cause of casualty.
4	Crewmembers check the engines and verify the condition of the alternator belts and that the electrical connections to the alternator are secure.
5	Check battery voltages using engine gauges.
6	Crewmembers ensure that all SINS switches are on and that no circuit breakers are tripped or fuses are blown.
7	Crewmembers report all findings to Coxswain.
8	Secure all non-vital equipment at the 12 VDC breaker panels.
9	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.

Section Q. Generator Emergency Procedures

Not applicable on this platform.

Appendix A. Outfit List & Stowage Plan

Introduction

This appendix is the standard stowage plan for the SPC-SW outfit. No deviation from this list is authorized, except in the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs, units are authorized to temporarily carry this extra equipment.

NOTE

This authorization is on a case-by-case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

In this Appendix

This appendix will contain the outfit list and stowage plan for the boat when provided by the USCG.

Item	Quantity
Anchor Locker	
Fortress 7 lbs Anchor (installed in bracket)	1 each
$^{3}/_{8}$ inch 316 SS Anchor Shackle w/Captive Pin	1 each
$^{3}/_{8}$ inch x 9 FT 316 SS Anchor Chain	1 each
316 SS Jaw to Jaw Swivel	1 each
$^{3}/_{4}$ inch 316 SS Anchor Line Thimble (spliced in eye)	1 each
Anchor Line, $2^{1}/_{4}$ inch Circumference DBN x 150 FT	1 each
Skiff Hook	1 each
Mooring Lines, 2 inch Circumference DBN x 30 FT	6 each
Fenders, Cylindrical $5^{1}/_{2}$ inch Diameter 20 inch Length	2 each
Pyrotechnics Storage Container	1 each
Item	**Quantity**
Main Deck	
Fire Extinguisher Type 1-A,10-B:C (one mounted under the forward portside crew seat at the console, one mounted under the starboard gunwale, forward of the rescue recess)	2 each
406 MHz Category II EPIRB w/GPS (Mounted to canopy top overhead, starboard side)	1 each
Kill Switch Lanyard, (spare stowed at Coxswain station overhead)	2 each
Boat Hook, Telescoping, 8 FT (mounted forward side of console above windshield in clamps)	1 each
24 inch Throwable Life Ring (aft face of anchor locker in bracket)	1 each
Life Ring Strobe Light (attached to life ring)	1 each
Snap Hook for Marker Light Lanyard	1 each
National Ensign (on removable flag mast)	1 each
CG Ensign (on removable flag mast)	1 each
Throw Bag	2 each
Snap Hook (attached to throw bag)	2 each
Towline $2^{1}/_{4}$ inch Circumference DBN x 150 FT (attached to towline reel)	1 each
Tow Reel Cover (on towline reel)	1 each
Survival Knife	1 each
Dive Ladder (in engine well)	1 each

Item	Quantity
Upper Forward Console Lockers	
Gun Ammo Storage	
Flashlight (w/D size batteries)	2 each
Portable Signal Air Horn, Push Button, w/8 ounce Propellant	1 each
8 ounce Propellant for Portable Signal Horn, Spare	1 each
Portable Hand Bilge Pump, 5 gpm	1 each
First Aid Kit	1 each
Hearing Protection	2 each
Hearing Protection, Disposable Foam Inserts	1 box
Navigation Kit	1 each
Lower Forward Console Lockers	
Drive Ladder Bracket	1 each
Item	**Quantity**
Console Locker	
Binoculars, 7 x 50 Marine Waterproof	2 each
Bucket	1 each
Spanner Wrench, 6 inch	1 each
Spanner Wrench, 4 inch	1 each
Window Guard/Screen	1 each
Rescue Sling	1 each
Tool Kit	1 each

Item	Quantity
Nav Kit Containing: (Required Inland and Near Coastal only.)	1 kit
Briefcase With CG Logo	1 each
Charts (as required per AOR)	various
Pencils	5 each
Pencil Sharpener	1 each
Stop Watch	1 each
Search Pattern Wheel	1 each
Parallel Plotter	1 each
Dividers	1each
Slide Rule, Nautical	1 each
Anemometer, Hand Held	1 each
Penlight w/Red Lens	1 each
Tide Book (pages as required)	various
Coast Pilot (pages as required)	various
NAVRULS	1 each
Light List (pages as required)	various

Appendix B. Time Compliance Technical Orders (TCTOs)

Introduction This appendix contains a list of authorized TCTOs for the SPC-SW.

NOTE For a complete breakdown of the Engineering Change Number, see the *Naval Engineering Manual, Chapter 41*, COMDTINST M9000.6 (series).

In this appendix This appendix contains the TCTOs for the SPC-SW.

Topic	See Page
Time Compliance Technical Orders (TCTOs)	B-2

Time Compliance Technical Orders (TCTOs)

TCTO Number	Subject	Date

Appendix C. Materiel Inspection Checklist

Introduction

This appendix is meant to be a systematic means to inspect a SPC-SW and to ensure the entire boat is prepared to meet mission demands.

This checklist may be locally reproduced.

