

# **Motorboat Operator Certification Course (MOCC)**

**And**

# **Motorboat Operator Training Course (MOTC)**

## **Field Teaching Aids**

**(v2015-03-24)**

**This document was developed collaboratively by the USFWS, UC Davis Office of Boating Safety, NOAA Small Boat Program, SBSA, and other agencies and organizations that utilize the MOCC. It is intended for used by instructors for field demos and exercises, to make sure important content are not missed. Field Teaching Aids may need to be modified to meet individual teaching styles or course formats and approaches.**



# MOCC Field Teaching Aids

## Table of Contents

MOCC Field Teaching Aid – Pool (In-water) Session.....	1
MOCC Field Teaching Aid – Inflatable PFDs.....	4
MOCC Field Teaching Aid – Boat Orientation (BO) Field.....	5
BO Handout- Exercise Sheet.....	6
BO (& OSM&I) Handout – Pre-Departure Checks Table (sample).....	7
MOCC Field Teaching Aid – Operating Systems, Maintenance, & Inspection (OSM&I) .....	8
OSM&I Handout – Float Plan (samples).....	11
OSM&I Handout – Maintenance & Troubleshooting Handout.....	13
OSM&I Handout – Example Drive Configurations.....	14
OSM&I (& BO) – Pre-Departure Checks Table (sample).....	15
OSM&I Handout – Boat Log (sample).....	16
OSM&I Handout – Pre-Departure Checklist (Sample).....	18
MOCC Field Teaching Aid – Fire Suppression.....	20
MOCC Field Teaching Aid – Visual Distress Signals (VDS).....	22
MOCC Field Teaching Aid – Trailer Orientation.....	24
MOCC Field Teaching Aid – Jet Pumps (inboard and outboard).....	26
MOCC Field Teaching Aid – Prop Change.....	30
MOCC Field Teaching Aid – Anchoring & Beaching.....	31
MOCC Field Teaching Aid – Towing (Rendering Assistance).....	33
MOCC Field Teaching Aid – Trailer Parking and Backing.....	35
MOCC Field Teaching Aid – Boat Trailer Launch & Retrieve.....	37
MOCC Field Teaching Aid – Teaching in Boats.....	38
MOCC Field Teaching Aid – Victim Recovery & Rescue Scenarios.....	40
MOCC Field Teaching Aid – Communications & Risk Management (C&RM).....	43
C&RM Handout – GAR Model.....	45
C&RM Handout – VHF Channels List.....	47
C&RM Handout – Phonetic Alphabet.....	48

## MOCC Field Teaching Aid – Pool (In-water) Session

### Overview

Typically for this session students are taught first as a class then broken up into four groups and taught at four “stations”, rotated at ~20-minute intervals; the session presents a series of practical lessons aimed at increasing the chance of survival when in the water.

### Content

#### Class Exercises

**Inflatable PFD demo** – See MOCC Field Teaching Aid – Inflatable PFDs

**Immersion suit** – This component of the Emergency Gear session can be taught to the entire class in a roughly 10-minute time block to streamline the rotations.

**Swimming rescue** – Discuss dangers of conducting a swimming rescue, and emphasize it is an advanced skill requiring training beyond the MOCC. Show ways to handle a conscious and unconscious victim.

**Survival Tactics** – This session (Details below) can be taught with the entire class in a 20-minute session to better illustrate the benefits of the huddle, illustrate “chains” for enhanced visibility and moving a group through the water, and to develop student/instructor comradery.

#### Group Rotations

**Emergency gear** – Teach the students about emergency gear and give them the opportunity to familiarize themselves with different gear and practice using it.

