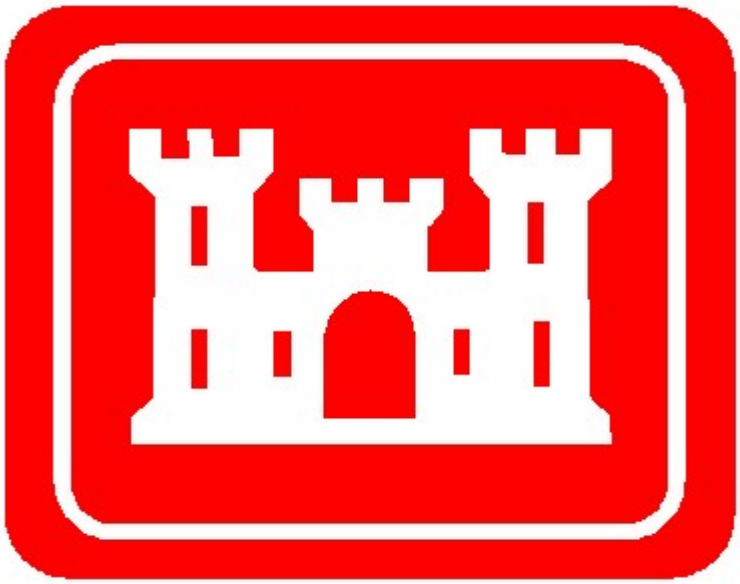
U.S. ARMY CORPS OF ENGINEERS
8 - HOUR MOTORBOAT REFRESHER TRAINING COURSE MANUAL



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COURSE AGENDA

The following refresher training outline may be used by local organizations to train employee operators of boats/vessels less than 26 feet in length. The course schedule can be altered to meet local requirements as long as the subjects listed below are included in the total curriculum.

0800 Intro and review of USACE Boating Policy
0815 Required Safety Equipment
0845 Boat and Trailer Maintenance
0915 Fire Suppression
0945 Rules of the Road, Aids to Navigation
1030 Trailering (cone Course), Launch and Retrieve and Docking
1130 Lunch (change into swim wear)
1215 Docking and Maneuvering Courses
1430 Water Based Emergency Procedures
1530 Pull course and boats, written test, marlinspike test, course evaluation
1700 End Course

Tab 1 Introduction and Safety Briefing

I. Introduction

A. ER 385-1-91 requires all U.S. Army Corps of Engineer (USACE) licensed motorboat operators to complete an 8-hour Motorboat Operator Refresher Training course every five years in order to retain their motorboat operator's license.

B. Purpose:

1. To validate that Corps personnel operate boats in a safe and prudent manner and in accordance with recognized federal, state, local and USACE laws and standards.

2. To validate the operation of boats at safe speed and that operators have the skills and knowledge necessary to maintain their motorboat operator's license.

3. To validate that Corps motorboat operators know the proper rescue techniques, to include self-rescue and have the ability to swim 100 yards in a personal flotation device (PFD).

II. Course Content – The class will cover:

A. Activity Hazard Analysis with Risk Assessment Code

B. Required safety equipment.

C. Boats and boat maintenance.

D. Trailering and trailer maintenance.

E. Rules of the Road and Aids to Navigation.

F. Emergency procedures to include rescue, fire suppression, and towing.

G. Docking and alongside maneuvers.

H. Serpentine, Slalom, Star and Emergency Stop maneuvering courses.

III. Course Safety

A. PFD's will be worn at all times on or near the water (No Exceptions).

B. In-water participation shall be voluntary for all students, but is a requirement for completing the course.

C. Participants must pass a 100-yard swim test while wearing a PFD.

D. Participants must be able to self-rescue themselves back into the boat.

E. All vessels shall have on board all equipment required by USCG, State, and EM 385-1-1.

F. All boat operations will be done at a safe and controlled speed, under the direction of an instructor

G. There will be one instructor and one student onboard during the emergency stop maneuvering exercise.

H. Engine kill switches will be tested prior to any boat operations getting underway.

I. Engine kill switch lanyards will be worn at all times by boat operators when boats are underway.

USACE Boating Policy

ER 385-1-91, Training, Testing and Licensing of Small Boat Operators.

Operators of USACE vessels, less than 26 feet in length, will successfully complete a 24-hour training class and be licensed prior to official operation of a USACE vessel. Licensed operators will complete an 8-hour refresher class every five years to retain the license.

Motorboat License Examiners and operators will be trained to be fully knowledgeable of prescribed safety procedures including the use of all equipment and/or tools necessary to safely perform assigned tasks and be capable of swimming 100 yards with a Personal Flotation device (PFD).

EM 385-1-1, Safety and Health Requirements Manual

01.A.15a. An Activity Hazard Analysis (AHA) shall be prepared and documented for each USACE activity as warranted by the hazards associated with that activity. Typically, an AHA, shall be prepared for all field, laboratory, industrial and maintenance activities.

01.A.15d. Work shall not begin until the AHA with Risk Assessment Code (RAC) for the work activity has been discussed with all engaged in the activity in a job pre-brief.

A sample AHA with RAC is included at the end of this tab. Districts must add any site specific information and hazards to the AHA for each training course. The AHA must be incorporated as part of the training curriculum and reviewed daily during training to accommodate changing conditions or activities.

19. F.05 All motorboat operators shall complete and document the following training

a. A boating safety course meeting the criteria of the USCG Auxiliary, National Association of Safe Boating Law Administrators (NASBLA), or equivalent;
b. Motorboat handling training based on the type of boats they will operate, provided by qualified instructors (in-house or other). Operators must pass a written and operational test;
c. Current USCG licensed personnel are exempt from the boating safety training, but they shall complete the written exam and operational test;
d. Government employees shall complete a USACE-approved 24-hour initial boating safety course and refresher as prescribed in ER 385-1-91.

Sample Activity Hazard Analysis (AHA)

Activity/Work Task: Boat Operators License Training Course	Overall Risk Assessment Code (RAC) (of the highest hazard): **M**
Project Location:	
Contract Number: N/A	
Date Prepared:	
Prepared by: Lead Motorboat Instructor Signature:	
Reviewed by: Safety Specialist Signature:	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity \ Probability	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Determine and enter RAC codes for each **"Hazard"** with safety **"Controls"** (E, H, M, or L)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Use the highest individual RAC of the Hazards + Controls below as the overall RAC for the Activity, and enter at the top of the AHA sheet.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Boat Operations **A) Maneuvering Courses (serpentine, slalom, emergency stop, star)**	1. Swamp or Capsize	1. Load boat according to manufacturer recommendations/data plate. Ensure equipment and occupant weight is balanced. The emergency stop maneuvering course should be conducted with one instructor and one student onboard.	L
	2. Drowning	2. Wear Personal Flotation Device (PFD). Know location and proper use of lifesaving devices (throw ring, throw bag, reach poles, ladder, cargo net)	M
	3. Collisions	3. Follow and obey boating rules/laws, recognize aids to navigation, maintain safe speeds, keep proper lookout	L
	4. Falls Overboard	4. Wear PFD, know proper rescue procedures and wear proper footwear to maintain balance and footing. Ensure kill switch is operational. Operator must be and instructor may be tethered via lanyard to an engine cutoff device. Pay close attention to all other boats operating on maneuvering courses.	M
	5. Fires/Explosions	5. Follow proper venting and starting procedures. Know location of fire extinguisher and proper suppression techniques.	L

	6. Sun/Heat	6. Wear proper clothing/hat to limit sun exposure and use sunscreen	**L**
	7. Dehydration	7. Rehydrate with water.	**L**
	8. Eye Fatigue	8. Wear proper eyewear/sunglasses	**L**
	9. Dust/Debris/Material in Eye	9. Wear proper eye protection	**L**
	10. Damaged/Sinking Vessel	10. Obey navigation rules and heed weather warnings. Get to safe harbor as soon as possible. Stay with vessel until rescue. Wear PFD.	**L**
	11. Entanglement in Lines	11. Keep vessel deck clear and properly coil or stow dock lines. Avoid pinch points and stay clear of lines under strain.	**L**
	12. Lacerations, Cuts, Punctures and Abrasions	12. Inspect deck area and equipment for hazardous conditions and correct before operating. Wear proper Personal Protective equipment (PPE). Have first aid kit readily accessible and know proper first aid treatment.	**L**
	13. Bruises and Broken Bones	13. Keep steering wheel, throttle control and vessel interior as dry as possible. Maintain three point body contact with vessel.	**L**
B) Docking/Alongside Maneuvering	1. Entanglement in Lines	1. Keep vessel deck clear and properly coil or stow dock lines. Avoid pinch points and stay clear of lines under strain.	**L**
	2. Pinch Points	2. Deploy boat fenders. Keep all body parts inside vessel.	**L**
	3. Falls	3. Remain seated or in a stationary position until vessel is stopped. Maintain three points body contact with vessel.	**L**
2. Trailering/Launching Boats	1. Accidents while Trailering	1. Utilize a properly sized tow vehicle and trailer for the load. Drive defensively. Obey traffic laws. Perform walk around of vehicle prior to driving and make sure all lights are operational. Check fluid levels, condition of tires and perform preventative maintenance as needed. Verify trailer is properly connected to tow vehicle and trailer lights are operational. Do not eat, drink, smoke, use cell phone or perform other tasks that interfere with attention to driving.	**L**
	2. Accidents while Launching and Retrieving Vessels	2. Prepare the vessel in staging area. Make sure boat ramp is clear of obstructions and make note of ramp conditions (wet, algae, etc.). Remove PFD before entering tow vehicle, engage 4-wheel drive if necessary. Lower driver's side window, remove	

		seat belt and turn off radio. Use a spotter when available to back down ramp. Set parking brake when trailer is lowered to proper launch depth. Start vessel engine before disconnecting winch strap. Maintain communication with vehicle operator as well as boat operator understanding signals given.	**L** **L**
	3. Pinches and Lacerations	3. Be aware of strap tension, pinch points and winch handle tension while releasing winch lock. Keep face and hands away from winch handle.	**L**
	2. Vehicle Enters the Water	2. Stay calm, unfasten seat belt and lower window(s) to equalize pressure and offer an escape route. Use automatic center punch to break window if necessary.	**L**
3. Refueling Boats	1. Fires and Explosions	1. a) Before fueling: close all compartments, hatches. Turn off electrical system and extinguish any open flames. No smoking. Remove portable fuel tanks from boat b) During fueling: maintain a ground between the fuel nozzle and the gas tank. Fill slowly to avoid spillage. Do not fill tank to brim. Leave room for fuel to expand c) After fueling: Replace fuel cap tightly, open all compartments, hatches. If equipped, run blower motor for four minutes to vent bilge before starting.	**L** **L** **L**
4. Using Auto Inflatable PFD's	1. General Use	1. Prior to use of an auto inflatable PFD, employees shall complete in-water testing and be trained in the use, maintenance, restrictions, care, storage inspection and post deployment procedures as per manufacturer's instructions.	**L**
	2. Failure of PFD/Improper Use/Assembly	2. Employees must follow manufacturer's instructions for wearing and properly installing re-charge kit. Verify indicator gauge reads "green".	**M**
	3. PFD damaged from storage	3. PFD must be thoroughly inspected by disassembling PFD and manually inflating bladder to check its integrity. Inspect arming mechanism for damage. Any deficiencies must be corrected before the PFD can be put back in service.	**L**
	4. Drowning	4. Employees wearing this PFD must have basic ability to tread water and be physically able to swim without a PFD. Employee must be trained in the manual operation of this PFD should automatic inflation fail.	**L**

5. Using PFD's	1. Failure	1. Before use make sure PFD is in serviceable condition and is not ripped or torn and all buckles, zippers or other fasteners are working properly. Make sure PFD is the right size and type for the intended wearer and for the task at hand.	**M**
6. Self-Rescue	1. Cuts and Muscle Strain	1. Employees can self-rescue themselves back into the vessel using one of four methods: a. Cavitation Plate on vessel engine b. Chin bounce c. Stirrup d. Ladder	
7. Victim Rescue	1. Muscle Strain	1. Employees can rescue a conscious and unconscious victim back to the vessel using one of these methods: A. Conscious Victim – use rescue procedure of Talk-Reach-Throw-Go and elevate procedure to the proper step depending on circumstances. B. Unconscious Victim – use any means (throw ring, cargo net, dock lines, reach pole, etc. to get victim astride of the boat. If possible retrieve victim back into boat. If not possible secure victim astride vessel until help arrives.	**L** **L** **L** **L**
8. Signal Flare Use	1. Severe Burns 2. Eye Damage	1. Stand with back to wind and point away from face and body when igniting and while signal is burning. 2. Point away from face and do not look directly at flame while signal is burning.	
9. Reserved			

Equipment to be Used	Inspection Requirements	Training Requirements & Competent or Qualified Personnel name(s)
1. Motorboats less than 26' in length with outboard engines. 2. Corresponding trailer matched to the motorboat. 3. Properly equipped tow vehicle. 4. Safety rescue devices such as throw rings, throw bags, reach poles, ladders, cargo net and lines, first aid kit.	1. Small Boat and Equipment Checklist from ER 385-1-91 2. Small Boat and Equipment Checklist from ER 385-1-91 3. Small Boat and Equipment Checklist from ER 385-1-91 4 & 5 Requirements vary to each particular piece of equipment as outlined in US Army Corps of	<u>Employees participating in this training must</u>: A. Have completed a NASBLA or equivalent boaters safety education course B. Be able to swim 100 yards with a PFD C. Be able to self-rescue themselves back into the vessel. D. Pass the written exam with a minimum score of 80% E. Be tethered to or wear a kill switch device when operating the vessel

5. Classroom equipment to include: computers, projector and copy machine.	Engineers Safety Manual EM 385-1-1 or as per manufacturer's instructions	F. Students wear a Type III or better inherently buoyant PFD unless previously trained to wear inflatable. G. Demonstrate the ability to handle the boat and operate correctly through the maneuvering courses H. Be able to trailer, launch and retrieve the boat I. Demonstrate the ability to correctly dock the boat <u>Boat License examiners</u>: A. A minimum of two examiners are required to perform the 24 hour motorboat training course B. Must be trained and certified in CPR/First Aid/AED C. Option to use a second lanyard attached to the students lanyard when student is operatoring the vessel *List the names of the certified boat examiners instructing the course*

Tab 2 Required Safety Equipment

I. Introduction: Recreational vessels 65 feet and less in length are categorized into four classes. Each class of vessels has minimum equipment requirements established by Federal law. Each individual state and the Corps of Engineers (EM 385-1-1) also have specific equipment requirements for vessels under their jurisdiction.