In this appendix

This appendix contains the following information:

No.	Area	See Page
I	Hull	C-3
II	Deck	C-4
III	Bilge	C-6
IV	Systems	C-7
V	Outboard Engines and Steering Actuator	C-8
VI	Console	C-10

Boat Number: _____

Station: _____

Date: _____

References:

1) *SPC-SW Operator's Handbook*, COMDTINST M16114.44 (series)
2) *Naval Engineering Manual*, COMDTINST M9000.6 (series)
3) *Coatings and Color Manual*, COMDTINST M10360.3 (series)
4) *Coast Guard Rescue and Survival Systems Manual*, COMDTINST M10470.10 (series)

Inspection Standards:

The following inspection standards apply to the SPC-SW hull, machinery, equipment, outfit, and all installed systems and accessories:

1) Operates smoothly and correctly.
2) Free of grease, oil, rust, and corrosion.
3) All fluid levels and pressure readings are within tolerances.
4) Protective coatings applied correctly and neatly.
5) Free of rips, tears, abrasions, and cracks.
6) Outfit and equipment correctly installed, adjusted and stowed to specifications and design (see *Appendix A*).
7) Labels, test dates, and placards properly indicated.
8) Free of non-standard/unapproved installations or equipment.
9) Maintained according to current manufacturer's guidelines and Commandant Directives.

Inspection Guidelines:

Inspections require a minimum of ***two*** personnel, preferably one Boatswain's Mate and one Machinery Technician, who possess extensive SPC-SW experience and a strong working knowledge of the contents of all references listed above. This Materiel Inspection Checklist is only applicable to boats in a "Bravo" or "Ready for Sea" condition. Each item on the checklist should be judged against applicable standards and references. Additional discrepancies uninstalled TCTOs, etc. should be listed.

Inspected By: _____ **Date:** _____

Inspected By: _____ **Date:** _____

I. Hull

ITEM	SAT	UNSAT	REMARKS
Hull (visible surfaces)			
Foam Collar			
Rubber Rub Rails			
Lettering/Numbering/Decals			
Waterline			
Bow Eye			
Anode			
Transom Steps			
Self-Bailing One-Way Scuppers			

REMARKS:_____

_____

_____

II. Deck

ITEM	SAT	UNSAT	REMARKS
Deck Plates (Hardware and Sealant)			
Deck Covering (Non-Skid)			
Console and Canopy			
Deck Access Covers			
Engine Well Platform			
Forward Bitt			
Cleats			
Lifting Eyes			
Quarter Bitts			
Tow Bitt			
Deck Tie Downs			
Gun Mounts			
Anchor Locker			
Console Forward Lockers			
Console Forward Locker Seat			
Console Locker			
Transom Lockers			
Bilge QAWTH			
EPIRB			
Radio Antennas			

ITEM	SAT	UNSAT	REMARKS
Dive Ladder			
Horn			
Radar Antenna			
GPS Antennas			
Blue Strobe Lights			
Loudhailer Speaker			
Floodlights			
Side Navigation Light (Red/Green)			
Anchor Light			
Towlight Mast			
Searchlight			
Weather Curtains System			
Windshield			
Windshield Wipers			

REMARKS:_____

_____

_____

III. Bilge

ITEM	SAT	UNSAT	REMARKS
Depth Sounder Transducer			
Electric Bilge Pumps and Float Switches			
Hull Drain Plug			

REMARKS:_____

IV. Systems

ITEM	SAT	UNSAT	REMARKS
Crew Seats			
Battery Switches			
Batteries and Battery Locker			
Battery Switch 12VDC Breaker Panel			
12 VDC Breaker Panel			
12 VDC Bus Bars			
Deck and Cabin Lighting			
Trim Tabs			
Jacking Plate			
Jacking Plate Hydraulic Pump			
Anchor, Line and Reel			
Tow Line and Reel			
Primer Bulbs (Fuel hose – Inline)			
Fuel Tank Level Sensor			
Fuel Filters (Racor)			
Fuel Fill/Vent			
Fuel Fill and Vent Lines			
Fuel Cutoff Valves			
Portable Fire Extinguishers			

REMARKS:_____

_____

_____

V. Outboard Engines and Steering Actuator

ITEM	SAT	UNSAT	REMARKS
Engine			
Engine Cover			
Oil Dipstick			
Oil Fill Cap			
Propeller			
Engine Attachment Points			
Cooling Water Flow Indicator			
Cooling Water Intakes			
Anodes			
Starter			
Alternator			
Belts			
Hoses			
Water Separator Bowl			
Wiring			
Control Cables and Linkage			
Steering			
Helm Pump			
Steering Cylinders			
Attaching Hardware			

ITEM	SAT	UNSAT	REMARKS
Tie Rod			
Hydraulic Lines and Fittings			

REMARKS:_____

VI. Console

ITEM	SAT	UNSAT	REMARKS
Ignition Panels (Start Keys, Engine Kill Switch Clips, and Lanyards)			
Communications/Navigation Equipment			
VHF Radios			
Radar			
Depth Sounders			
Microphones			
Engine Throttle Control			
Steering Wheel			
Power Panels and Switches			
Defroster Control			
Searchlight Control			
Engine Gauges and Warning Lights			
Interior Lights			
Windshield Wipers and Washer Controls			
Towlight Mast			

REMARKS:_____

_____

_____

Appendix D. Disabling Casualties

Introduction

This appendix contains disabling casualties for the SPC-SW. Refer to *Chapter 5, Section A* of this handbook for steps to follow if any of these casualties occur.

