FM 4-01.502 (FM 55-502)

Army Watercraft Safety

May 2008

Distribution Restriction: Approved for public release; distribution is unlimited.

Headquarters, Department of the Army



Headquarters Department of the Army Washington, 1 May 2008

Army Watercraft Safety

Contents

		Page
	PREFACE	vi
	INTRODUCTION	vii
Chapter 1	MARINE SAFETY PROGRAM	1-1
•	SAFETY SURVEYS AND INSPECTIONS	1-1
	ARMY ACCIDENT REPORTING AND INVESTIGATION	1-2
	WATERCRAFT SAFETY NOTIFICATION AND READINESS	1-5
	Training	1-14
Chapter 2	LIFE SAVING EQUIPMENT	2-1
	PERSONAL FLOTATION DEVICES	2-1
	HYPOTHERMIA PROTECTIVE CLOTHING	2-4
	PERSONNEL MARKER LIGHT	2-10
	SIGNAL WHISTLE	2-11
	RING BUOY	2-13
	FLOATING DISTRESS MARKER	2-15
	DISTRESS SIGNALS	2-17
	INFLATABLE LIFE RAFTS	2-25
	HYDROSTATIC RELEASE UNITS	2-28
	EMERGENCY ESCAPE BREATHING DEVICE (EEBD)	2-30
	STOKES LITTER	2-33
	HEAVING / SAFETY LINE	2-35
	LINE THROWING DEVICE	
	NEIL ROBERTSON STRETCHER	
	RESCUE / WORK BOAT	2-38
Chapter 3	FIRE FIGHTING	
	FIRE FIGHTING ABOARD ARMY WATERCRAFT	3-1
	FIRE FIGHTING AGENTS	3-2

Distribution Restriction: Approved for public release; distribution is unlimited.

^{*}This publication supercedes FM 55-502, 23 December 1996.

	FIXED FIRE FIGHTING SYSTEMS	3-3
	PORTABLE FIRE EXTINGUISHERS	3-5
	GALLEY FIRE SUPRESSION SYSTEM	3-6
	REPORTING A FIRE	3-7
	FIRE DRILLS AND TRAINING	3-7
	FIGHTING CLASS B FIRES IN ARMY VESSELS	3-9
	FIRE FIGHTING SYSTEMS CAPABILITIES AND LIMITATIONS	3-11
	CHOOSING CORRECT FIRE FIGHTING EQUIPMENT	3-14
	SMOKE CONTROL	3-14
	SPACE ISOLATION	3-15
	REENTRY	3-15
	DESMOKING, ATMOSPHERIC TESTING, DEWATERING, AND REMANNING	3-16
	PERSONNEL PROTECTION AND FIRE FIGHTING EQUIPMENT	3-17
Chapter 4	DAMAGE CONTROL	4-1
•	INTRODUCTION	4-1
	DEWATERING PUMP	4-1
	WEDGES	4-9
	PLUGS	4-9
	EMERGENCY DAMAGE PIPE REPAIR KIT	4-10
	ELECTRIC REPAIR KIT	4-11
	SHIP'S MAUL	4-12
	SHORING	4-13
	CONFINED SPACE ENTRY	4-16
Chapter 5	GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)	5-1
•	OVERVIEW	
	EMERGENCY POSITION INDICATING RADIOBEACON (EPIRB)	
	SURVIVAL CRAFT TRANSCEIVER (SCT)	
	SEARCH AND RESCUE TRANSPONDER (SART)	5-9
	NAVTEX	5-10
	INTERNATIONAL MARITIME SATELLITE ORGANIZATION (INMARS)	AT) .5-14
	MF/HF RADIO	5-19
	VHF RADIO	5-20
Chapter 6	GENERAL INFORMATION	6-1
	SAFE TACTICAL WATERBORNE & CARGO OPERATIONS	
	BATTERY MAINTENANCE	6-1
	EYE / FACE WASH STATIONS	6-2
	POWER TOOL SAFETY	
	COLOR CODING	
	PERSONAL PROTECTIVE EQUIPMENT (PPE)	