**Equipment** – Float Coats, Chest Waders with belt, Work suits, Immersion suit, Type I, II, III, V, PFDs.

#### Content

- a) **Immersion suit** – Describe how an immersion suit is stowed and demonstrate how to get into an immersion suit. Point out that they are to be worn with all clothing including shoes. Explain that plastic bags work well to allow your feet to slide into the garment. Explain that extra gear (food, water, and clothing) should be carried. Describe how to jump in the water and that air will rush out, and has a tendency to blow the hood back. Emphasize zipper maintenance (waxing) and not allowing zipper to bottom out. **Optional if time** – Have students attempt to don an immersion suit (and/or work suit) while in the water.
- b) **Waders** – Have students try on waders and go in the water with and without extra floatation, and/or chest belt, on. Add PFD to show difference.

- c) Float coat and Work Suit – Have students try both. Show students how to limit water flow using straps/buckles.
- d) **PFDs** – Contrast Type I, II, III, and IV PFDs and their ability to turn a victim face up.
- e) **Extra gear** – Explain that each individual should personalize gear (e.g. carry strobe, whistle, flares, balaclava, etc.).

**Throwing devices** – Teach students how to throw Type IV PFDs and rescue (throw) bags.

**Equipment** – Throw Bags, Type IV cushions, Type IV rings, with lines attached.

**Content**

- a) **Throw bag** – Demonstrate how to throw it while packed, and coiled in hand. How to fill the bag with water and re-throw. Throwing options (over and under hand). How to stuff the bag. Allow students to practice with “victim” at 30’. Advise that a throw bag does not meet USCG regulations (i.e., is not a PFD). Don’t tie to yourself.
- b) **Throw bag/Type IV Ring-and-Cushion Combinations** – Discuss the need for a line attached. Type of line to use (floating). Use of throw bag for line source. Demonstrate throwing options. Point out pros and cons of Type IV throw cushions versus rings.
- c) **Use of other objects that float** – Point out the value of throwing other objects that float (e.g., cooler) to serve as floatation, drift indicator, and search target.

**Rescue Techniques** – Present techniques a person can use to get themselves back on board a vessel, or get someone else onto a vessel.

**Equipment** – Boat hook, line, cargo net, lifting strap, webbing. Conduct this station using a boat (e.g., inflatable at pool) or dock if possible.

**Content**

- a) Explain that, before anyone gets on a vessel they should ask themselves “how would I get back on if I fell off?”
- b) Explain and demonstrate the different methods that might be used to get back on, including: bounce, using the cavitation plate or drive unit, ladder, leg over gunwale, webbing in PFD, permanent lines in boat.
- c) Describe how the OB trim switch can be used to lift you out of the water.
- d) Discuss getting a victim on board and review the “talk, reach, throw, row, go”, and “self, partner, victim”, priorities.
- e) Explain that you need to minimize additional harm a victim who has injuries (e.g., spinal or compound fractures).
- f) Demonstrate and practice how to bounce a victim on board (without immersing the victim’s airway), and “roll” a victim on board by parbuckling. Demonstrate how to get a victim on board using a cargo net if available.
- g) Also, emphasize reaching with something you can let go of (e.g., shirt, stick, boat hook).
- h) Discuss rescue scenarios if time permits.

**Survival Tactics** – Teach students how to survive if overboard.

**Equipment** – PFDs students bring/normally wear.

**Content**

- a) Have all students with their PFDs on swim the length of the pool. This allows the instructors to determine the swimming competency of students and adequacy of gear. Demonstrate adjustment and proper fit of gear and method for donning in water.

**Ask students the question:** "...you ended up in the water, what now...?"

- b) Discuss and demonstrate how to use the HELP (heat escape lessening posture) position. Show (or discuss) how the difficulty of this exercise differs when using a Type I versus a Type III PFD. Point out that you should get as much of your body out of the water as possible.
- c) Discuss and demonstrate the group "Huddle." Explain the importance of keeping everyone together for psychological advantage and helping those who are in the worst condition. Rotate people into the center. Explain the advantages of having a group (heat, stability, visibility), and locking arms or tethering together.
- d) Demonstrate, talk students through, chains for both survival and increased visibility, arms locked over next legs, and side by side, arms locked to next leg, also good if a person does not have a PFD.
- e) Review cold-water (<50F) immersion  
Present 1-10-1 principle (1-min to control breathing, gasp reflex and hyperventilation, 10-min of good motor skills, the time to get things done to set up for long-term survival, 1-hour before unconsciousness).
- f) Discuss present- and post-rescue collapse – How attitude and adrenaline play roles in survivability.

