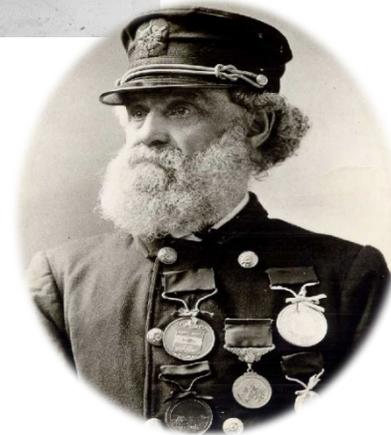
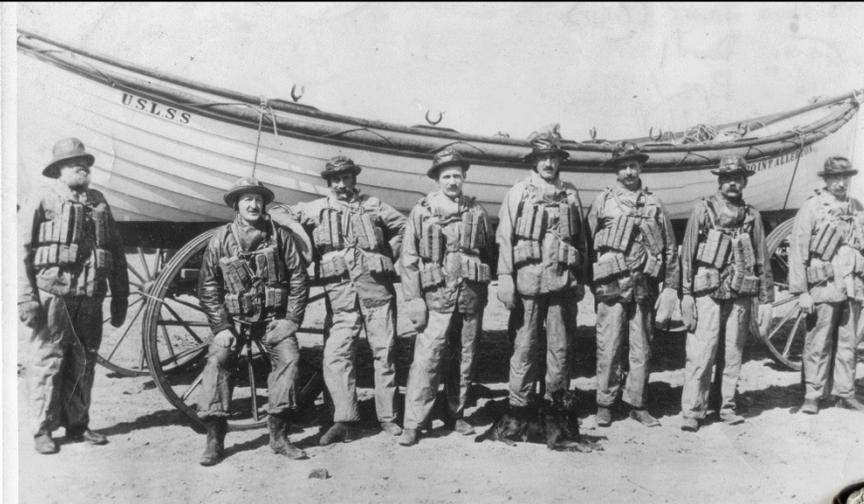




BOAT CREW HANDBOOK – Rescue and Survival Procedures



Captain Joshua James, USLSS

Captain Joshua James, USLS

Joshua James was probably the most celebrated lifesaver in the world, credited with saving hundreds of lives from the age of 15 when he first joined the Massachusetts Humane Society until his death at the age of 75 while on duty with the U.S. Life-Saving Service. He was honored with the highest medals of the Humane Society, the United States, and many other organizations. His father, mother, brother, wife, and son were also heroic lifesavers.

Joshua James was the ninth of twelve children. He was called a "great caretaker" by his brothers and sisters. He was reared by his older sister Catherine, who tended him from babyhood and took over the family upon the death of their mother. Her death was the first tragedy of Joshua's life. She and Joshua's baby sister perished in the sinking of the schooner *Hepzibah*, belonging to Reinier, her son and one of Joshua's older brothers. This event was influential in shaping Joshua as a lifesaver.

A natural seaman, Joshua also applied himself to practical books, and started going to sea early in life with his father and brothers. His profession was hauling, lightering, and freight carrying, like his father and brothers. He went into business at the age of 25 and remained until he was 62, when he became a full-time lifesaver with the U.S. Life-Saving Service. His wife, Louisa Luchie, was born when he was but 16 years of age. Joshua waited for her to grow up and proposed when she reached the marriageable age of 16. Two years before she had saved the life of a swimming companion--establishing a tradition of lifesaving that ran through both their lives and their families. Their children numbered eight girls and two boys. Three of the girls and one boy died in infancy, saddening the father for the rest of his life. The surviving son, Osceola James, born in 1865, became a sailor, master of the *Myles Standish*, a captain of the Hull volunteer lifesavers, a gold lifesaving medal winner with a record approaching his distinguished father's.

The dramatic death of Joshua James occurred on 19 March 1902. Two days earlier the entire crew save one of the Monomoy Point Life-Saving Station perished in a rescue attempt. This tragedy affected Joshua deeply, and convinced him of the need for even more rigid training of his own crew. So at seven o'clock in the morning of 19 March, with a northeast gale blowing, he called his crew for a drill. For more than an hour, the 75-year-old man maneuvered the boat through the boisterous sea. He was pleased with the boat and with the crew. Upon grounding the boat he sprang onto the wet sand, glanced at the sea and stated, "The tide is ebbing," and dropped dead on the beach.

Retrieved from: https://www.uscg.mil/history/people/Joshua_James.asp



BCH 16114.2A
FEB 01, 2021

BOAT CREW HANDBOOK - RESCUE AND SURVIVAL PROCEDURES– BCH16114.2A

Subj: BOAT CREW HANDBOOK - RESCUE AND SURVIVAL PROCEDURES

- Ref:
- a. *Rescue and Survival Systems Manual*, COMDTINST M10470.10 (series)
 - b. *Boat Crew Handbook – Boat Operations*, BCH16114.1
 - c. *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series)
 - d. *Pyrotechnic, Screening, Marking, and Countermeasure Devices, NAVSEA SW050-AB-MMA-010 Volume I*
 - e. *Boat Crew Handbook – Seamanship Fundamentals*, BCH16114.4

1. PURPOSE. This Handbook provides guidance on how to survive in maritime environments and situations. Major topics within this handbook are survivability factors, survival equipment and pyrotechnics, and egress and life rafts.
2. DIRECTIVES AFFECTED. The Boat Crew Rescue and Survival Procedures Handbook, BCH16114.2, is canceled.
3. DISCUSSION. This Handbook provides guidance on how to survive in maritime environments and situations.
4. MAJOR CHANGES. Major changes to this BCH are as follows:
 - a. Updated Boat Crew Survival Vest Figure 3-10.
 - b. Updated Glossary definition of Signal Kit/MK79.
 - c. Changed language throughout to align with updates to reference (a). Examples of these small language changes include: authorization of cutter crews to wear Type III PFD during cutter deck evolutions, authorization to continue to use previously purchased dry suit until repair cost exceeds 50% of purchase price, option to use Abandon Ship Life Preserver in high heat areas, advising PFD storage in a climate-controlled environment, and correcting the name of Sterns Model I600 (from 1600).

5. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is intended to provide operational guidance for Coast Guard personnel and is not intended to nor does it impose legally-binding requirements on any party outside the Coast Guard.
6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. Environmental aspects and impact considerations were examined in the development of this Handbook and have been determined to be not applicable.
 - a. The development of this Handbook and the general policies contained within it have been thoroughly reviewed by the originating office in conjunction with the Office of Environmental Management, Commandant (CG-47). This Handbook is categorically excluded under current Department of Homeland Security (DHS) categorical exclusion DHS (CATEX) A3 from further environmental analysis in accordance with the U.S. Coast Guard Environmental Planning Policy, COMDTINST 5090.1 and the Environmental Planning (EP) Implementing Procedures (IP).
 - b. This Handbook will not have any of the following: significant cumulative impacts on the human environment; substantial controversy or substantial change to existing environmental conditions; or inconsistencies with any Federal, State, or local laws or administrative determinations relating to the environment. All future specific actions resulting from the general policy in this Handbook must be individually evaluated for compliance with the National Environmental Policy Act (NEPA) and Environmental Effects Abroad of Major Federal Actions, Executive Order 12114, Department of Homeland Security (DHS) NEPA policy, Coast Guard Environmental Planning policy, and compliance with all other applicable environmental mandates.
7. DISTRIBUTION. No paper distribution will be made of this Handbook. An electronic version will be located on the Office of Boat Forces (CG-731) Portal site:
<https://cg.portal.uscg.mil/units/cg731/SitePages/Manuals.aspx>.
8. FORMS/ REPORTS. None
9. REQUESTS FOR CHANGES. To recommend edits and changes to this Handbook, please submit a formal request at the following link:
<https://cg.portal.uscg.mil/communities/bfco/doctrine/SitePages/Questions%20%20Recommendations.aspx>.

J. BRIAN RUSH /s/
U.S. Coast Guard
Chief, Office of Boat Forces



Table of Contents

CHAPTER 1 INTRODUCTION	1-1
SECTION A. PURPOSE OF THIS HANDBOOK	1-2
SECTION B. HOW TO USE THIS HANDBOOK	1-3
CHAPTER 2 SURVIVABILITY FACTORS	2-1
SECTION A. HUMAN FACTORS AND SURVIVABILITY	2-2
A.1. The Will to Survive	2-3
A.2. Human Elements	2-5
SECTION B. ENVIRONMENTAL FACTORS AND SURVIVABILITY	2-8
B.1. Sea State	2-9
B.2. Water Temperature	2-9
B.3. Air Temperature	2-12
B.4. Weather and Time of Day	2-13
B.5. Proximity to Land / Decision Factors	2-14
B.6. Protection from Exposure	2-15
SECTION C. OPEN WATER SURVIVAL SKILLS	2-18
C.1. Cold Water Survivability	2-19
C.2. Critical Factors	2-20
C.3. Survival Measures	2-20
C.4. Water Survival Skills	2-20
C.5. Climbing onto an Overturned Boat Hull	2-22
C.6. Boarding a Boat from the Water	2-23
CHAPTER 3 SURVIVAL EQUIPMENT AND PYROTECHNICS	3-1
SECTION A. PERSONAL FLOTATION DEVICE (PFD)	3-2
<i>PFD Storage</i>	3-2
A.1. Description	3-2
A.2. Storage	3-3
<i>Sterns Model I600 (Type I) PFD</i>	3-3
A.3. Description	3-3
A.4. Advantages	3-4
A.5. Disadvantages	3-4
A.6. Donning	3-4
A.7. Entering the Water	3-5
<i>Survivors (Type I) PFD</i>	3-6
A.8. Description	3-6
A.9. Advantages	3-6
A.10. Disadvantages	3-6
A.11. Donning	3-7
<i>Type III PFD</i>	3-7
A.12. Description	3-7
A.13. Advantages	3-8
A.14. Disadvantages	3-8
A.15. Donning	3-8
A.16. Non-Coast Guard Approved Type III PFDs	3-9
A.17. Advantages	3-9
A.18. Disadvantages	3-9
A.19. Donning	3-10
<i>Ring Buoys/Throwable Devices</i>	3-10
A.20. Description	3-10



- A.21. Advantages 3-10
- A.22. Disadvantages 3-10
- Non-Coast Guard Approved Cutter Specific PFDs* 3-11
- A.23. Description 3-11
- A.24. Standard Navy PFD with Collar 3-11
- A.25. Abandon Ship Life Preserver 3-12
- SECTION B. HYPOTHERMIA PROTECTIVE CLOTHING 3-13
- Cold Weather Principles* 3-13
- B.1. Layered Clothing 3-13
- B.2. Maintaining Body Heat 3-13
- Anti-Exposure Coverall* 3-14
- B.3. Description 3-14
- B.4. Donning 3-14
- B.5. Entering the Water 3-14
- Dry Suit* 3-15
- B.6. Description 3-15
- B.7. Use 3-15
- B.8. Donning 3-16
- B.9. Entering the Water 3-16
- B.10. Doffing 3-17
- SECTION C. BOAT CREW SURVIVAL VEST 3-27
- Boat Crew Survival Vest* 3-28
- C.1. Description 3-28
- C.2. Contents 3-28
- Emergency Signaling Mirror* 3-29
- C.3. Description 3-29
- C.4. Use 3-29
- C.5. Characteristics 3-29
- C.6. Operation 3-29
- Strobe Light* 3-30
- C.7. Description 3-30
- C.8. Use 3-30
- C.9. Characteristics 3-30
- C.10. Operation 3-31
- Illumination Signal Kit, MK-79 MOD 0* 3-31
- C.11. Description 3-31
- C.14. Operation 3-32
- Signal Whistle* 3-34
- C.15. Description 3-34
- C.16. Use 3-35
- C.17. Characteristics 3-35
- Smoke and Illumination Signal, MK-124 MOD 0/1* 3-35
- C.18. Description 3-35
- C.19. Use 3-35
- C.20. Characteristics 3-36
- C.21. Operation 3-36
- Survival Knife* 3-38
- C.22. Description 3-38
- Personal Locator Beacon (PLB)* 3-38
- C.23. Description 3-38
- C.24. Use 3-38
- C.25. Characteristics 3-38
- C.26. Operation 3-39
- SECTION D. PARACHUTE ILLUMINATION SIGNAL, M127A1 3-40
- D.1. Parachute Illumination Signal, M127A1 3-40



CHAPTER 4 EGRESS AND LIFE RAFTS 4-1

SECTION A. EGRESS PROCEDURES FROM A CAPSIZED BOAT 4-2

Preparation 4-2

 A.1. Potential Capsizing Forces and Factors 4-2

 A.2. Preparations for Egress 4-3

 A.3. Know When Something is Wrong 4-4

Escape 4-4

 A.4. Escape Procedures – Initial Response 4-4

 A.5. Escape Procedures – Secondary Response 4-5

 A.6. Post Capsize Procedures 4-5

SECTION B. RESCUE AND SURVIVAL RAFT 4-6

Inflation and Deployment 4-6

 B.1. Automatic Inflation and Deployment 4-6

 B.2. Manual Inflation and Deployment 4-6

Boarding a Life Raft from the Water 4-8

 B.3. Boarding a Life Raft from the Water 4-8

On-Raft Conduct 4-9

 B.4. Tasks Onboard a Raft 4-9

 B.5. Conduct in a Raft 4-10

 B.6. Using a Raft to Rescue Others 4-11

APPENDIX A GLOSSARY A-1

APPENDIX B LIST OF ACRONYMS B-1



Table of Figures

FIGURE 2-1 OUTER GARMENT COMPARISON	2-19
FIGURE 2-2 CAPSIZED VESSEL	2-22
FIGURE 3-1 STERNS MODEL I600	3-3
FIGURE 3-2 SURVIVORS TYPE I	3-6
FIGURE 3-3 TYPE III DEVICE PFD	3-7
FIGURE 3-4 NON-COAST GUARD APPROVED TYPE III PFD	3-9
FIGURE 3-5 STANDARD NAVY PRESERVER	3-11
FIGURE 3-6 ANTI-EXPOSURE COVERALL.....	3-14
FIGURE 3-7 DRY SUIT.....	3-15
FIGURE 3-8 MSD640 DRY SUIT.....	3-21
FIGURE 3-9 CUTTER SURFACE SWIMMER DRY SUIT	3-24
FIGURE 3-10 BOAT CREW SURVIVAL VEST	3-28
FIGURE 3-11 EMERGENCY SIGNALING MIRROR	3-29
FIGURE 3-12 STROBE LIGHT	3-30
FIGURE 3-13 ILLUMINATION SIGNAL KIT, MK-79 MOD 0.....	3-31
FIGURE 3-14 SIGNAL WHISTLE.....	3-34
FIGURE 3-15 SMOKE AND ILLUMINATION SIGNAL, MK-124 MOD 0.....	3-35
FIGURE 3-16 SURVIVAL KNIFE	3-38
FIGURE 3-17 PERSONAL LOCATOR BEACON (PLB).....	3-39
FIGURE 3-18 PARACHUTE ILLUMINATION SIGNAL, M127A1.....	3-40
FIGURE 4-1 MANUAL DEPLOYMENT OF SURVIVAL RAFT	4-7
FIGURE 4-2 LIFE RAFT AS RESCUE FERRY	4-11

Table of Tables

TABLE 3-1 BOAT CREW SURVIVAL VEST CONTENTS	3-28
--	------



CHAPTER 1

Introduction

Introduction

The danger of falling overboard, capsizing, or sinking is always present while underway. Few people can stay alive for a long period of time in the water without some type of survival equipment. Fear, fatigue, and exposure are the enemies of water survival. The desire to live, the ability to think clearly, and proficiently use available equipment can make the difference between life and death. The boat coxswain has overall responsibility for the safety and conduct of passengers and crew. However, each boat crew member has the personal responsibility to stay alert and knowledgeable in the use of survival equipment and procedures.

In this Chapter

This Chapter contains the following sections:

Section	Title	See Page
A	Purpose of this Handbook	1-2
B	How to Use this Handbook	1-3



Section A. Purpose of this Handbook

Introduction This purpose of this Handbook provides guidance on how to survive in maritime environments and situations. Major topics within this handbook are survivability factors, survival equipment and pyrotechnics, and egress and life rafts.

In this Section This Section contains the following information:

Title	See Page
Procedures	1-2

Procedures This Handbook is not intended to cover every contingency that may arise, nor every rule of unit or boat operations. Successful operations require the exercise of good safety practices, sound judgment and common sense at all levels of command.



Section B. How to Use this Handbook

Introduction Each Chapter that follows in this Handbook includes its own table of contents and is divided into Sections.

In this Section This Section contains the following information:

Title	See Page
Chapter Layout	1-3
Warnings, Cautions, and Notes	1-3

Chapter Layout

The first page of each chapter includes an *Introduction*, and an *In this Chapter*, as applicable.

The first page of each section includes an *Introduction*, an *In this Section*, as applicable.

In the left column of each page are block titles, which provide a descriptive word or phrase for the corresponding block of text to the right.

Warnings, Cautions, and Notes

The following definitions apply to “Warnings, Cautions, and Notes” found throughout the Handbook.

WARNING

Operating procedures or techniques that must be carefully followed to avoid personal injury or loss of life.

CAUTION!

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

NOTE

An operating procedure or technique that is essential to emphasize.



CHAPTER 2

Survivability Factors

Introduction This Chapter addresses the various factors impacting survivability in maritime environments, and the skills needed to survive.

In this Chapter This Chapter contains the following sections:

Section	Title	See Page
A	Human Factors and Survivability	2-2
B	Environmental Factors and Survivability	2-8
C	Open Water Survival Skills	2-18



Section A. Human Factors and Survivability

Introduction

Survival is the “preservation of one’s own life under conditions of immediate peril.” To preserve one’s own life at sea requires the ability to live through extreme conditions of emotional and physical shock, and hardship for an indefinite period of time. When faced with an open water survival situation, it is important to remember that environmental obstacles are as much mental as physical. Before accumulating information on the use and operation of survival systems, it is important to first understand the psychological barriers to the will to survive that must be overcome.

The most predominant psychological barrier to survival is fear: fear of the unknown, fear of discomfort, and fear of one’s own weakness. Fear of the environment in an open water situation leads us to fear our own chances of survival, and even though we overcome these fears to some extent, a lack of confidence in our ability may weaken our will to survive. Studies of survivors and their experiences show that the successful survival of any situation depends on several factors. The survivor must:

- (01) Be mentally and spiritually prepared for the possibility,
- (02) Be in good physical condition,
- (03) Have the proper equipment available and know how to use it,
- (04) Be properly dressed for any survival situation, and
- (05) Be thoroughly familiar with vessel egress procedures.

The key to these experiences is developing a survivor’s “attitude.” In other words, to develop those traits and characteristics that will enhance one’s chance of survival.

In this Section

This Section contains the following information:

Title	See Page
The Will to Survive	2-3
Human Elements	2-5



A.1. The Will to Survive

Based on interviews with a number of sea survivors, twelve characteristics were identified to help in understanding the will to survive. They are:

- | | |
|--------------------|---------------------|
| (01) Courage | (07) Purpose |
| (02) Determination | (08) Attentiveness |
| (03) Cheerfulness | (09) Confidence |
| (04) Positiveness | (10) Productiveness |
| (05) Flexibility | (11) Persistence |
| (06) Willingness | (12) Certainty |
-

A.1.a. Courage

Courage is the state or quality of mind or spirit that enables you to face danger or fear with self-possession, confidence, and resolution. Courage enables us to overcome these fears that can overcome us in a survival situation. Each time we encounter danger or fear and overcome it, we strengthen our courage.