In this appendix

The disabling casualties list covers the following subject areas:

Topic	See Page
Engine Parameters	D-2
Engineering System Components	D-2
Boat Outfit	D-3
Electronics/Navigation	D-3
General Materiel	D-3
Trailer	D-3

Engine Parameters

1) Engine Lube Oil Pressure
   a) Green Engine Oil Pressure Light extinguishes on ignition panel, engine RPM is automatically limited to 1800 RPM.
2) Engine Cooling Water
   a) Red overheating indicator illuminates on the ignition panel, engine speed is automatically reduced to 1800 RPM. If condition continues for another 20 seconds, the engine automatically shuts down.
3) Fuel filter separator alarm activated.

Engineering System Components

1) Engine fails to start.
2) Uncontrollable overheating.
3) Inoperable visual or audible alarms.
4) Metallic/non-metallic noise: metal-on-metal/fuel-knock/bearing/clicking.
5) Excessive engine vibration.
6) Any gasoline fuel system leak.
7) Engine oil level empty (no oil on the dipstick).
8) Any engine wiring insulation damaged or chafed resulting in an exposed conductor.
9) Engine surging (over 50 RPM).
10) Engine over speed (over 6000 RPM).
11) Loss of engine control.
12) Continuous electrical breaker trip.
13) Continuous failure of outboard engine fuses.
14) Steering system inoperative.
15) Engine mount hardware loose or missing.
16) Loose/missing propeller coupling nut.
17) Loose/disconnected engine control hardware.
18) Loose/disconnected steering actuator hardware.
19) Electrical arcing and sparking.
20) Odor of insulation overheating.

Boat Outfit	1) Missing engine kill switch activation clip and lanyard. 2) Missing spare engine kill switch lanyard. 3) Portable fire extinguisher missing or unserviceable.
Electronics/ Navigation	1) No electronic means of signaling distress (i.e., no radio, EPIRB not installed or unserviceable, etc.). 2) 12-Volt system will not energize.
General Materiel	1) Hull/transom plate breach below the waterline.
Trailer	1) Truck and complete hitch system (hitch, ball mount, and ball) not rated at 10,500 lbs or greater, rating must be marked by manufacturer's sticker or stamp.

This page intentionally left blank.

Appendix E. Restrictive Discrepancies

Introduction

This appendix contains restrictive and major discrepancies for the SPC-SW. Refer to *Chapter 5* of this handbook for steps to follow if any of these casualties occur.

Engine and Boat Systems

1) Engine performance:
   a) Minimum RPM of 4500 for two minutes.
   b) Overheating indicator illuminates, alarm sounds.
2) Any leaks
   a) Outboard cooling water components.
   b) Outboard engine lubrication system components.
   c) Steering actuator help pump, hoses or fittings.
3) Inoperable tilt/trim system.
4) Inoperable trim tabs.
5) Inoperable fuel gauge.
6) Installed bilge pump missing/inoperative

Boat Outfit

1) Missing anchor/line/shackles.

Electronics/ Navigation

1) Navigation lights inoperative or displaying improper characteristics.
2) Depth sounder inoperative.
3) GPS inoperative.
4) Radar inoperative.
5) Magnetic compass affected as described below:
   a) Deviation table missing.
   b) Compass deviation greater than 5°.
6) Electronics:
   c) One VHF transceiver inoperative.
7) Both loudhailer and horn inoperable.

General Material and Safety	1) Holes/cracks in the hull/transom plate above the waterline. 2) Portable fire extinguishers not secured in bracket. 3) Missing non-skid section (8½ x11”). 4) Missing boat crew survival vest.
Trailer	1) Damage or deformation of the wheel rim flange which results in exposure of the tire bead (sealing surface) and/or damage or deformation which warps the circular shape of the rim. 2) Brake rotor damage. 3) Tire air pressure below 40 PSI. 4) Tire tread depth less that ⅛. 5) Brake/tail extinguished or one or more LEDs extinguished in the light. 6) Missing/loose lug nut(s). 7) Missing or flat, improper size, damaged or worn tire(s). 8) Trailer running lights inoperative or wrong characteristic. 9) Any brake fluid leak from the brake system. 10) Brake actuator or back up solenoid inoperative or no fluid. 11) Wheel bearings or brakes have excessive noise or play. 12) Structural cracks. 13) Missing safety wire cables or brake emergency chain. 14) Emergency brake latch fails to operate. 15) Missing tie down straps (4 required/not including winch strap).

Appendix F. Major Discrepancies

Introduction

This appendix contains major discrepancies for the SPC-SW. Refer to *Chapter 5* of this handbook for steps to follow if any of these casualties occur.