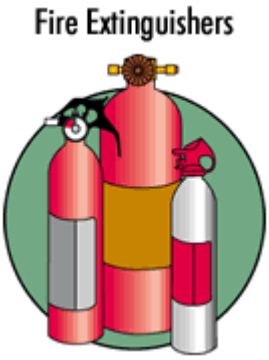
II. Vessel Classes:

A. Class A – Vessels less than 16 feet (4.9 m) in length.
B. Class 1 – Vessels 16 feet to less than 26 feet (4.9 – 7.9 m) in length.
C. Class 2 – Vessels 26 feet to less than 40 feet (7.9 – 12.2 m) in length.
D. Class 3 – Vessels 40 feet to not more than 65 feet (12.2 – 19.8 m) in length.

For the purposes of this training our equipment requirements will only be based on Class A and Class I vessels

III. Required Equipment. The Coast Guard sets minimum safety standards for recreational boats and associated safety equipment. To meet these standards some of the equipment must be Coast Guard approved. "Coast Guard Approved Equipment" meets Coast Guard specifications and regulations relating to performance, construction or materials.

IV. Fire Extinguishers. Vessels are required to carry readily accessible fire extinguishers that are approved for marine use by the U.S. Coast Guard. The size and number of extinguishers acceptable for use on boats depend on the size of the boat and whether or not there is a fixed fire extinguishing system installed on the boat. All extinguishers must be readily accessible and they must be kept in a serviceable condition.



A. There are four types of fire extinguishing agents approved for use on vessels. All 4 of the extinguishing agents suppress a fire by smothering it.

1. Carbon Dioxide (CO2). CO2 extinguishers must be re-inspected every six months and be tagged. The containers must be hydrostatically tested every 5 years.

2. Dry Chemical. Dry chemical extinguishers are the most common extinguishers in use today.

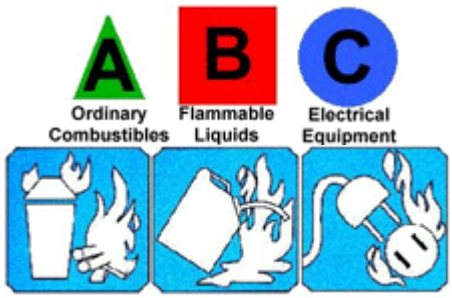
3. Foam. Foam extinguishers that were manufactured prior to 1965 and were Coast Guard approved still meet the legal requirements as long as they are in serviceable condition. Foam extinguishers manufactured after 1965 are not approved for marine use.

4. Halon-1301 can still be used if it's an existing system. You can even get it recharged with reclaimed agent. Halon is no longer manufactured, but it's still out there. Alternatives to Halon-1301, you have FM-200 (or FE-227), FE-13, FE-25, Novec-1230, and inert gas systems like Argonite or Inergen. In portable fire extinguishers, Halon can still be recharged, although it's Halon-1211 in portables. Other agents that work good in a hand-portable are Halotron and FE-36.

B. Classification of Fire Extinguishers. Fire extinguishers are classified by a letter and number symbol.

The number indicates the relative size of the extinguisher while the letter indicates the type of fire it can effectively extinguish.

A - Combustible solids (wood, paper).
B - Flammable liquids (gasoline, solvents, grease, oil, some paints).
C - Electrical equipment (wiring, fuse boxes, energized electrical equipment).



	Foam (gals)	CO2 (lbs)	Dry Chemical (lbs)	Halon (lbs)
B-I	1.25	4	2	2.5
B-II	2.5	15	10	10

C. Fixed extinguisher systems.

1. Coast Guard approved systems are required to have a discharge indicator. This is usually a pressure gauge visible outside the engine compartment or an indicator light located in the Helmsman's position, which will show the operator if the system has been discharged.

2. Systems shall be either Halon or dry chemical. Halon-1301 can still be used if it's an existing system. You can even get it recharged with reclaimed agent. Halon is no longer manufactured, but it's still out there.

D. Fire extinguisher requirements on recreational vessels.

1. The number of approved fire extinguishers required to be aboard a recreational vessel depends upon the length and/or construction of the vessel.

2. Fire extinguishers are required on all recreational boats, which have compartments, wherein explosive or flammable gases or vapors can be trapped. The following conditions require a fire extinguisher.

a. Closed compartments under thwarts and seats wherein portable fuel tanks may be stored.
b. Unsealed double-bottoms not completely filled with flotation material.
c. Closed living spaces.
d. Closed stowage compartment in which combustible or flammable materials are stowed.
e. Permanently installed fuel tanks. A tank is permanent if it is secured in any way. If weight or location is such as to likely prevent someone from removing it in an emergency, the tank is considered permanent.

3. The following conditions do not, in themselves, require that fire extinguishers be carried.
a. Bait wells or ice chests/collers.
b. Glove compartments.
c. Buoyant flotation materials.
d. Open slatted flooring.

4. All recreational boats meeting the necessary requirements must carry at least the minimum number of hand portable fire extinguishers required for its size.

5. Some vessels are known as “open boats”. These vessels are constructed so no flammable gases or vapors can be trapped in any area of the boat, are propelled by outboard motors with portable fuel tanks, and are not carrying passengers for hire. These vessels are not required to carry fire extinguishers.

6. The following chart lists the number of extinguishers that are required. In the case where a Coast Guard approved pre-engineered fire extinguishing system is installed for the protection of the engine compartment, the required number of units may be reduced in accordance with the chart.

Minimum Number of Hand Portable Fire Extinguishers Required		
Vessel Length	**No Fixed System**	**With Approved Fixed Systems**
Less than 26’	1 B-I	None

E. In order for a fire extinguisher to be acceptable for use it must meet the following:

1. It must be readily accessible and mounted in its specific marine-type bracket.

2. It must be in good condition and serviceable.

3. An approved extinguisher is marked by the following method:

Marine Type U.S.C.G.
Type ___ Size ___
USCG Approval Number 162.028

F. Boat operators should check their fire extinguishers for:

1. USCG approval.

2. Proper mounting bracket and in condition for immediate use.

3. Proper size and type for vessel.

4. Check nozzles of extinguisher regularly to ensure that they are clear of obstructions.

5. Check gauges regularly to make sure that the extinguisher is charged and that the plastic gauge cover is not damaged.

6. Dry chemical extinguishers without gauges or indicating devices must be inspected every 6 months. If the gross weight of a CO2 extinguisher is reduced by more than 10% of the net weight, the extinguisher is not acceptable and must be recharged.

7. Dry chemical extinguishers should be turned upside down to check for clumping of chemicals. If chemicals are clumped together, the extinguisher is not acceptable.

V. Personal Flotation Devices (PFD's). PFD's are designed to help you remain afloat in the water and to keep your head and face in a position which permits breathing. More than 90% of deaths in boating are from drowning and at least 80% of those drowning victims were not wearing a PFD. PFD's aid you against drowning and also help protect you from hypothermia, which is another major cause of death in boating accidents.

There are two types of flotation devices. Each is designed for different boating activities and water conditions and has its own maximum buoyancy, performance level, and limitations. You should choose your life jacket based on your boating activities and conditions. PFD's must be in serviceable condition, must be the appropriate size and fit for the intended wearer as marked on the Approval Label and they must have an Approval Number as specified in 46 CFR, Part 160.

1. **Wearable PFD**:

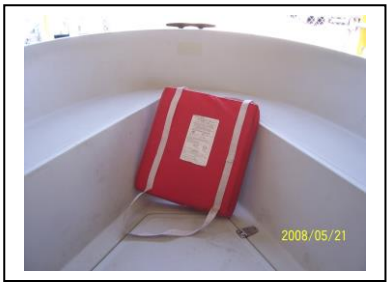
Adult: (persons weighing more than 90 pounds and providing **25 pounds of buoyancy** in fresh water for 48 hours.

Child: (persons weighing less than 90 pounds and providing **16.5 pounds of buoyancy** in fresh water for 48 hours.

ALL Wearable PFD's:

- shall support the wearer in the water in an upright or slightly backward position, and shall provide support to the head so that the face of an unconscious or exhausted person is held above the water
- shall be capable of turning the wearer, upon entering the water, to a safe flotation position as described above

2. **Throwable PFD**: These are designed to be thrown to a person in the water. Throwable devices include boat cushions, ring buoys, and horseshoe buoys. They are not designed to be worn and must be supplemented by a wearable PFD. It is required to keep these devices immediately available for emergencies. These throwable PFD's are constructed of cork or foam with either a canvas or special purpose plastic covering. Rings may be equipped with grab lines. Cushions are made of fibrous glass or foam with vinyl dipped material covering and straps for grasping. All cushions carry a warning against wearing on the back. The **minimum buoyancy is 16.5 pounds for ring buoys or 18 pounds for boat cushions**.



F. Federal PFD requirements.

1. **Class A boats**. On boats less than 16 feet in length there must be one Wearable PFD for each person on board. They must be readily accessible and of a suitable size and fit for the intended wearer.

2. **Class I boats**. On boats 16 feet in length and over there must be one Wearable PFD for each person on board plus at least one Throwable PFD that must be immediately available.

3. On any boat underway a child under the age of 13 must wear an appropriate USCG approved PFD unless they are below decks or in an enclosed cabin. Individual State statutes for age requirements preempt this USCG requirement so be sure and check your area of operation for the proper age requirement.

G. Maintenance of PFD's should be done in accordance with the Manufacturers recommendation and owner's manual. At a minimum

1. Check your life jackets before each use.

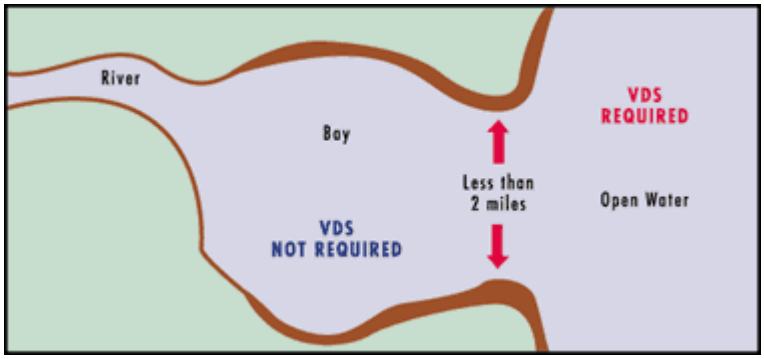
2. Check that all hardware and straps are in working order.

3. Check for rips, tears, leaks, mildew, lumpy or hardened buoyancy material, & oil saturation in the fabric.

4. Don't use PFD as a kneeling pad or boat fender.

5. If wet, allow it to dry thoroughly in open air before storing.

VI. Visual Distress Signals (VDS). All vessels used on coastal waters, the Great Lakes, territorial seas, and those waters connected directly to them, up to a point where a body of water is less than two miles wide, must be equipped with U.S.C.G. Approved visual distress signals. Vessels owned in the United States operating on the high seas must be equipped with U.S.C.G. Approved visual distress signals.



A. The following vessels are not required to carry day signals but must carry night signals when operating from sunset to sunrise:

1. Recreational boats less than 16 feet in length.

2. Boats participating in organized events such as races, regattas, or marine parades.

3. Open sailboats less than 26 feet in length not equipped with propulsion machinery.

4. Manually propelled boats.

B. Pyrotechnic Visual Distress Signals. Pyrotechnic Visual Distress Signals must be Coast Guard Approved, in serviceable condition, and readily accessible. They are marked with an expiration date. Expired signals may be carried as extra equipment, but can not be counted toward meeting the visual distress signal requirement, since they may be unreliable. Launchers manufactured before January 1, 1981, intended for use with approved signals, are not required to be Coast Guard Approved. If pyrotechnic devices are selected a minimum of three are required. That is, three signals that meet both day and night use requirements. Pyrotechnic devices should be stored in a cool, dry location, if possible. A watertight container painted red or orange and prominently marked "DISTRESS SIGNALS" or "FLARES" is recommended.

1. Flare Pistol. The flare pistol is approved for day and night use. The flare has a 6-7 second burn time, reaches an altitude of 250-500 feet and produces 10-15,000-candle power of light. You should only use these flares if you are in sight of a ship or plane or if you are reasonably sure that someone on shore may see you. In some states the pistol launcher for meteors and parachute flares may be considered a firearm. Therefore, check with your state authorities before acquiring such a launcher.

2. Hand-held Flares. Hand-held flares are approved for day or night use. These flares have a 3 minute burn time that produces 700 candle power. You should only use these flares if you are in sight of a ship or plane or if you are reasonably sure that someone on shore may see you.

3. Orange Smoke Flare. Orange smoke flares are approved for daytime use only. This flare produces a cloud of orange smoke with a 60 second burn time with a maximum visibility of 5 miles. The flare is either hand-held or it floats in the water. You should only use these flares if you are in sight of a ship or plane or if you are reasonably sure that someone on shore may see you.