## MOCC Field Teaching Aid – Inflatable PFDs

### Overview

This demonstration is presented to the entire class during the in-water (pool) session. The objective is to inform students of policies, benefits, drawbacks, and designs of inflatable PFDs, and includes the opportunity for students to wear an inflatable PFD in the water.

### Equipment

One manual and/or auto-inflating PFD.

### Content

- Describe components of inflatable PFDs
  - Auto/manual and manually only
  - Bladder/tube, arming mechanisms
- Review policies (DOI/Bureau/Office/Individual) regarding use of inflatable PFDs.
- Emphasize an inflatable PFD should only be worn when doing so provides an equal or improved level of safety when compared to the use of inherently-buoyant PFDs.
- Describe benefits and uses of inflatable PFDs
  - Freedom of movement
  - Comfort in high heat
  - Ability to turn a person upright
  - High buoyancy
  - Ability to deploy manually when needed
  - Use in aviation, access to firearms for LE Agents, and value when there is risk of entrapment in the event of capsizing
- Describe limitations of inflatable PFDs
  - Risk of failure to inflate
  - Risk of inflating when not needed
  - Hindrance to swimming and performing tasks when inflated (e.g., climbing over a gunnel)
  - Describe auto-inflating mechanisms (Hydrostatic and dissolving material) and limitations and potential for failure of each
  - Point out the mechanisms and materials requiring routine testing, maintenance, and inspection
  - Cost of rearming kits, and need for rearming after each cartridge discharge.
  - Potential for mismatching rearm kit with PFD
  - Product recalls
- Demonstrate the use (deployment) of an inflatable PFD
- Allow students to wear an inflatable PFD in the water

## MOCC Field Teaching Aid – Boat Orientation (BO) Field

### Overview

The purpose of this session is to familiarize the students with the vessels used in the course, and make sure all have input as to whether or not vessels are adequately equipped, and seaworthy.

### Equipment

Federal Required Equipment pamphlets and boat inspection sheets (See available BO Handouts).

### Content

- Boats are arranged for inspection, and students broken into groups, each group with one inspection sheet (attached). In some courses the lead will also have groups fill out a pre-departure checklist or float plan in addition to the inspection sheet, or substitute the inspection sheet with a more comprehensive sheet.
- Groups are assigned a boat to start with, asked to fill out the inspection sheet, and evaluate the vessel (and others if time allows) based on what they learned in class (e.g., boat orientation and required equipment lectures).
- The instructor assigned to the talk brings the groups together and asks a representative from each group to review their findings for the boat they started with. After a group representative presents their findings for a boat (and other groups give input if they too evaluated the boat), the instructor who will be teaching in that boat points out the features students will need to know for operation (e.g., blower, trim, and/or kill switch locations, throttle/propulsion control attributes, specific do's/don'ts or cautions for the vessel).
- At the end of the boat orientation field session, the instructor assigned to the talk should ask if any student believes any of the boats should not be used for the training.
- Students should conduct vessel checks each day before boats depart for rotations.

### Options

Consider purposely leaving required equipment off the boat so students can discover deficiencies.