Engine and Boat Systems

1) Bilge pump hoses missing hose clamps.
2) Loose/missing fittings, nuts, bolts, brackets, etc.
3) Loose/missing hardware on the engines used for attaching accessories and sensors.
4) Battery terminal loose or corroded.
5) Engine control cables loose.
6) Any loose wire terminal.
7) Fluid levels below minimum required.
8) Zincs corroded more than 50%.
9) Any engine wiring insulation damaged or chaffed, without an exposed conductor.
10) Damage/inoperative locker latch/locks.
11) Any standard boat machinery, with the exception of those listed on the disabling or restrictive list, not operating properly.

Boat Outfit

1) Life ring and/or distress lights (missing/unserviceable).
2) Missing throw line bag.
3) Missing seat belts.
4) Missing mooring lines.
5) Missing/inoperable flashlight.
6) Missing/inoperable boat hook.
7) Missing fenders.
8) Missing/inoperable skiff hook.
9) Missing/inoperable hand bilge pump.
10) Fire Extinguisher PMS not recorded on equipment tag or improperly completed.

Electronics/ Navigation	1) Compass light inoperative. 2) Damaged/inoperative blue light. 3) Expired deviation table. 4) Any standard boat electronics, with the exception of those listed on the restrictive list, not operating properly.
General Material and Safety	1) Improperly repaired damage to hull. 2) Damage to removable mast. 3) Loose/missing/improper fittings, nuts, bolts, brackets, etc. 4) Improperly stored gear (to include non-standard/additional gear). 5) Missing/improperly outfitted first aid kit. 6) Extinguished deck illumination light (interior or exterior). 7) Any standard boat machinery or system, with the exception of those listed on the disabling or restrictive lists, not operating properly.
Trailer	1) Loose, missing, or improper hardware. 2) Brake fluid level low. 3) Nonstandard type tie-down straps. 4) Missing section of DOT reflective tape. 5) Missing/damaged/misaligned bunks. 6) Missing/damaged tire change kit. 7) Tire air pressure 50-65 PSI. 8) Tire air pressure above 80 PSI. 9) Clearance light extinguished. 10) Bearing lubricator damaged or missing. 11) Damaged/missing trailer jack. 12) Damage or deformation of the wheel rim flange which does not result in exposure of the tire bead (sealing surface) 13) Any standard trailer machinery or system, with the exception of those listed on the disabling or restrictive lists, not operating as designed.

Appendix G. Vehicle – Trailer Matching Checklist

Introduction This appendix is meant to help the unit match an appropriate vehicle to a specific towing mission.

NOTE When obtaining weights, units should ensure that vehicles have a "normal" load in them. If a crew of four normally deploys and carries gear with them, then ALL weights should be obtained with the same people in vehicle with the same gear.

In this appendix This section includes the following information:

Topic	See Page
Trailer	G-2
Tow Vehicle	G-2
Hitch System	G-3

Trailer-Truck-Hitch Matching Checklist

Trailer

1. _____ **GROSS TRAILER WEIGHT (GTW):** Obtained from trailer, boat and normal "load" sitting detached from tow vehicle on scales. Boats should be at full fuel level and loaded with whatever gear is normally onboard during trailering operations.

2. _____ **TRAILER TONGUE WEIGHT (TTW):** This is usually obtained from detaching the trailer with normal load from the tow vehicle and weighing only the weight produced by the jack stand or nose-wheel. It is important to have the trailer adjusted to the height that it would be towed at.

Tow Vehicle

3. _____ **BASE CURB WEIGHT (BCW):** This is the weight of the vehicle with fuel and no passengers or cargo. This number can be obtained from the vehicle owner's manual or the manufacturer.

4. _____ **GROSS VEHICLE WEIGHT (GVW):** This is the Base Curb Weight (BCW) plus the weight of any passengers and cargo. To obtain this weight, detach the trailer from the tow vehicle and weigh the vehicle with the passengers and cargo onboard.

5. _____ **GROSS AXLE WEIGHT – FRONT (FRONT GAW):** This is the total weight placed on the front axle. To determine your FRONT GAW, drive your vehicle to a scale and with the trailer attached park only the front wheels of the tow vehicle on the scale. This is your FRONT GAW.

6. _____ **GROSS AXLE WEIGHT RATING – FRONT (FRONT GAWR):** This is the total weight the front axle is capable of carrying. This information is printed on the safety placard located on the driver's door.

7. _____ **GROSS AXLE WEIGHT REAR (REAR GAW):** This is the total weight placed on the rear axle during towing operations. To obtain the REAR GAW place all four wheels of the tow vehicle leaving the trailer wheels off of the scale. From this number, subtract your FRONT GAW. This is your REAR GAW.

8. _____ **GROSS AXLE WEIGHT RATING – REAR (REAR GAWR):** This is the total weight the rear axle is capable of carrying. This information is printed on the safety placard located on the driver's door.

9. _____ **GROSS VEHICLE WEIGHT RATING (GVWR):** This is the maximum allowable weight of the fully loaded vehicle.

10. _____ **GROSS COMBINATION WEIGHT (GCW):** This is the weight of the towing vehicle and fully loaded trailer, including passengers and any cargo.