	EQUIPMENT GUARDS	6-6
	FALL PROTECTION	6-7
	HEAD PROTECTION	6-11
	GANGWAYS	6-12
	LOCK OUT / TAG OUT OF ENERGY SOURCES	6-12
	SIGNAGE	6-18
	FIRST AID KIT, BURN TREATMENT	6-19
Appendix A	ITEMIZED SAFETY EQUIPMENT	A-1
Appendix B	TELEPHONIC NOTIFICATION OF GROUND ACCIDENT	B-1
	GLOSSARY	Glossary-1
	REFERENCES	References-1
	INDEX	
Figure	1-1, Master Firefighting & Safety Equipment List (under revision)	1-11
•	1-2, Station Bill Instructions	
_	2-1. Anti-exposure Coverall	
_	2-2. (Immersion) suit (typical)	
_	2-3. Personnel marker light	
•	2-4. Signal whistle	
_	2-5. Ring buoy with reflective tape / material	
_	2-6. Floating distress marker	
Figure	2-7. Signal, illumination red star parachute, M126A1 (Interior)	2-19
Figure	2-8. Signal, illumination red star parachute M126A1 (Exterior)	2-19
Figure	2-9. M126A1 Firing Instructions (Step 1)	2-20
Figure	2-10. M126A1 Firing Instructions (Steps 2 and 3)	2-20
Figure	2-11. M126A1 Firing Instructions (Steps 4 and 5)	2-21
Figure	2-12. M126A1 Firing Instructions (Steps 6 through 8)	2-21
Figure	2-13. Marker Location, Marine; Mk 58 Mod 1	2-22
Figure	2-14. Marine Smoke & Illumination Signal, Mk 124 Mod 0	2-24
Figure	2-15, Heaving Safety Line	2-35
Figure	2-16. Neil Robertson stretcher	2-38
Figure	3-1, HFC-227EA (FM 200) Fire Extinguishing Systems	3-4
Figure	3-2. OBA operational parts and assemblies	3-21
Figure	3-3. Navy type A4 OBA	3-23
•	3-4. Properly donned OBA	
Figure	3-5. Spectacle Kit	3-24
Figure	3-6. Lifting straps over head	3-26
Figure	3-7. Canister held in standby position	3-28
Figure	3-8. Inserting chin into face piece	3-29
Figure	3-9. Pulling straps over head	3-30

Figure 3-10. Tightening lower straps	3-30
Figure 3-11. Tightening upper straps	3-31
Figure 3-12. Testing face piece seal	3-31
Figure 3-13. Testing OBA for leaks by compressing bag	3-33
Figure 3-14. Exploded view of training canister assembly	3-38
Figure 3-15. Training canister firing mechanism assembly	3-38
Figure 3-16. Firefighter's Coveralls	3-43
Figure 3-17. Firefighter's Anti-Flash Hood	3-43
Figure 3-18. Anti-flash gloves	3-44
Figure 3-19 DC / Firefighter's helmet	3-44
Figure 3-20. Firefighter's gloves	3-45
Figure 3-21. Fireman's boots	3-45
Figure 3-22. Fully donned ensemble with and without BA	3-47
Figure 4.1. P-100 Pump	4-2
Figure 4-2 Starting and priming the pump unit	4-5
Figure 4-3 Starting the engine	4-5
Figure 4-4. Water Driven Fan	4-9
Figure 4-5. Example of how to measure a wedge for identification, H (3") x W(6") x L (12")	4-9
Figure 4-6. Example of how to measure a plug for identification, End Width (10") x Point	t
Width (7") x Length (12")	
Figure 4-7. Installing a Soft Patch on a Pipe	
Figure 4-8. Jubilee Pipe Patches	
Figure 4-9. Three Types of Reinforced Metallic Clamps	
Figure 4-10. Electrical Tool Kit	
Figure 4-11. Ships Maul	
Figure 4-12. Anchoring Fit	
Figure 4-13. Correct Shoring Angles	
Figure 4-14. Shoring for Bulging Plate	
Figure 4-15. Steel Adjustable Shoring Batten	
Figure 4-16. Wood Shoring	
Figure 5-1. INMARSAT B Above Deck Equipment	
Figure 5-2. INMARSAT C Above/Below Deck Equipment	
Figure 6-1. Plumbed eye / face wash unit (typical)	
Figure 6-2. Portable eye / face wash unit	
Figure 6-3. Components of Fall protection systems (1 of 4)	
Figure 6-4. Components of Fall Protection Systems (2 of 4)	
Figure 6-5. Components of Fall Protection Systems (3 of 4)	
Figure 6-6. Components of Fall Protection Systems (4 of 4)	
Figure 6-7. Hardhat Basic Design	
Figure 6-8. Danger tag	
Figure 6-9. Caution tag	6-17