## BO Handout- Exercise Sheet

Boat 1	Boat 2
Make	Make
Length	Length
Capacity	Capacity
Class	Class
Hull type	Hull type
Propulsion	Propulsion
Construction	Construction
Tank (installed or portable) Fuel level	Tank (installed or portable) Fuel level
Equipment deficiencies	Equipment deficiencies
Boat 3	Boat 4
Make	Make
Length	Length
Capacity	Capacity
Class	Class
Hull type	Hull type
Propulsion	Propulsion
Construction	Construction
Tank (installed or portable) Fuel level	Tank (installed or portable) Fuel level
Equipment deficiencies	Equipment deficiencies

## BO (& OSM&I) Handout – Pre-Departure Checks Table (sample)

Pre-Departure Safety Checks (Sample)				
Year / Make / Model:				
Length:	Capacity:	Hull Design:	Hull Material:	Propulsion:
Small Boat Required Equipment Checks			Small Boat Operational Safety Checks	
Copy of Registration & Display of Numbers:			Battery Connections & Power:	
Location, Number and Type of Life Jackets:			Engine Blower & Fuel System Ventilation:	
Location and Type of Throwable Rescue Devices:			Engine Oil / Fuel Levels / Water Separator Filter:	
Location & Number & Type of Serviceable Fire Extinguishers:			Electrical Fuses & Gauges:	
Location of Sound Producing Device:			Electronics Systems:	
Location, Amount and Type of Visual Distress Signals:			Engine Trim / Tilt:	
Navigation Lights Operational:			Steering & Throttle Linkages:	
Location and Status of First Aid Kit:			Bilge Pump & Bailing Devices:	
Type / Condition of Anchor & Line:			Hull / Scuppers / Thru-Hull Fittings / Boat Plugs:	
Type & Quantity of Mooring /Utility Lines:			Hatches & Doors:	
Deck Equipment: Boat Hook / Paddles / Fenders			Cleats / Rails / Deck Fittings:	
Navigational Equipment: Compass / GPS / Maps & Charts			Winches / Davits / Other:	
Spare Parts & Tool Kit:				

## MOCC Field Teaching Aid – Operating Systems, Maintenance, & Inspection (OSM&I)

### Overview

The objective is to cover what to check & inspect in a boat prior to beginning a trip, start-up procedures, and troubleshooting (See available OSM&I Handouts).

### Equipment

Outboard motor(s) — 4-cycle and/or 2-cycle, and Inboard motor(s) if available.

### Content

#### General

- Records:
  - Log book required by policy and common sense;
  - Use hour meter to track intervals. Install aftermarket hour meter (Hobbs meter) on smaller engines;
  - Record fueling and oil used by hour;
  - Track gallons-per-hour for check on performance and fuel needs;
  - Record point-to- point fuel use for future reference;
  - Periodically record vital readings (e.g., temp, oil psi, volts, and RPM @ idle, cruise, and top speed) at recorded load;
  - Record maintenance performed;
  - Record problems/symptoms.
- Having an owner’s manual on board with newer motors.
- Keeping boat and bilge clean – safety/accountability.
- When troubleshooting, always assume simple solution to problems before complex.
- Tools- at least enough for basic repairs.
- Spare parts – At least have those that are designed to break (e.g., shear pins), and those known to break or foul (e.g., spark plugs, belts, filters).

### What to Inspect

#### Condition of Vessel

- Inspect hull/sponson
- Inspect deck
- Inspect hardware (cleats, bow eye, transom eyes, railing, etc.)
- Inspect Bilge (if applicable)
- Drain plugs in place
- Scuppers clear (for IB and RHIB)
- Sacrificial anodes at least 50% of original size

#### Electronics

- Turn on battery switch (if applicable)
- Test all electronic equipment (VHF radio, GPS, Navigation Lights, Horn, etc.)
- Test power to engines
- Test bilge pump(s)

- Test wipers
- Test heater if equipped

### **Helm Controls**

- Steering has full range of motion
- For tiller steered motors, set steering- and throttle-friction adjustment(s)(if equipped).
- Throttle arm has full range of motion
- Return throttle arm to neutral position
- Keys on board
- Kill switch (if required) in place
- Trim tabs functioning (if equipped)

### **Fuel**

- Fuel tank(s) not leaking
- Fuel level optimal (rule of thirds)
- Fuel hose fittings match gas tank and engine
- Fuel hoses free of cracks/leaks
- Fuel/water separator drained of water and/or within replacement date/hrs.
- Fuel vent open (if portable tank)
- Fuel bulb functioning
- If Inboard, blower functioning.