It is important to realize the difference between fear and panic. Fear has a purpose. It is the mind's tool to pool all available resources. Panic on the other hand, is an unreasonable, overwhelming, and uncontrollable fear that can be one's worst enemy in a survival situation.

A.1.b. Determination

Stories about those who did not survive are usually founded on the idea that the would-be survivor did not realize they had it in them to carry on just a little further. Physically, the human body will rise to the occasion and call upon itself when needed. Many survival case histories show determination alone was the only factor in the successful return of the survivor.

Determination in thinking leads to quick, decisive action as you may have to act quickly. This excerpt to one survivor's story is evidence of determination:

The shore was about 50 yards away, but I experienced extreme difficulty in swimming due to the incoming tide. Several times, I had to turn on my back and try to float and propel myself with only my feet. It was only with extreme effort that I was able to make the shore. Upon reaching it, I was completely exhausted and in a state of partial shock, but forced myself to go on.

A.1.c. Cheerfulness

A strong sense of humor is instrumental in influencing the outcome of any survival situation. The ability to use humor and stay cheerful in a stressful situation will help the survivor withstand the anxieties and apprehensiveness of the situation.



A.1.d. Being Positive	Being positive helps the survivor make the best of the situation. Thoughts of failure will hinder the survivor’s ability to make sound and clear decisions. Self-fulfilling prophecies are usually manifested from negative thoughts and attitudes. Failure is inevitable when one believes there is no hope in sight. Self-discipline, adaptability, and tolerance all play parts in being positive in a survival scenario.
A.1.e. Flexibility	Athletes base their performance on being flexible as part of their overall fitness. Coast Guard personnel also maintain high levels of fitness to perform their duties. Flexibility is also a mental process. Being mentally flexible means having an open mind and the ability to act in a unique, creative and imaginative manner.
A.1.f. Willingness	Many studies suggest we avoid psychological pain and discomfort to a greater extent than we do physical pain. In most cases, freedom from mental stress is more important than those that are physical. Willingness is the ability to make decisions and a readiness to act even when the situation seems hopeless.
A.1.g. Purpose	Setting realistic goals (both near-term and long-term) and achieving them drives our sense of purpose. In a survival scenario, goal setting has a high survival value. Goal setting is a motivator, and as such, generates a will to live.
A.1.h. Attentiveness	One of the most dangerous aspects of Coast Guard life is being unprepared. Mental preparedness, whether it be for jogging around a track, executing a patrol mission, or finding oneself in an open water survival situation is absolutely key to efficient planning and effective mental attitude.
A.1.i. Confidence	Being properly trained is key in preparing for any situation. The skills and knowledge we obtain from training yields one important side-effect: confidence. Confidence can only be built through repetition and experience.
A.1.j. Productiveness	Keeping busy can also increase the chance of survival. Humans are social creatures, and teamed with loneliness and boredom can undermine the productive nature that is extremely important in a survival situation. Keeping the mind and body active will help to concentrate on the act of survival.



A.1.k.
Persistence

The will to survive is fundamentally based on persistence. Emotionally, the survivor needs to stay active in spite of the situation. Concentrate on those items left behind. Family, friends, and personal goals will once again be met and achieved.

A.1.l. Certainty

The will to survive is inevitably dependent on the survivor's ability to remain certain that they will once again return to family, friends and co-workers. Those who have survived in the past have not depended on luck or magic, they have depended on the mental skills presented above and on the equipment and procedures presented in the chapters that follow.

A.2. Human Elements

Human Factors play an important role in survival situations. This Section provides detail on such areas of Human Factors as:

- (01) Strength and Endurance,
 - (02) Skill Level,
 - (03) Intelligence,
 - (04) Age and Gender.
-

A.2.a. Strength and Endurance

Physical fitness standards are required to ensure crew members have sufficient strength and endurance to safely perform duties during normal and adverse conditions. These standards will also have a positive impact if a crew member is exposed to cold, wet environments. The combination of rough seas, cold temperatures and wet conditions can quickly cause the crew to become less effective.

Physical fitness increases the ability to maintain a higher degree of thermoregulation between the skin and vital organs. However, high levels of body fat can increase the potential for survival in cold, wet environments. Increased body fat acts similar to extra layers of clothing in that it adds more protection to vital organs.

If the crew member is able to get out of the water and onto the overturned hull, a life raft, or some other floatation device, survival will be highly dependent on the air temperature and wind velocity as well as their ability to sustain shivering. However, this state will decrease the rate of heat loss considerably due to the conductivity of air being less than that of water.



A.2.b. Skill Levels

All tasks require a certain skill level. The required skill level is a function of the situational demands and the experience of the operator. Exposure to a cold, wet environment also has an effect on a person's skill level. As core temperature decreases to 93°F (34°C), cognitive and motor functions become impaired. Skilled performance can be categorized into three levels: Knowledge-based level, Rule-based level, and Skill-based level.

- (01) **Knowledge-based level** behavior is evoked when entirely new, unstructured, or complex problems are encountered. At this level, the individual uses meaningful concepts or physical properties to make decisions. Decision-making involves the identification of options or alternatives, assessing their relative attractiveness, assessing the likelihood of being realized, and integration of considerations to identify what appears to be the best option. Knowledge-based level behavior is the first level of behavior that is affected by exposure to cold, wet environments.
- (02) At the **Rule-based level** an action is selected by activating in working memory a hierarchy of rules. Such rules may have been derived empirically during previous occasions, by instruction or by conscious problem solving and planning. Information from the environment is used to select or modify these rules. Rule-based level behavior is the second level of behavior that is affected by exposure to cold, wet environments.
- (03) **Skill-based level** is when highly automated sensory-motor and cognitive performances and takes place without conscious control. This level of behavior is the final level to be affected by exposure to cold, wet environments.

A.2.c. Intelligence

Memory capacity plays an important role in open water survival situations. The rate at which we process cognitively (mental storage, retrieval, and manipulation) is not only a function of general intelligence but of individual aptitude as well. The better a survivor learns and acquires new information, the higher the probability of rescue.



A.2.d. Age and Gender

Aging is widely thought to compromise body temperature defense during cold exposure. Controlled laboratory comparisons show that older men may be less able than younger men to defend core temperature during cold exposures. Heat production due to shivering may also be less in older than younger men due to the reduction of muscle mass. These aging effects begin to be apparent after about 45 years of age in men. Older women defend core temperature during cold exposure as well as, or better than younger women; this is due to body composition changes attributable to aging. Older women tend to have more body fat than younger women, which accounts for impaired, as well as improved, thermoregulatory responses to cold environments.

Gender related differences in body size, body shape and composition contribute to a difference in cold tolerance between men and women, which is particularly apparent in cold water. Most women have greater body-fat content than men of comparable age. A thicker subcutaneous fat layer accounts for greater maximal tissue insulation and lower critical water temperature. Despite this difference, however, greater body-fat content may not provide women with a thermoregulatory advantage over men.

When women and men of equivalent subcutaneous fat thickness are compared, the women have a greater surface area and smaller total body mass. Although insulation is equivalent, women's total heat loss is greater due to the larger surface area. Because of their smaller body mass, body heat content is less in the women. Therefore body temperature falls more rapidly for any given thermal gradient and metabolic rate.

Comparison of men and women with equivalent total body masses shows that women still seem to be at a disadvantage in the cold. In this case, women's greater body-fat content enhances insulation, and surface area differences between genders are not as pronounced. Nevertheless, a smaller lean body mass limits a women's capacity for heat production, compared to men of comparable total body mass. However, under colder conditions that stimulate shivering the limited thermogenic capacity of women will result in a more rapid decline in their core temperature than in men of equivalent total body mass.



Section B. Environmental Factors and Survivability

Introduction

Recent technological advances have shortened the duration survivors spend in the open water. Search and rescue equipment, personnel training, and optimally designed equipment (as described in **PART 1 CHAPTER 3 Survival Equipment and Pyrotechnics**) have all attributed to increased successes in survivor recovery.

However, the possibility of being in an extended open water survival situation still exists. Being mentally prepared, using Coast Guard approved and correctly maintained equipment will increase your chances for survival.

Time is critical when forced to enter cold water. The loss of body heat is the greatest danger to survival in open water. Critical factors that increase the threat of hypothermia and other cold water injuries include:

- (01) Sea State,
- (02) Water Temperature,
- (03) Air Temperature,
- (04) Weather and Time of Day,
- (05) Proximity to Land,
- (06) Improper Use of Survival Equipment,
- (07) Protection from Exposure.

This Section contains information on the external environment and those elements of human factors that contribute to the success of open water survival.

In this Section

This Section contains the following information:

Title	See Page
Sea State	2-9
Water Temperature	2-9
Air Temperature	2-12
Weather and Time of Day	2-13
Proximity to Land / Decision Factors	2-14
Protection from Exposure	2-15



B.1. Sea State Sea states can range from calm and mirror-like to driving sea spray with exceptionally high waves. Survivability depends not only on the sea state the survivor deals with, but with the sea state the rescue vessel must bear.

B.1.a. Effects of Wind and Waves There are several forces that create waves at sea, the most significant of which is wind. The factors which determine the characteristics of wind waves are: wind speed, wind duration, and fetch (the distance over open water which the wind has blown).

As the wind begins to blow, it creates seas, which are typically steep, choppy, and have little pattern. As the wind continues, the seas begin to become more defined. In heavy weather, observing and measuring waves is important; if you can get a general sense of the waves in which you are operating, it will allow you and your crew to operate accordingly.

Strong winds usually have the same effects as strong currents on wave behavior, but because of the infinite variables of wind speed, direction, and interaction with currents, it is often difficult to predict what effect the wind will have on waves.

The survivor must be more vigilant during high sea states and be ready to signal rescuers at a moment's notice. High seas contribute to severe motion sickness; feelings of frustration and water aspiration are major concerns.

NOTE 

The sea anchor, supplied with life rafts provides the most stability in any wave pattern. To ensure proper positioning of the sea anchor, the sea anchor should rest in the trough of the wave as the bow of the craft is at the crest of the wave.

B.2. Water Temperature Like sea state, water temperature has a significant impact on chances of survival.

B.2.a. Hypothermia One of the greatest dangers in open water survival is hypothermia. When the human body is submerged in water, heat is lost approximately 26 times faster than it is on dry land. Hypothermia is described in the First Aid Handbook.



B.2.b.
Application

Regardless of the type, all clothing will prevent the skin from reaching the temperature of water. Cooling rates will vary depending upon the type of protection, whether wet or dry suits. Clothing provides extra thickness between the skin and water or wind. Since heat is generally conducted away from the body by the movement of water, adding extra layers keeps the skin further away from the moving water thus reducing heat loss to varying extents.

Dry suits increase protection and decrease cooling rates in both rough and calm water. Dry suits are the most effective form of protection in both rough and calm water. However, the barrier must be maintained between the water and skin for the suit to remain effective. Cooling rates are slightly higher in rough water, though this is often linked to increased heart rate and exertion in an attempt to stay afloat. If water does penetrate a dry suit, they are not rendered useless; however, the effectiveness of the suit decreases and cooling rates may increase, especially if there is water exchange. A downside is that cold water causes diuresis, or increased urinary output.

It is important to remember that dry suits provide protection only to an extent and in all cases, with the exception of heated suits, will eventually lead to heat loss with the potential for hypothermic problems. Regardless of the suit worn, individuals should egress from the water as quickly as possible. A life raft or other floatation device should be used if available. Survival time will increase significantly once out of the water.



B.2.c. Symptoms
 of Lowered
 Body Core
 Temperatures

The body goes through noticeable symptoms when exposed to cold water as indicated in **Table 3-2**

Core Body Temperature.

°F	°C	Symptoms
98.6 to 96	37	(01) Cold sensations (02) Skin vasoconstriction (03) Increased muscle tension (04) Increased oxygen consumption
97	36	(05) Sporadic shivering suppressed by voluntary movements (06) Gross shivering spells (07) Further increase in oxygen consumption (08) Uncontrollable shivering
95 (Note 1)	35	(09) Mental confusion (10) Impairment of rational thought (11) Drowning possible (12) Decreased will to survive
93	34	(13) Loss of memory – speech impaired (14) Sensory function impaired (15) Motor performance impaired
91 (Note 2)	33	(16) Hallucinations, delusions, clouding consciousness (17) Shivering stops
90	32	(18) Heart rhythm irregularities (19) Motor performance grossly impaired
88	31	(20) Shivering stopped
86	30	(21) Loss of consciousness (22) No response to pain
80	27	(23) Death
Note 1: Voluntary tolerance limit in laboratory experiments.		
Note 2: 50% of those in survival situations do not survive at this body core temperature.		

Table 3-2
Core Body Temperature



B.2.d.
Predicted
Survival Time

Being prepared at the onset of a survival situation can help minimize heat loss. **Table 3-3** below shows the predicted survival times of the average person in 50° Fahrenheit water for various situations. Contrary to popular belief, the survivor should not swim around in efforts to keep warm. This will only increase the rate of heat loss and speed the onset of hypothermia.

Without Flotation	
Survival Floating	1.5 Hours
Treading Water	2.0 Hours
With Flotation	
Swimming	2.0 Hours
Holding Still	2.7 Hours
HELP Posture	4.0 Hours
Huddle w/ Others	4.0 Hours

Table 3-3
Predicted Survival Time

NOTE 

When worn correctly, the appropriate anti-exposure coveralls or dry suit will protect the survivor and add layers of insulation. Thermal gloves, socks, underwear and neoprene hoods all add additional layers of protection.
Inflatable raft floors will provide an additional layer of insulation.

**B.3. Air
Temperature**

Air Temperature is a prime contributor to hypothermia. The combination of cold air with cold water is a recipe for danger.

B.3.a. Effects of
Wind and
Waves

When the wind is blowing, heat loss in the body increases exponentially due to the wind chill factor. Actions must be taken to protect against wind chill. In open water survival situations, actions taken to protect the survivor from wind effects (e.g., laying low in a raft, using neoprene hoods, etc) can greatly enhance survivability and lessen the effects of hypothermia.

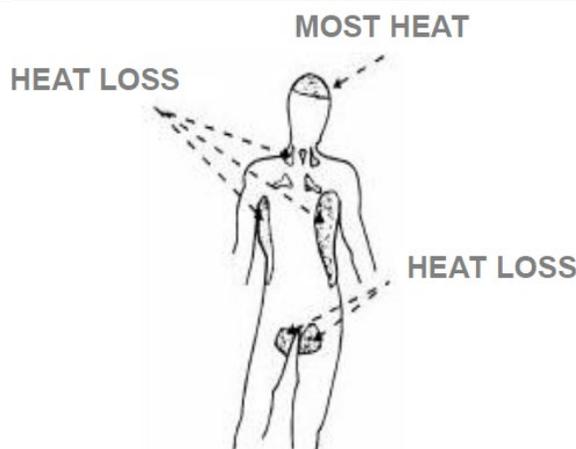


B.3.b.
Wind/Wave
Effects
Mitigation

Survivors should be aware of the areas of the body that are most prone to heat loss. **Figure 3-4** represents those areas of the human body most prone to cooling. The majority of heat loss occurs in and around the top of the head.

NOTE 

When worn correctly, the appropriate anti-exposure assemblies will protect the survivor and add layers of insulation. Insulated boots, balaclavas, watch caps, thermal gloves, socks, underwear and neoprene hoods all add additional layers of protection.



*Drawing Courtesy
of U.S. Navy*

Figure 3-4
Body Areas Prone to Heat Loss

**B.4. Weather
and Time of
Day**

The weather and time of day play a major effect on any survival scenario.

B.4.a. Effects of
Weather on
Survival

Survivors in open water must realize that rescue efforts may be hampered or even postponed because of inclement weather. Survivors must be prepared for a prolonged evolution—even after the weather improves.

- (01) **Fog.** Fog is composed of tiny water droplets hanging in the atmosphere, sufficiently dense to scatter light rays and reduce visibility. Fog makes locating anything more difficult, including survivors in the open water.
- (02) **Waves.** Waves, seas, and surf can present the greatest challenges to survival skills. By understanding how waves form and behave, survivors know what to expect and how to minimize danger and increase the chance of survivability.

Of the two major types of waves, the broad, rounded waves are likely to be the type of wave an open water survivor will have to deal with. Breaking waves are the most dangerous kind of wave for open water survivors. How dangerous the wave is depends on the ratio of wave



height to length, and on wave frequency. Steep sloped waves are the most dangerous.

- (03) **Rain, Sleet, & Snow.** As with fog, precipitation can limit the sight of the survivor as well as the rescue party. Precipitation can add to other complexities such as contributing to the onset of hypothermia.

B.4.b Time of Day

Statistically, rescues occur within a short time following a mishap. Wind and sea currents make pinpointing survivors more predictable when the mishap site is known. As time progresses, this predictability becomes more difficult. In hours of darkness, it becomes critical that the appropriate signaling devices are employed. Mentally, the first few moments an individual is in a survival situation are the most disorientating, however, the survivor must remember that rescue vessels may be nearby during this time. During hours of darkness, flares and lights are crucial when these vessels are near.

B.5. Proximity to Land / Decision Factors

With land in sight, the survivor must make a decision whether to swim or row for land or to wait. Swimming or rowing away from a “last known position” has inherent risk and survivors from a capsized boat are often safer staying with the boat or other visible debris. Shorelines are dotted with various hazards including sharp rocks, strong current, and breaking waves. Unless land is close and conditions appear favorable, the survivor should not try to swim to shore.

Considerations when making the decision to swim to shore include:

- (01) **Distance.** With no visible reference from sea, distance can be deceiving and create the illusion that land is closer than it actually is. Glare from the water surface can hinder the ability to gauge the distance to shore.
 - (02) **Water Current.** Underlying current near the shoreline may hamper progress and severely rob the survivor of available energy.
 - (03) **Physical Condition.** As mentioned above when dealing with water currents, the survivor’s physical condition can be the limiting factor in surviving a swim or row for shore.
 - (04) **Swimming Competency.** Swimming skills must be considered in making the shoreline. A poor swimmer will expend more energy to make the shoreline than an accomplished swimmer.
 - (05) **Water Temperature.** The colder the water temperature, the more energy will be required to swim the same distance in warmer waters. Also, cold water intrusion may occur and hasten hypothermia.
-



B.6. Protection from Exposure

The most inhospitable location on our planet is the open water. The survivor must be prepared for hot, temperate, cool, or cold conditions. Survivors must be aware of the dangers of too much exposure to the sun and take preventive measures to guard against a decrease in performance.

B.6.a. Hot Climates

Performance in open water can easily be affected by the heat and vibration of the boat, which can increase fatigue. This Section discusses the various sun and heat related factors that crew members may encounter during their activities.

Clothing and equipment should be worn so that there is free circulation of air between clothing and the body surface. Clothing acts as a barrier that prevents evaporative cooling. Many synthetic fabrics reduce the absorption and dispersal of sweat needed to achieve optimum heat loss by evaporation. Impermeable clothing does not “breathe” and thus greatly increases an individual's susceptibility to heat related illnesses. Impermeable clothing must be avoided. When using impermeable clothing, take precautions to avoid the rapid buildup of body heat. Heat illnesses may be manifested in minutes if impermeable clothing is worn.