C. Non-Pyrotechnic Visual Distress Signals. Non-Pyrotechnic Visual Distress Signals must be in serviceable condition, readily accessible, and certified by the manufacturer as complying with U.S.C.G. requirements.

1. Orange Distress Flag. The orange distress flag is used during the daytime only. The flag is orange and displays a black ball over a black square and must be at least 3' x 3' in size. The flag is most distinctive when attached to and waved on a paddle, boathook, or flown from a mast. It may also be incorporated as part of devices designed to attract attention in an emergency, such as balloons, kites, or floating streamers.

2. Electronic Distress Light. The electronic distress light is for nighttime use only. This light automatically flashes the international SOS distress signal. This light must be marked with an indication that it meets Coast Guard requirements in 46 CFR 161.013.

3. Under Inland Navigation Rules, a high intensity white light flashing at regular intervals from 50-70 times per minute is considered a distress signal. Such devices do NOT count toward meeting the visual distress signal requirement.

D. Federal Requirements.

1. If using pyrotechnic devices, at least 3 day and 3 night devices must be carried or 3 combination day/night devices.

2. If using non-pyrotechnic devices, at least 1 day and 1 night device must be carried.

3. Vessels may also carry any combination of pyrotechnic and non-pyrotechnic devices so long as the minimum number required per type is carried.

4. Class A vessels must carry VDS when operating at night on required waters.

5. Class I, II, and III vessels require VDS at all times when operating on required waters.

6. Open sailboats less than 26 feet in length not equipped with propulsion machinery and manually propelled boats are not required to carry VDS.

7. All vessels used on coastal waters, the Great Lakes, territorial seas, and those waters connected directly to them, up to a point where a body of water is less than two miles wide, must be equipped with U.S.C.G. Approved visual distress signals.

VII. Sound Producing Device. The navigation rules require sound signals to be made under certain circumstances. Meeting, crossing and overtaking situations described in the Navigation Rules are examples of when sound signals are required. Recreational vessels are also required to sound signals during periods of reduced visibility.

A. Class A and Class I Vessels must have some means of making an efficient sound signal. An efficient sound signal is defined as a device that can produce a four to six second blast.

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VIII. Navigation Lights. Recreational vessels are required to display navigation lights between sunset and sunrise and other periods of reduced visibility (fog, rain, hazy, etc.). The U.S. Coast Guard Navigation Rules, International-Inland, specifies lighting requirements for every description of watercraft. The information provided here is intended for power-driven vessels less than 26 feet in length**.**

On a vessel, navigation lights are lights shown that are of a specific color, (white, red, green, yellow, blue), arc, range of visibility, and location, as required by law and regulations. Their basic purpose is to prevent collisions by alerting each vessel to the other's presence. Lights also indicate the relative heading of one vessel as seen from another, and give clues to her size, special characteristics, and/or current operations, and who has the right of way.

A. Light Definitions.

1. Anchor light - an all-around white light exhibited where it can best be seen and is visible for two miles.

2. Masthead light - A white light placed over the fore-and-after centerline of the vessel, showing an unbroken light over an arc of 225 degrees, from dead ahead to 22.5 degrees abaft (behind) the beam on both sides of the vessel. On boats less than 12 meters (39.4 feet) in length, the masthead light may be off the fore-

and-aft centerline, but must be as close to it as possible. The term "masthead light" is something of a misnomer. More often than not, this light is not at the top of the mast. On motorboats, it is often on a short staff at the top of the cabin. On sailboats, it is usually part way up the mast, and another light, the anchor light, is actually at the masthead.

3. Sidelights - Colored lights - red on port and green on starboard - showing an unbroken arc of the horizon of 112.5 degrees, from dead ahead to 22.5 degrees abaft the beam on each side.

4. Combination lights - On a vessel of less than 20 meters (65.6 feet) in length, the sidelights may be combined in a single fixture carried at the centerline of the vessel, except that on boats less than 12 meters (39.4 feet) in length, this combination light need be carried only as close to the centerline as possible.

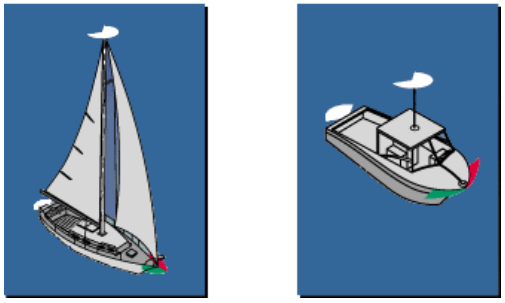
5. Stern light - A white light showing over an unbroken arc of the horizon of 135 degrees, centered on dead astern.

6. All-Around Lights - A light, the color determined by its use, showing over an unbroken arc of the horizon of 360 degrees.

B. Power-Driven Vessels.

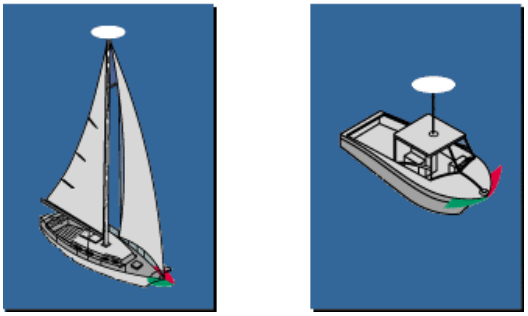
1. A recreational powerboat under way is required to display a masthead light forward, red and green sidelights and a stern light, as indicated in Figure 1.

Figure 1



3. A recreational powerboat may instead display a 360' all-round white light (Figure 2)

Figure 2

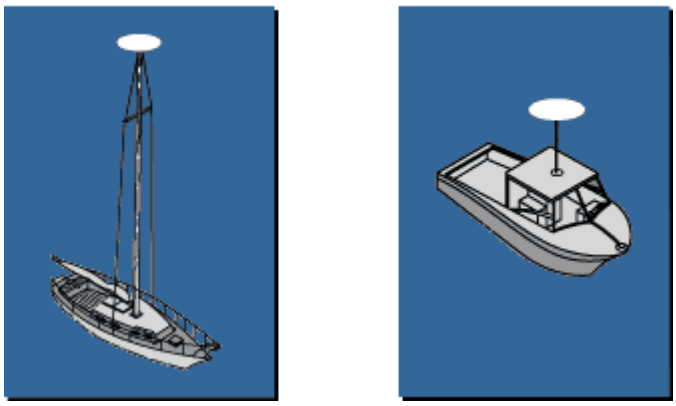


C. Anchored Vessels.

1. Power-driven vessels and sailing vessels at anchor must display an all-around white anchor light (Figure 8).

2. Vessels less than 23 feet (7 meters) in length are not required to display anchor lights unless anchored in or near a narrow channel, fairway or anchorage, or where other vessels normally navigate.

Figure 8



IX. Corps of Engineer Requirement's: Government operators shall be licensed and certified in accordance with ER 385-1-91 and EM 385-1-1

EM 385-1-1 references:

- 01.A.15.a. An AHA shall be prepared and documented for each USACE activity as warranted by the hazards associated with the activity
- 03.B.01 b. TYPE III, 16 unit first aid kit (EM 385-1-1, Table 3-1)
- 05.J.01 Inherently buoyant Type III, Type V work vests, or better USCG-approved personal flotation devices (PFDs) shall be provided and properly worn (zipped, tied, latched, etc., in closed fashion) by all persons in the following circumstances:
  - a. On floating pipelines, pontoons, rafts, or stages;
  - b. On structures or equipment extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees;
  - c. Working alone at night where there are drowning hazards, regardless of other safeguards provided;
  - d. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit; or
  - e. Whenever there is a drowning hazard.
- 05.J.02 Automatic-Inflatable PFD's Type V or better, USCG approved for commercial use, may be worn by workers in lieu of inherently buoyant PFD's provided the following criteria are met:
  - Over 16 years old and weigh 90 lbs or more.
  - Activity Hazard Analysis (AHA) shall be developed for the intended activity
  - PFDs must be inspected, maintained, stowed and used in accordance with the manufacturer's instructions. PFD's used in heavy construction or maintenance activities or where hot work (welding, brazing, cutting, soldering, etc.) is to be performed must be designed, tested and certified by the manufacturer for this type of work; **NOTE: The standard commercial auto-inflatable PFD does not meet these requirements**

- ► PFDs shall provide a 30-pound minimum buoyancy post-deployment and have a status indicator window;
- ► Personnel shall be trained in the use, maintenance, restrictions, care, storage, inspection and post-deployment procedures per manufacturer's instructions;
- ► The USCG-approval for auto-inflatable PFD's is contingent upon the PFD being worn, not stowed. All auto-inflatable PFDs must be worn at all times drowning hazard exists;
- ► In-water testing is required for all first time users to so that wearers become familiar with the feel and performance of the PFD.
- ► Must be worn

- 05.J.03 All wearable PFD's shall be of an international orange (or orange/red) or ANSI 107 yellow green color.
  - ► Each inherently buoyant PFD shall have at 31 sq. in. (200 sq. cm.) of retro-reflective material attached to its front side and at least at 31 sq. in. (200 sq. cm.) on its back side per USCG requirements (46 CFR Part 25.25-15).
  - ► Each auto-inflatable PFD shall have at 31 sq. in. (200 sq. cm.) of retro-reflective material attached to its front side and at least at 31 sq. in. (200 sq. cm.) on its bladder, to be visible when deployed

- 05.J.06 d. Ring Buoys (20" diameter) shall have at least **90** ft of 3/8 in. solid braid polypropylene, or equivalent, attached.
  Throw bags may be used *in addition to* ring buoys.
  These throwable devices and lifelines shall be inspected at a minimum of every six months and stored in such a manner to allow immediate deployment and be protected from degradation from weather and sunlight

- 19.A.05 a. Fenders shall be provided to prevent damage and sparking and to provide safe areas for workers exposed to pinching situations

- 19.A.05 c. Signal Devices (lights, sound devices, etc) shall be provided on all vessels to give signals required by the navigation rules applicable to the waters on which the vessel is operated on.

- 19.B.04 a.
  (1) At least one portable or permanent ladder of sufficient length to allow a person to self rescue by boarding the ladder from the water
  (2) Other methods or means designed to assist in the rescue of an incapacitated person overboard

- <u>19.D.07</u> Small boats with length 26 ft (7.9 m) or less shall be provided with integrated combinations of two or more of the below listed items to provide continuous perimeter protection around the vessel. The installations shall be in accordance with either ABYC Standards or ISO Standard 15085, as demonstrated by a Manufacturer's certificate, label or other documentation.
  - ► Cockpits;
  - ► Coamings;
  - ► Handholds;
  - ► Toe Rails;
  - ► Life Rails;
  - ► Deck Rails;
  - ► Stern Rails
  - ► Bow Rails.

- 19.F.02 d. All open cabin launches or motorboats shall be equipped with "kill (dead man) switches".

- 19.F.03 a. The minimum number and rating of fire extinguishers that shall be carried on motorboats:
  - Class A and Class I = One, 1-A:10B-C
    Class II and III = Two, 1-A:10B-C

- 19.F.03 b. All motorboats having gasoline or liquid petroleum gas in cabins, compartments or confined spaces shall be equipped with an automatic CO2 fire extinguishing system

- 19.F.04 Float Plans containing the following information shall be prepared by the motorboat operator when engaged in surveying, patrolling or inspection activities that are remote and expected to take longer than four hours or when travelling alone and filed with the operators supervisor
    - ► Vessel information
    - ► Personnel on board
    - ► Activity to be performed
    - ► Expected departure, route and time of return
    - ► Means of communication

- 19.F.05 All motorboat operators shall complete and document the following training:

    - ► A boating safety course meeting the criteria of the USCG Auxiliary, National Association of State Boating Law Administrators (NASBLA), or equivalent; and
    - ► Motorboat handling training, based on the types of boats they will operate, provided by qualified instructors (in-house or other). Operators must pass a written and operational test.
    - ► c. Current USCG licensed personnel are exempt from the boating safety training, but they shall complete the written exam and operational test;
    - ► d. Government employees shall complete a USACE-approved 24-hour initial boating safety course and refresher as prescribed in ER 385-1-91.

Additional recommended safety equipment:

- ► Anchor and line
- ► Tow line and bridle
- ► Radios/electronics
- ► Mooring lines
- ► Boat hook
- ► Bilge pump(s)
- ► Rescue line
- ► Paddle
- ► Compass
- ► Tool kit
- ► First aid kit
- ► Navigation kit
- ► GPS
- ► Nautical Chart
- ► Hand-held light
- ► Additional PFD’s

Personnel Protective Equipment (29 CFR 1910.132)

- ► EYE PROTECTION - Clear/tinted, impact rated
- ► FOOTWEAR - Non-skid/scuffing, cushioning, insulation
- ► HEARING PROTECTION - Ear muffs/plugs
- ► U.V. RAY PROTECTION - Sun block, clothing

U.S. Army Corps of Engineers

Boat Operations Float Plan

DATE:

LAUNCH SITE:

DEPARTURE TIME:

EXPECTED RETURN TIME:

ROUTE OF TRAVEL:

VESSEL:

VEHICLE:

PERSONNEL ON BOARD:

CONTACT INFORMATION:

MISSION:

Tab 3 Boat/Trailer Maintenance, Trailering & Launching/Retrieving

I. Introduction. This module will provide a general introduction into boat motor/trailer maintenance, trailering and launching and retrieving. The *Daily Operators Inspection Checklist* at the end of this tab is to be used each time a motorboat and/or trailer are put into use.