### **Engine/Lubrication**

- If OB – Lower engine to run position
- Engine free of leaks (external and internal)
- Engine oil optimal (2- & 4-cycle)
- If inboard, coolant level optimal
- Throttle arm is engaging transmission
- If OB – Water intake and overboard discharge free of obstructions
- For pull start engines, cord extends and retracts fully
- For portable engines, clamps tightened down and safety chain is attached
- Engine raised for trailering to launch ramp

### **Propulsion**

- Propeller free of damage
- If Jet, impeller free of damage & unobstructed
- If Jet, reverse gate and linkage functioning

### **Start-up Procedures**

1. If Inboard (IB) – Check engine compartment (no water/fuel leaks).
2. Check electronics (e.g., bilge pump, horn, Nav. lights, wipers, depth gauge).
3. If Outboard (OB) or I/O – Lower Engine & ensure water intakes are submerged.
4. OB - Check fuel fittings to ensure good connection. Prime fuel bulb.
5. Ensure kill switch (if equipped) is in place.
6. Ensure engine is in starting position (e.g., neutral if OB).
7. For cold start, follow throttle and choke procedures (see motor manual).
8. START ENGINE (key or pull cord).
9. IB – Check engine compartment (no water/fuel leaks).
10. OB – Once engine is running, ensure overboard discharge is flowing.
11. Let engine warm up for 10-15 minutes before throttling past idle.

## Troubleshooting

*(When troubleshooting, always assume simple solution to problems before complex)*

### Fuel issues

- Fuel odor – always stop and figure out where it's coming from and what the risk is
- Won't start fuel issues:
  - Trace fuel line for outboards (fix problems)
  - Pump bulb for outboards
  - Check fuel vent for outboards (open)
  - Vapor lock for inboards (cool by opening cowling and running blower)
  - Water in gas (value of fuel/water separator)
  - Check spark plugs for fouling
- Ethanol fuel (issues regarding fuel "going bad" – hydrophilic, parts deterioration)

### Electrical

- Keep batteries serviced – use of on-board chargers
- Won't start electrical issues:
  - Check master switch
  - Check kill switch
  - Check battery connections and cables
  - Check fuses

### Cooling

- Never start a boat motor out of water
- How to supply water when on land
- What to look for to be sure your cooling system is working:
  - Outboard – Overboard discharge stream
  - Outboard - Overheat alarm
  - Inboard – Temp gauge (know what's normal – log book)
  - Inboard – Alarm/lights/temp of exhaust manifolds
- Trouble with cooling system:
  - Check intakes
  - Follow lines – remove debris, ice
  - Know motor – thermostat before or after indicator stream?
  - Inboard – check heat exchanger
  - Inboard (new motors) – go to idle when overheating

### Lubrication

- System's oil warning (see manual).
- Two-cycle versus four-cycle oil needs.
- 2-cycle – Oil pre-mixed or in reservoir (symptom if not mixed).
- Lower Unit oil, check, change, leakage.
- Winterizing – keep upright and dry is sufficient for normal storage. Explain winterizing if needed.