Survivors should shield themselves from the effects of sun and heat as best as possible. Sunshades should be fabricated from any means available. During the heat of the day, observe the following:

The body may be cooled by getting into the water; however, check for marine life and be sure you are secured to the raft. This action will also aid in dehydration, as survivors have actually absorbed enough water to activate the kidneys after only a short time in the water.

- (01) Clothes can be kept wet by splashing water on them.
- (02) Keep physical activity to an absolute minimum in the water.
- (03) Use sun screen cream or similar ointment if available.
- (04) Wear sunglasses or improvise eye cover made from cloth or paper.

Heat stroke can occur when the body's cooling mechanism (sweating) fails to adequately cool the body. The major symptom of heat stroke is red, hot and dry skin. Mitigating the effects of heat stroke can easily be accomplished by keeping the body cooled by the measures outlined above. Keep incapacitated survivors lying down with the head elevated. Outer clothing should not be removed. Underclothes may be removed and used to cover exposed head, neck or to parts of the body which would otherwise be exposed.

NOTE

Personnel who are not accustomed to strenuous physical activity in hot and humid environments are particularly susceptible to heat injuries. Excess body weight also contributes to this susceptibility.

B.6.b. Sunburn

Continuous exposure to the sun can cause sunburn and other complications such as heat stroke, dehydration, etc. Unprotected exposed skin will suffer from



premature aging and an increased chance of skin cancer. The limit to surface heating, the point at which skin becomes painful, is 109°F (43°C) and higher. At 113°F (45°C), pain is severe, and if that temperature is maintained burns will result.

Symptoms of sunburn are: redness, swelling, or blistering of the skin. Other effects of overexposure to the sun are fever, gastrointestinal symptoms, malaise, and pigment changes in the skin.

B.6.c.
Dehydration

An adequate fluid intake is essential to remain healthy. Fluids are lost from the body in several ways. The most obvious loss is through the kidneys. The less obvious loss of body fluid occurs through perspiration from the skin and respiration through the lungs. As a result, an average, healthy adult requires two or three liters of fluid a day to replace these losses. Extremely warm weather significantly increases the loss of fluids. Try to stay away from liquids such as tea, alcohol, coffee, and soft drinks. These liquids speed up fluid loss.

Healthy adults must satisfy their water and electrolyte requirements. When water and electrolytes are not replaced, the body experiences dehydration. Drinking alcohol and caffeine increases dehydration. At first there is thirst and general discomfort, followed by an inclination to slow physical movement, and a loss of appetite. As more water is lost, an individual becomes sleepy and experiences a rise in body temperature.

By the time the body loses 5% of body weight in fluids, the individual begins to feel nauseated. When 6 to 10% of body fluids are lost, symptoms increase in this order:

- (01) Dry mouth,
 - (02) Dizziness,
 - (03) Headache,
 - (04) Difficulty in breathing,
 - (05) Tingling in the arms and legs,
 - (06) Skin color turns bluish,
 - (07) Indistinct speech,
 - (08) Inability to walk,
 - (09) Cramping legs and stomach.
-



B.6.d. Effects of Cold Climates In cold climates, the major problems range from hypothermia and frostbite, to immersion, or “Trench” foot. In cold climates, observe the following:

- (01) Keep as dry and warm as conditions will dictate. If possible, remove wet clothing and replace with dry clothing.
 - (02) Clothing should be worn in loose fitting layers.
 - (03) Don anti-exposure suit (if available).
 - (04) Inflate raft floor or add available material for additional layers of insulation.
 - (05) Huddle with other survivors.
 - (06) Mild stretching and exercise improves circulation—this is key in preventing immersion foot.
 - (07) Avoid sitting in cramped positions for long periods. Move arms, feet, and legs as much as possible.
 - (08) Wiggle the toes inside boots.
 - (09) Keep feet as warm and dry as possible.
 - (10) Avoid the use of alcohol and tobacco.
-



Section C. Open Water Survival Skills

Introduction

In the event a crew member enters or ends up in the water due to an emergency, survival procedures should be pre-planned. By doing so, the chances for a successful rescue are increased.

This Section addresses the survival techniques that will greatly increase the survival for a person in the water (PIW) Crew members should never forget that wearing the proper PPE is the best insurance for survival.

In this Section

This Section contains the following information:

Title	See Page
Cold Water Survivability	2-19
Critical Factors	2-20
Survival Measures	2-20
Water Survival Skills	2-20



C.1. Cold Water Survivability

The length of time a person can stay alive in cold water depends on the temperature of the water, the physical condition of the survivor, and the action taken by the survivor. **Figure 2-1** illustrates the relationship between water temperature and estimated time of useful consciousness. Swimming typically reduces a person's chance of survival due to more rapid loss of body heat.

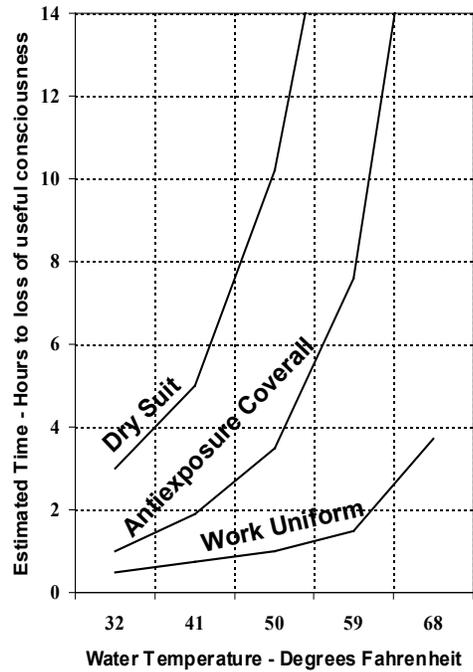


Figure 2-1
Outer Garment Comparison



C.2. Critical Factors

Time is critical when forced to enter cold water. The loss of body heat is one of the greatest dangers to survival. Critical factors that increase the threat of hypothermia and other cold-water injuries include:

- (01) Prolonged exposure to cold-water temperatures,
 - (02) Sea spray,
 - (03) Air temperature,
 - (04) Wind chill.
-

C.3. Survival Measures

Several preventive measures that can be used to increase the chances for successful cold water survival include:

- (01) Put on as much warm clothing as possible, making sure to cover head, neck, hands and feet.
 - (02) If the hypothermia protective clothing does not have inherent flotation, put on a PFD.
 - (03) Before entering the water, button up clothing, turn on signal lights (only at night), locate your survival whistle and make any other preparations for rescue.
 - (04) Avoid entering the water if possible. If it is necessary to jump into the water, cover nose and mouth with one hand and place other hand on the PFD or area between wrist and elbow.
-

C.4. Water Survival Skills

Water survival skills that should be utilized to increase the chances for surviving cold water immersion include:

- (01) Immediately upon entering the water, become oriented to the surrounding area. Try to locate sinking boat, floating objects, and other survivors.
- (02) Try to board a life raft, overturned boat (if floating), or other floating platform as soon as possible to shorten the immersion time. Body heat is lost many times faster in the water than in the air. Since the effectiveness of the insulation worn is seriously reduced by being water soaked, it is important to be shielded from wind to avoid a wind-chill effect. Huddling close to the other occupants in the craft will also conserve body heat.
- (03) While afloat in the water, do not attempt to swim unless it is necessary to reach a fellow survivor or a floating object which can be grasped or climbed onto.
- (04) Unnecessary swimming will pump out any warm water between the body and the layers of clothing and will increase the rate of body-heat



loss. Also, unnecessary movements of arms and legs send warm blood from the inner core to the outer layer of the body resulting in a rapid heat loss.

- (05) The body position assumed in the water is very important in conserving heat. Float as still as possible with legs together, elbows close to your side and arms folded across the front of the PFD. This is called the Heat Escape Lessening Position (HELP) and minimizes exposure of the body surface to the cold water. Try to keep head and neck out of the water (see [Figure 3-2](#)). However, if wearing a Type III PFD, or if the HELP position turns the body face down, bring legs together tight and arms tight to sides and head back.
- (06) Another heat conserving position is to huddle closely to others in the water making as much body contact as possible. A PFD must be worn to be able to maintain these positions in the water (see [Figure 3-3](#)).
- (07) Keep a positive attitude about survival and rescue. This will extend survival time until rescue comes. **A will to live does make a difference.**

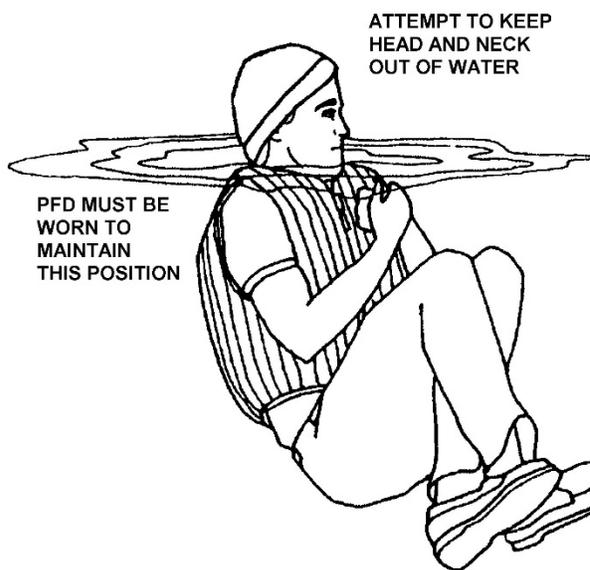


Figure 3-2
Single PIW

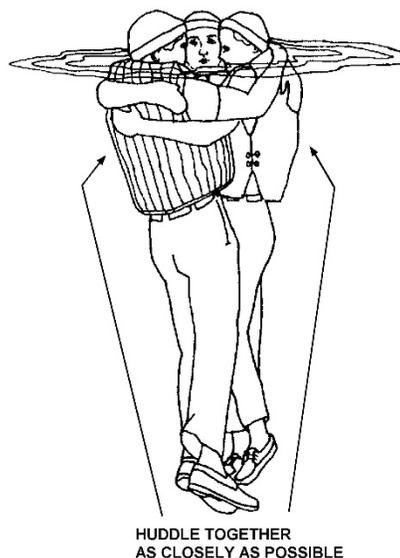


Figure 3-3
Multiple PIW Huddling



C.5. Climbing onto an Overturned Boat Hull

Regardless of what factors or condition contributed to the capsizing of your vessel, after you safely egress, you are now faced with an open water survival situation. The ability to think clearly and proficiently can make the difference between life and death. Climbing onboard an overturned vessel will provide greater protection from the elements and hypothermia. Once onboard, your chances of being spotted by rescuers (Coast Guard or good Samaritans) greatly increases because it is a larger object that can be seen from greater distances.

The majority of capsized vessels will inherently float and not sink for some time. The hull will float bow-up with the stern lying just beneath the surface of the water due to the vessel hull design and weight of the engines (see [Figure 2-2](#)). Although there is no standard procedure for climbing onto an overturned vessel, general procedures are listed below.



Figure 2-2
Capsized Vessel

Use the following procedures when climbing onto an overturned boat hull:

- (01) Look for the easiest access point to climb aboard, this is often found towards the stern of the vessel since it will be lower in the water than the bow.
- (02) Use the natural design of the boats hull for hand holds eg. keel, chine, through hull drains.

CAUTION!

Be careful of sharp edges, burs, and protruding objects that may cause injury or tear PPE when climbing on board the overturned boat hull.

- (03) Be aware that some leverage points may be slightly below the surface, e.g. Rub rails, swim platforms, life lines.
- (04) Assist other survivors in climbing aboard.

Once on board the overturned vessel, get as much as your body out of the water as possible to reduce your exposure to hypothermia. Apply training principles learned in the [Open Water Survival Skills](#) section and [Post Capsize Procedures](#) paragraph.



C.6. Boarding a Boat from the Water

After a vessel capsizes or sinks survivors may find themselves floating, awaiting rescue. Assistance can range from minutes to hours. Rescuers (Coast Guard or good Samaritans) will arrive and begin recovering all persons from the water.

There are many different types of vessels that may arrive on scene to assist. These will range from military, commercial, and/or recreationally operated vessels. Commercial and recreational vessel operators have limited experience with recovering persons from the water and their vessels are not specifically designed for rescue operations. For this reason, survivors need to become familiar with basic boat characteristics for boarding a boat from the water.

Vessel characteristics for recovery consideration:

- (01) Swim platform or ladder,
- (02) Lowest point of freeboard,
- (03) Transom door,
- (04) Jacobs ladder,

You may have to get creative and think about what specific characteristics are available on board the rescue vessel that can aid in your recovery. Depending on duration of exposure to the elements, survivors may have lost dexterity and have limited strength that will require additional assistance for recovery. Remember, you have the training, experience and may have to verbally communicate with the rescue vessel on the most prudent method for recovery.

If capable after being rescued, commence overseeing the recovery of remaining survivors and administering first aid as necessary.



CHAPTER 3

Survival Equipment and Pyrotechnics

Introduction

The danger of falling overboard, capsizing, or sinking is always present while underway. Few people can stay alive for long in the water without some type of survival equipment. Fear, fatigue, and exposure are the enemies of water survival. The desire to live, and the ability to think clearly and proficiently use available equipment can make the difference between life and death. The coxswain has overall responsibility for the safety of the boat and crew including ensuring that all required safety equipment is onboard, readily accessible, in working condition, and its use and operation understood by all. However, each boat crew member has the personal responsibility to stay alert and knowledgeable in these matters.

This Chapter addresses the general characteristics and useage of survival gear and signaling devices, including pyrotechnics, not specific requirements for boats and operations. Reference (a) provides specific guidance on survival equipment discussed in this Chapter.

In this Chapter

This Chapter contains the following sections:

Section	Title	See Page
A	Personal Flotation Device (PFD)	3-2
B	Hypothermia Protective Clothing	3-13
C	Boat Crew Survival Vest	3-27
D	Parachute Illumination Signal, M127A1	3-40



Section A. Personal Flotation Device (PFD)

Introduction The term personal flotation device (PFD) is a general name for the various types of devices designed to keep a person afloat in water. PFDs include life preservers, vests, cushions, rings, and other throwable items. They are available in five different styles, each with its own purpose and flotation characteristics.

A usable PFD is approved, in good serviceable condition, and of appropriate size for the intended user. Each boat crew member must wear a usable PFD appropriate for the weather conditions and operations in which he/she will be performing.

The coxswain is responsible for ensuring that each boat crew member wears the appropriate PFD for the weather conditions/operations they will be performing.

NOTE 

A wearable PFD can save a life, but only if it is worn.

In this Section

This Section contains the following information:

Title	See Page
PFD Storage	3-2
Sterns Model I600 (Type I) PFD	3-3
Survivors (Type I) PFD	3-6
Type III PFD	3-7
Ring Buoys/Throwable Devices	3-10
Non-Coast Guard Approved Cutter Specific PFDs	3-11

PFD Storage

A.1. Description

Despite the mildew inhibitor treatment that is required by manufacturers for PFDs, stowing them in moist locations will increase deterioration of the fabric. Heat, moisture, and sunlight will increase the deterioration of PFD parts.



A.2. Storage

PFDs should be stored in a climate-controlled environment in accordance with Reference (a). All PFDs should be kept away from oil, paint, and greasy substances. The Coast Guard does not consider any PFD “readily accessible” if it is kept in its original wrapper. Persons under stress may be unable to get them out promptly. Also, the wrapper can trap moisture leading to mildew and rot.

NOTE

Remember, even more important than PFD storage condition is that PFDs be readily accessible.

Sterns Model I600 (Type I) PFD

A.3. Description

The Sterns Model I600, also known as a Type I ([Figure 3-1](#)), is a one-piece, PFD required for the J-Davit tender and during abandon ship operations. It is authorized for use by survivors, passengers on towed vessels, or prisoners aboard vessels. Sterns model I600 PFD provides an unconscious person the greatest chance of survival in the water. It is universally sized for adults (90 pounds and over) which provides at least 22 pounds of buoyancy. The PFD must be international orange in color.



Figure 3-1
Sterns Model I600



A.4. Advantages

Sterns model I600 PFD is effective for all waters, especially open, rough, or remote waters where rescue may be delayed. It is designed to turn most unconscious wearers in the water from a face-down position to a vertical or slightly backward position, allowing the wearer to maintain that position. It provides at least 22 pounds of buoyancy. This buoyancy will allow the wearer to relax and save energy while in the water, thus extending survival time.

A.5. Disadvantages

There are three major disadvantages to this type of PFD:

- (01) It is bulky and restricts movement.
- (02) Its buoyancy restricts the underwater swimming ability needed to escape from a capsized boat or to avoid burning oil or other hazards on the surface of the water.
- (03) It provides minimal protection against hypothermia.

A.6. Donning

Before entering the water, don and adjust Sterns model I600 PFD using the following procedures:

WARNING



For safety, always tuck all loose straps into your pockets, shirt, or belt. Adjust straps on injured people before they are lowered into the water.

Step	Procedure
1	Don PFD as you would a vest.
2	Buckle upper chest strap and pull tight.
3	Secure lower chest strap snap hook to the ring on the left and pull strap tight.



A.7. Entering the Water

Use the following procedures to enter the water:

NOTE 

Follow these steps before entering the water wearing any type of PFD or combination of cold weather protective device (e.g., dry suit) and PFD.

Step	Procedure
1	Ensure all straps on the PFD are securely fastened, tightened to a snug fit, and tucked in to prevent them from snagging.
2	Stand on the boat's gunwale, on the windward side, at a point closest to the water.
3	Check surrounding area for debris and depth.
4	Hold elbows close to your sides and cover your face with one hand.
5	Grip PFD or area between wrist and elbow with the other hand.
6	Looking straight ahead, keep the body erect and legs held together and crossed when entering the water. It is better to gently slip in, if possible, rather than jumping.
7	Minimize initial immersion by spreading arms and applying a scissor kick upon entry.

NOTE 

If jumping into water is necessary with chemicals, oil, or burning oil on the surface, place one hand over mouth with palm under chin and split fingers tightly squeezing nostrils shut. Place other hand on the PFD collar to keep it in place.



Survivors (Type I) PFD

A.8. Description The Survivors – PFD, is a Type I (**Figure 3-2**) PFD. A wearable device that will keep most unconscious wearers face-up in the water. It is intended for use by passengers, prisoners, and non-mission essential personnel. It comes in international orange with SOLAS reflective panels:

- (01) Adult (more than 90 pounds) which provides at least 22 pounds of buoyancy.
- (02) Child (less than 90 pounds) which provides at least 18 pounds of buoyancy.



Figure 3-2
Survivors Type I

A.9. Advantages Lightweight and easy to don. Easily stacked for storage.

A.10. There are three major disadvantages to this type of PFD:

Disadvantages

- (01) It restricts movement.
 - (02) Its buoyancy restricts the underwater swimming ability needed to escape from a capsized boat or to avoid burning oil or other hazards on the surface of the water.
 - (03) It provides minimal protection against hypothermia.
-



A.11. Donning

Before entering the water, don and adjust a near-shore buoyant vest PFD using the following procedures:

Step	Procedure
1	Grasp the PFD at the lower part of head opening and pull outward to expand opening.
2	Slip head through opening.
3	Pass the body strap around the back and fasten at the front of the PFD, then adjust the strap for a snug fit.