11. _____ **GROSS COMBINATION WEIGHT RATING (GCWR):** This is the maximum allowable weight of the towing vehicle and fully loaded trailer, including passengers and any cargo. This number is typically found in the owner's manual or through your local dealer.

12. _____ **MAXIMUM TRAILER TOWING RATING (MTTR):** Maximum amount the vehicle is designed to tow. This number is typically found in the owner's manual or through the manufacturer's representative.

Hitch System

13. _____ **HITCH CAPACITY (HC):** This is the weight that the hitch is designed to safely tow. This information is typically found on a plate attached to the hitch frame.

14. _____ **TOW BALL RATING (TBR):** This is the weight that the towing ball is designed to safely handle. It is typically stamped onto the top of the ball.

15. _____ **TONGUE WEIGHT RATING (TWR**): This is the weight that the hitch system is designed to safely support. This number is typically stamped on the hitch frame.

16. _____ **DRAW BAR TONGUE RATING (DBTR**): This is the tongue weight that the draw bar is designed to safely carry. This is typically found stamped on the top of the draw bar.

This page intentionally left blank.

Appendix H. List of Acronyms

Introduction This appendix contains a list of the acronyms used throughout the handbook.

In this appendix This appendix contains the following information:

Topic	See Page
List of Acronyms	G-2

ACRONYM	DEFINITION
AES	Advanced Encryption Standard
AGND	Aground
AIS	Automatic Identification System
AOPS	Abstracts of Operation
AOR	Area of Responsibility
CBP	Customs and Border Patrol
CBP	Customs and Border Patrol
CASREPS	Casualty Reports
DAMA	Demand Assigned Multiple Access
DBN	Double Braided Nylon
DES	Digital Encryption Standard
DGPS	Differential Global Positioning System
DIW	Dead-in-the-Water
DOT	Department of Transportation
DSC	Digital Selective Calling
EPA	Environmental Protection Agency
EPIRB	Emergency Position Indicating Radio Beacon
FFCS	Full Function Crew Station
GPH	Gallons Per Hour
GPS	Global Positioning System
GVW	Gross Vehicle Weight
HF	High Frequency
HP	Horsepower
I/O	Inboard/Outdrive
ICCS	Integrated Crew Communications Systems
ICV	Intercommunicating Fill Valve
kW	Kilowatt
KTS	Knots

ACRONYM	DEFINITION
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LOA	Length Overall
LOS	Line of Sight
MCS	Master Control Station
MLEM	Maritime Law Enforcement Manual
MSST	Maritime Safety and Security Team
NM	Nautical Mile
NSN	National Stock Number
OHIP	Overhead Instrument Panel
ORM	Operational Risk Management
OTAR	Over the Air Re-keying
PFD	Personal Flotation Device
PMS	Preventive Maintenance Schedule
PBL	Personal Beacon Locator
PML	Personnel Marker Light
PPE	Personal Protective Equipment
PQS	Performance Qualification Standard
PSI	Pounds per Square Inch
PWCS	port, waterways, and coastal security
QAWTH	quick acting watertight hatch
RF	Radio Frequency
RFO	Ready for Operations
RPM	Revolutions per Minute
RT	Receiver/Transmitter
SAR	Search and Rescue
SINS	Scalable Integrated Navigation System
SOP	Standard Operating Procedure

ACRONYM	DEFINITION
SPC-SW	Special Purpose Craft – Shallow Water
SPD	Single Point Davit
SOLAS	Safety of Life at Sea
SSB	Single Side Band
STAN Team	Standardization Team
TBCM	Tactical Boat Crew Member
TCOXN	Tactical Coxswain
TCTOs	Time Compliance Technical Orders
TMT	Training Management Tool
UHF-FM	Ultra High Frequency-Frequency Modulated
UNWY	Underway
VAC	Volts Alternating Current
VDC	Volts Direct Current
VHF-FM	Very High Frequency-Frequency Modulated
WAAS	Wide Area Augmentation System
WOT	Wide Open Throttle

Index

A

activation clip, D-3
additional crewmembers, 4-4
additional passenger, 3-29, 4-5
AIS, 2-3, 2-4, 2-27, 3-37, 3-39, 3-44
alarm lamp unit, 3-10, 3-31
alongside tow, 2-20
alternator, 3-16, 3-30, 7-14, 7-19
anchor, 2-6, 2-12, 2-28, 2-29, 3-23, 3-35, 3-45, 7-5, 7-10, 7-11, 7-12, 7-16, A-2, C-4, C-5
anemometer, A-4
anode, 3-17, 3-53, C-4, C-8
antenna, 2-3, 2-4, 2-17, 2-27, 3-42, 3-43, 3-44, 3-63, 3-66, C-5
anti-ventilation plate, 3-9
AOPS, 1-3
AOR, A-4
authority and responsibility, 4-3
auxiliary, 3-33, 3-37, 3-40, 3-45, 3-46, 3-48, 3-50, 7-2, 7-9
Auxiliary Machinery Compartment, 7-2, 7-9