## OSM&I Handout – Float Plan (samples)

USFWS Float Plan (draft v2014-05-06)							
Scheduled trip dates/times	Depart From:				Return To:		
	Date:		Time:		Date:		Time:
Trip purpose							
Trip description	(List details of trip and locations work will be performed)						
Boat Operator and Crew Information	<u>Name</u>	<u>Role</u>	<u>Agency</u>	<u>Phone</u>	<u>Emergency Contact</u>	<u>Phone</u>	
Boat Description	(Length, Registration, Make/Model, Color, Distinguishing characteristics)						
Towing vehicle and Trailer information	(License-plate numbers, and vehicle make, model, color)						
Means of contact and contact schedule	(Identify communications equipment; e.g., VHF radio/operating channel, mobile phone/numbers)						
Float-Plan Contact	(The person responsible for initiating emergency action if the vessel is overdue)						
What will be done by the Float Plan Contact if the boat is overdue	The Float-Plan Contact will consider the boat overdue if the crew has not checked in by (date/time): _____						
	If a boat is overdue, the Float Plan Contact will (list actions and identify Emergency-Response contacts including phone numbers):						
What will be done by the boat operator if the trip is delayed							
Emergency Equipment on board							
Comments:							

### Boating Safety Float Plan (sample)

Date(s): \_\_\_\_\_ Departure Time: \_\_\_\_\_ Return Time: \_\_\_\_\_

Vessel: \_\_\_\_\_  
(Name / State #'s or Documentation #'s / Length and Type / Color Description)

Departing From: \_\_\_\_\_ Launch/Recovery Site: \_\_\_\_\_

Transit Area: \_\_\_\_\_ Vehicle Description: \_\_\_\_\_

Mooring Location: \_\_\_\_\_ Vehicle License #: \_\_\_\_\_

Area(s) of Research: \_\_\_\_\_  
(Latitude & Longitude and /or Name with Physical Description)

If operator has not returned or made contact as arranged please call the following emergency number:

\_\_\_\_\_  
(List the local USCG or Rescue Authority for your area of research)

#### Operator and Crew Information

1) Operator: \_\_\_\_\_ Phone #: \_\_\_\_\_

#### Additional Persons On Board:

(Name / Affiliation / Phone#)

2) \_\_\_\_\_

3) \_\_\_\_\_

4) \_\_\_\_\_

5) \_\_\_\_\_

#### Weather Conditions & Forecast

<input type="radio"/> Inland <input type="radio"/> Offshore <b>What are the forecasted conditions?</b>  Water Surface: _____ Water Current: _____ Wind: _____ / _____ <small>(velocity)                      (direction)</small>	Day <input type="radio"/> Night <input type="radio"/> <small>(Nav Lights &amp; Rescue Lights Required)</small> <b>Visibility:</b> _____ <small>(Distance NM)                      (Clear / Fog / Haze / Rain)</small>  <b>Sunrise:</b> _____ <b>Sunset:</b> _____ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">High Tides</th> <th style="width: 50%;">Low Tides</th> </tr> <tr> <td>Height _____ Time _____</td> <td>Height _____ Time _____</td> </tr> <tr> <td>Height _____ Time _____</td> <td>Height _____ Time _____</td> </tr> </table>	High Tides	Low Tides	Height _____ Time _____	Height _____ Time _____	Height _____ Time _____	Height _____ Time _____
High Tides	Low Tides						
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#### Mission Description