Tables

Table 1-1, Document Posting Areas	1-9
Table 1-2 Risk Management Matrix	1-15
Table 1-3 Risk Management Factors	1-15
Table 2-1. Types of PFDs	2-2
Table 2-2. Hypothermia Effects	2-4
Table 2-3. Required ring buoys and attachments	2-14
Table 2-4. US Army watercraft authorized pyrotechnics	2-18
Table 3-1. Tending Line Signals	3-40
Table 5-1. Recommended GMDSS Publications	5-3
Table 5-2. NAVTEX Stations in the US B(1) Characters	5-11
Table 5-3. NAVTEX Broadcast Subject Indicator Characters	5-12
Table 5-4. INMARSAT Satellite Positions	5-15
Table 5-5. US Coast Guard DSC-Equipped Shore Stations	5-19
Table 6-1. Watercraft Color Codes	6-5
Table A-1. Itemized Safety Equipment	A-1
Table A-2. Modular Causeway System Equipment	A-9

Preface

This manual provides guidance and technical information relevant to safety and survival equipment/systems used by US Army watercraft. Items listed in Appendix A are provided by the Marine Safety Office as safety equipment recommended for use aboard Army Watercraft. Vessel Technical Manuals and Basic Issue Items lists should be consulted for required equipment.

The manual contains guidance, instructions, technical data, illustrations, and procedures pertinent to the application, inspection, modification, maintenance, and the use of safety equipment, safety policies, and survival systems. The primary users of this manual are watercraft masters and key personnel engaged in the supervision, operation, or maintenance of US Army watercraft.

This publication applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the United Sates Army Reserve unless otherwise stated

The proponent of this publication is the United States Army Training and Doctrine Command (TRADOC). The preparing agency is the United States Army Transportation Center and School. Submit written comments and recommendations for improving this publication on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, USATC&FE, ATTN: ATZF-OCT-S (Marine Safety Office), Fort Eustis, VA 23604-5407. Send comments and recommendations on electronic DA Form 2028 by email to marinesafety@conus.army.mil and to LeeeATCLFC@conus.army.mil (Attn: Doctrine Division).

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

Introduction

PURPOSE

This manual provides a single source of guidance and technical information relevant to rescue equipment, survival systems and safety policies used on Army watercraft by Army watercraft personnel.

NOTE: Deviations from configurations of equipment presented in this manual are not recommended and are not authorized. To maintain standardization and to preclude the dangers of operating with potentially unsafe equipment, modifications to rescue equipment and survival systems are not authorized.

ADMINISTRATION

Because watercraft units have a unique requirement for the specific vessel Annual Safety Survey, commanders will appoint, in writing, a person to manage the unit's Annual Safety Survey program in addition to the generic duties of the Unit Safety Officer. This individual is responsible for the unit administration and coordination of the safety equipment inspection and maintenance requirements outlined in this manual.

CONTENTS

This manual contains guidance, instructions, technical data, drawings, illustrations, procedures, and descriptions pertinent to the configuration, modification, application, inspection, fabrication, maintenance and repair, and the use of rescue equipment and survival systems. The Transportation Branch Marine Safety Office, Fort Eustis, VA, will formulate, produce, and distribute applicable changes to the equipment and to respective chapters of this manual.

Warnings, Cautions and Notes The following definitions apply to "WARNINGS," "CAUTIONS," and "NOTES" found throughout this manual.

WARNING

Operating or maintenance procedures, techniques may result in personal injury or loss of life if not carefully followed.

CAUTION

Operating maintenance procedures, techniques, may result in damage to equipment if instructions are not carefully followed.

NOTE: Operating or maintenance procedures, techniques, and so on that are considered essential to emphasize.