Type III PFD

A.12. Description

Type III PFD is routinely worn aboard boats or cutter crews during underway deck evolutions when freedom of movement is required and the risk of falling over the side is minimal. It is not designed to turn an unconscious wearer to a face-up position; the design is such that conscious wearers can place themselves in a vertical or slightly backward position. It has a minimum of 15.5 pounds of buoyancy and comes in many sizes and colors. (Figure 3-3) shows one style of Type III PFD that boat crews are authorized to wear. Most approved flotation jackets (“float coats”) are also Type III devices.



Figure 3-3
Type III Device PFD



A.13. Advantages

Type III PFDs offer boat crew members greater comfort and freedom of movement. The Type III PFD is designed so wearers can place themselves in a face-up position in the water. Type III PFD allows greater wearing comfort and is particularly useful when water-skiing, sailing, hunting from a boat, or engaging in other water activities.

NOTE

The Type III PFD provides adequate flotation when wearing a full complement of law enforcement gear. If unable to remain afloat, jettison easily accessible equipment.

A.14. Disadvantages

The following are some disadvantages to the Type III PFD:

- (01) Flotation characteristics are marginal and not suitable for wear in heavy seas,
- (02) Tendency to ride-up on the wearer in the water,
- (03) Wearer may have to tilt head back to avoid a face-down posture in the water,
- (04) The distribution of the flotation material reduces or eliminates the turning ability when compared to the Survivors Type I PFD.

A.15. Donning

Before entering the water, don and adjust a Type III PFD using the following procedures:

Step	Procedure
1	Place your arms through the openings in the vest.
2	Close zipper, if provided. Close front slide fasteners.
3	Adjust waist straps for a snug fit.



A.16. Non-Coast Guard Approved Type III PFDs

Non-Coast Guard Approved Type III PFDs (**Figure 3-4**) are intended for specific activities and may be carried instead of a Coast Guard-approved Type III PFD only if used according to the approval condition on the label. Examples of Non-Coast Guard Approved Type III PFDs are:

- (01) Mustang Survival MD-3183 v22 with survival equipment pockets,
- (02) Lifesaving Systems Life Preserver Survival Vest.

NOTE 

Non-Coast Guard Approved PFDs are not Coast Guard approved because they have beaded handles vice t-handles (which have been deemed a snag hazard). Reference (a) contains a list of all Non-Coast Guard Approved PFDs.



Figure 3-4
Non-Coast Guard Approved Type III PFD

A.17. Advantages

The Non-Coast Guard Approved Type III PFD offers boat crew members greater comfort and maneuverability compared to the typical Type III vest. Lightweight and not as bulky, the inflatable Non-Coast Guard Approved Type III device is especially beneficial to units in warmer climates. When fully inflated, the inflatable Non-Coast Guard Approved Type III provides more buoyancy. Some Non-Coast Guard Approved Type III inflatables provide storage pockets/pouches which, when properly outfitted, eliminate the need for wearing the Boat Crew Survival Vest mentioned later in this chapter.

A.18. Disadvantages

The initial purchase price and preventive maintenance costs of Non-Coast Guard Approved Type III inflatable PFDs are greater than most Type III vests. It also requires more frequent and complicated preventive maintenance. As with any other automated feature, if the auto-inflate mechanism were inoperative, the PFD would have to be manually inflated. This could be a problem if the crew member is knocked unconscious while falling overboard. Automatically inflatable PFDs are also known to hinder egress from an enclosed cabin environment.



A.19. Donning

There are several different styles of Non-Coast Guard Approved Type III PFDs. Each has a specific method of donning, equipment storage, and activation. Prior to use, each crew member must complete the performance qualification standards for that specific style of Non-Coast Guard Approved Type III. PFD PQS can be found on the Office of Boat Forces Portal site.

Ring Buoys/Throwable Devices

A.20. Description

Ring Buoys/Throwable Devices are Coast Guard-approved devices that are easily deployed to a person-in-the-water and are grasped by the user until rescued. Buoyant cushions come in many different colors. Ring buoys (see [Figure 3-5](#)) are usually international orange.



Figure 3-5
Ring Buoy/Throwable Device

A.21. Advantages

An advantage of Ring Buoys/Throwable Devices is that since they are not worn like other PFDs, there are no size restrictions. This type of device is designed to be stored on deck for easy deployment should someone fall overboard. If quickly deployed following a person in the water, Ring Buoys/Throwable Devices also act as markers assisting in returning to the area where the person originally fell overboard. See Reference (b) for more information on Person-in-the-Water Recovery.

A.22.
Disadvantages

A disadvantage of Ring Buoys/Throwable Devices is that they are not worn, although some can be secured to the body once reached in the water.



Non-Coast Guard Approved Cutter Specific PFDs

A.23. Description Examples of Non-Coast Guard Approved Cutter Specific PFDs include the Standard Navy PFD with Collar (**Figure 3-5**) and the Abandon Ship Life Preserver.

A.24. Standard Navy PFD with Collar

This preserver is one of the best devices for keeping a person afloat; however, its major drawback is that it requires training to become familiar with the many straps and fastenings used to don this device quickly and properly. Consequently, the Standard Navy Preserver is not Coast Guard-approved for civilian use. Auxiliarist or other government agency (OGA) going aboard a Coast Guard cutter as crew (or passenger) should be given instructions in donning this PFD.

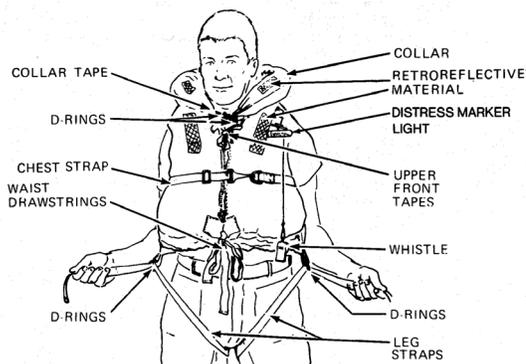


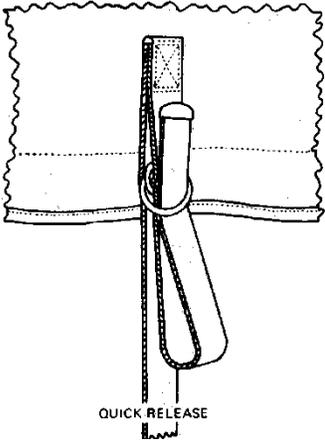
Figure 3-5
 Standard Navy Preserver

A.24.a. Donning

Use the following procedure to put on the standard Navy PFD with collar:

Step	Procedure
1	Don the PFD as you would a vest.
2	Secure the chest-strap snap hook on the right side to the D-ring on the left and pull strap tight around the chest.
3	Extend the leg straps hanging from the rear waist area and route through legs from the rear to the front.



4	<p>Insert the right leg strap through the right double D-rings hanging from the side waist area and route the bitter end over the top D-ring and through the bottom. Pull all slack from the strap. Rig strap for quick release as shown in the figure (right). Repeat for the left leg strap.</p>	 <p>QUICK RELEASE</p>
5	Pull waist drawstrings tight and secure with a bowknot.	
6	Tie upper front tapes together with a bowknot.	
7	Secure collar tapes through collar D-rings and tie with a bowknot.	

A.25. Abandon Ship Life Preserver



The Abandon Ship Life Preserver may be used as an option by cutter personnel in high heat areas and/or confined spaces during general emergency conditions or abandon-ship operations but is not a replacement for the Navy Type I PFD w/ Collar.

A.25.a. Donning, Adjusting and Inflating

Use the following procedures to don, adjust, and inflate the Abandon Ship Life Preserver:

Step	Procedure
1	Buckle the waist belt around the waist with the pouch to the rear.
2	Adjust the waist belt to allow rotation of the pouch to the stomach area.
3	When required, unsnap the pouch, unroll the inflatable chamber, and pass head through yoke opening.
4	Inflate the preserver by pulling the yellow inflation lanyard with a slow steady pull until the inflation assembly actuates.
5	If the CO ₂ inflation assembly fails, orally inflate preserver by unscrewing the knurled ring, depressing the mouthpiece, and blowing into the oral inflation tube.



Section B. Hypothermia Protective Clothing

Introduction

Accidentally falling into cold water has two potentially lethal consequences: drowning and hypothermia. Previously, the protection provided by PFDs against drowning was discussed. All Coast Guard and Auxiliary crews including passengers will be outfitted with the appropriate hypothermia protective clothing per Reference (a).

Hypothermia protective clothing is designed to permit functioning in cold weather and water conditions. There are two primary types used by the Coast Guard:

- (01) Anti-exposure coverall,
- (02) Dry suit (or approved replacement).

NOTE

A special type float coat, with a Type V-approval label, meets the same flotation requirements as the anti-exposure coverall, but provides only partial covering and less thermal protection.

In this Section

This Section contains the following information:

Title	See Page
Cold Weather Principles	3-13
Anti-Exposure Coverall	3-14
Dry Suit	3-15

Cold Weather Principles

B.1. Layered Clothing

The best way to avoid cold-related injuries is to wear proper clothing. When choosing clothing combinations, the best advice is to layer clothing.

B.2. Maintaining Body Heat

Wet clothing robs the body of heat by breaking down the thermal protection of insulated clothing. It is extremely important to replace wet clothing as soon as possible to prevent cold-related injuries, particularly if the person is idle after a period of heavy perspiring.

Many cold weather medical problems involve wet hands, feet and head. These areas should receive special care.



Anti-Exposure Coverall

B.3. Description The anti-exposure coveralls are the primary Layer III garment worn when members are exposed to intermittent sea spray or rain and thermal protection is required (**Figure 3-6**). If properly worn with the straps appropriately adjusted, the water will not flush out of the suit and will delay the onset of hypothermia.



Figure 3-6
Anti-Exposure Coverall

B.4. Donning Anti-exposure coveralls are designed to be worn over the uniform in the same manner as standard coveralls. Also, hoods, balaclava, goggles and gloves should be used to protect against the elements.

B.5. Entering the Water Before entering the water with anti-exposure coveralls, perform the following procedures:

Step	Procedure
1	Ensure the zipper is completely closed.
2	Tighten straps at the waist, thigh, and ankle to reduce transfer of cold water inside the suit. This increases the degree of hypothermia protection.
3	Orally inflate the pillow behind the collar. This will provide support for the head.



Dry Suit

B.6. Description The dry suit, one part of a multilayered maritime cold-weather suit system (MCWSS), provides protection in areas where exposure to wind, spray, cold water, and hypothermia is likely (see **Figure 3-7**). The dry suit, with proper undergarments, provides the best protection for crew members in adverse weather and cold-water immersion.

When the mission performed by the member is more likely to cause excess damage to a dry suit (AtoN maintenance, fisheries boardings), other Coast Guard authorized hypothermia protective clothing may be worn. Details on all authorized PFDs can be found in Reference (a).



Figure 3-7
Dry Suit

WARNING

Dry suits provide no inherent buoyancy. A PFD must be worn over a dry suit at all times while underway.

B.7. Use When worn with a PFD and proper undergarments, a dry suit offers mobility and superior protection against the effects of wind, spray and cold-water immersion.



B.8. Donning

Use the following procedure to put on the MCWSS. Follow the steps closely to ensure proper sealing of neck and wrist seals:

Step	Procedure
1	Lubricate inside of the neck and wrist seals with unscented talc.
2	Don Layer I moisture wicking followed by Layer II fleece insulating undergarments.
3	Don the MCWSS in the same fashion as donning coveralls, entering it one leg at a time.
4	Pull the bottom section of the suit up to the waist and place arms into the sleeves.
5	Gently push one hand through the wrist seal at a time using the index finger of the opposite hand to stretch the seal as you push your hand through. Repeat for opposite hand. Make sure insulating undergarments are not sandwiched between seal and skin and flatten any folds or rolls of the seal flat against the skin.
6	Bring the upper portion of the suit over the head, aligning the neck opening with the top of the head. Reach inside the top of the neck seal with the fingers and gently pull the seal outward and down as you push your head through. Ensure insulating undergarments are not sandwiched between seal and skin, and flatten any folds or rolls of the seal flat against the skin.
7	Close the entry and relief slide fasteners. Have a fellow crew member double check all fasteners to ensure it is closed completely against the sealing plug.
8	Remove excess air from the suit by sliding fingers under the neck seal and squatting down, pull arms tight against the chest and release seal.

WARNING 

Use of comfort devices to stretch the neck or wrist seals away from the skin such as neck rings or O-ring comfort devices are not authorized.

CAUTION!

Use extreme caution when donning the MCWSS. Prior to donning the MCWSS, remove all rings, watches, earrings, necklaces and eyeglasses that will cause damage to wrist and neck seals.

B.9. Entering the Water

Before entering the water, perform the following procedures:

Step	Procedure
1	Slip on a neoprene hood.
2	Close all zippers and fasten Velcro wrist and ankle straps.
3	Put on gloves.



B.10. Doffing

Use the following procedure to take off the dry suit:

Step	Procedure
1	Remove all other equipment donned over the dry suit before removing the dry suit.
2	Wash down the dry suit while wearing it paying particular attention to entry and relief slide fasteners. Remove all traces of salt.

CAUTION!

Failure to completely open slide fastener will damage the suit when it is removed.

3	Completely open the entry slide fastener.
4	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling head from seal and shoulders and head out of the suit.
5	Insert two fingers under wrist seal and gently pull seal outward. Cup the hand, fingertips and thumb together, and gently pull hand from seal. Repeat for other hand.
6	Remove legs from suit. Insert a wide dry suit hanger out through the neck seal, close entry slide fastener half way and hang until dry.
7	Completely open the entry slide fastener.
8	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling head from seal and shoulders and head out of the suit.
9	Insert two fingers under wrist seal and gently pull seal outward. Cup the hand, fingertips and thumb together, and gently pull hand from seal. Repeat for other hand.
10	Remove legs from suit. Insert a wide dry suit hanger out through the neck seal, close entry slide fastener half way and hang until dry.
11	Completely open the entry slide fastener.
12	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling head from seal and shoulders and head out of the suit.
13	Insert two fingers under wrist seal and gently pull seal outward. Cup the hand, fingertips and thumb together, and gently pull hand from seal. Repeat for other hand.
14	Remove legs from suit. Insert a wide dry suit hanger out through the neck seal, close entry slide fastener half way and hang until dry.



B.11. Industrial Style Dry Suit

Coxswains, crew members, boarding officers and boarding team members may use the Industrial breathable marine survival system (MSD901) in lieu of the MCWSS when operating in conditions requiring dry suit use.

A.11.a. MSD901 Donning Procedure

Use the following procedure to put on the MSD901. Follow the steps closely to ensure proper sealing of neck and wrist seals:

Step	Procedure
1	Ensure the MSD901 is completely assembled in accordance with MPC.
2	Completely loosen the neck seal.
3	Ensure the wrist, thigh and ankle adjustments are loose.
4	Completely open the chest zipper.
5	Completely open the waterproof circumference zipper.
6	Don Layer I moisture wicking undergarment.
7	Fold the upper portion of the suit forward at the waist and slide one leg at a time into the suit until your toes reach the end of the socks.
8	Pull the bottom section of the suit up to the waist and place arms into the sleeves.
9	Gently push one hand through the wrist seal at a time using the index finger of the opposite hand to stretch the seal as you push your hand through. Repeat for opposite hand. Make sure insulating undergarments are not sandwiched between seal and skin and flatten any folds or rolls of the seal flat against the skin.
10	Bring the upper portion of the suit over the head, aligning the neck opening with the top of the head. Reach inside the top of the neck seal with the fingers and gently pull the seal outward and down as you push your head through. Make sure insulating undergarments are not sandwiched between seal and skin and flatten any folds or rolls of the seal flat against the skin.
11	Fold the waterproof zipper cover out of the way.



12	Grasp the end of the waterproof zipper on your right side and the zipper pull with the opposite hand.
	
13	Pull the zipper closed completely around the waist circumference, ensuring the zipper is tight against the sealing plug.

WARNING 

Failure to completely close the waterproof entrance and relief zippers to the sealing plug will allow water to leak into the suit resulting in drastic loss of survival time.

14	Pull relief zipper closed completely ensuring the zipper is tight against the sealing plug.
15	Fold the waterproof zipper cover closed over the zipper.
16	Buckle the waist belt and adjust to a comfortable fit.
17	Adjust and close the ankle and thigh adjustment straps.
18	Grasp and pull the neck seal drawstring to ensure a watertight and comfortable fit.
	
19	Secure the end of the neck seal drawstring to the tab under the outer collar.
20	Buddy-check all fasteners and zippers.



WARNING



Use of comfort devices to stretch the neck or wrist seals away from the skin such as neck rings or O-ring comfort devices are not authorized and shall not be used.

WARNING



Per reference (a), the MSD901 shall be worn with all three modules completely assembled.

CAUTION!

Use extreme caution when donning the MSD901. Prior to donning the MSD901, remove all rings, watches, earrings, necklaces and eyeglasses that will cause damage to wrist and neck seals.

A.11.b.
Doffing
Procedure

Use the following procedure to take off the MSD901:

Step	Procedure
1	Remove all other equipment donned over the MSD901 before proceeding.
2	Wash down the MSD901 while wearing it paying particular attention to entry and relief slide fasteners. Remove all traces of salt.
3	Unbuckle the waist belt and release the ankle, wrist and thigh adjustment straps.

CAUTION!

Failure to completely open slide fastener will damage the suit when it is removed.

4	Fold the waterproof zipper cover out of the way. Completely open the waterproof zipper.
5	Completely loosen the neck seal drawstring and open the chest zipper.
6	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling head from seal and shoulders and head out of the suit.
7	Insert two fingers under wrist seal and gently pull seal outward. Cup the hand, fingertips and thumb together, and gently pull hand from seal. Repeat for other hand.
8	Remove legs from suit. Hang the suit by the hanging loop, close waterproof zipper half way and hang until dry.



B.12. Ice Rescue Dry Suit Two dry suits are approved specially for ice rescue operations only:

- (01) The MSD 640 dry suit, and
- (02) The MSD 630 dry suit.

NOTE *GR*

Per reference (a), all previously purchased dry suits that are still serviceable are authorized for use until the repair cost exceeds 50% of the purchase price of a new dry suit.



Figure 3-8
MSD640 Dry Suit

B.12.a. MSD640 Donning Procedure Before donning the MSD-640, ensure appropriate polypropylene undergarments are worn.

CAUTION!

Always don the dry suit on a clean surface such as a towel or tarp to avoid attracting debris. Pebbles, sand, dirt and other debris on the ground can cause damage to dry suit sock and compromise the suit's integrity.

CAUTION!

Use extreme care when donning the dry suit. Prior to donning, remove all rings, watches, earrings, necklaces and eyeglasses that will cause damage to the wrist and neck seals. Footwear other than thermal socks must not be worn inside the drysuit.

Use the following procedures to put on the MSD640. Follow the steps closely to ensure proper sealing of the neck and wrist seals:

Step	Procedure
1	Ensure that Velcro® wrist covers and ankle covers are unfastened.
2	Ensure waist adjusters are loosened.
3	Ensure that both the outer shell entry zipper and waterproof entry zipper are fully opened.