II. Routine boat motor maintenance (Check owner's manual and shop manual for detailed procedures).

1. Grease all fittings and drive parts of the motor with proper lubricants.

2. Change lower unit (gear case) lubricants at least every 100 hours of operation or once each season, whichever occurs first.

3. Inspect spark plugs and clean or replace as necessary.

4. Check motor for loose hose connections, leaks or parts lying inside lower housing tray.

5. Propeller examination and replacement/installation. (Instructor should demonstrate how to change a propeller)

a. Remove and clean propeller if you find fish line wrapped around the shaft.

b. Replace propeller if damaged by being bent or a series of nicks is present. The unbalanced propeller could damage the engine.

A. Trouble Shooting

1. Engine fails to start or engine loses power or stops while under way. (Engines are more likely not to start than to quit while running)

a. Out of gas, gas is old, or the fuel system is dirty.

b. Check the valves of a portable fuel tank and the fuel line from the tank to the engine. Be sure the line is properly connected to the tank and to the engine.

c. Check the battery connections.

d. Loose wire in the ignition circuit. Warning: The ignition system on an outboard system can cause a serious shock.

e. Fuel not reaching cylinders. Check the on/off valve and the fuel from the tank to the cylinders; check the fuel line under the engine cover; check the spark plugs to see if they are wet with fuel; if so, the engine may be flooded.

f. Overheated. If the engine is hot, the cooling system may be blocked or the water pump may be worn out. Do not try to start an overheated engine, let it cool first. Outboard engines have water pump indicators that discharge a steady stream of water when the water pump is operating properly.

g. Fouled spark plug – clean or replace the spark plug.

h. Carburetor adjustment too lean or too rich.

i. Improper oil/fuel mixture.

j. Kill switch is disengaged.

2. Engine seems to run well but lacks power while under way:

a. Improper mounting.

b. Incorrect tilt angle or improper load distribution.

c. Fouled propeller or lower unit.

d. Damaged propeller blades or bushing assembly.

e. Engine knock. Often caused by loose propeller or loose flywheel nut, by worn bearings, worn pistons, or by a broken engine mount spring. Generally, if the engine starts to knock, take it to a dealer.

f. Excessive water in bilge resulting in extra weight. Check for leak or drain plug.

III. Trailer Maintenance

A. Check trailer brakes for proper operation before each trip.

B. Check hydraulic fluid levels in brake reservoir.

C. Grease wheel bearings with water resistant grease in accordance with manufacturer's specifications. It is a good idea to always carry an extra set of wheel bearings, a jack, and a lug wrench.

D. Check trailer tires to ensure that they are properly inflated and that they are not dry rotted. You can protect against dry rot by use of preservative.

E. Check bottom support bunks and guides to ensure that they are not cracked or splintered and that they are functioning properly.

F. Check and lubricate the trailer winch. Ensure that the nylon webbing or cable is not cut, frayed or worn in any way.

IV. Trailering the load

A. Check tie down straps for security and proper operation.

B. Ensure that the safety catch is securely attached to the bow of the vessel.

C. Check the safety chains to ensure that they are criss-crossed under the tongue of the trailer. This will catch and cradle the tongue and prevent the tongue from dropping and hitting the pavement, which can lead to a potentially serious accident. Chains need to be long enough that they don's bind when turning, yet not so long that they drag on the roadway.

D. Ensure that the hitch is properly and securely latched over the ball. Check to ensure that the safety pin or latch that locks the hitch onto the ball is in its proper position.

E. Check to make sure that the transom saver (if used) and the tie down straps are properly secured.

V. Driving Tips

A. Reduce normal driving speed when towing a trailer. The additional weight of the trailer makes it take longer to slow down. The increased length and width of the vehicle and trailer decreases visibility when changing lanes and makes it more difficult to make turns.

B. Check your vehicle owner's manual to determine the best gear to use while towing.

C. On long trips, pull over periodically to check the rigging, tires and bearings.

VI. Launching Tips

A. Check the weather conditions of the area where you will be boating before you leave to trailer to the area.

B. Prepare your vessel and trailer in the staging area (attach dock lines, fenders, load gear, unplug trailer lights, put in drain plugs, etc.) so as to not block ramp traffic.

1. Visually check the condition of the ramp
2. Remove all straps EXCEPT the bow strap
3. One person in vessel and one person in vehicle. Must communicate with each other
4. When boat operator is ready signal the driver
5. Vehicle window must be down, remove seat belt, turn radio off as well as anything else, that will prevent clear and understandable communication between the driver and operator.
6. Back the boat and trailer down the ramp, until boat transom starts to float and keeping the tow vehicle's wheels out of the water.
7. Vehicle driver - apply emergency brake then put in park
8. Boat operator - lower motor and start, allow to warm up
9. Vehicle driver - unhook safety chain and bow strap and signal when ready
10. When boat operator is ready, put foot on brake, release emergency brake and slowly back in to water
11. Boat operator - reverse motor(s) and ease off trailer
12. When ready, put vehicle in forward gear and slowly pull trailer out of water to the parking area

VII. Retrieving Tips

1. Visually check the condition of the ramp
2. Vehicle window must be down, remove seat belt, turn off radio as well as anything else that will prevent clear and understandable communication between the driver and operator.
3. Back trailer down to proper depth
4. Set emergency brake and put vehicle in park
5. Exit vehicle and stand to side to aid guiding boat onto trailer
6. Boat operator should trim up motor(s) and ease forward onto bunks
7. Let boat settle and ease forward as dictated by the boats position on trailer
8. When bow is a couple of inches from bow stop, hold in position and allow bow strap to be secured
9. Vehicle driver - Winch boat up against the bow stop
10. When secure, communicate with boat operator
11. Boat operator should turn off motor(s) and trim up
12. When ready, put vehicle in gear, release emergency brake and slowly pull boat out of water to staging area
13. Once in staging area plug in lights, secure highway chain, check hitch connections, secure all loose items on boat, secure transom straps and transom saver (if applicable) remove drain plugs (if applicable) and recheck bow strap and safety chain.

Daily Boat Operator Inspection/Checklist	Each block must be filled in before operation. Each block must be filled Yes – Y / No – N / or N/A
Boat Name/ID	

FLOAT PLAN									
Inspection Criteria	**Date**								
Form is filled out and filed in Supervisor's Office? (4+ hours)									
Float Plan is updated for departure?									
BOAT/MOTOR – BEFORE OPERATIONS									
Inspection Criteria	**Date**								
Inspect boat and motor(s) for damage, securely mounted, bilge dry and cleanliness.									
Is boat drain plug secure?									
Are all fluids levels full?									
Is the boat motor equipped with an operational kill switch?									
Motor is full of fuel and oil? Fuel and oil lines good condition?									
Raise lower unit and check water intake, prop, and prop nuts?									
Return lower unit to water and start engine if all OK. Check for proper operation of:									
Exhaust water discharge?									
Oil and water pressure? Gauges operational?									
Water/fuel/oil leaks?									
Check forward and reverse gears, turn wheel lock to lock.									
Extra fuel/oil is on board and secure?									
Is the ignition key on board and does the operator have their license in their possession?									
Paddle and oars are on board and in good condition?									
Boat is equipped with anchor and sufficient anchor line?									
Is a personal floatation device (PFD) provided to each boat passenger and to operator and do PFDs have reflective tape and a whistle attached and inspected?									
Is the boat equipped with dedicated bow and stern lines?									
Is boat equipped with fire extinguishers of at least the size and rating specified and inspected?									
Batteries are fully charged, secure and have good connections?									
Navigation, anchor lights, and horn working properly?									
Tool box has necessary equipment, including: spark plug, wrench, prop wrench and screwdriver, spare spark plugs and fuel filter, spare prop nuts and cotter pins, and spare prop?									

SAFETY EQUIPMENT ON BOARD									
Inspection Criteria	**Date**								
Throw-able life ring with 90-feet of line?									
Radio check completed for all communication equipment on board?									
Ladder and reachable ball-pointed boat hook?									
Working compass, depth sounder, and chart plotter?									
Is there a working, waterproof flashlight on board with extra batteries?									
First Aid Kit (fully stocked) on board and inspected?									
Serviceable signal/flare kit on board and inspected?									
Rescue throw bag(s)									
TOWING VEHICLE AND TRAILER									
Inspection Criteria	**Date**								
Rescue throw bag in towing vehicle?									
Is vehicle of adequate weight and powered to safely tow loaded boat and trailer?									
Is hitch properly rated for weight of boat and trailer to be towed?									
Is hitch secured to the frame (not bumper) of towing vehicle?									
Is the ball on the hitch the proper size for the trailer to be towed?									
Winch, safety chain, and tie downs (front & back) are secure and in proper working order and safety pin installed in hitch coupler?									
Safety chains installed and crossed on trailer?									
Is remote braking mechanism operating properly?									
Does towing vehicle have adequately sized rear view mirrors on both sides?									
Is rear suspension of towing vehicle sufficient and in condition to accept trailer tongue weight?									
Are trailer tires properly inflated?									
Do all trailer signal, stop, tail, and marker lights function properly following connection to towing vehicle?									

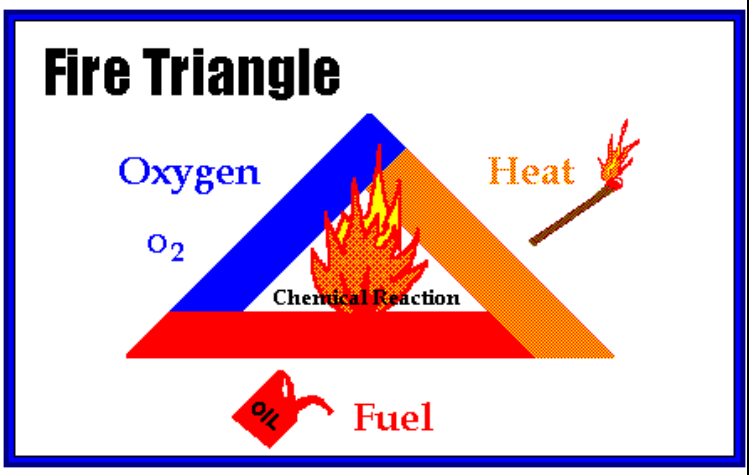
ON RETURN – AFTER OPERATION									
Inspection Criteria	**Date**								
Fuel and oil in motor and full?									
Spare fuel and oil containers are full?									
Wheel blocks are in place?									
Trash is removed?									
Boat cleaned (in same or better condition than prior to your use)?									
Equipment secure in proper locations?									
Life jackets (PFDs) and throw bags are dried out?									
Inspect/report damage and needed maintenance									
Boat key and credit card turned in?									
Flush out lower unit as needed?									
Float Plan is updated for return and completed?									
Float Plan is turned in and filed?									
Comments									
		Print Name_____ Signature_____	Print Name_____ Signature_____	Print Name_____ Signature_____	Print Name_____ Signature_____	Print Name_____ Signature_____	Print Name_____ Signature_____	Print Name_____ Signature_____	Print Name_____ Signature_____

Tab 4 Fire Suppression

I. Basics of fire suppression.

A. The first priority of fire suppression is to save lives, not property (boats). This fire fighting training is provided to contain a small fire to enable a safe exit of occupants.

B. The fire triangle is made up of three elements: heat, oxygen, and fuel. If you remove any one of these elements the fire will be extinguished.



C. Review "Equipment Requirements" tab to review fire extinguisher types.

D. This is "1st Aid" fire fighting. The equipment and techniques are designed to knock down a very small fire or at least slow it down until occupants exit and professional help arrives.

II. P.A.S.S.

Pull, Aim, Squeeze, and Sweep

1. **PULL the pin:** This unlocks the operating lever and allows you to discharge the extinguisher. Some extinguishers may have other lever-release mechanisms.

2. **AIM low:** Point the extinguisher nozzle (or hose) at the base of the fire.

3. **SQUEEZE the lever above the handle:** This discharges the extinguishing agent. Releasing the lever will stop the discharge. (Some extinguishers have a button instead of a lever.)

4. **SWEEP from side to side:** Moving carefully toward the fire, keep the extinguisher aimed at the base of the fire and sweep back and forth until the flames appear to be out. Watch the fire area. If the fire re-ignites, repeat the process.

III. What to do if your boat catches fire.

A. Come to a full stop as soon as possible. Continuing to move will fan the flames

B. Make sure all passengers have on a PFD

C. Position boat so that smoke and flames are downwind

D. If burning material is not attached and is accessible, throw it over the side.

E. Use P.A.S.S. method to attempt to extinguish fire

F. Summon help via VHF marine radio

G. Abandon ship if necessary.

Tab 5 Emergency Procedures

I. Introduction.

A. Background

1. Most boating fatalities involve capsizing or falls overboard, i.e., people end up in the water that were not planning on being there and were not wearing a PFD.

2. Vessels less than 16 feet account for most fatalities. Ironically, small vessels have less stringent equipment requirements.

3. Most drownings occur within ten feet of safety. Therefore, chances are that most rescues will be a simple reach or throw.

B. Priorities in rescue situations.

1. Self is most important. Do not do anything that will endanger you during a rescue attempt.

2. Your partner(s) are second in importance. Ensure that both you and your rescue partner(s) are safe during any rescue attempt.

3. The victim is least important. You and your rescue partner(s) should not do anything that will cause them to become a victim during a rescue attempt.

C. Characteristics of a person in distress.

1. Can wave and yell for help.

2. Has not yet reached the panic stage.

D. Characteristics of a person drowning.

1. Cannot speak, consciously wave for help, or consciously grab rescue device.

2. Has reached the stage of total panic.

3. May have as little as 20 to 60 seconds before they go under; or may disappear immediately.

4. Appear to be doing a sideways breaststroke with arms raised above the head and moving down onto the water. The head is tilted way back and the mouth is wide open. May have the appearance of playing or splashing.