USE OF THE WORDS "SHALL," "WILL," "MAY," AND "SHOULD"

The following definitions apply to the words "shall, will, may," and "should" throughout this manual.

- Use of "shall" and "will" indicates a mandatory requirement.
- Use of "may" and "should" indicates an acceptable or suggested means of accomplishment.

UPDATING

This manual will be updated periodically by the issuing of a List of Effective Pages that includes all original, revised, added, and deleted pages. This list will be inserted in the front of each volume, immediately following the title page. Revised and added pages, appropriately dated, will be issued with the change and will be inserted into this volume according to page numbers. The replaced and/or deleted pages and the superseded List of Effective Pages will be discarded. National Stock Numbers (NSN) and associated equipment listed may change as technologies advance. As recommended, interim changes will be submitted for insertion to this manual by means of the US Army Watercraft Safety Advisory from the Marine Safety Office. All directives shall be complied with that are issued after the date of the latest change. These directives will be incorporated into the next change or revision of this manual.

GENERAL

Regulatory guidance for rescue and survival equipment and systems are contained in AR 56-9. Policies and procedures pertaining to all other aspects of the equipment and systems are stated in this manual.

ALLOWANCE

Allowances of rescue and survival equipment are determined by the type of vessel and mission. Additional equipment may be required to provide for passengers and maintenance. Specific allowances may be found in the appropriate watercraft Basic Issue Items (BII) list. Appendix A of this manual provides a quick reference guide, but must be verified with the BII.

Chapter 1

Marine Safety Program

The Army's watercraft safety program is designed to help mariners perform their mission in a safe manner and to give the Risk Level Decision Maker the necessary support/advise tools to make an informed decision. The program uses vessel safety surveys, a hazard tracking system, and institutional training to ensure that watercraft and the personnel assigned are able to maintain operational readiness and mission effectiveness. Topics covered in this section are:

- Safety Surveys and inspections
- Army Accident Reporting and Investigation
- Watercraft Safety Notification and Readiness
- Safety Inspections

SAFETY SURVEYS AND INSPECTIONS

- 1-1. **Surveys.** The Transportation Branch Marine Safety Office is assigned the task of performing Marine Safety Surveys to meet the Department of the Army's triennial requirement. All Army watercraft will undergo a safety survey every three (3) years conducted by the Transportation Branch Safety Office (TBSO), Marine Safety Specialist (MSS), Fort Eustis, VA., and annually by the Battalion or below. Surveys will not be conducted on watercraft in overhaul, at sea, or within the first three months after being placed in service. The purpose for the safety survey is to:
 - Uphold and maintain the safety posture of Army watercraft as related to readiness.
 - Provide compliance with Army and other federal safety regulations.
 - Assess the level of safety standardization within the Army watercraft field.
 - Provide on–site assistance for crew safety training.
 - Accumulate lessons learned from Army watercraft crews.
- 1-2. **Survey Guides.** Safety Survey Guides are designed to be generic to vessel classes and are periodically updated as both vessel safety equipment and governing laws/regulations improve. Standardized Safety Guides have been developed and are available from the Transportation Branch Marine Safety Office and the Army Electronic Product Support web site.
- 1-3. **Inspections.** Safety inspections are the responsibility of the Commander. Army watercraft must follow Army Regulations, Department of Defense Regulations, United States Public Laws and International Maritime Laws. Both Coastal and International laws allow the Department of the Army to establish different criteria as long as these criteria do not adversely impact any other Maritime organization or Maritime operation. The vessel master is ultimately responsible for insuring vessel inspections and surveys occur as required for his or her assigned vessel, with special attention to rescue and survival equipment.
- 1-4. Both the public laws and DOD/DA Regulations require Safety inspections of each watercraft to be performed within specific time frames. Public law requires annual inspections be performed by the owning organization and periodic inspections by law enforcement agencies of the national flag of the vessel. DA Regulations require an annual safety inspection of all equipment and facilities managed/owned by each specific command. Additionally, DOD Regulations require a triennial safety inspection of all vessel equipment and management processes be conducted by a major component command level. The Army has assigned this task to Commander, Training and Doctrine Command, who further assigned the task to the Chief of Transportation.