B

ball mount, 3-55, 3-56, D-3
bar, C-7, C-9, G-3
batteries, 2-22, 3-31, 3-32, 3-33, A-3, C-7
battery, 1-3, 2-9, 2-22, 3-9, 3-10, 3-12, 3-15, 3-20, 3-31, 3-33, 3-48, 7-14, 7-19, C-7, F-1
beaching, 3-13, 3-14
beacon, 3-44, H-2
beam, 2-3, 3-36, 3-58, 5-7
beam seas, 5-7
bilge, 2-10, 2-16, 2-30, 3-1, 3-24, 3-25, 3-33, 3-48, 3-49, 5-7, 7-5, 7-8, 7-11, 7-15, 7-16, A-3, C-1, C-6, F-1
binoculars, A-3
bitts, 2-14, 2-20
blue light, 3-35
blue strobe light, 3-33, 3-36
boarding, 2-21
boat crew survival vest, E-2
boat handling, 5-7, 7-3
boat operations, 3-66
boat outfit, 3-11, 3-62, 5-3, A-1
boat specifications, 2-3
brake actuator, 3-57, 3-64, E-2
breakaway lever, 3-57, 3-58
bulkhead, 2-12, 2-29, 3-35
buoy, 2-12
buoyancy, 3-25, 5-7

C

canopy, 2-6, 2-10, 2-11, 2-17, 2-27, 3-35, 3-36, 3-39, 3-42, 3-43, 3-44, 3-45, 3-62, A-2
capsizing, 7-2, 7-3
cargo, 2-3, G-2, G-3
CASREP, 5-2, 5-5
casualty, 1-3, 4-1, 5-2, 5-4, 5-5, 7-1, 7-2, 7-4, 7-5, 7-6, 7-7, 7-8, 7-10, 7-11, 7-12, 7-13, 7-14, 7-15, 7-16, 7-18, 7-19
cathodic protection, 3-53
CBP, H-2
certified crewmember, 4-2
channel, 3-44
chart, 3-39
circuit breakers, 3-37, 3-48, 7-19
cleats, 2-13
CO, 4-4
CO/OIC, 4-4
Coast Pilot, A-4
COMDTINST, 1-3, 4-1, 4-2, 4-3, 4-4, 4-6, C-2
COMDTINST M10470.10, 4-6, C-2
COMDTINST M16114.32, 4-2, 4-4
COMDTINST M16114.33, 4-1, 4-2, 4-4
COMDTINST M16114.4, 1-3
COMDTINST M5000.3, 4-3
COMDTINST M9000.6, 1-3, C-2
compass, 3-37, 3-40, E-1, F-2
configuration control, 1-5
console, 2-6, 2-7, 2-8, 2-10, 2-16, 2-17, 2-22, 2-23, 2-24, 2-26, 3-5, 3-14, 3-19, 3-21, 3-22, 3-24, 3-27, 3-29, 3-31, 3-33, 3-34, 3-35, 3-36, 3-37, 3-38, 3-39, 3-40, 3-41, 3-42, 3-43, 3-44, 3-45, 3-46, 3-47, 3-48, 3-50, A-2, A-3, C-1, C-10
console locker, 2-8, 2-16, 2-17, 2-22, 2-23, 3-21, 3-22, 3-27, 3-31, 3-33, 3-35, 3-36, 3-37, 3-38, 3-39, 3-41, 3-42, 3-43, 3-44, 3-45, 3-46, 3-50
container, A-2
control console, 2-17, 3-5
cooling water, 3-7, 7-4, 7-13, 7-16, E-1

cooling water intake, 3-7, 7-13
corrosion, 3-17, 3-53, C-2
coupler latch, 3-58
Coxswain, 2-24, 2-26, 3-11, 3-28, 3-40, 4-1, 4-3, 4-4, 4-5, 5-3, 5-4, 7-1, 7-4, 7-5, 7-7, 7-8, 7-10, 7-11, 7-12, 7-13, 7-14, 7-16, 7-17, 7-19, A-2
Coxswain console, 3-31
crew requirements, 4-2
crewmember, 4-1, 7-4, 7-5, 7-7, 7-8, 7-10, 7-11, 7-12, 7-16
current, 7-1, 7-4, 7-5, 7-7, 7-8, 7-10, 7-11, 7-12, 7-13, 7-14, 7-15, 7-16, 7-18, 7-19, C-2, H-4

D

DAMA, H-2
danforth, 2-28
dash panel, 3-13, 3-14, 3-31
davit, H-4
deadrise, 2-5
deck, 2-1, 2-5, 2-10, 2-12, 2-15, 2-16, 2-23, 2-30, 3-22, 3-23, 3-24, 3-25, 3-26, 3-29, 3-33, 3-48, A-2, C-1, C-4, F-2
deck drains, 3-26
defroster, 3-33, 3-50, 3-52, C-10
depth of water, 7-4
depth sounder, 2-10, 2-30, E-1
DES, 3-43
dewatering, F-1
DGPS, 3-39, 3-41, 3-42, H-2
diode, H-3
dipstick, 3-8, 3-9, C-8, D-2
directional control, 3-21, 3-36
disabling casualties, 5-2, D-1
displacement, 2-3, 2-4, 2-14
DO, 3-65
draft, 2-3, 2-23, 2-27, 3-18, 3-25
drain, 2-10, 3-8, 3-9, 3-24, 7-11, 7-12
DSC, 3-43