#### Checklist

<b>Specific Type of Operations:</b> _____ _____ _____ _____	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li><input type="radio"/> # _____ PFD's</li> <li><input type="radio"/> VDS- Flares &amp; Non- Pyro</li> <li><input type="radio"/> Radio</li> <li><input type="radio"/> E.P.I.R.B.</li> <li><input type="radio"/> Cell # _____</li> <li><input type="radio"/> Anchor</li> <li><input type="radio"/> Bilge, Oil, antifreeze, fuel</li> <li><input type="radio"/> Maintenance log</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li><input type="radio"/> First Aid Kit</li> <li><input type="radio"/> O2 Kit if Scuba</li> <li><input type="radio"/> Flash Light</li> <li><input type="radio"/> Food</li> <li><input type="radio"/> Water</li> <li><input type="radio"/> Paddles</li> <li><input type="radio"/> _____</li> <li><input type="radio"/> _____</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li><input type="radio"/> # _____ PFD's</li> <li><input type="radio"/> VDS- Flares &amp; Non- Pyro</li> <li><input type="radio"/> Radio</li> <li><input type="radio"/> E.P.I.R.B.</li> <li><input type="radio"/> Cell # _____</li> <li><input type="radio"/> Anchor</li> <li><input type="radio"/> Bilge, Oil, antifreeze, fuel</li> <li><input type="radio"/> Maintenance log</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> First Aid Kit</li> <li><input type="radio"/> O2 Kit if Scuba</li> <li><input type="radio"/> Flash Light</li> <li><input type="radio"/> Food</li> <li><input type="radio"/> Water</li> <li><input type="radio"/> Paddles</li> <li><input type="radio"/> _____</li> <li><input type="radio"/> _____</li> </ul>
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## OSM&I Handout – Maintenance & Troubleshooting Handout

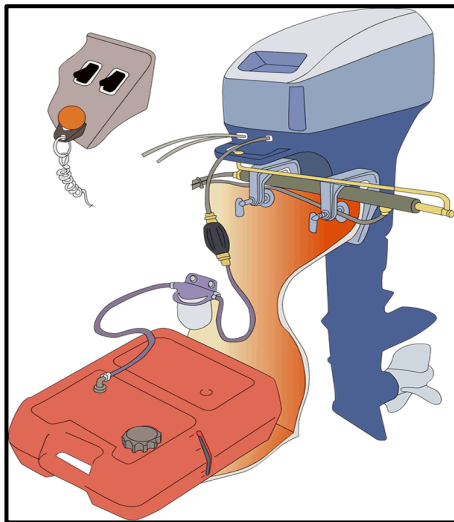
### FUEL SYSTEMS

**! Fuel Odor- STOP- Ventilate & Locate**

#### Leaks

**Symptom: “Engine turns but Won’t Start”**

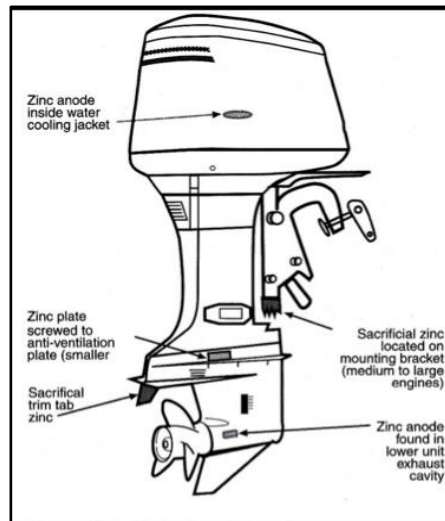
- **Outboard FUEL Issues:**
  - Trace fuel line check for air leaks & connections
  - Inspect Fuel Bulb (primed?)
  - Fuel Tank Vent (open?)
  - Fuel Filter – Water Separator
  - Spark Plugs Fouled?
- **Inboard FUEL Issues:**
  - Vapor Lock – Open Hatch to Cool Engine & Run the Blower
  - Fuel Valve (open position?)
- **Bad Fuel- Change Fuel & Use a Stabilizer**



### ELECTRICAL SYSTEMS

**Symptom: “Engine will not turn-over or run”**

- **Inboards & Outboards (In NUETRAL?)**
  - Check battery master switch
  - Check Kill Switch
  - Check Battery Connections
  - Check Fuse Panel / Box
  - Check Starter/Coil Fuse Link
  - Check Spark Plug Wire
- **PUMPS, MECHANICAL & HYDRAULICS**
- **Bilge Pump-** Intake & Hose clear of debris
- **Steering-** Fittings Greased / Reservoir Full
- **Zinc Anodes-** Inspect for corrosion
- **Hoses Fittings-** Inspect for wear & leaks
- **Throttle-** Inspect linkage connections