5. Will drown you if they can get close enough to you.

II. Rescue sequence. Always consider rescue techniques in this order. **Talk, Reach, Throw, Row, Go.**

A. **Talk.** Try to talk the victim into self-rescue if the situation permits. Remember to maintain visual and verbal contact with the victim while using any rescue technique.

B. **Reach.** Reach towards the victim with something that the victim can grab hold of and be pulled to safety.

1. Use pike pole, paddle, fishing pole, etc. to reach out to victim.

2. Place reach device in the victim's hand or under their arm. A drowning victim cannot think rationally to reach out and grab hold of the item. If the device touches them, the victim will grab hold of it instinctively.

3. Be careful that the victim doesn't pull in the rescuer. The rescuer should be prepared to let go of reach device if they are in danger of being pulled into the water with the victim.

4. Rescuer can extend an arm or leg to the victim, but be sure that the rescuer is firmly anchored to safety. This is a dangerous maneuver because the rescuer may not be able to let go if the victim is pulling the rescuer into the water.

C. **Throw.** Throw an object that floats to the victim and that is attached to a line to pull the victim to safety.

1. Use the throwing technique when conditions or time prevent a reach rescue.

2. Throw upstream or upwind so device will float to victim.

3. Shout "rope" when throwing.

4. Type IV ring buoy with 90 feet of polypropylene line attached.

a. Required by EM 385-1-1 on all Corps vessels.

b. A ring buoy is the best choice for a victim in the panic stage or unable to keep themselves afloat.

c. Rescuers must practice throwing ring buoy to maintain proficiency. Inexperienced rescuer may have trouble with throwing distance and accuracy.

5. Throw bag or heaving line.

a. These aids offer no flotation to the victim.

b. Inexperienced rescuers may find the throw bag or heaving line easier to use than a ring buoy.

c. These aids are good for use with victims able to float unassisted and not in the panic stage.

d. Throw bags or heaving lines must be thrown past the victim so they may grab the line and not the bag.

6. Other possible throwing items may include any type PFD, cooler, spare tire, or anything that floats.

D. **Row.** Use a boat to go to the victim.

1. Approach victim into the wind or current for more positive control of your vessel.

2. Use reach and throw techniques when the vessel is close enough to the victim.

3. As your boat nears the victim, shut the engine off unless other hazards dictate otherwise (nearby dam, currents, high winds, etc.).

E. **Go.** Go to the victim using in-water rescue techniques as a last resort.

1. Special notes.

a. In-water rescue is the most dangerous form of rescue that should only be attempted by individuals who have been trained, who consistently practice, and who are in adequate physical condition.

b. Cold water rescue (water temperature less than 70 degrees) requires the use of a cold-water survival suit.

c. Use in-water rescue as a last resort when all other methods have failed or are impossible.

2. Unconscious victim rescue.

a. The rescuer, wearing a PFD, enters the water feet first and swims to victim with a ring buoy and line.

b. Rescuer slips ring buoy down one of victim's arm and shoulder.

c. Rescuer places own arm through the crook in victim's other arm and grabs ring buoy.

d. Victim's head will now be supported above the water and victim can be towed to safety. Victim can be given artificial respirations in this position if needed.

3. Conscious victim rescue. This is the most dangerous rescue technique!!

a. The rescuer, wearing a PFD, enters the water feet first and swims to victim with a type IV or other type of PFD. A line may be attached to the rescuer or the PFD.

b. Rescuer shoves the PFD towards the victim while keeping away from the victim. Rescuer continues to maintain visual and verbal contact with the victim.

c. Rescuer tows victim back to safety, while keeping away from the victim at all times.

d. If the victim grabs hold of the rescuer, the rescuer should swim underwater forcing the victim to let go to come up for air.

III. Getting victims into the rescue boat.

A. Know your boat. Use the stern or as far astern as possible. Some boats will not safely allow an over-the-side retrieval.

B. Conscious victim with no major injury.

1. A ladder is the easiest and most effective means of boarding a boat. EM 385-1-1 requires Corps vessels to carry a boarding ladder.

2. A stirrup can be made by tying loops in a line and fastening it to a cleat. Victim can then climb the loops as a rope ladder.

3. Retrieval strap.

a. Put a loop of rope or webbing under the victim's armpits.

b. May need two rescuers to lift the weight of the victim.

c. May need to use the bounce technique. Bounce twice, pulling victim as high as possible on the second bounce into the boat.

C. Unconscious or weak victims can be rolled aboard the vessel.

1. Secure the end of a rescue net or blanket by tying it to the side of the boat or by standing on it.

2. Put the rest of the net/blanket in the water and cradle the victim with it.

3. Rescuers pull up in unison, rolling the victim up and over the side of the boat.

4. Do not use this technique if the victim has suspected cervical injuries or other trauma.

D. Suspected spinal injuries.

1. Rescuing victims with suspected spinal injuries requires highly specialized training and equipment. In some cases, this rescue will be provided by local emergency medical services (EMS).

2. Symptoms of spinal injuries may include severe neck or back pain, loss of movement and feeling in extremities, tingling, deformity of back or neck, and breathing stopped.

3. If hypothermia or other life threatening conditions are not a factor, keep the victim in the water until EMS or trained personnel arrive. Try to eliminate any movement caused by waves and wakes.

4. One method of spinal injury management is provided for informational purposes. This technique requires special training and practice.

a. While still in the water, keep head and neck aligned and not moving by using the vice grip technique.

b. Place one forearm on the victim's sternum and the other on the victim's spine.

c. Support the victim's head by cupping the chin and back of the skull with your hands.

d. Put pressure on the victim's chest and spine, not on the head.

5. Move the victim only if a life threatening, immediate danger exists (i.e. dam, fire, hypothermia). Try to minimize head and neck movement as much as possible. This is a desperate, last-ditch effort used only when not moving the victim would result in certain death. Secure the victim to a backboard or makeshift backboard if possible.

IV. Getting yourself back into your boat unassisted.

A. **Chin-up bounce**.

1. This technique is difficult for most people or for use on high-sided boats.

2. Grab the stern or gunwale at the lowest point and bounce up as if doing a chin up.

3. Try to get the upper half of your body over the gunwale and into the boat.

B. **Stirrup**: This technique can be used by finding a loose line hanging off the boat and tying it into a loop. Put your foot into the loop, grab the stern or gunwale, stand up and pull yourself into the boat.

C. **Cavitation plate**.

1. Ensure that the engine is off. Be careful of slippery surface of cavitation plate. Be careful of hot surfaces on the engine. Stay away from the prop as much as possible.

2. Find the cavitation plate above the propeller and use it for a step.

3. Place your foot closest to engine on the plate.

4. Find hand holds on the motor or cleats.

5. Stand up and pull yourself up as if climbing a ladder.

D. **Ladder:** This is the easiest and most effective means of boarding a boat. EM 385-1-1 requires Corps vessels to carry a boarding ladder.

V. Self-rescue in cold water.

A. Hypothermia basics (lowering of body temperature).

1. Water conducts heat 25 to 35 times as fast as air.

2. Try and get as much of your body out of the water as possible, no matter how cold or windy it is (i.e. crawl up on top of your overturned boat).

3. Keep all clothing on and buttoned up. Many studies show this will keep you warmer and more buoyant.

4. Anticipate harsh conditions. Wear wool instead of cotton, wear a hat, wear a float coat type PFD, etc.

5. In most cases it is better to stay put rather than swimming or treading water, which causes rapid loss of body heat.

6. During a sudden immersion, cover your mouth and nose to prevent gasping in water.

7. Water Temperature (degree F) Survival Time

32.5	15-45 minutes
32.5 – 40	30-90 minutes
40 – 50	1-3 hours
50 – 60	1-6 hours

8. Water less than 70 degrees F is considered cold water.

B. Heat Escape Lessening Posture (HELP).

1. Cross legs, fold arms, bring knees up, hunch shoulders to neck.

2. HELP prevents heat loss from head, neck, underarms, and groin.

3. HELP works only while wearing a PFD, although HELP position is difficult with some types of PFDs. Even a partial HELP position is beneficial.

4. HELP can increase survival time as much as 4 times.

C. HUDDLE.

1. Use this position when there are 2 or more victims.

2. Victims wrap arms around each other and lock their legs together.

3. HUDDLE position can increase survival time as much as 4 times.

D. Cold water near drowning.

1. Prolonged submersion in cold water may not necessarily result in drowning.

2. There have been numerous documented cases of recovery after 1 hour of submersion. The younger the victim and colder the water, the better the chances for survival.

3. Victim will appear to be dead.

4. Don't give up. Administer CPR and notify EMS.

E. Handle all cold-water victims with extreme care. Prevent further heat loss but do not try to quickly rewarm.

Tab 6 Rules of the Road & Aids to Navigation

I. Introduction: Why are there rules and aids to navigation?

A. To avoid collision. The most common type of boating accident is collision with another vessel. This is usually caused by an improper lookout.

B. To provide a safe route on the water. The second most common type of boating accident is collision with a fixed object.

II. How to keep from running into each other.

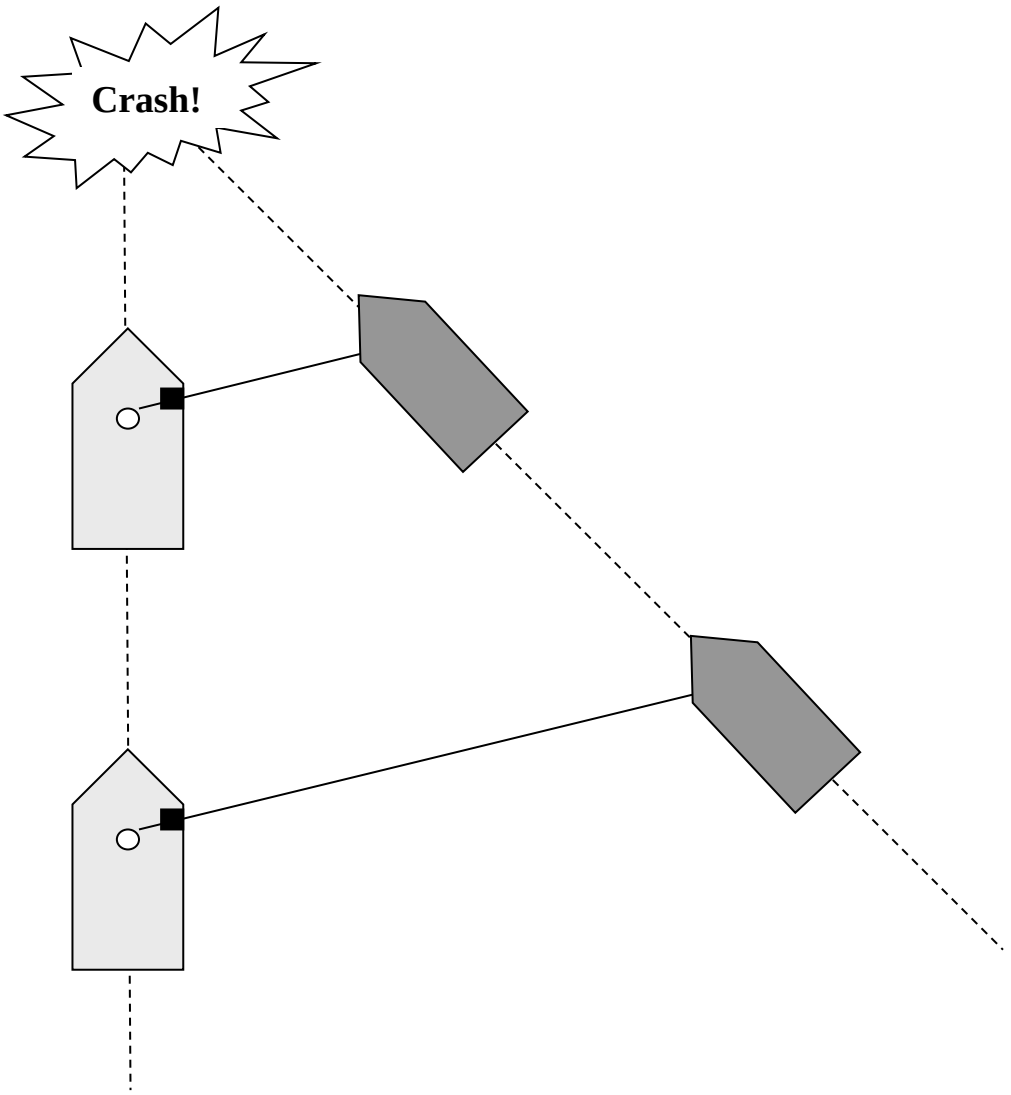
A. The most important rule is to avoid collision no matter who is in the right.