4	Ensure the suspenders are pulled out of the suit legs.
5	Slide your legs into the suit until your toes reach the ends of the socks.
6	Don the suspenders. Ensure they are crossed in the back but not twisted.
7	Apply unscented talcum powder to the inside of the wrist seals.
8	Place right arm into right sleeve.
9	Carefully place the right hand into the right cuff by pointing the fingers straight, tucking the thumb underneath and inserting the hand through the seal. Do not make a fist when putting your wrist through the seal.
10	Roll the Velcro® wrist covers back and refasten to a snug fit.
11	Repeat steps 7-10 for the left arm.
12	Bring the upper portion of the suit over your head, aligning the neck opening with the top of the head. Reach inside the top of the neck seal with fingers and gently pull the seal outward and down as you push your head through. Flatten any folds or rolls of the seal against the skin.
13	Close the waterproof entry zipper. Reach over your left shoulder with your right hand and grasp the zipper toggle. While holding the top of the zipper, pull the toggle down until the zipper is completely fastened.
14	Ensure the waterproof relief zipper is completely closed and the slider is fully engaged with the zipper stop. Stow the zipper toggle in the yellow loop located under the zipper cover
<p>CAUTION! Per reference (a), dry suits alone provide inadequate insulation for hypothermia protection. Personnel shall wear thermal underwear beneath the dry suit to provide protection from cold temperature, wind, sea spray and rain. Dry suits are not inherently buoyant. The harness flotation vest shall be worn over the dry suit for all cutter swimmer deployments.</p>	
15	Close the outer shell entry zipper. Reach over your left shoulder with your right hand and grasp the zipper toggle. While holding the top of the zipper, pull the zipper down until the zipper is completely fastened.
16	Tighten the ankle Velcro® covers to a snug fit.
17	Prior to water entry, cross arms in front and gently slide finger between neck seal and your neck, squat down and force excess air through the neck opening.



B.12.b. Doffing Procedure

Use the following procedure to take off the MSD640:

Step	Procedure
1	Remove all equipment worn over the suit.
2	Thoroughly rinse down the exterior of the suit while wearing it, paying special attention to the seals and zippers. Remove all dirt, salt and debris.
3	Loosen Velcro® waist and ankle adjustment tabs.
4	Completely open the outer shell entry zipper and the inner immersion layer waterproof zipper.
<p>CAUTION! Placing undue force on the zipper may damage the seal and harm the integrity of the suit. Never forcefully yank on the zipper.</p>	
5	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling neck seal over your head.
6	With an unclenched fist, slowly pull each hand through the wrist seals while holding the rubber seal open
<p>CAUTION! Pulling on the wrist seal may damage the seal.</p>	
<p>NOTE <i>↪</i> If wearing suspenders, remove suspenders prior to proceeding.</p>	
7	Pull suit down past hips and slide legs from the suit.



**B.13. Cutter
Surface
Swimmer Dry
Suit**

The cutter surface swimmer dry suit is worn by cutter surface swimmer personnel when deployed into water that is 50 degrees Fahrenheit and below.



**Figure 3-9
Cutter Surface Swimmer Dry Suit**



B.13.a. Donning Procedures

Use the following steps to put on the cutter surface swimmer dry suit:

Step	Procedure
1	Lubricate the inside of the neck and wrist seals with unscented talcum powder.
2	Don insulating undergarments as required.
3	Pull the bottom section of the suit up to the waist and place arms into the sleeves.
4	Gently push one hand through the wrist seal at a time using the index finger of the opposite hand to stretch the seal as the hand pushes through. Repeat for opposite hand. Make sure insulating undergarments are not sandwiched between seal and skin and flatten any folds or rolls of the seal flat against the skin.
5	Bring the upper portion of the suit over the head, aligning the neck opening with the top of the head. Reach inside the top of the neck seal with the fingers and gently pull the seal outward and down as the head pushes through. Make sure insulating undergarments are not sandwiched between seal and skin and flatten any folds or rolls of the seal flat against the skin.
NOTE 	Use only one or two fingers to pull the entry and relief slide fasteners closed. If more force is required, the slide fastener may not be properly aligned or lubricated. If difficulty is encountered when closing slide fasteners, stop immediately, back the slide up and check for the cause of the interference. Correct the problem before proceeding. The slide fastener must be snug tight against the sealing plug. Use paraffin to lubricate the slide fastener.
6	Close the entry and relief slide fasteners. Have a fellow crew member double check slide fastener to ensure it is closed completely against the sealing plug.
7	Remove excess air from the suit by sliding fingers under the neck seal and squatting down, pull arms tight against the chest and release seal.



B.13.b. Doffing
Procedures

Use this procedure to take off the cutter surface swimmer dry suit:

Step	Procedure
1	Remove all other equipment before removing the dry suit.
2	Wash down the dry suit while wearing it; pay particular attention to entry and relief slide fasteners. Remove all traces of salt.
CAUTION!	Failure to completely open slide fastener will damage the suit when it is removed.
3	Completely open the entry slide fastener.
4	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling head from seal and shoulders and head out of the suit.
5	Insert two fingers under wrist seal and gently pull seal outward. Cup the hand, fingertips and thumb together, and gently pull hand from seal. Repeat for other hand.
6	Remove legs from suit.



Section C. Boat Crew Survival Vest

Introduction

The equipment in the boat crew survival vest provides crew members a means to signal their position on the surface of the water, day or night. The vest is worn over all PFDs with the exception of Type V inflatables. The vest does not interfere with wearing a PFD or hypothermia protective clothing. If using a Type V inflatable, the equipment normally stored in the boat crew survival vest will be tethered to the PFD's storage pocket/pouch.

Per reference (a), the components of the boat crew survival vest shall not be removed to other devices/individual PFDs. Auxiliary survival equipment requirements are outlined in the reference (c).

In this Section

This Section contains the following information:

Title	See Page
Boat Crew Survival Vest	3-28
Emergency Signaling Mirror	3-29
Strobe Light	3-30
Illumination Signal Kit, MK-79 MOD 0	3-31
Signal Whistle	3-34
Smoke and Illumination Signal, MK-124 MOD 0	3-35
Survival Knife	3-38
Personal Locator Beacon	3-38



Boat Crew Survival Vest

C.1. Description

Boat crew survival vests contain the equipment listed in **Table 3-1** Boat Crew Survival Vest Contents, with their use, characteristics, and operation described later in this Section.

Figure 3-10 shows the boat crew survival vest and the proper storage location for each item.

WARNING

In addition to the PFD, each crew member must also be outfitted with either a boat crew survival vest, or if wearing a Type III inflatable PFD, the same contents found in the survival vest stored in the PFD's pocket/pouch. Reference applicable maintenance procedure cards.



Figure 3-10
Boat Crew Survival Vest

C.2. Contents

Item	Equipment	Quantity
1	Emergency Signaling Mirror	1
2	Strobe Light	1
3	MK 79 Personal Distress Signal Kit	1
4	Whistle	1
5	MK-124 Mod 0/1 Marine Smoke and Illumination Signal	1
6	Survival Knife	1
7	Personal Locator Beacon (PLB)	1

Table 3-1
Boat Crew Survival Vest Contents



Emergency Signaling Mirror

C.3. Description The emergency signaling mirror is a pocket-sized mirror with a sighting hole in the center and a lanyard attached (see [Figure 3-11](#)). However, any common mirror is useful as an emergency signaling device.

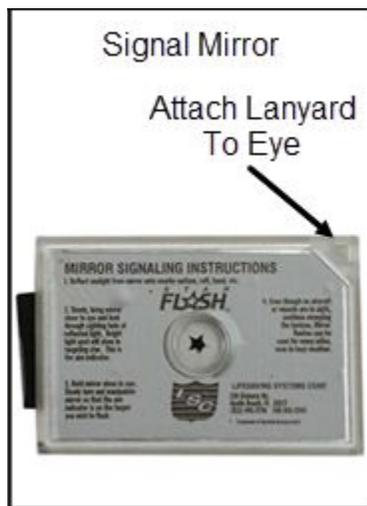


Figure 3-11
Emergency Signaling Mirror

C.4. Use The mirror is used to attract the attention of passing aircraft, boats, or ground rescue teams by reflecting light at them. Instructions for using the mirror are printed on its backside.

C.5. Characteristics Light reflected in this manner can be seen at a great distance from the point of origin. Practice is the key to effective use of a signal mirror.

C.6. Operation The following procedures describe how to properly use this accessory:

Step	Procedure
1	Face a point about halfway between the sun and an object you wish to signal.
2	Reflect sunlight from the mirror onto a nearby surface such as the raft, your hand, etc.
3	Slowly bring the mirror up to eye-level and look through the sighting hole. You will see a bright light spot, this is the aim indicator.
4	Hold the mirror near your eye and slowly turn and manipulate it so the bright light spot is on target.



Strobe Light

C.7. Description The strobe light is a lightweight, compact, battery-operated strobe light that emits a high intensity white LED visual distress signal (**Figure 3-12**).

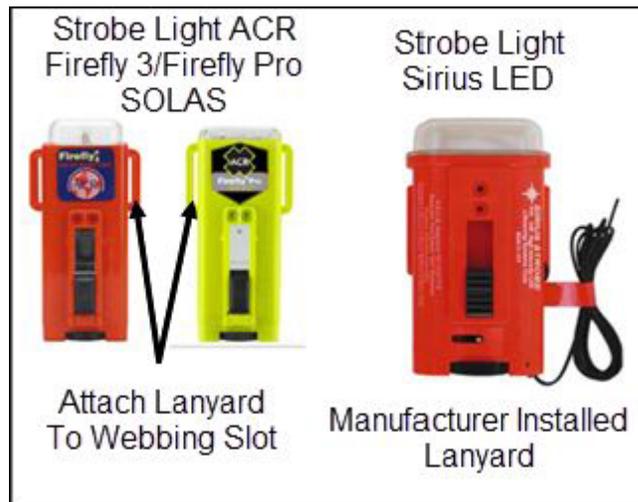


Figure 3-12
Strobe light

C.8. Use The strobe light is used to attract the attention of aircraft, ships, or ground parties. One side is equipped with hook fastener tape so that it can be attached to the boat crew safety helmet, inflatable PFD, or survival vest. This eliminates the need to hold the strobe light, freeing up hands to operate other signaling equipment.

C.9. Characteristics The strobe lights emit approximately 50 to 70 flashes per minute. It will operate for a minimum of 8 hours continuous, but typically 18+ hours. Depending on atmospheric conditions, the strobe light has a visual range of 2 – 5 miles.



**C.10.
 Operation**

The following are the procedures to operate the strobe light:

Step	Procedure
1	Turn <i>on</i> : Slide the switch into the <i>on</i> position. Light should begin flashing within seconds.
2	Turn <i>off</i> : Slide the switch back into the <i>off</i> position. The light should stop flashing.
NOTE Coast Guard Deployable Specialized Forces units utilizing MILTAC strobe light will have different operating procedures.	

Illumination Signal Kit, MK-79 MOD 0

**C.11.
 Description**

The MK-79 MOD 0 is a pyrotechnic illumination signal kit that contains seven screw-in cartridge flares (MK-80) and one pencil-type projector (MK-31). The projector in this kit is used to aim and fire a signal cartridge (**Figure 3-13**). Additional information can be found in reference (d).

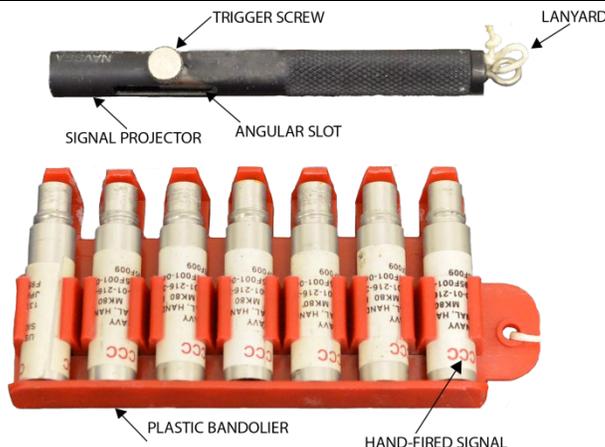


Figure 3-13
Illumination Signal Kit, MK-79 MOD 0

C.12. Use

The MK-79 MOD 0 is used to attract vessels, aircraft, and ground rescue teams.

**C.13.
 Characteristics**

These signals produce a single red star display at an altitude of 250-650 feet for a minimum time of 4.5 seconds. Their luminous intensity is about 12,000 candle power.



**C.14.
Operation**

The following are procedures for operating the MK-79 MOD 0:

Step	Procedure
1	Remove the bandolier and projector from the plastic envelope.
2	Cock the firing pin of the projector by moving the trigger screw to the bottom of the vertical slot and slipping it to the right so that it catches at the top of the angular (safety) slot. 
WARNING  Failing to cock the firing pin back may result in the cartridge firing prematurely when attaching to the projector.	
3	Bend protective plastic tab away from signal in bandolier to allow attachment to projector. 
WARNING  The plastic tabs over signals in the bandolier protect percussion primers on the cartridges from being struck accidentally. They should be kept intact until just before loading into the projector.	



WARNING 

Keep the projectile-end of the flare pointed in a safe direction while loading the flare in the projector. Ensure Step 2 is completed prior to “loading.” Accidental firing may occur if projector is not cocked.

- 4 Attach a signal flare to the projector and rotate clockwise until the signal is seated.



- 5 Hold projector overhead with arm fully extended. The projector should be pointed at a slight angle away from the body.





6	While firmly gripping the projector, fire the signal by slipping the trigger screw to the left out of the safety slot and into the firing slot.
NOTE 	This action should be one continuous movement so that the thumb does not interfere with the upward motion of the trigger screw when it is brought into the firing slot. The trigger screw must "snap" upward.
7	If the signal fails to fire, try again twice by depressing the trigger screw to the bottom of the firing slot with the thumb and releasing it quickly. If it still fails to fire, wait 30 seconds before unscrewing, to reduce the possibility of hang fire.
WARNING 	Do not aim at personnel, aircraft, or other objects.
8	Unscrew (counterclockwise) the spent signal case or signal that has failed to fire. Discard by throwing overboard.
9	To fire another signal, repeat the procedures above.

Signal Whistle

C.15. Description The whistle is a small, hand-held device (see [Figure 3-14](#)) that produces a loud sound when it is blown. The standard whistle is constructed of plastic and resembles a police officer's whistle.



Figure 3-14
Signal Whistle



C.16. Use The sound produced by a whistle will attract the attention of rescuers and guide them to the whistle's origination. During periods of restricted visibility, fog, and darkness, rescuers may hear the sound it produces before they sight the strobe light.

C.17. Characteristics Depending on weather conditions, a whistle's audible sound may be heard at a distance of up to 1,000 yards. Any wind has the effect of carrying the sound downwind.

Smoke and Illumination Signal, MK-124 MOD 0/1

C.18. Description The MK-124 Mod 0/1 is a pyrotechnic smoke and illumination signal used day or night as a distress signal at sea or on land (**Figure 3-15**). One end produces orange smoke as the day signal and the other end produces a red flare as the night signal. Additional information can be found in Reference (d).

NOTE 

Auxiliary crew members may use commercially available Coast Guard approved survival equipment while operating an Auxiliary facility. See reference (c) for specific requirements.



Figure 3-15
Smoke and Illumination Signal, MK-124 MOD 0/1

C.19. Use These signals are used to attract vessels, aircraft, and ground rescue teams day or night. The signal may also be used to indicate wind direction for helicopter hoists. It is labeled with the following operating instructions:

- (01) Do not dispose of the signal until both ends have been used.
- (02) Only when signals misfire should it be disposed of over the side. Misfires are a safety hazard if kept onboard a vessel.
- (03) When both ends of the signal have been discharged, properly dispose of it. In an actual distress situation, spent signals may be tossed over the side.

WARNING 

Per reference (a), under no circumstances shall personnel ignite both ends simultaneously.



**C.20.
Characteristics**

As mentioned above, both ends of the device produce a signal and each end burns for about 20 seconds. The night end produces a red flare (similar to a road flare) and the day end produces orange smoke.

**C.21.
Operation**

The device has two raised bands around its circumference on its night end (flare). These bands positively identify the night end by sense of touch. Also, a label on the case identifies the day (smoke) and night (flare) ends and provides instructions for use.

After choosing which end to use, perform the following procedures:

Step	Procedure
WARNING 	After ignition, the outer case may overheat and burn the hand. Dropping the signal on land will not decrease its effectiveness.
WARNING 	Do not look directly at the light of a night flare close up. The intensity of the lights could burn the eyes.
WARNING 	Do not direct either end of a signal toward another person.
1	Remove the protective cap from the end to be ignited. 
2	Slide the plastic lever in the direction of the arrow until fully extended. 



3	<p>Hold the signal downwind and overhead at a 45° angle from the horizon over the side of the raft or away from dry debris to prevent burns from hot drippings.</p> 
<p>WARNING  Prior to pulling lever downward, position all fingers below top of signal.</p>	
4	<p>Using the thumb, pull down on the extended tab to ignite signal.</p> 
5	<p>If the smoke signal end flames up, briefly immerse it in water or hold it against a solid object.</p>
6	<p>After using one end, douse in water to cool it, or if on land, place it on the ground to cool. Save the signal to use the other end when needed.</p>



Survival Knife

C.22. Description

The survival knife (**Figure 3-16**) is a basic tool used to free the crew member from entangling lines. It is also used to cut material blocking a path in escaping a capsized or sinking boat. It should be a fixed blade design with a blunt tip made of corrosion-resistant material. The blade should be checked periodically for sharpness.



Figure 3-16
Survival Knife

Personal Locator Beacon (PLB)

C.23. Description

The PLB (**Figure 3-17**) is a smaller version of the common ship mounted 406 MHz EPIRB that is used on military, commercial, and recreational vessels. This personal transmitter is capable of broadcasting a distress signal that can be received and tracked world-wide guiding emergency response resources to the transmitting position for rescue.

C.24. Use

The PLB is for emergency use only. This device is the primary distress signal and should be activated immediately to signal for help. Once activated, do not turn it off. Once search vessels or aircraft have reached the transmitting position area, use other signaling equipment (radio, signal mirror, flares, etc.) to vector them to the position.

C.25. Characteristics

The PLB is a personal transmitter capable of broadcasting on both 406 MHz and 121.5 MHz. The international satellite based search and rescue system (COSPAS SARSAT) monitors 406 MHz and is able to provide a position accurate to within three nautical miles within 90 minutes. Once the rescue platform is in the vicinity, the 121.5 MHz transmitter provides a signal allowing the resource to home in on the vessel or individual in distress particularly if the individual is equipped with flares and a strobe light.



C.26.
Operation

Since PLB's may vary in style and operation, as new models are produced, each crew member should read and understand the PLB owner's handbook. Prior to getting underway with the PLB the first time, each crew member should demonstrate the test sequence and explain the activation procedure to a qualified member.



Figure 3-17
Personal Locator Beacon (PLB)



E.3.a. Safety Precautions

Per reference (a), the following safety precautions shall be strictly observed when firing the parachute illumination signal:

- (01) Do not remove a signal from its sealed container until just before use.
- (02) Do not attempt to use dented, cracked, or otherwise damaged or deteriorated signals.
- (03) While handling the illumination signal outside of its canister, be sure to avoid striking the primer.