E

ECs, 1-4, B-1, B-2, C-2
egress, 5-3
electrical system, 3-30
electronic equipment, 3-37
engine control, 3-13, D-2, F-1
engine cover, 3-5, 3-7, 3-9, 3-16, 7-13
engine fuel system, 3-4, 3-24
engine kill switch, 3-11, 7-10, D-3
engine lube oil, 3-8, 7-12
engine mount, 3-24, 7-11, D-2
engine mounted fuel filter, 3-24, 7-11
engine oil, 3-8, 3-9, D-2
engine RPM, 3-12, 3-13, 3-19, 7-2, 7-4, 7-5, 7-7, 7-10, 7-17, D-2
engine speed, 3-2, 3-13, D-2
engine warning lights, 3-10
Engineer, 4-5, 7-4
environmental limits, 5-2, 5-5
EPIRB, 3-44, 3-45, 7-3, A-2, C-4, D-3, H-2
Executive Officer, 4-3
Executive Petty Officer, 4-3
exhaust, 3-7, 3-17

F

Facility Manager, 1-1, 1-3, 1-4
fender, 2-11, 3-25
FFCS, H-2
fire extinguisher, 3-47, 7-8, D-3
fire watch, 7-8
flashlight, A-3
flooding, 3-65, 7-2, 7-4, 7-15, 7-16
floodlights, 3-36, C-5
following sea, 5-7
foundation, 3-36
free surface, 3-22, 5-7
freeboard, 2-3
frequency, H-2, H-3, H-4
fuel consumption, 5-6
fuel fill, 2-23, 3-23
fuel filter, 2-10, 3-5, 3-22, 3-24, 7-8, 7-11
fuel injection, 3-6
full function crew station, H-2
fuse panels, 3-16
fuses, 3-16, 3-37, 7-19, D-2

G

gasoline, 2-3, 3-4, 3-22, D-2
gear oil, 3-9
gearshift, 3-13
GPH, 3-48, H-2
GPS, 3-39, 3-42, 3-44, 7-19, A-2, C-5, E-1, H-2
grounding system, 2-27
gun mount, 2-16

H

hand-crank jack, 3-58
handling, 3-55, 4-4, 5-7, 7-3

hatch, 2-6, 2-10
haul-out facility, 7-17
heading, 3-37, 3-39, 3-41, 5-7
height, 3-56, G-2
Helm pump, 2-25, 3-20
hoisting, 2-3
horn, 3-33, 3-39, 3-46, A-3, C-5, E-1
hull construction, 2-5
hydraulic pump, 2-9
hydraulic steering, 2-25, 3-20, 3-21

I

ICCS, H-2
ice, 2-4
ICV, H-2
idle speed, 3-2
ignition system, 3-9
in-line fuses, 3-37
intercom, 3-45

K

key switch, 3-10, 3-11, 3-27
kill switch, 3-11, 7-10, A-2, C-10, D-3

L

lanyard, 3-11, A-2, D-3
launching, 3-13, 3-14, 3-64, 3-65
law enforcement light, 3-35, 3-36
LCD, H-3
LEDs, 3-58
lighting, 3-35, 3-66
lightning, 2-27
lights, 2-17, 3-10, 3-27, 3-33, 3-35, 3-36, 3-37, 3-58, 3-64, C-5, C-10, E-1, E-2, F-1
line handling, 4-4
line reel, 2-6, 2-29
loading, 3-27
lookout, 4-4
LOS, H-3
loudhailer, 3-37, 3-39, 3-45, C-5, E-1
lube oil, 3-8, 7-12
lubrication system, 3-8, E-1

M

machine gun, 3-67
magnetic compass, 3-40, E-1
major hull systems, 2-22
manual relief valve, 3-15
mast, 2-17, 2-18, 2-19, 3-35, A-2, C-5, C-10, F-2
masthead light, 2-17, 3-35
Materiel Inspection Checklist, C-1
MCS, H-3
minimum crew, 4-1, 4-2
MK 16, 2-16
mooring, 2-13, 2-14, 2-20, 3-13, 3-14, A-2, F-1
MSST, H-3
Multi Display Unit, 3-39

N

navigation, 2-17, 2-18, 2-24, 2-26, 3-1, 3-33, 3-35, 3-39, 4-3, 4-4, 7-2, 7-19, A-3, C-10, D-1, D-3, E-1, F-2, H-3
NAVRULS, A-4
noise, D-2, E-2
non-skid, 2-12, 2-17, E-2

O

OHIP, 2-26
OIC, 4-4
operating in beam seas, 5-7
operating in following seas, 5-7
operating parameters, 5-2
operating range, 5-6
operational characteristics, 2-4
OTAR, 3-43
outdrive, H-2
outfit list, 1-1, A-1