B. Determining if you are on a collision course.

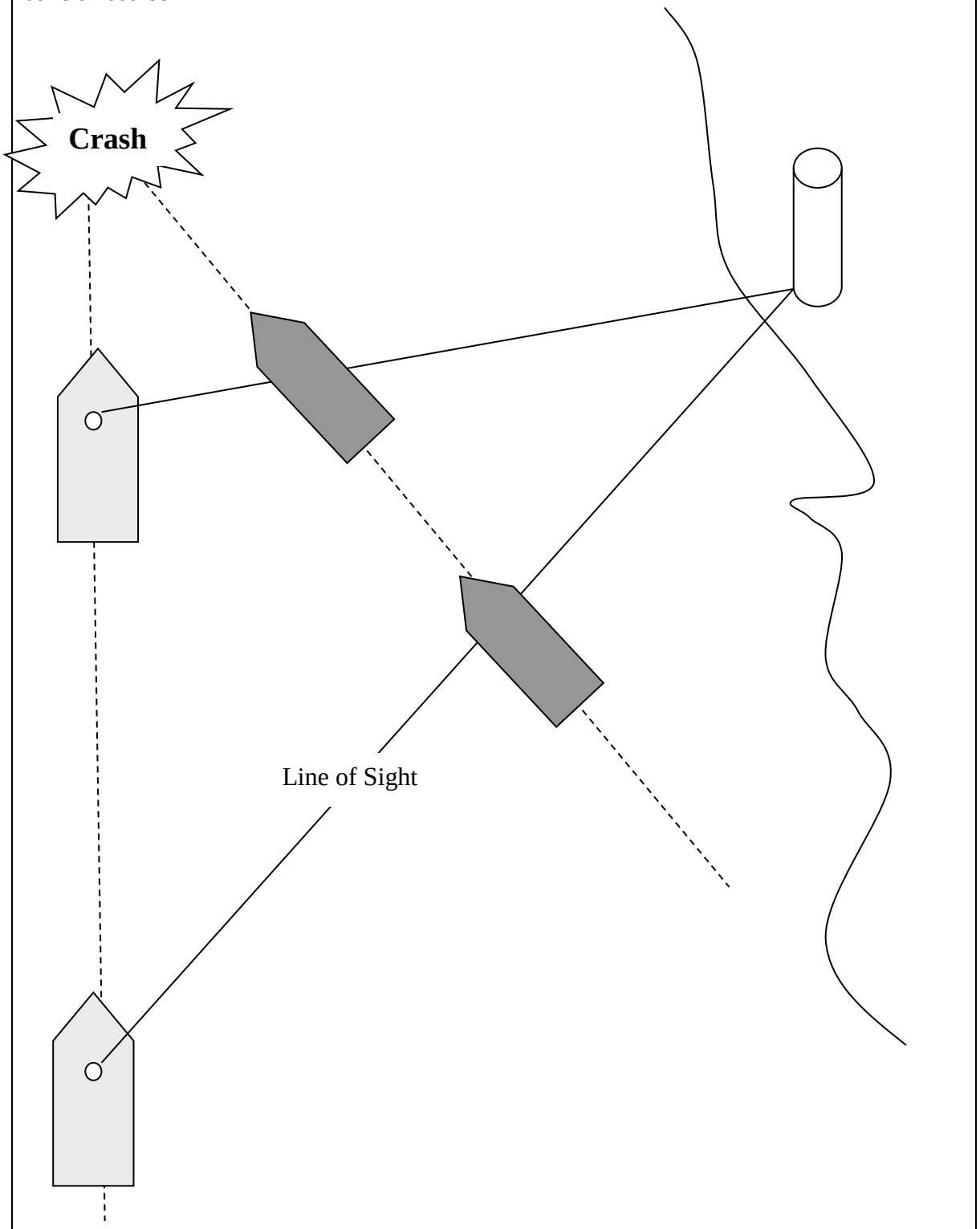
1. A collision course is difficult to tell on the water, especially at night. Vessels are not confined to a lane like cars.

2. Constant bearing, decreasing range.

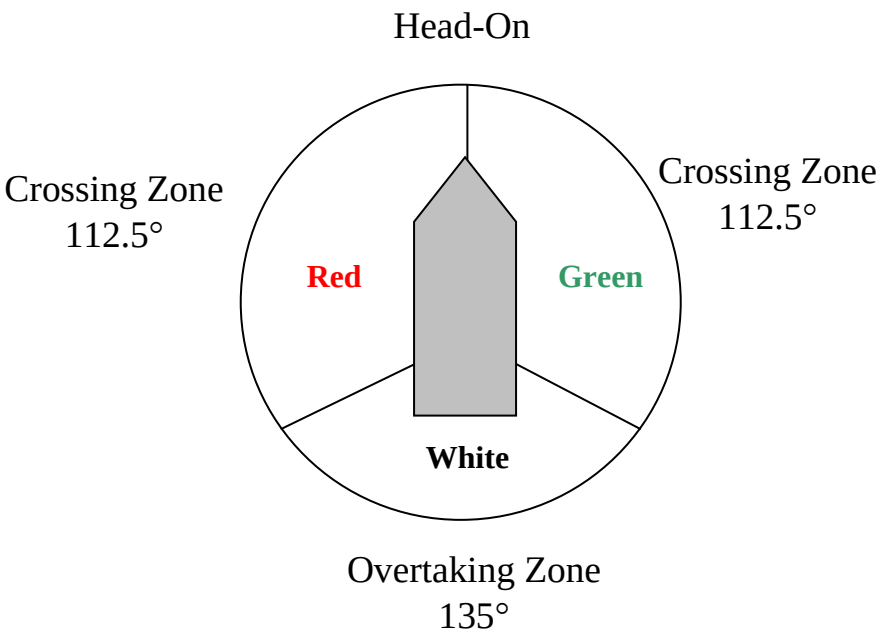
a. Sight in the other boat off your compass or any piece of equipment on your boat. If the other boat gets closer but is still in the same relative position to your boat, you may be on a collision course.



b. Sight in the other boat off of a tall object on the opposite shore (radio tower, tall tree, etc.). If the other boat gets closer but still has the same relative position to itself, you may be on a collision course.



III. What to do when encountering another boat.



A. Head On – When two boats approach each other on opposite or nearly opposite courses.

1. Neither has the right-of-way.

2. Keep to the right (starboard).

3. May keep left (port) if both vessels are far enough apart so as to pass at a safe distance.

B. Crossing – When the course of two vessels will intersect.

1. A vessel coming at you from your starboard side is the stand-on vessel so you must give way. This is your danger zone.

2. A vessel coming at you from your port side SHOULD give way to you (but don't count on it).

3. The crossing zone includes an arc of 112 ½ degrees from dead ahead to slightly aft the beam.

C. Overtaking – When one vessel passes from behind or nearly from behind.

1. A vessel being overtaken is the stand-on vessel.

2. The overtaking zone includes an arc of 135 degrees across the stern.

3. If an overtaking vessel starts out in an overtaking zone and moves into the crossing zone, it is still considered an overtaking situation.

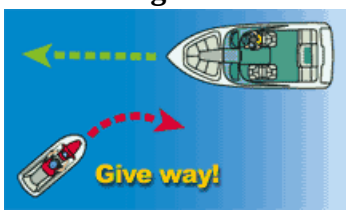
D. Lights as applied to meeting situations.

1. Memory Aid. The words “right”, “starboard”, and “green” all have more letters in them than their counterparts: “left”, “port”, and “red”. Also, “left” and “port” each have four letters.

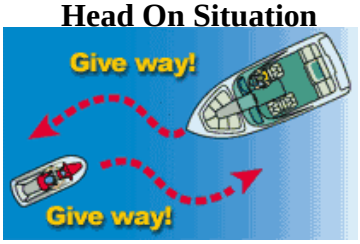
2. If you see red, green and white, you are in a head-on situation. Keep to starboard.

3. If you see red and white, it indicates a crossing situation and the other boat is the stand-on vessel.

Crossing Situation

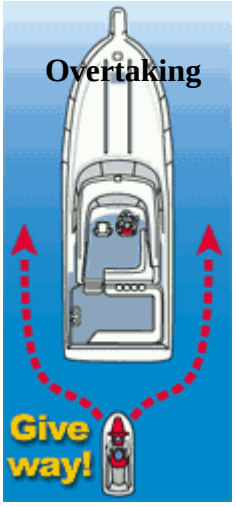


Head On Situation



4. If you see green and white, it indicates a crossing situation where you are the stand-on vessel (but don’t count on it).

Overtaking



5. If you see only the white stern light, you are overtaking another vessel and they are stand-on. But be careful! White only could also indicate a vessel at anchor or a vessel under oars.

6. If only red and/or green is visible without white, it indicates a sailboat.

7. Refer to reference manuals for additional light applications that may be used by various types of vessels in your local area.

8. Memory Aid. Think of vessel lights like a traffic light. Green means go and red means stop.

E. Certain vessels have priority. Priority order is as follows under **Inland Rules.**

1. Vessels not under command (runaway, adrift, adandoned).

2. Vessels restricted in their ability to maneuver because of size or draft (towboat, dredge, large ship, etc.).

3. Fishing vessel engaged in trawling but not trolling.

4. Sailboat under sail, or manually powered boats. A sailboat operating under power is considered a power vessel.

5. Power driven vessel that is underway.

6. A sea plane that is on the water.

F. Whistles/horns.

1. These need to be used only when danger of collision exists. In reality, recreational vessels seldom use them.

2. Signals (inland rules).

a. 5 short blasts – Danger, doubt, do not understand.

b. 3 short blasts – I am operating astern propulsion.

c. 2 short blasts – I intend to leave you on my starboard side.

d. 1 short blast – I intend to leave you on my port side.

e. 1 prolonged blast - 1) When approaching a bend or area of waterway where other vessels may be obscured by an intervening obstruction, 2) when leaving a dock or berth, or 3) at two-minute intervals for power driven vessels underway in restricted visibility.

f. Under inland rules, the other vessel answers with the same signal if in agreement.

G. Visual Distress Signals.

1. See Tab 2 Required Equipment.

2. Use anything you can to attract attention; waving arms, flashlights, etc.

IV. Aids to navigation

A. Types:

1. Buoys (floating aids): nuns; cans; bell/gong/whistle buoys; lighted buoys

2. Beacons (fixed aids): lighthouses; day boards; range markers.

B. Navigation Systems:

1. IALA (International Association of Lighthouse Authorities). IALA System A and IALA System B regulate navigational markings throughout most of the world. System A is generally used in the Eastern Hemisphere, while System B is generally used in the Western Hemisphere.

a. IALA System A. This system puts the red lateral buoys on the left side of the channel as a vessel is returning to port from seaward.

b. IALA System B. This system puts the red lateral buoys on the right side of the channel as a vessel is returning to port from seaward. This system and its variations are used in North America.

2. U.S. Aids to Navigation (Navigable Waters Except Western Rivers and Intercoastal Waterway). Navigation aids in this lateral system are determined by their position with respect to the navigable channel, as the channels are entered and followed from seaward toward the head of navigation.

3. Intracoastal Waterway. The Intracoastal Waterway (ICW) runs parallel to the Atlantic and Gulf Coasts from Mile Zero at Norfolk, VA, to the Mexican Border. Most aids to navigation on the ICW are conventional day beacons and buoys, but with the added identification of yellow triangles on “red” aids and yellow square’s on “green” aids.

4. Western Rivers. This system is used on the Mississippi River and its tributaries above Baton Rouge, LA and on some other rivers that flow toward the Gulf of Mexico.

5. Uniform State Waterway Marking System. This system is primarily for use on lakes and other inland waterways not portrayed on nautical charts. It supplements the U.S. Aids to Navigation system and is generally compatible with it. Regulatory Buoys are a common feature of this system.

C. Tricks to remember: **Red – Right – Returning**.

D. Navigation charts: OWW is NOAA Chart 11428

Tab 7 Course Familiarization/Maneuvering

I. Course description options.

A. Serpentine Course. The purpose is to:

1. Develop relationships to fixed objects while maneuvering to port/starboard, after efficiently getting the boat on plane.
2. Become familiar with the steering capabilities of the boat.
3. Become familiar with the steering and throttle coordination of the boat.
4. Learn how to prevent cavitation.

B. Transition Course. The purpose is to:

1. Develop ability to transition between serpentine course and slalom course.
2. Master skills necessary to successfully complete the course, making all turns.

C. Emergency Stop Mode Maneuver. The purpose is to:

1. Practice maneuvers necessary to avoid a collision while at safe speed so that one can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. This is based on the maneuverability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions.
2. Practice decision-making.
3. Practice smooth steering and throttle control.
4. Heighten the operator's perception of obstacles in the water.
5. Practice making emergency stops by reducing speed during proper course change.
6. Develop skills to judge distance, time and boat speed.
7. Power should be reduced immediately to idle while turning the helm. The engine is shifted to neutral only after the turn is complete.

D. Docking Maneuver. The purpose is to:

1. Develop skills necessary to dock a boat on the port and starboard sides to a fixed dock and a floating vessel.
2. Develop skills necessary to pull forward into a boat slip.
3. Develop skills necessary to back into a boat slip.

E. Optional buoy pattern courses can be substituted for buoy pattern courses indicated above if local conditions or limitations of training site warrants change. The purpose of these optional course Star Pattern and Maneuvering Courses is to:

1. Provide alternate buoy courses for instructors to use when required by local circumstances.
2. Develop relationships to fixed objects while maneuvering to port/starboard.
3. Become familiar with the steering capabilities of the boat.
4. Become familiar with the steering and throttle coordination of the boat.
5. Learn how to prevent cavitation.
6. Practice docking and backing maneuvers.
7. Develop skills for selecting and engaging the correct gear for docking, backing and cruising.

F. Course rules and regulations.

1. If a “Code Red” is declared, all boats must immediately come to a stop and remain stopped until directed by an instructor.
2. Only one boat will be on a maneuvering course at a time unless directed otherwise by an instructor.
3. Type III inherently buoyant or better PFD’s must be worn by students in boats at all times.
4. A working radio must be carried in each boat and be turned on at all times.
5. A kill switch is required in each boat. Operators must be attached to the kill switch via a lanyard when underway. When navigating the maneuvering courses the instructor may have a second lanyard attached to the student lanyard.
6. At least one instructor will be in boats containing students at all times.
7. When conducting the emergency stop maneuvering course there will be one instructor and one student in the boat.
8. Boat operators will maintain a safe and controlled speed at all times.

II. Course Maneuvering.

A. Serpentine Course

Students will practice operation of a boat through 8 gates, while on plane, at safe cruising speed.