E.3.b. Firing Procedures

The following are procedures for firing the parachute illumination signal M127A1:

Step	Procedure
1	Remove a signal from its container.
2	Hold the signal in left hand with the RED knurled band of the signal FACING UP. Align left thumb and forefinger along the red band. <div data-bbox="889 934 1182 1491" style="text-align: center;"> </div>



3	<p>Withdraw the firing cap from the lower end of the signal.</p> 
4	<p>Point the ejection end of the signal (the end opposite the red knurled band) away from personnel, equipment, and materials. Slowly push the cap onto the primer (red band) end until the cap meets the edge of the knurled band. DO NOT PERMIT THE CAP TO GO BEYOND THE RED BAND.</p> 
<p>CAUTION! Exercise due care to prevent the expended rocket body from falling on people, watercraft, and structures.</p>	



5	<p>Hold the signal FIRMLY at arm's length with the left hand, with the ejection end facing straight up. The signal should be held in a vertical position (90° elevation) when firing.</p> 
6	<p>Strike the firing cap bottom sharply with the palm of the right hand, keeping the left arm rigid and pointing straight up.</p> 
7	<p>If a misfire occurs while underway, toss it overboard. Or If a signal misfires while on land, place it in a secure position to prevent people from being hurt should the signal fire. The signal must not be approached for at least 30 minutes.</p>

WARNING 

When conducting SAR operations with a helicopter, extreme caution and coordination must be used by surface units using pyrotechnics. Do not fire pyrotechnics without permission and instructions from the Aircraft Commander.



E.3.c. Firing
Angles

Firing a signal at angles other than a vertical position may be necessary under the following circumstances:

- (01) To compensate for high wind velocities.
- (02) To gain maximum illumination of the area.

NOTE 

If a signal is fired at an angle less than 90° elevation (directly overhead), the altitude reached is reduced and the altitude of candle burnout is lessened. If the firing angle is 60° or less, the candle will, in almost all cases, still be burning when it strikes the surface.



CHAPTER 4

Egress and Life Rafts

Introduction This Chapter addresses egress from a capsized boat and survivability in an open water environment to ensure that the safety and survival of personnel is not compromised. Personnel must become thoroughly familiar with their boat, procedures, and the challenges of survival in an open water environment.

In this Chapter This Chapter contains the following sections:

Section	Title	See Page
A	Egress Procedures from a Capsized Boat	4-2
B	Rescue and Survival Raft	4-6



Section A. Egress Procedures from a Capsized Boat

Introduction The key to surviving capsizing is practicing what you will do when you are suddenly underwater, upside down in the dark and only have one breath in you. Proper preparation and your initial response will largely determine the outcome. The crew must recognize the conditions that make capsize likely, and control the preconditions that will make a capsize lethal. reference (e) describes environmental and boat stability conditions that can lead to capsizing. These chapters also present warning signs and measures to take to minimize risk. The coxswain must continually assess the conditions to ensure the safety of the boat crew and of those in distress; however, all crew members have the responsibility to keep the coxswain advised if the situation changes.

In this Section This Section contains the following information:

Title	See Page
Preparation	4-2
Escape	4-4

Preparation

A.1. Potential Capsizing Forces and Factors

When a boat is in the water, two forces, buoyancy versus gravity work against each other. While buoyancy pushes up from the water to keep a boat afloat, gravity pushes the boat down into the water. Under normal circumstances the forces of buoyancy and gravity will offset each other, unless an external force acts upon a boat. Stability is of paramount importance – if a boat becomes unstable, small, normally minor outside forces can create a situation where capsizing can occur or perhaps be just one bad boat handling maneuver away. While stability loss itself can cause a boat to capsize, it is often a combination of loss of stability, environmental factors, and maneuvering decisions that lead to capsizing.

A boat is less likely to capsize in deep, open water. The chances of capsizing are greatest while operating in or near the surf or breaking seas. The force needed to capsize is most likely to come from heavy seas directly astern (following seas), or large breakers striking abeam. If in doubt, a boat should stay at sea until conditions change. The safest point for most boats to take heavy seas is nearly bow-on. A boat should not operate or tow in conditions beyond the capability of the boat or crew. In such conditions, the Operational Commander should be advised so that the proper resource (e.g. MLB, cutter, or helicopter) can respond.



While not necessarily contributing or causal factors, conditions present in many capsizings included:

- (01) Surf or breaking seas,
- (02) Shallow water depth (less than 20 feet),
- (03) High speed maneuvers,
- (04) Going against a strong tidal current and with steep following seas,
- (05) Escorting or towing another boat through an inlet,
- (06) Maneuvering a boat alongside another vessel while underway,
- (07) Restricted visibility due to darkness, rain, or fog,
- (08) Center of gravity changes (e.g. low fuel in the tank, excessive amounts of water in the bilges, icing of topsides, or overloading of cargo and/or people).

A.2.
Preparations for
Egress

If the hull is intact after capsizing, it may not sink for some time, even in rough seas, but quick egress is the best option for survival. The crew will be able to escape if panic is avoided. Some preparations and good to know information ahead of time include:

- (01) Perform frequent visualization “what-if” scenarios (night time, seating locations, etc.).
 - (02) Learn the boat’s interior. Initially the crew will be disoriented due to being upside down, water up your nose, and with a lack of lighting.
 - (03) Stow all loose gear, and have all equipment and doors operating properly for ease in escaping.
 - (04) Know the location and use of all survival equipment. Check them regularly to be sure that it is adequate, in good repair, and that all signalling devices work.
 - (05) Be ready to grab a sturdy support to prevent being thrown about.
 - (06) Cold water decreases the length of time most people can hold their breath underwater. Immersion in cold water may give a sensation of tightness in the chest and also causes a gasp reflex which may impact your ability to hold your breath.
 - (07) Remember if you are wearing an inherently buoyant PFD or an inflatable PFD that has been activated, the PFD’s buoyancy will try to bring you to the surface of the water but the cabin will be in the way. In theory, if you remain upright, you will be able to walk out of the boat on the overhead which is now acting as the deck. In most cases it will be difficult to remain upright and therefore your PFD may “pin” you to the overhead (deck). Consider removing PFD if necessary.
-



A.3. Know When Something is Wrong

A boat doesn't capsize without influencing forces. As mentioned in [A.1. Potential Capsizing Forces and Factors](#) of this Section there are certain conditions and factors that make capsizing more likely. Regardless of whether the above conditions are present or not, there comes a point where the operator feels a difference in how the boat normally feels. For example, the time for action is as soon as the boat starts to roll beyond normal limits, heel, or feel different from normal.

Escape

A.4. Escape Procedures – Initial Response

If the boat you are on capsizes make every effort to egress as quickly as possible. If you are not entrapped, GET OUT as quickly as possible! Your escape route is a common sense decision. Do not think of egress routes in terms of primary, secondary or tertiary egress routes where there are preferred exits. Instead consider where you are and your initial response given your position in the boat. Procedures for egress from a cabin boat are below:

- (01) Remain Calm,
 - (02) Brace for impact/roll,
 - (03) Wait until all violent motion has stopped,
 - (04) Maintain reference point with one hand on armrest, handrail. etc.
 - (05) Open window/door,
 - (06) Release restraint (If applicable),
 - (07) Continue to maintain reference points while exiting through door/window,
 - (08) Exit through door/window by pulling your body using a hand-over-hand technique – DO NOT Kick as this can disorient or injure a crew member following you out the same exit,
 - (09) If necessary, remove excess gear (PFD, LE belt, etc.),
 - (10) Once on the surface – see [A.6. Post Capsize Procedures](#).
-



A.5. Escape Procedures – Secondary Response

If the boat you are on capsizes and your initial response to egress is blocked or unsuccessful, shift to your secondary response. This will be the next most logical exit available to you. Additional procedures are below:

- (01) Remain Calm.
- (02) If needed, seek air pocket prior to secondary attempt.
- (03) Maintain reference point and use hand-over-hand technique to the secondary response exit - DO NOT Kick as this can disorient or injure a crew member following you out the same exit.
- (04) Open Door/Window.
- (05) If necessary, remove excess gear (PFD, LE belt, etc.).
- (06) Once on the surface – see Post capsized procedures.

A.6. Post Capsized Procedures

Survivors from a capsized boat should attempt to stay with the boat or other visible floating debris. This not only offers a larger target for search assets but also affords more protection against hypothermia as water robs your body of heat faster than air.

- (01) Climb onto hull of vessel (if possible).
- (02) Take personnel muster.
- (03) Activate PLB.
- (04) Visually scan for possible rescue vessels. If in range, personnel act as a team to signal using pyro, signal mirror, etc.
- (05) Inventory Survival gear.
- (06) Stay with the boat until rescued or boat sinks.

NOTE

If unable to board the overturned hull, survivors should huddle and tether themselves together and stay with the overturned vessel. Survivors should make every effort to stay with the overturned vessels without physically tying themselves to the vessel.

A.6.a. Remaining Inside a Capsized Boat

Make every effort to egress from a capsized boat quickly, it is your best option to survive but if for some reason someone cannot exit the capsized boat:

- (01) Remain calm and stay within an air pocket.
 - (02) Unless certain of rescue efforts on the surface, activate PLB. There is no guarantee that other crew were able to escape and initiate rescue.
 - (03) When hearing rescuers, attempt to communicate to them by shouting or tapping on the hull.
 - (04) Conserve oxygen by remaining calm and minimizing physical activity. If possible, get out of the water to reduce risk of hypothermia.
 - (05) Remember that rescuers should arrive soon.
-



Section B. Rescue and Survival Raft

Introduction

Where applicable, the multipurpose raft is designed for crew survival or rescue and assistance to persons in distress. The discussion here applies to almost any commercially available raft. The Auxiliary may use commercially available Coast Guard-approved life rafts that may typically be less complete but still serve the same purpose. The instructions for use and maintenance of any life raft should always be reviewed.

In this Section

This Section contains the following information:

Title	See Page
Inflation and Deployment	4-6
Boarding a Life Raft from the Water	4-8
On-Raft Conduct	4-9

Inflation and Deployment

B.1. Automatic Inflation and Deployment

When properly stowed, this life raft is designed to automatically float free from its storage rack and inflate in the event of capsizing or sinking. As the raft container is released and drifts away, the inflation cable, attached to the raft-end of the 50-foot painter line, is pulled tight. When this occurs, the CO₂ cylinder will automatically discharge and inflate the life raft. The painter line will remain attached to the rack by a weak link, which requires 500 pounds of force to separate. Separation will also occur by heaving around on the painter line or by the stress exerted on it from the raft's buoyancy if the boat/cutter sinks to a depth greater than 50 feet.

B.2. Manual Inflation and Deployment

Because of increased functionality and capability of boats, the use of rescue rafts is dwindling in the Coast Guard. Depending on the situation, if time permits before sinking, manually deploy the life raft. If the life raft is not automatic, or if its automatic functions do not work, follow the procedures outlined in [B.2.a. Manual Inflation Procedures of Boat-Installed Life Raft](#) or [B.2.b. Manual Inflation Procedures of Cutter Life Raft](#) for manual deployment.



B.2.a. Manual Inflation Procedures of Boat-Installed Life Raft

To manually deploy the rescue and survival raft, perform the following procedures (see **Figure 4-1**):

Step	Procedure
1	Cut/untie painter line from hydrostatic release unit.
2	Secure painter line to a strong point on boats deck.
3	Lift container and toss overboard.
4	Pull painter line to actuate inflation cylinder, life raft will inflate.
<p>NOTE ☞ In the event of a fire on your vessel, drop the raft into the water on the windward side of the vessel to stay upwind of harmful smoke, fumes and fire.</p>	
5	Time permitting; place extra equipment and supplies aboard the raft such as signals, portable radios, water, and food.
6	If practical, pull raft alongside and board directly from the boat.
7	Deploy sea anchor.
8	Pull the canopy over the support tubes and secure.
9	If the boat begins to sink, cut the painter line to free the raft to drift.
10	Follow the “Immediate Actions” instruction booklet located inside equipment container.
<p>CAUTION! In the event of upside-down inflation, right the raft from the end opposite of the inflation assembly and CO2 bottle. This end is marked “here to right.”</p>	

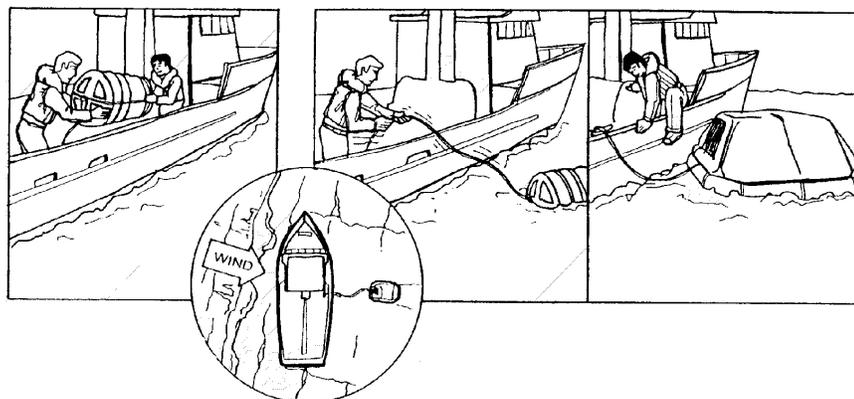


Figure 4-1
 Manual Deployment of Survival Raft



B.2.b. Manual Inflation Procedures of Cutter Life Raft

Use the following procedure to deploy the raft for use by the crew:

Step	Procedure
1	Cut or untie the painter line from the weak link.
2	Trigger the hydrostatic release and remove the raft container from the stowage rack.
3	Secure the painter line to a cleat or bitt.
4	Drop the raft into the water on the leeward side of the cutter.
5	Pull the remaining painter line (approximately 50 feet) from the raft container to actuate the inflation assembly. As the raft inflates, tend the painter line to keep the raft close. Fend off the inflating raft to prevent damage to the raft from the cutter.
6	Time permitting; place extra equipment and supplies aboard the raft such as signals, portable radios, immersion suits, water and food
7	If practical, pull the raft alongside the embarkation net/Jacobs ladder and board the raft directly.
8	Set a watch on the cutter and painter line. If the cutter begins to sink, cut the painter line to free the raft to drift.

Boarding a Life Raft from the Water

B.3. Boarding a Life Raft from the Water

With the life raft deployed and tied off alongside, the boat/cutter crew should try to remain onboard the platform for as long as possible. If the boat/cutter starts to sink rapidly, try and board the life raft directly, cutting the painter line once onboard. If unable to board the raft directly, you will need to enter the water.

Once in the water get aboard the life raft. This is done by climbing on the boarding ladder or ramp depending on the type of raft and pulling yourself up using the straps attached to the raft for this purpose.

B.3.a. Boarding a Life Raft from the Water Without Ramp

Perform the following procedures:

Step	Procedure
1	Facing entrance, use buoyancy of worn PPE to spring up.
2	Legs together, dolphin kick.
3	Grab top tube, then straps inside raft to pull in.
4	Get help from people inside the raft.



WARNING



Due to the high risk of accidentally puncturing inflatable rafts, extreme care must be taken when boarding or assisting personnel out of the water and into the raft. This is especially important if such persons are wearing survival vests. Once in the life raft all persons should seat themselves on the floor and remain in that position if possible. All sharp objects should be collected and stored to prevent puncturing the raft fabric.

On-Raft Conduct

**B.4. Tasks
 Onboard a Raft**

Upon boarding a raft, complete the following procedures as soon as possible:

CAUTION!

Be careful not to snag the raft with your shoes or with sharp objects.

Step	Procedure
1	Account for everyone and search for survivors.
2	If more than one raft is deployed, tie them together.
3	Check the physical condition of all people aboard. Give first aid as necessary. Weather permitting, wash any oil or gasoline from clothing and body. These substances will not only burn skin, but also pose a fire hazard. Additionally, they may be transferred from skin to the raft, deteriorating the rubber surfaces.
4	Salvage any floating equipment that may be useful. Inventory, stow, and secure all survival items.
5	If no longer attached to the vessel, deploy the sea anchor to reduce rate of drift and improve stability in heavy seas.
6	Check the raft for proper inflation and points of possible chafing (areas where equipment may wear a hole in the buoyancy tubes).
7	Bail out any water that may have entered the raft.
8	Inflate the floor immediately.
9	In cold water, put on hypothermia protective clothing, if available. Rig the entrance cover, close when necessary.
10	If other people are with you, huddle together for warmth.



B.5. Conduct in a Raft

The safety and survival of everyone in a raft depends on clear thinking and common sense. To protect those aboard and increase survival time, perform the following procedures:

Step	Procedure
1	Maintain a positive attitude.
2	Inventory all equipment. Ration water and food. Assign lookout and other necessary duties to crew members.
3	Do not rely on memory. If materials are available, keep a written log. Record the following: (01) Time of entry into the water, (02) Names and physical condition of survivors, (03) Ration schedule, (04) Winds, (05) Weather, (06) Direction of swells, (07) Times of sunrise and sunset, (08) Other navigation data.



B.6. Using a Raft to Rescue Others

When it is impossible or too dangerous to maneuver close to a distressed vessel, the life raft may be used to ferry survivors to the boat. It may also be used to recover people from the water if a boat cannot get close enough to them.

WARNING 

Although the raft is ballasted and very stable in most sea states, it may capsize in large breaking waves. For this reason, consider other methods for rescue of people in breaking surf or seas. (e.g., helicopter rescue).