P

padeye, 2-13
passenger, 3-29, 3-29
passengers, 3-29, 3-55, 4-1, 4-3, 4-5, G-2, G-3
Performance Data, 5-1, 5-6
PFD, H-3
planing, 2-5, 3-25
PML, 7-3
PMS, 3-64, 5-2, F-1, H-3
polyethylene, 2-5, 2-11, 3-25
positive buoyancy, 5-7
power tilt switch, 3-14
PPE, 4-6, H-3
PQS, H-3
Propeller, C-8
propulsion, 3-1, 3-2, 7-4, 7-16

protective equipment, 4-6, H-3
PWCS, 2-2
pyrotechnics, A-2

Q

QAWTH, 2-9, 2-10, 2-30, 3-24, 3-25, 3-48

R

radar, 2-17, 3-37, 3-39, 7-19, C-5, C-10, E-1
radome, 3-39
RD 30, 3-41
Ready for Operation, 5-2, H-3
receiver and ball mount, 3-55
reflective tape, F-2
remote control, 2-11
RFO, 5-2, H-3
ring buoy, 2-12
risk assessment, 5-3, 5-4, 7-4, 7-5, 7-7, 7-10, 7-11, 7-12, 7-13, 7-14, 7-17, 7-19
rub rails, 2-11

S

safety chains, 3-57
safety wire, 2-13, 3-57, 3-58, 3-63, 3-64, E-2
salvage, 7-16
SAR, 2-2
scuppers, 3-26, C-3
search and rescue, 2-2, 7-3
searchlight, 2-3, 2-4, 3-33, 3-35, 3-36, 3-63, C-5, C-10
seas on the beam, 5-7
seat, 2-7, 3-28, 3-29, 3-29, 3-47, 3-62, A-2, F-1
seat belt, 3-28, F-1
seawater cooling pump, 3-6
seawater strainer, 3-7
self-bailing deck drain, 3-26
shackle, 2-28, 3-57, A-2
shaft, 3-7, 3-9, 3-17
SINS, 3-39, 7-19, H-3
skiff, F-1
skiff hook, F-1
SOP, H-3
SPC-SW, 1-1, 1-3, 1-4, 1-5, 2-1, 2-2, 2-3, 2-5, 2-6, 2-10, 2-12, 2-13, 2-14, 2-15, 2-22, 2-24, 3-1, 3-2, 3-5, 3-6, 3-10, 3-16, 3-22, 3-25, 3-30, 3-31, 3-35, 3-39, 3-40, 3-41, 3-44, 3-47, 3-54, 3-59, 3-62, 4-1, 4-5, 4-6, 5-1, 5-2, 5-3, 5-4, 5-5, 5-7, 5-8, 7-1, 7-3, 7-11, 7-16, A-1, B-1, C-1, C-2, D-1, E-1, F-1, H-4
spotter, 3-58, 3-65, 3-66
SS, A-2
stability, 3-25, 5-7
STAN Team, 1-3, 1-4
standard boat, 1-3, 5-3, A-1, F-1, F-2
standardization, 1-3, 1-5, 5-2, 5-3
steering, 2-11, 2-24, 2-25, 3-20, 3-21, 3-64, 7-2, 7-4, 7-5, 7-6, 7-16, C-1, C-8, C-10, D-2, E-1
stern bracket, 3-15, 3-17
stern light, 2-17, 3-35
storage, 2-6, 2-7, 2-8, A-2
stowage, 3-62, 3-63, A-1
strobe, 2-12, 3-33, 3-36, 7-3, A-2, C-5
surf, 7-3
survival, 4-6, C-2, E-2
survival vest, E-2

T

tank vent fitting, 3-23
throttle, 3-10, 3-13, 3-14, 3-21, 7-10, C-10
Tie-down straps, 3-59
tie-downs, 2-6, 3-59
tilt lock lever, 3-14, 3-15
TMT, 1-3
tongue weight, 3-56, G-3
Top RPM and Speed, 2-4
tow bitt, 2-14, 2-29
tow light, 2-17, 3-35
tow reel, 2-29
tow vehicle, 3-55, 3-57, 3-58, 3-64, 3-65, 3-66, G-2
towing, 2-4, 2-13, 2-14, 2-17, 2-20, 3-19, 3-35, 3-55, 3-56, 3-57, 3-61, 3-62, 3-64, 3-65, G-1, G-2, G-3
towline, 2-29, A-2
trailer coupler, 3-56, 3-57, 3-58
trailer hitch, 3-55, 3-56
trailer lights, 3-58, 3-64
Trailering, 3-63
transducer, 2-10, 2-30, 3-39, 3-41, C-6
transverse bulkheads, 2-6
trim tab, 3-27, 3-37, E-1

U

UCMJ, 4-3
UHF, 2-27, 3-37, 3-39, 3-44

V

vessel at anchor, 3-45
VHF-FM, 3-37, 3-39, 3-42, 3-43, 7-8, 7-14, 7-19

W

WAAS, H-4
water separator, 3-5, 3-12, 7-11
watertight hatch, 2-10
winch, 2-13, 3-59, 3-65, 3-66, E-2
winch strap, 3-59, E-2
windows, 2-10
wipers, 3-1, 3-50, 3-51, C-5, C-10

X

XO, 4-3
XPO, 4-3

Y

yelp siren, 3-45