B. Transition Course

Students will practice operating the boat on plane through four serpentine gates then transition into a six buoy slalom course.

C. Emergency Stop Mode Course

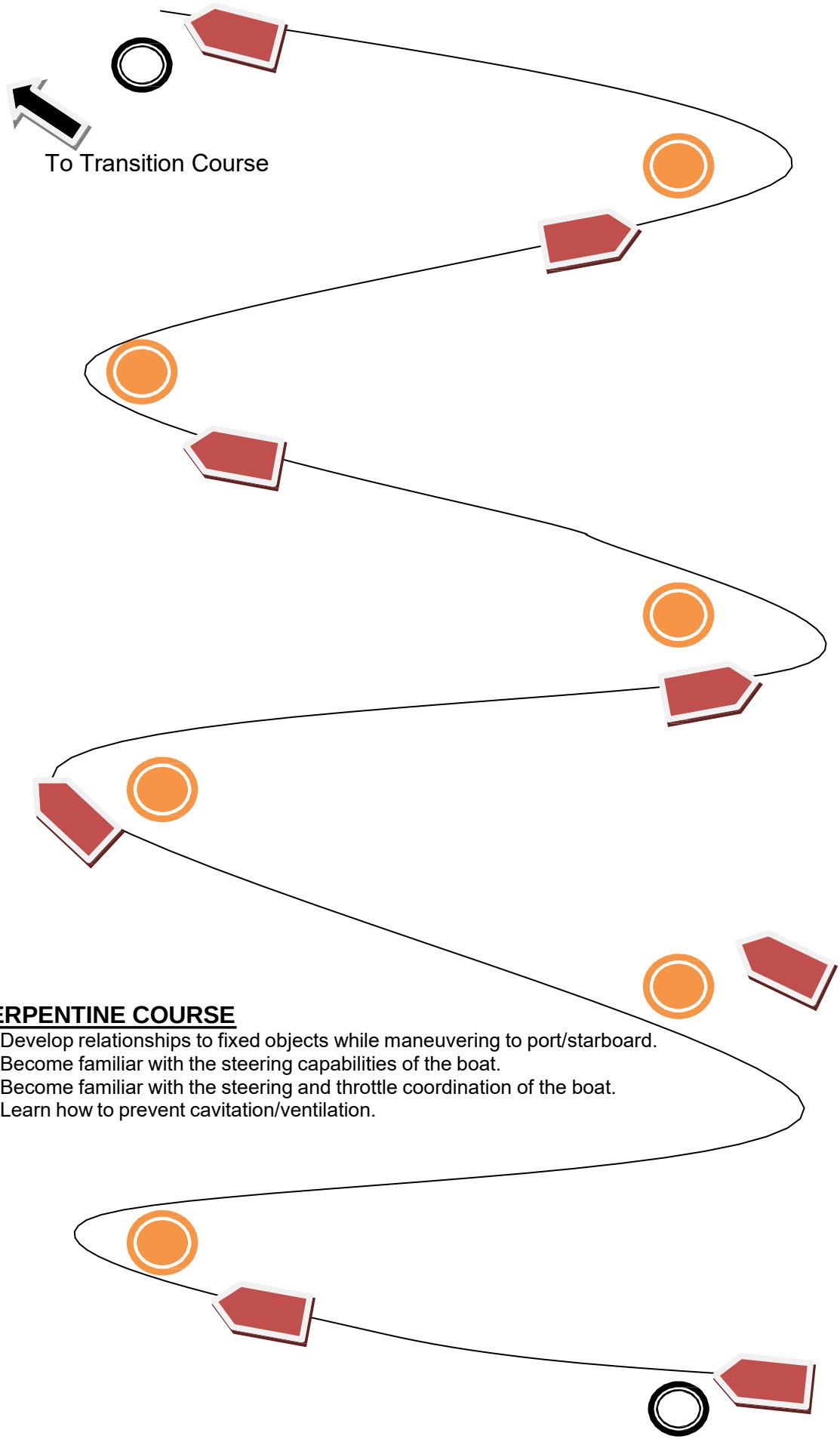
1. Students will practice operations to simulate evasive maneuvers necessary to avoid a fixed object at safe speed.
2. Students will practice operations to simulate evasive maneuvers necessary to avoid a collision with another boat at safe speed.

D. Docking Maneuvers.

1. Students will practice skills necessary to dock a boat on the port and starboard side to a fixed dock.
2. Students will practice skills necessary to pull into a boat slip in forward.
3. Students will practice skills necessary to back into a boat slip.

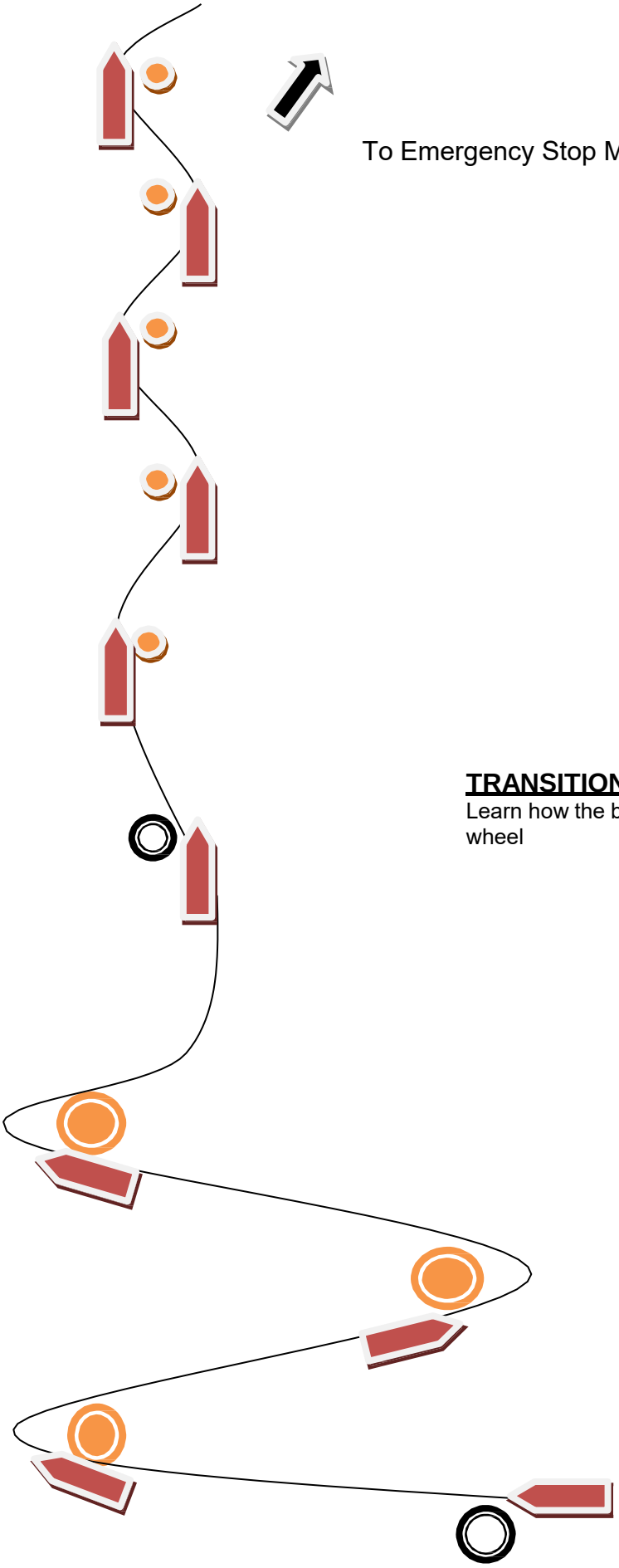
E. Star Pattern.

1. Students will practice skills necessary to maneuver a boat in tight quarters.
2. Boats must approach star pattern, enter between buoys 1 and 2, drive forward between buoys 4 and 5, back up between buoys 2 and 3, drive forward between buoys 1 and 5, back up between buoys 3 and 4, then drive forward out of the pattern between buoys 1 and 2. On any maneuver, the boat’s centerline should not drift past the buoys.



SERPENTINE COURSE

1. Develop relationships to fixed objects while maneuvering to port/starboard.
2. Become familiar with the steering capabilities of the boat.
3. Become familiar with the steering and throttle coordination of the boat.
4. Learn how to prevent cavitation/ventilation.



To Emergency Stop Mode Course

TRANSITION to SLALOM MANEUVERING

Learn how the boat stern responds to short turns of the wheel

Guidelines and Controls for the Proper

Instruction of the Emergency Mode Stop

Maneuver:

NOWS Standards "Emergency Mode Stop

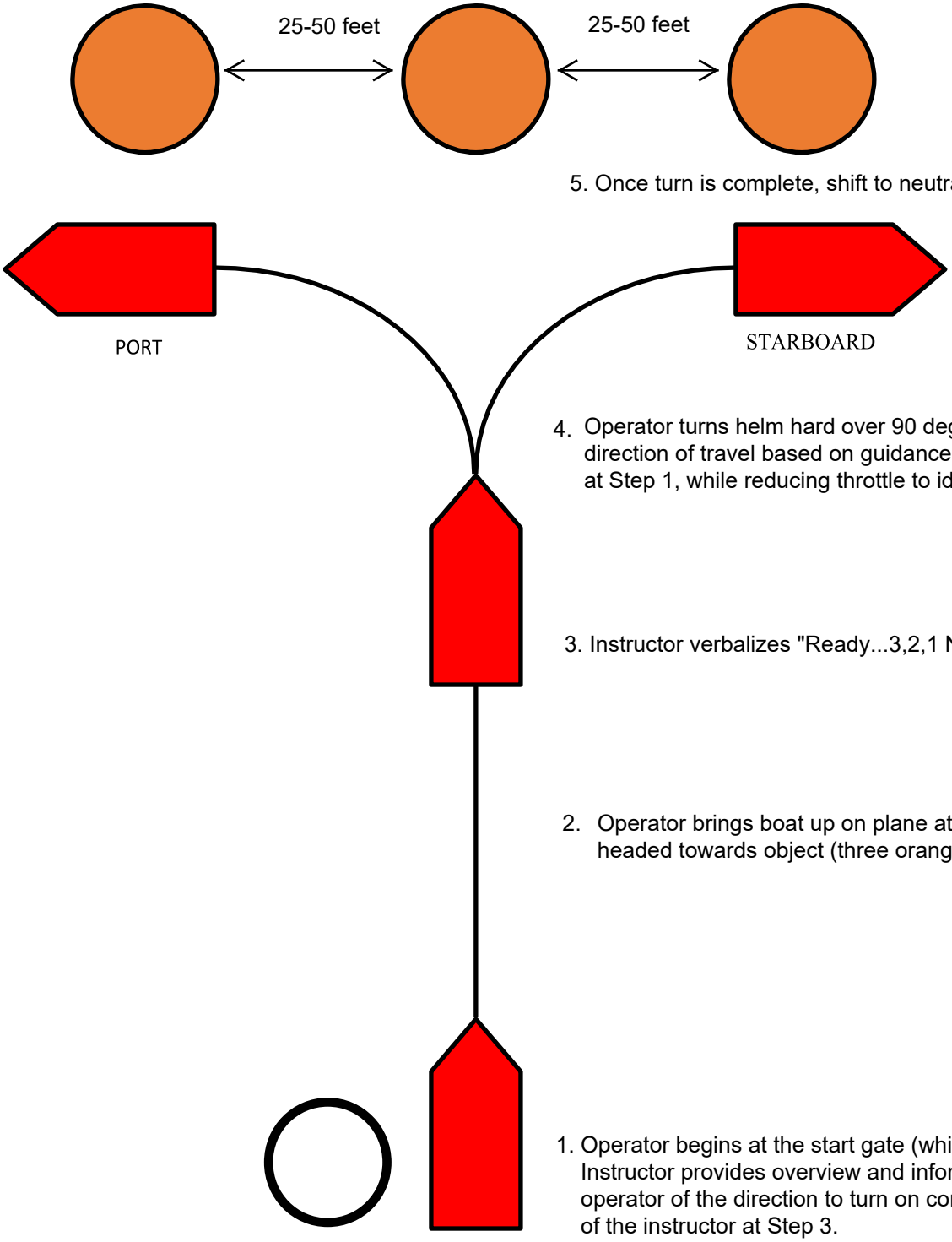
- Operator is given "port' or "starboard" direction prior to getting the boat underway
- Operator brings boat on to plane at safe speed and heads for a buoy downrange
- Instructor will give a three second count "*Ready… 3…. 2…. 1… Now!"*
- Operator makes a smooth 90-degree turn **while throttling down** to idle

The major difference in this modification is the when the throttle reduction occurs. Reducing throttle while making the turn will eliminate the "recoil" that took place under the old maneuver.

View the video at https://www.youtube.com/watch?v=f91u5JfIEOs

- **Instructor must operate the training boat prior to using the boat for instruction** and perform this maneuver at varying safe speeds. This will make them familiar with the boats handling capabilities.
- **Instructor must know the minimum and maximum RPM range where the boat can safely execute the maneuver.**
- **The maneuver must always be done using a fixed point of reference for the turn.**
- **One student and one instructor on the boat** shall be the only way this maneuver is trained.
- **Verify the kill switch (engine cut-off device) is operable prior to getting underway and the operator is tethered to the device**.
- A **verbal walk trough of the maneuver with the student prior to demonstration** should occur to explain the mechanics of the move, how the boat will react and the forces that will occur when the concurrent turn and throttle down happen
- **Instructor will point out potential hazards** and identify three points of contact for stability.
- **Ensure the operator is confident, willing and able to attempt the maneuver**. Not intended to scare or intimidate operators, but to build confidence and understanding of the boats capabilities. New operators with limited experience may require more boat operation before attempting this maneuver.
- **Ensure operator understands the verbal commands** that will be given to complete the maneuver. "*Port or Starboard*" "*Ready… 3…. 2…. 1… Now!"*
- The **instructor may make use of the double lanyard system to the kill switch.**
- The **instructor should demonstrate this maneuver multiple times at various safe speeds** and then discuss with the student the different reactions that occurred.
- When **students first operate, they will proceed on plane at the lowest RPM** where the boat will execute the maneuver.
- **As confidence builds the RPM's can be increased as long as it is at safe speed** and they demonstrate the proper techniques to execute the maneuver.
- **After each run, conduct a review** of improvements or tips to help the operator understand the emergency stop maneuver for future operation/re-certifications.