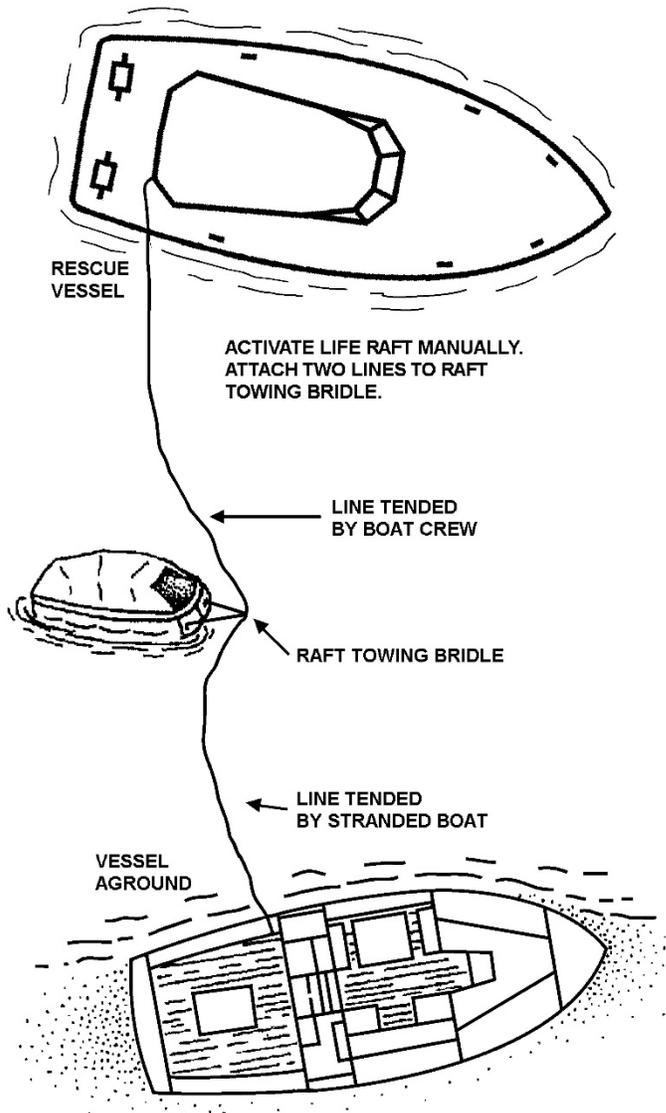


Figure 4-2
Life Raft as Rescue Ferry



Use the following procedures when deploying a life raft during a rescue attempt (see **Figure 4-2**):

Step	Procedure
1	Remove the raft container from its storage rack.
2	Do not manually or automatically inflate the life raft while removing the tape sealing the life raft case (half shells) together.
3	Roll the life raft out of the case and place it in the water on the leeward side of the boat.
4	Pull the painter line from the raft container, manually inflate the raft, and hold it alongside your boat.
5	Attach two lines, each of a length longer than the maximum distance between your boat and the people in distress.
6	Use one line to tend the life raft from your boat during the evolution (NEVER LET GO OF THIS LINE).
7	Pass the other line to the people in distress with a heaving line or let the current float it down to them.
8	Tell the persons being assisted to haul the life raft to their position.
WARNING 	Ensure each person is wearing a PFD. Do not permit more people to enter the raft than are allowed by the raft's specifications.
9	Once the life raft is alongside, direct the persons to board the life raft, one person at a time.
10	If the number of people being assisted is more than the carrying capacity of the raft, direct the people remaining to tend the line attached to the life raft from their location; haul back the maximum number of survivors and repeat the procedure.
11	After recovering all people, deflate the raft and bring it aboard the rescue boat. The raft may have taken on water during the rescue evolution. De-ballast the raft before bringing it aboard. Use the handles located on the ballast bags and slowly lift one side of the raft until all the water has run out.
12	Once the raft is aboard, do not repack the raft. Wash the raft and have it repacked at a certified packing station before returning it to service.



APPENDIX A Glossary

Introduction This appendix contains a list of terms that may be useful when reading this Manual.

In this Appendix This appendix contains the following information:

Topic	See Page
Glossary	A-1

TERM	DEFINITION
Abeam	To one side of a vessel, at a right angle to the fore-and-aft centerline.
Aft	Near or toward the stern.
Astern	The direction toward or beyond the back of a vessel.
Attitude	A vessel’s position relative to the wind, sea, hazard, or other vessel.
Beam	The widest point of a vessel on a line perpendicular to the keel, the fore-and-aft centerline.
Below	The space or spaces that are underneath a vessel’s main deck.
Bilge	The lowest point of a vessel’s inner hull, which is underwater.
Bitt	A strong post of wood or metal, on deck in the bow or stern, to which anchor, mooring, or towing lines may be fastened.
Bow	The forward end of the vessel.
Breaker	A wave cresting with the top breaking down over its face.
Buoyancy	The tendency or capacity of a vessel to remain afloat.
Capsize	To turn a vessel bottom side up.
Center of Gravity	Point in a ship where the sum of all moments of weight is zero. With the ship at rest, the center of gravity and the center of buoyancy are always in a direct vertical line. For surface ships, center of buoyancy is usually below center of gravity, and the ship is prevented from capsizing by the additional displacement on the low side during a roll. Thus the point at which the deck edge enters the water is critical because from here onward, increased roll will not produce corresponding increased righting force.
Characteristic	The audible, visual, or electronic signal displayed by an aid to navigation to assist in the identification of an aid to navigation. Characteristic refers to lights, sound signals, racons, radiobeacons, and daybeacons.



TERM	DEFINITION
Chine	The intersection of the bottom and the sides of a flat bottom or “V” hull boat.
Chop	Short steep waves usually generated by local winds and/or tidal changes. Change of operational control. The date and time at which the responsibility for operational control of a ship or convoy passes from one operational control authority to another.
Cleat	An anvil-shaped deck fitting for securing or belaying lines. Wedge cleats are used in yachting to hold sheets ready for instant release.
Coast Guard-Approved	Label denoting compliance with Coast Guard specifications and regulations relating to performance, construction, and materials.
Course (C)	The horizontal direction in which a vessel is steered or intended to be steered, expressed as angular distance from north, usually from 000° at north, clockwise through 360°.
Coxswain	Person in charge of a boat, pronounced “COX-un.”
Craft	Any air or sea-surface vehicle, or submersible of any kind or size.
Crest	The top of a wave, breaker, or swell.
Current (Ocean)	Continuous movement of the sea, sometimes caused by prevailing winds, as well as large constant forces, such as the rotation of the earth, or the apparent rotation of the sun and moon. Example is the Gulf Stream.
Datum	In SAR, refers to the probable location of a distressed vessel, downed aircraft, or PIW, which is corrected for drift at any moment in time. Depending on the information received this may be represented as a point, a line or an area.
Deck	The horizontal plating or planking on a ship or boat.
Distress	As used in the Coast Guard, when a craft or person is threatened by grave or imminent danger requiring immediate assistance.
Draft	The point on a vessel’s underwater body, measured from the waterline, that reaches the greatest depth.
Drift	The rate/speed at which a vessel moves due to the effects of wind, wave, current, or the accumulative effects of each. Usually expressed in knots.
Drogue	A device used to slow rate of movement. Commonly rigged off the stern of a boat while under tow to reduce the effects of following seas. May prevent yawing and/or broaching. (see <i>sea anchor</i>).
Dry Suit	A coverall type garment made of waterproof material having a rubber or neoprene seal around the neck and wrist cuffs. Allows the wearer to work in the water or in a marine environment without getting wet.
Emergency Position-Indicating	A device, usually carried aboard a maritime craft, that transmits a signal that alerts search and rescue authorities and enables rescue units to locate the scene of the distress.



TERM	DEFINITION
Radio Beacon (EPIRB)	
Emergency Signal Mirror	A mirror used to attract attention of passing aircraft or boats by reflecting light at them. Such reflected light may be seen up to five miles or more from the point of origin.
Eye	The permanently fixed loop at the end of a line.
Eye Splice	The splice needed to make a permanently fixed loop at the end of a line.
Fatigue	Physical or mental weariness due to exertion. Exhausting effort or activity. Weakness in material, such as metal or wood, resulting from prolonged stress.
Ferry	To transport a boat, people or goods across a body of water.
Fetch	The unobstructed distance over which the wind blows across the surface of the water.
Fitting	Generic term for any part or piece of machinery or installed equipment.
Flash	A relatively brief appearance of light, in comparison with the longest interval of darkness in the same character.
Freeboard	Distance from the weather deck to the waterline on a vessel.
Gunwale	The upper edge of a boat’s side. Pronounced “gun-ul.”
Heaving Line	Light, weighted line thrown across to a ship or pier when coming along side to act as a messenger for a mooring line. The weight is called a monkey fist.
Heel	Temporary leaning of a vessel to port or starboard caused by the wind and sea or by a high speed turn.
High Seas	That body of water extending seaward of a country’s territorial sea to the territorial sea of another country.
Hoist	To lift. Display of signal flags at yardarm. The vertical portion of a flag alongside its staff.
Hull	The body or shell of a ship or seaplane.
Hull Integrity	The hull’s soundness.
Hypothermia	A lowering of the core body temperature due to exposure of cold (water or air) resulting in a subnormal body temperature that can be dangerous or fatal. The word literally means “under heated.”
Inboard	Toward the center of a ship or a group of ships, as opposed to outboard.
Inlet	A recess, as a bay or cove, along a coastline. A stream or bay leading inland, as from the ocean. A narrow passage of water, as between two islands.



TERM	DEFINITION
Keel	The central, longitudinal beam or timber of a ship from which the frames and hull plating rise.
Kicker Hook	See <i>skiff hook</i> .
Knot (kn or kt)	A unit of speed equivalent to one nautical mile (6,080 feet) per hour. A measurement of a ship's speed through water. A collective term for hitches and bends.
Leeward	The side or direction away from the wind, the lee side.
Life Jacket	See <i>personal flotation device</i> .
Life Ring (Ring Buoy)	A buoyant device, usually fitted with a light and smoke marker, for throwing to a person-in-the-water.
Lifeline	Line secured along the deck to lay hold of in heavy weather; any line used to assist personnel; knotted line secured to the span of lifeboat davits (manropes or monkey lines) for the use of the crew when hoisting and lowering. The lines between stanchions along the outboard edges of a ship's weather decks are all loosely referred to as lifelines, but specifically the top line is the lifeline, middle is the housing line, and bottom is the footline. Any line attached to a lifeboat or life raft to assist people in the water. Also called a grab rope.
Light	The signal emitted by a lighted aid to navigation. The illuminating apparatus used to emit the light signal. A lighted aid to navigation on a fixed structure.
List	The static, fixed inclination or leaning of a ship to port or starboard due to an unbalance of weight.
Log	A device for measuring a ship's speed and distance traveled through the water. To record something is to log it. Short for logbook.
Logbook	Any chronological record of events, as an engineering watch log.
Lookout	A person stationed as a visual watch.
Maritime	Located on or close to the sea; of or concerned with shipping or navigation.
Mayday	The spoken international distress signal, repeated three times. Derived from the French <i>M'aider</i> (help me).
Mooring	A chain or synthetic line that attaches a floating object to a stationary object. (e.g., dock, sinker).
Nautical Mile (NM)	2000 yards; Length of one minute of arc of the great circle of the earth; 6,076 feet compared to 5,280 feet per a statute (land) mile.
Navigation	The art and science of locating the position and plotting the course of a ship or aircraft.
On Scene	The search area or the actual distress site.



TERM	DEFINITION
Overdue	When a vessel or person has not arrived at the time and place expected.
Overload	Exceeding the designed load limits of a vessel; exceeding the recommended work load of line or wire rope.
Painter Line (Painter)	A line at the bow or stern of a boat which is used for making fast; a single line used to take a vessel in tow alongside, commonly used with ships and their boats when placing the boat into use over the side.
Personal Flotation Device (PFD)	A general name for various types of devices designed to keep a person afloat in water (e.g., life preserver, vest, cushion, ring, and other throwable items).
Port	The left side of the vessel looking forward toward the bow.
Range	A measurement of distance usually given in yards. Also, a line formed by the extension of a line connecting two charted points.
Rig	To devise, set up, arrange. An arrangement or contrivance. General description of a ship's upper works; to set up spars or to fit out. A distinctive arrangement of sails (rigging), as in a schooner rig. An arrangement of equipment and machinery, as an oil rig.
Roll	Vessel motion caused by a wave lifting up one side of the vessel, rolling under the vessel and dropping that side, then lifting the other side and dropping it in turn.
Rubrail	A permanent fixture, often running the length of a boat, made of rubber that provides protection much as a fender would.
SARSAT	Search and rescue satellite aided tracking. See <i>Cospas-Sarsat System</i> .
Sea Anchor	A device, usually of wood and/or canvas, streamed by a vessel in heavy weather to hold the bow up to the sea. Its effect is similar to a drogue in that it slows the vessel's rate of drift. However, it is usually made off to the bow opposed to the stern as in the use of a drogue.
Sea Current	Movement of water in the open sea.
Sea Drogue	See <i>sea anchor</i> .
Set (of a Current)	The direction toward which the water is flowing. A ship is set by the current. A southerly current and a north wind are going in the same direction. Measured in degrees (usually true).
Ship	Any vessel of considerable size navigating deepwater, especially one powered by engines and larger than a boat. Also, to set up, to secure in place. To take something aboard.
Signal Kit/MK-79	A signal kit used to attract vessels, aircraft, and ground rescue teams. Each cartridge flare burns red, has a minimum duration of 4.5 seconds, and reaches a altitude of 250' to 650'.



TERM	DEFINITION
Smoke and Illumination Signal	A signal used to attract vessels and aircraft. It has a night end and a day end. The night end produces a red flame, the day end has an orange smoke.
Sound Signal	A device that transmits sound, intended to provide information to mariners during periods of restricted visibility and foul weather; a signal used to communicate a maneuver between vessels in sight of each other.
Standard Navy Preserver (Vest Type with Collar)	A Navy PFD vest used by the Coast Guard onboard cutters. Allows user to relax, save energy, increase survival time and will keep users head out of water, even if user is unconscious. Not found as part of a boat outfit.
Starboard	The right side of the vessel looking forward toward the bow.
Stern	The extreme after end of a vessel.
Strobe Light	A device that emits a high intensity flashing light visible for great distances. Used to attract the attention of aircraft, ships, or ground parties, it flashes white light at 50 plus or minus 10 times per minute.

Surface Swimmer	In the Coast Guard, a specially trained individual that is deployed from floating units, piers, or the shore to help people in the water.
Swell	Wind-generated waves which have advanced into a calmer area and are decreased in height and gaining a more rounded form. The heave of the sea. <i>See roller.</i>
Swimmer's Harness	A harness used to tether and retrieve surface swimmers during rescue/recovery operations.
Tide	The periodic vertical rise and fall of the water resulting from the gravitational interactions between the sun, moon, and earth.
Trough	The valley between waves.
Vessel	By U.S. statutes, includes every description of craft, ship or other contrivance used as a means of transportation on water. "Any vehicle in which man or goods are carried on water." (<i>see ship</i>).
Wave	A periodic disturbance of the sea surface, caused by wind (and sometimes by earthquakes).
Wave Frequency	The number of crests passing a fixed point in a given time.
Wedge	Used as temporary repair in event of damage aboard vessel. Made of soft wood, they are forced into holes or damaged areas to stop leaking, to plug damaged structures, or to reinforce shoving. Part of a damage control kit.



TERM	DEFINITION
Wet Suit	A tight-fitting rubber suit worn by a skin diver in order to retain body heat. Designed to protect wearer from exposure to cold, wind, and spray. Constructed of foam neoprene, a durable and elastic material with excellent flotation characteristics. These buoyancy characteristics, which affect the entire body, will cause floating horizontally, either face up or face down.
Whistle	A piece of survival equipment used to produce a shrill sound by blowing on or through it. To summon, signal or direct by whistling. A device for making whistling sounds by means of forced air or steam. A whistling sound used to summon or command. It is attached to some PFDs and is an optional item for the personal signal kit. It has proven very useful in locating survivors in inclement weather and can be heard up to 1,000 yards.
Wind-Chill Factor	An estimated measurement of the cooling effect of a combination of air temperature and wind speed in relation to the loss of body heat from exposed skin.
Windward	Towards the wind.



APPENDIX B List of Acronyms

Introduction

This Appendix contains a list of acronyms that may be useful when reading this and other Coast Guard manuals.

In this Appendix

This appendix contains the following information:

Topic	See Page
List of Acronyms	B-1

ACRONYM	DEFINITION
A/C	Air Conditioning
AAR	After Action Report
ACFT	Aircraft
ACIP	Aviation Incentive Pay
ACMS	Aviation Computerized Maintenance System
ACP	Area Contingency Plan
ACP	Alternate Compliance Program
ACTSUS	Active Suspension
ADF	Automatic Radio Direction Finder
ADSW-AC	Active Duty Special Work in Support of Active Component
A/C	Air Conditioning
ADT	Active Duty for Training
ADT-AT	Active Duty Training for Annual Training
AEO	Assistant Engineering Officer
AEPO	Assistant Engineering Petty Officer
AFC	Allowance Fund Control
AFFF	Aqueous Film – Forming Foam
AIDS	Acquired Immunodeficiency Syndrome
AIM	Administrative Investigations Manual
AIS	Automatic Identification System
AH	Amplitude Modulation
AMIO	Alien/Migrant Interdiction Operation
AMS	Automated Manifest System



ACRONYM	DEFINITION
AMVER	Automated Mutual-Assistance Vessel Rescue
ANB	Aids to Navigation Boat
ANS	Aquatic Nuisance Species
ANSI	American National Standards Institute
ANT	Aids to Navigation Team
AOPS	Abstract of Operations
AOR	Area of Responsibility
API	American Petroleum Institute
APPS	Act to Prevent Pollution from Ships
APR	Aid Positioning Report
ASB	Arctic Survey Boat
ATB	Aviation Training Boat
AtoN	Aids to Navigation
AtoNIS	Aids to Navigation Information System
ATR	Ammunition Transaction Report
AUXCOM	Auxiliary Boat Commander
AUX DATA	Auxiliary Data
AUXPATCOM	Auxiliary Patrol Commander
AV	Aid Verifier
BA	Bridge Administration
BAC	Blood Alcohol Content
BAS	Basic Allowance for Subsistence
BCEB	Boat Crew Examination Boards
BCM	Boat Crew member
BCMP	Boat Class Maintenance Plan
BDCM	Buoy Deck Crew member
BDS	Buoy Deck Supervisor
BECCE	Basic Engineering Casualty Control Exercises
BEQ	Bachelor Enlisted Quarters
BM	Boatswain's Mate
BNTM	Broadcast Notice to Mariners
BO	Boarding Officer
BO/BTM PQS	Boarding Officer / Boarding Team Member Personnel Qualification Standard



ACRONYM	DEFINITION
BOSN	Boatswain
BS	Breaking Strength
BSC	Boating Safety Circular
BTM	Boarding Team Member
BUSL	Buoy Utility Stern Loading
BWI	Boating While Intoxicated
BWM	Ballast Water Management
C2	Command and Control
C2PC	Command/Control Personal Computer
CABs	Compressions, Airway, and Breathing
CAC	Crisis Action Center
CASCOR	Casualty Correct
CASREP	Casualty Report
CBL	Commercial Bill of Lading
CB-L	Cutter Boat – Large
CB-M	Cutter Boat – Medium
CB-OTH	Cutter Boat – Over the Horizon
CBRN	Chemical, Biological, Radiological, Nuclear
CB-S	Cutter Boat – Small
CDAR	Collateral Duty Addictions Representative
CDI	Course Deviation Indicator
CDO	Command Duty Officer
CDR	Commander
CDV	Course Deviation Variance
CEM	Crew Endurance Management
CERCLA	Comprehensive Environment Compensation and Liability Act
CEU	Civil Engineering Unit
CF	Comparison Factors
CFC	Combined Federal Campaign
CFR	Code of Federal Regulations
CFVS	Commercial Fishing Vessel Safety
CGADD	Coast Guard Addendum
CGDF	Coast Guard Dining Facility



ACRONYM	DEFINITION
CGIS	Coast Guard Investigative Service
CGPC	Coast Guard Personnel Command
CIC	Combat Information Center
CIO	Command Intelligence Officer
CISM	Critical Incident Stress Management
CM	Configuration Management
CMAA	Chief Master at Arms
CMCO	Classified Material Control Officer
CMG	Course Made Good
CMS	COMSEC (Communication Security) Material System
CO	Commanding Officer or Carbon Monoxide
CO/OIC	Commanding Officer/Officer-in-Charge
COCO	Chief of Contracting Officer
COFR	Certificate of Financial Responsibility
COG	Course Over Ground
COI	Certificate of Inspection
COLREG	International Regulations for Preventing Collisions at Sea
COMCEN	Communications Center
COMDTINST	Commandant Instruction
COMINT	Communications Intelligence
COMMS	Communications
CONOPS	Concept of Operations
COR	Certificate of Registry
COTP	Captain-of-the-Port
COTR	Contracting Officer’s Technical Representative
CPC	Commandant’s Performance Challenge
CPO	Chief Petty Officer
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
CQA	Commandant’s Quality Award
CRT	Cathode Ray Tube
CS	Creeping Line Search
CSIM	Control Station Interface Module



ACRONYM	DEFINITION
CSMP	Current Ship's Maintenance Project
CSP	Commence Search Point
CSP	Career Sea Pay
CVE	Control Verification Examination
CVS	Commercial Vessel Safety
CWO	Chief Warrant Officer
DAMA	Demand Assigned Multiple Access
DAN	Driver's Alert Network
DANTES	Defense Activity for Non-Traditional Education Support
DAPA	Drug and Alcohol Program Administration
DDEC	Detroit Diesel Electronically Controlled
DEER	Defense Enrollment and Eligibility Reporting System
DEMPs	Diesel Engine Maintenance Programs
DF	Direction Finding
DGPS	Differential Global Positioning System
DICP	Drop-In Communications Package
DISREP	Discrepancy Report
DISREPS	Discrepancy Report
DIW	Dead-in-the-Water
DMA	Defense Mapping Agency
DMB	Data Marker Buoy
DMOA	Designated Medical Officer Advisor
DMS	Docket Management System
DO	Defense Operations
DoD	Department of Defense
DONCAF	Department of the Navy Central Adjudication Facility
DOT	Department of Transportation
DPB	Deployable Pursuit Boat
DR	Dead Reckoning
DSC	Digital Selective Calling
DVL	Digital Voice Logger
DWO	Deck Watch Officer
DWONR	Deck Watch Officer Navigation Rules



ACRONYM	DEFINITION
EAP	Employee Assistance Program
EAPC	Employee Assistance Program Coordinator
EBL	Electronic Bearing Line
EC	Electronic Control
EC	Engineering Change
ECM	Electronic Control Module
ECR	Engineering Change Request
ECS	Electronic Chart System
EDF	Enlisted Drug Facilities
EDM	Electronic Display Module
EEZ	Exclusive Economic Zone
EGIM	Electronic Gear Interface Module
ELC	Engineering Logistics Center
ELINT	Electronics Intelligence
ELT	Emergency Locator Transmitter
ELT	Enforcement of Laws and Treaties
EMI	Extra Military Instruction
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EO	Engineering Officer
EOCT	End-of-Course Test
EP	Estimated Position
EPA	Environmental Protection Agency
EPES	Enlisted Personnel Evaluation System
EPIRB	Emergency Position Indicating Radio Beacon
EPO	Engineering Petty Officer
EPO/EO	Engineering Petty Officer/Engineering Officer
EPS	Environmental Protection Specialist
ERIM	Engine Room Interface Module
ESA	Endangered Species Act
ESD	Electronics Support Detachment
ESU/D	Electronics Support Unit/detachment
ET	Electronics Technician



ACRONYM	DEFINITION
ETA	Electronic Transportation Acquisition
ETA	Estimated Time of Arrival
EXCOM	Extended Communications
FAA	Federal Aviation Agency
FAR	Family Advocacy Representative
FAR	Federal Acquisition Regulations
FAST	Facial Drooping, Arm Weakness, Speech Difficulty, and Time is Critical
FBIS	Foreign Broadcast Information Service
FEDEX	Federal Express
FEED	Federal Energy Efficiency Funding
FFCS	Full Function Crew Station
FID	Field Information Document
FINCEN	Finance Center
FIR	Field Intelligence Report
FL	Fitness Leader
FLOCS	Fast Lubricating Oil Change System
FLS	Fleet Logistics Supply
FM	Frequency Modulation
FMP	Fisheries Management Plan
FOIA	Freedom of Information Act
FOSC	Federal On-Scene Coordinator
FOUO	For Official Use Only
FPCON	Force Protection Conditions
FPM	Feet Per Minute
FRP	Fiberglass Reinforced Plastic
FS	Food Service Specialist
FSC	Federal Supply Classification
FSI	Field Sobriety Test
FSIC	Fiscal, Sanitation, Immigration or Customs
FSO	Food Services Officer
FWPCA	Federal Water Pollution Control Act
FWS	Fish and Wildlife Service
GAR	Green-Amber-Red



ACRONYM	DEFINITION
GFM	Global Freight Management
GMDSS	Global Maritime Distress and Safety System
G-OCS	Office of Boat Forces
G-OI	Office of Intelligence
GPH	Gallons Per Hour
GPS	Global Positioning System
GRUCOM	Group Commander
GSA	Government Service Administration
GTA	Government Transportation Account
GV	Government Vehicle
HAZCOM	Hazardous Communication
HAZMAT	Hazardous Material
HAZWASTE	Hazardous Waste
HCPV/HIV	High Capacity Passenger Vessel/High Interest Vessel
HDOP	Horizontal Dilution of Precision
HEA	Harbor Entrance and Approach
HELP	Heat Escape Lessening Position
HF	High Frequency
HIN	Hull Identification Number
HIV	Human Immunodeficiency Virus
HS	Homeland Security
HPU	Hydraulic Power Unit
HRSIC	Human Resources Services and Information Center
HSC	Harbor Safety Committee
HUMINT	Human Intelligence
HVAC	Heating, Ventilation, and Air Conditioning
IACS	International Association of Classification Societies
IALA	International Association of Lighthouse Authorities
IAMSAR	International Aeronautical and Maritime Search and Rescue
I-AtoNIS	Integrated Aids to Navigation Information Systems
ICA	Individual Credit Accounts



ACRONYM	DEFINITION
ICAO	International Civil Aviation Organization
ICC	Intelligence Coordination Center
ICLL	International Convention on Load Lines
ICMTS	Interagency Committee of the Marine Transportation System
ICS	Incident Command System
ICV	Intercommunicating Fill Valve
ICW	Intracoastal Waterway
IDT	Inactive Duty for Training
IEC	International Electrotechnical Commission
IIP	International Ice Patrol
IIR	Intelligence Information Report
IIRAIRA	Illegal Immigration Reform and Immigrant Responsibility Act
ILO	International Labor Organization
IMARV	Independent Maritime Response Vessel
IMO	International Maritime Organization
IMPAC	International Merchant Purchase Authorization Card
INA	Immigration and Nationality Act
INS	Immigration and Naturalization Service
IPIECA	International Petroleum Industry Environmental Conservation Association
IPS	International Pipe Standard
IRIS	Incident Reporting Information System
ISC	Integrated Support Command
ISM	International Ship Management
ISO	International Standards Organization
IT	Information Systems Technician
IUU	Illegal, Unreported, and Unregulated
JOOD	Junior Officer of the Day
JQR	Job Qualification Requirement
KO	Contracting Officer
LC	Load Center
LCD	Liquid Crystal Display



ACRONYM	DEFINITION
LCVP	Landing Craft, Vehicle, Personnel
LE	Law Enforcement
LEISII	Law Enforcement Information System II
LEMAN	Law Enforcement Manual
LEO	Law Enforcement Officer
LEQB	Law Enforcement Qualification Board
LEU	Law Enforcement Unit
LHA	Local Housing Authority
LHI	Local Housing Inspector
LIR	Letter Incident Report
LKP	Last Known Position
LLNR	<i>Light List</i> Number
LMR	Living Marine Resource
LNB	Large Navigation Buoy
LNG	Liquid Natural Gas
LOA	Length Overall
LOB	Line-of-Bearing
LOC	Letter of Commendation or Level of Consciousness
LOGREQ	Logistics Requirements
LOP	Line of Position
LORAN-C	Long-Range Aid to Navigation
LORSTA	LORAN Station
LOS	Line-of-Sight
LUFS	Large Unit Financial System
LUT	Local User Terminal
LWL	Length on Waterline
MAA	Master at Arms
MARB	Maritime Assistance Request Broadcast
MARPOL	International Convention for the Prevention of Pollution from Ships
MARSEC	Marine Security Conditions
MASINT	Measurement and Signature Intelligence



ACRONYM	DEFINITION
MAW	Maximum Allowable Weight
MBR INT	Member's Initials
MCB	Motor Cargo Boat
MCM	Manual for Courts-Martial
MCS	Master Control Station
MDA	Maritime Domain Awareness
MDV	Marine Dealer Visit
MDZ	Maritime Defense Zone
MEDICO	Medical Advice
MEDEVAC	Medical Evacuation
MEP	Marine Environmental Protection
MEPC	Marine Environment Protection Committee
MER	Marine Environmental Response
MF	Medium Frequency
MFPU	Maritime Force Protection Unit
MHS	Maritime Homeland Security
MI	Marine Information
MI	Maintenance Inspection
MI & R	Maintenance, Improvement and Repair
MIC	Manufacturer Identification Code
MICA	Management Information for Configuration and Allowances
MICA	Machinery Information Catalog Allowance
MIM	Marine Interface Module
MISLE	Marine Information for Safety and Law Enforcement
MJM	Military Justice Manual
MLB	Motor Lifeboat
MLC	Maintenance and Logistics Command
MLCPAC	Maintenance and Logistics Command Pacific
MMD	Merchant Mariner Document
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Services
MMSI	Maritime Mobile Service Identity



ACRONYM	DEFINITION
MOA	Memorandum of Agreement
MOB	Man Overboard
MOU	Memorandum of Understanding
MPR	Multiple Persons-in-the-Water
MPS	Marine Protected Species
MRE	Military Rule of Evidence
MRR	Medium-Range Recovery
MSAP	Maritime SAR Assistance Policy
MSB	Motor Surf Boat
MSC	Marine Safety Center
MSFCMA	Magnuson-Stevens Fisheries Conservation and Management Act
MSO	Maintenance Support Outline
MSO	Marine Safety Office
MSS	Marine Safety and Security
MSST	Maritime Safety and Security Team
MTL	Master Training List
MTS	Marine Transportation System
MTSNAC	Marine Transportation System National Advisory Council
MWR	Moral, Welfare and Recreation
NAFA	Non-Appropriated Fund Activity
NAVAIDS	Navigational Aids
NAVRULS	Navigation Rules
NCP	National Contingency Plan
NCW	Naval Coastal Warfare
NDRS	National Distress Response System
NDRSMP	National Distress Response System Modernization Project
NDS	National Distress System
NESU	Naval Engineering Support Unit
NJP	Non-Judicial Punishment
NLB	Nearshore Life Boat
NLT	No Later Than
NM	Nautical Miles
NMEA	National Marine Electronics Association



ACRONYM	DEFINITION
NMFS	National Marine Fisheries Service
NMLBS	National Motor Lifeboat School
NOS	National Ocean Survey
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NRT	National Response Team
NSARC	National Search and Rescue Committee
NSB	Non-Standard Boat
NSF	National Strike Force
NSFCC	National Strike Force Coordination Center
NSN	National Stock Number
NSP	National Search and Rescue Plan
NSS	National Search and Rescue Supplement
NTP	Naval Training Publication
NVDC	National Vessel Documentation Center
NVIC	Navigation and Vessel Inspection Circular
NWP	Naval Warfare Publication
OBA	Oxygen Breathing Apparatus
O/S WX	On-Scene Weather
OCMI	Officer-in-Charge Marine Inspection
OER	Officer Evaluation Report
OIC	Officer-in-Charge
OIC INT	Officer in Charge's Initials
OJT	On-the-Job Training
OM & S	Operating Materials and Supplies
OMMP	Occupational Medical Monitoring Program
OOD	Officer of the Deck (Day)
OPA	Oil Pollution Act
OPAREA	Operational Area
OPCEN	Operations Center
OPCON	Operational Control
OPFAC	Operating Facility
OPLAN	Operations Plan



ACRONYM	DEFINITION
OPORD	Operations Order
OPORDER	Operations Order
OQB	Operations Qualification Board
ORM	Operational Risk Management
OS	Operations Specialist
OSB	Operations Standards Board
OSC	Operations Systems Center
OSC	On-Scene Commander
OSHA	Occupational Safety and Health Administration
OTC	Officer in Tactical Command
PA	Privacy Act
PAL	Personnel Allowance List
PALMS	Patrol Order Management System
PAO	Public Affairs Officer
PATCOM	Patrol Commander
PAWSS	Ports and Waterways Safety System
PCS	Permanent Change of Station
PDD	Presidential Decision Directive
PDR	Personnel Data Record
PDS	Personnel Data System
PERSRU	Personnel Reporting Unit
PES	Port and Environmental Safety
PFD	Personal Flotation Device
PI	Personnel Inspection
PIAT	Public Information Assistance Team
PIE	Partnership in Education
PIW	Person-in-the-Water
PLB	Personal Locator Beacon
PMIS/JUMPS	Personnel Management Information System/Joint Uniform Military Pay System
PMLV	Personnel Marker Light
PMS	Preventative/Planned Maintenance System
PO	Petty Officer
POB	Persons Onboard



ACRONYM	DEFINITION
POD	Probability of Detection
POP	Planned Obligation Priority
POS	Probability of Success
POPFAC	Parent Operating Facility
POW	Plan of the Week
PPE	Personal Protective Equipment
PPI	Plan Position Indicator
PPS	Precise Positioning Service
PQS	Personnel Qualification Standard
PR	Position Report
PRECOM	Preliminary Communications
PREP	Preparedness for Response Exercise Program
PS	Parallel Search
PSCO	Port State Control Officer
PSU	Port Security Unit
PTO	Power Take-Off
PWB	Port and Waterways Boat
PWSA	Ports and Waterway Safety Act
QAWTD	Quick-Acting Watertight Door
QEB	Qualification Examining Board
QRC	Quick Response Card
RACON	Radar Beacon
RB-HS	Response Boat-Homeland Security
RB-M	Response Boat-Medium
RBS	Recreational Boating Safety
RB-S	Response Boat-Small
RCC	Rescue Coordination Center
RDF	Radio Direction Finder
RFMC	Regional Fisheries Management Council
RFMO	Regional Fisheries Management Organization
RFO	Ready for Operations
RIK	Rations-In-Kind
RMS	Readiness Management System



ACRONYM	DEFINITION
RNAV	Radio Aids to Navigation
ROC/POE	Required Operational Capability/Projected Operational Environment
RP	Responsible Party
RPAL	Reserve Personnel Allowance List
RS	Rescue Swimmer
RSC	Rescue Sub-Center
RT	Receiver/Transmitter
SAFE	Substance Abuse Free Environment
SAI	Small Arms Instructor
SAP	Simplified Acquisition Procedures
SAR	Search and Rescue
SAREX	SAR Exercise
SARMIS	Search and Rescue Mission Information System
SARSAT	Search and Rescue Satellite Aided Tracking
SAT	Subsistence Advisory Team
SATCOM	Satellite Communication
SB	Sailboat
SC	SAR Coordinator
SCUBA	Self-Contained Underwater Breathing Apparatus
SDB	Service Dress Blue
SDO	Sector Duty Officer
SEAOP	Special and Emergency Operations Procedure
SEPRATS	Separate Rations
SF	Safety Factor
SIGINT	Signals Intelligence
SIPRNET	Secret Internet Protocol Routing Network
SITREP	Situation Report
SKF	Skiff
SLDMB	Self Locating Datum Marker Buoy
SMC	SAR Mission Coordinator
SMS	Safety Management System
SMTJ	Special Maritime and Territorial Jurisdiction
SNO	Statement of No Objection



ACRONYM	DEFINITION
SOA	Speed of Advance
SOG	Speed Over Ground
SOLAS	Safety of Life at Sea
SO-OP	Auxiliary Division Operations Officer
SOP	Standard Operating Procedure
SOPA	Senior Officer Present Afloat
SOPEP	Shipboard Oil Pollution Emergency Plan
SOQ	Sailor of the Quarter
SOS	Save Our Ship
SPC	Special Purpose Craft
SPC (HWX)	Heavy Weather Special Purpose Craft
SPC (LE)	Special Purpose Craft (Law Enforcement)
SPE	Severity-Probability-Exposure
SPF	Sun Protection Factor
SPOC	SAR Point of Contact
SPS	Standard Positioning Service
SRA	Short-Range Aids to Navigation
SROE	Standing Rules of Engagement
SRR	Search and Rescue Region
SRR	Short-Range Recovery
SRS	Synchronous Reference Sensor
SRU	Search and Rescue Unit
SS	Square Search
SSB	Single Side Band
SSB-HF	Single Side Band - High Frequency
SSL	Standard Support Level
SSM	Support and Special Mission
SSMR	Shore Station Maintenance Record
SSPO	Station Support Petty Officer
STA OPS	Station Operations
STAN & RFO	Readiness and Standardization Program
STANT	Station Aids to Navigation Team
STAR	Standard Automated Requisitioning



ACRONYM	DEFINITION
STCW	Standards of Training, Certification and Watchkeeping for Seafarers
STTR	Short Term Resident Training Request
STU III	Secure Telephone Unit
SURPIC	Surface Picture
SWE	Service-wide Exam
SWL	Safe Working Load
TACON	Tactical Control
TAD	Temporary Assigned Duty
TAIT	Temporary Access Inventory Tool
TANB	Trailerable Aids to Navigation Boat
TB	Tuberculosis
TBSA	Total Body Surface Area
TC	Technical Committee
TCM	Telecommunications Manual
TCOW	Telecommunications Watchstander
TCT	Team Coordination Training
TD	Temporary Duty
TD	Time Difference
TFC	Total Fuel Consumption
THREATCON	Threat Conditions
TMT	Training Management Tool
TOI	Target of Interest
TPSB	Transportable Port Security Boat
TQC	Training Quota Management Center
TRACEN	Training Center
TRATEAM	Training Team
TRS	Timing Reference Sensor
TSN	Track Line Non-Return Search
TSR	Track Line Return Search
U/W	Underway
UCMJ	Uniform Code of Military Justice
UEG	Unit Environmental Guide
UEPH	Unaccompanied Enlisted Personnel Housing



ACRONYM	DEFINITION
UHF	Ultra High Frequency
UMI	Universal Marine Interface
UMIB	Urgent Marine Information Broadcast
UOF	Use of Force
UPF	Unit Performance Factor
UPH	Unaccompanied Personnel Housing
UPS	United Parcel Service
USBP	United States Border Patrol
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USPS	U.S. Power Squadron
USWMS	Uniform State Waterway Marking System
UTB	Utility Boat
UTBSC	Utility Boat Systems Center
UTC	Coordinated Universal Time
UTL	Utility Boat Light
UTM	Utility Boat Medium
UTS	Unit Travel System
UV	Ultraviolet
VHA	Variable Housing Allowance
VHF	Very High Frequency
VRM	Variable Range Marker
VRO	Variable Ratio Oiler
VRP	Vessel Response Plan
VS	Sector Search
VSC	Vessel Safety Check
VTS	Vessel Traffic Services
WP	Working Punt
WAAS	Wide Area Augmentation System
WAMS	Waterways Analysis and Management System
WC	Wellness Coordinator
WLIC	Construction Tender
WLL	Working Load Limit



ACRONYM	DEFINITION
WPB	Patrol Boat
WR	Wellness Representative
WWM	Waterways Management
XO	Executive Officer
XPO	Executive Petty Officer
XTE	Cross Track Error