Emergency Stop Mode



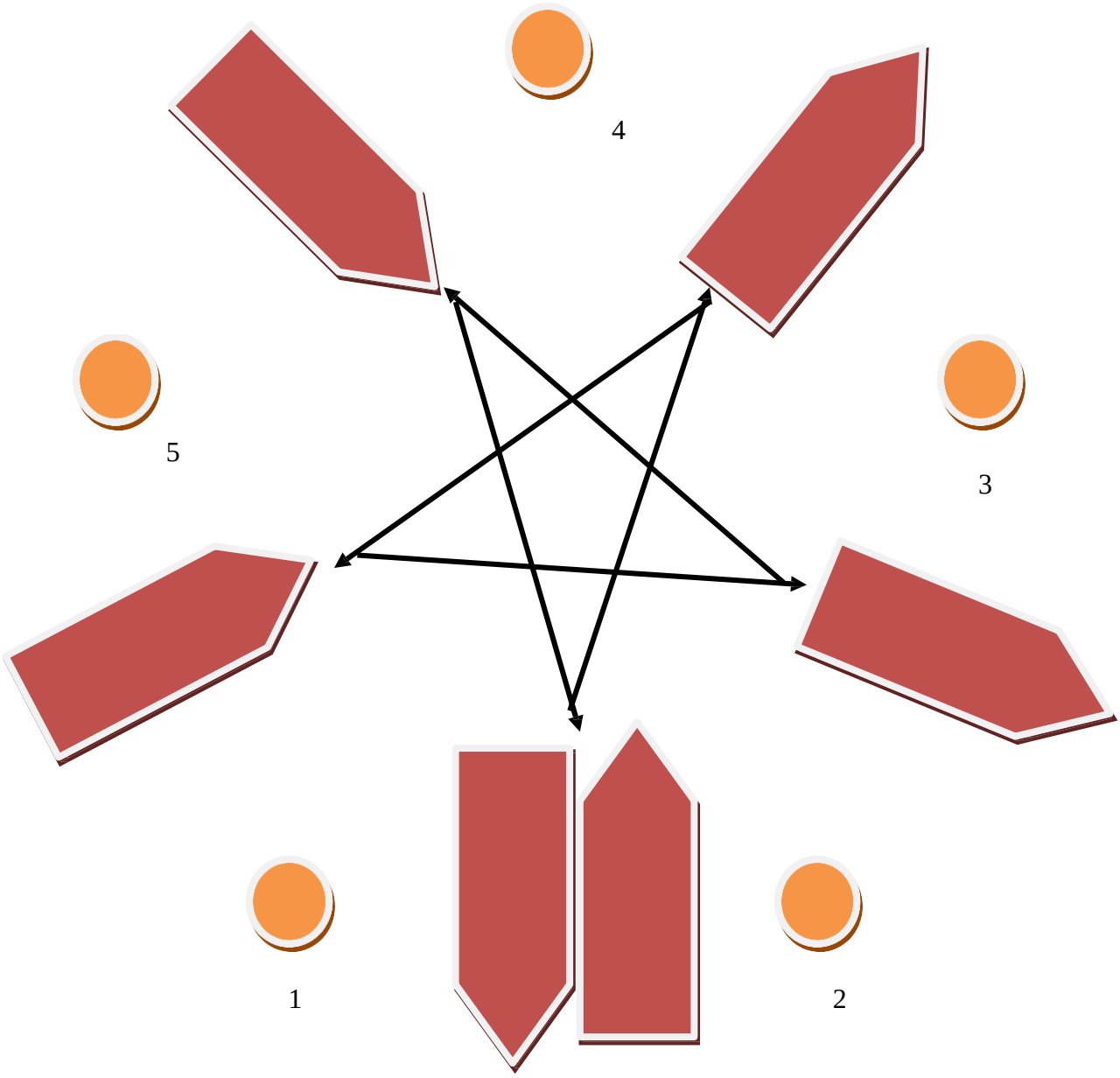
5. Once turn is complete, shift to neutral

4. Operator turns helm hard over 90 degrees in the direction of travel based on guidance received at Step 1, while reducing throttle to idle.

3. Instructor verbalizes "Ready...3,2,1 NOW

2. Operator brings boat up on plane at safe speed headed towards object (three orange buoys).

1. Operator begins at the start gate (white buoy). Instructor provides overview and informs operator of the direction to turn on command of the instructor at Step 3.



STAR PATTERN MANEUVERING

1. Skills necessary to maneuver a boat in tight quarters.

2. Boats must approach star pattern, enter between buoys 1 and 2, drive forward between buoys 3 and 4, back up between buoys 1 and 5, drive forward between buoys 2 and 3, back up between buoys 4 and 5, then drive forward out of the pattern between buoys 1 and 2. On any maneuver, the boat's centerline should not drift past the buoys.

TAB 8
8 HR. MOTORBOAT OPERATOR
COURSE EVALUATION SHEET

1. Overall, how would you rate the Motorboat Operator Course in terms of its value:

_____ Excellent _____ Very Good _____ Good _____ Fair _____ Poor

2. Please rate the following classroom aspects of the course:

	Excellent	Very Good	Good	Fair	Poor
Trailer & Trailer Maintenance	____	____	____	____	____
Fire Suppression	____	____	____	____	____
Required Safety Equipment	____	____	____	____	____

3. Please rate the following practical aspects of the course:

	Excellent	Very Good	Good	Fair	Poor
Trailering	____	____	____	____	____
Launching/Retrieving	____	____	____	____	____
Docking	____	____	____	____	____
Maneuvering Course	____	____	____	____	____
Self Rescue & Emergency Procedures	____	____	____	____	____

4. What is the single most important thing you have gained from taking this course?

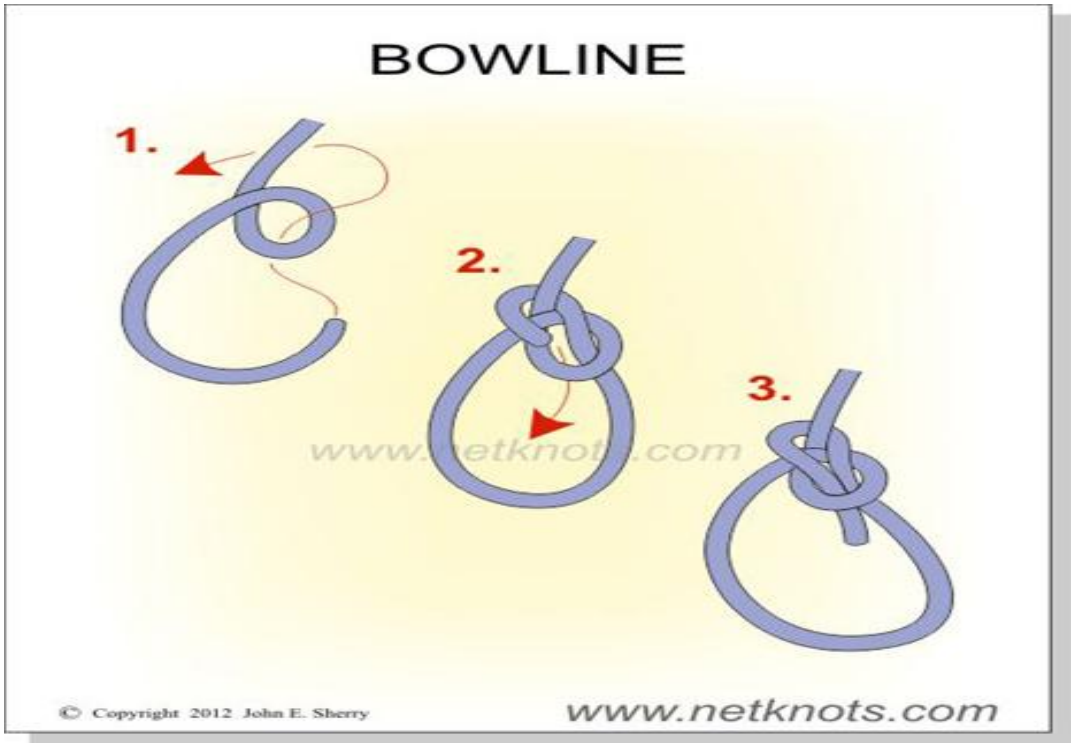
5. Which part(s) of the course did you get the most out of (and why)?

6. Which part(s) of the course did you get the least out of (and why)?

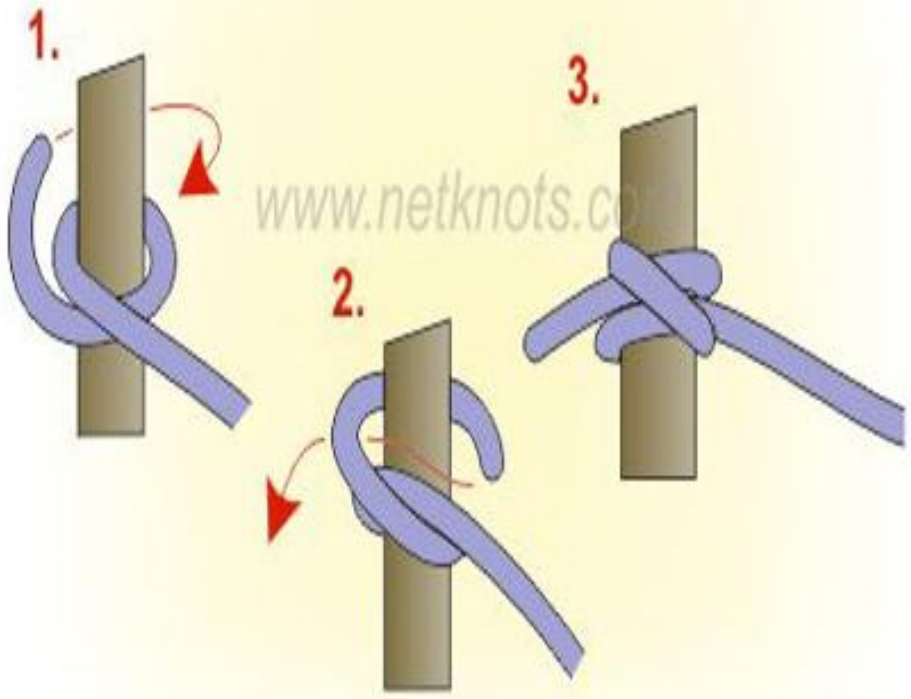
7. Please provide your suggestions and comments:

APPENDIX A

MARLINSPIKE KNOTS TO KNOW



CLOVE HITCH



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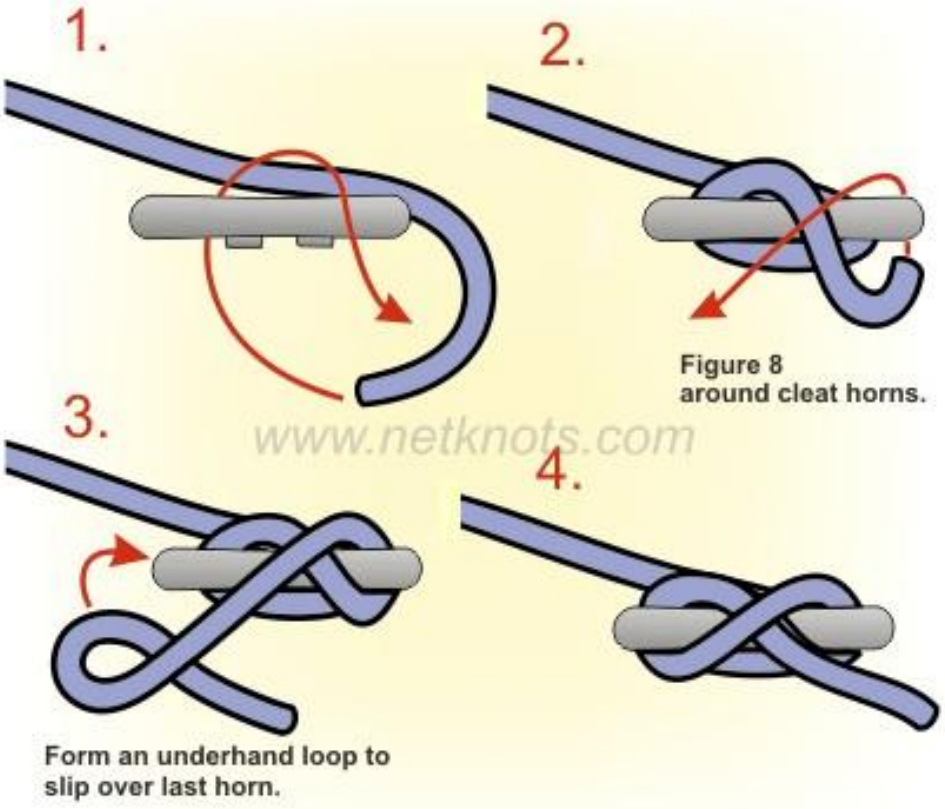
CLEAT HITCH



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