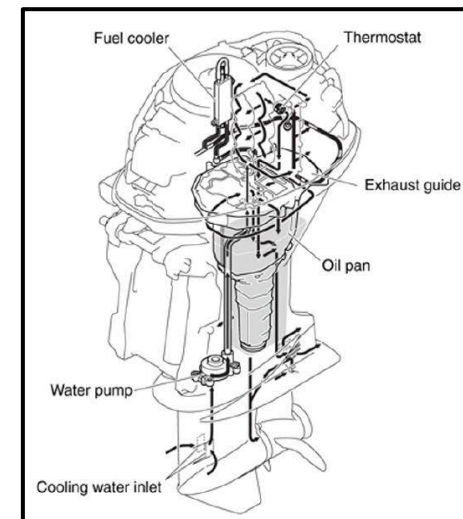


### ENGINE COOLING SYSTEMS

**! NEVER Start without WATER Flow**

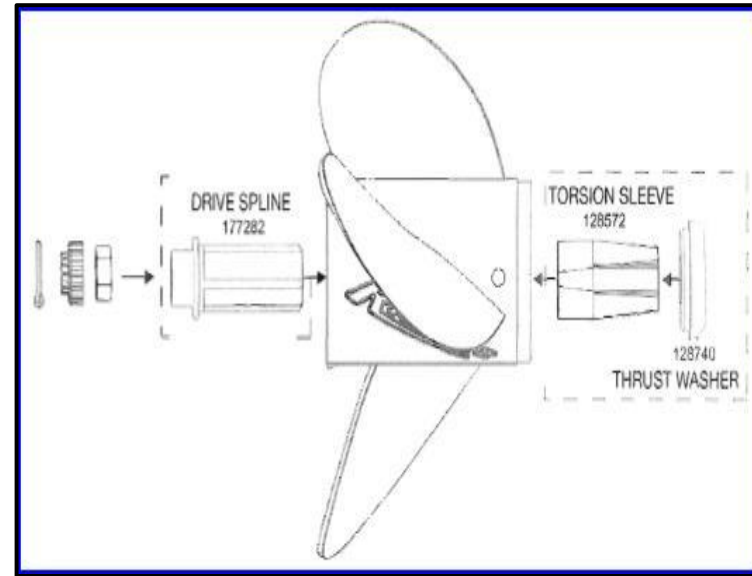
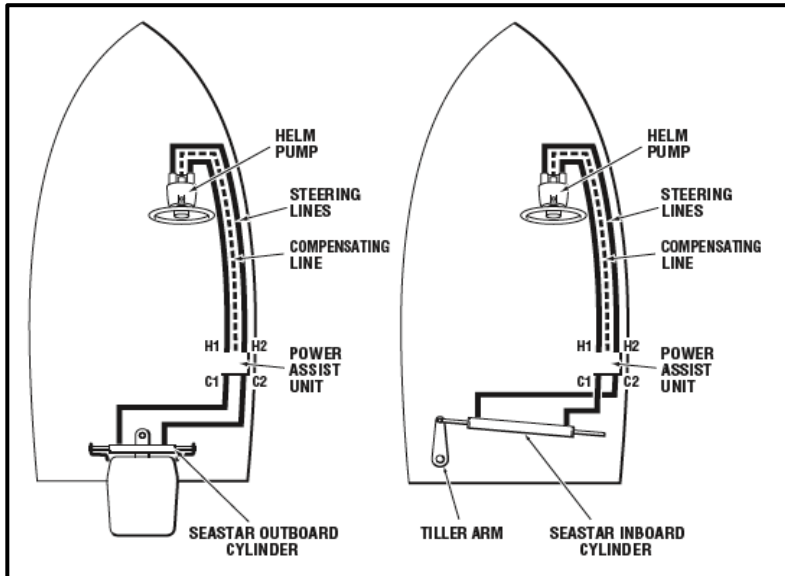
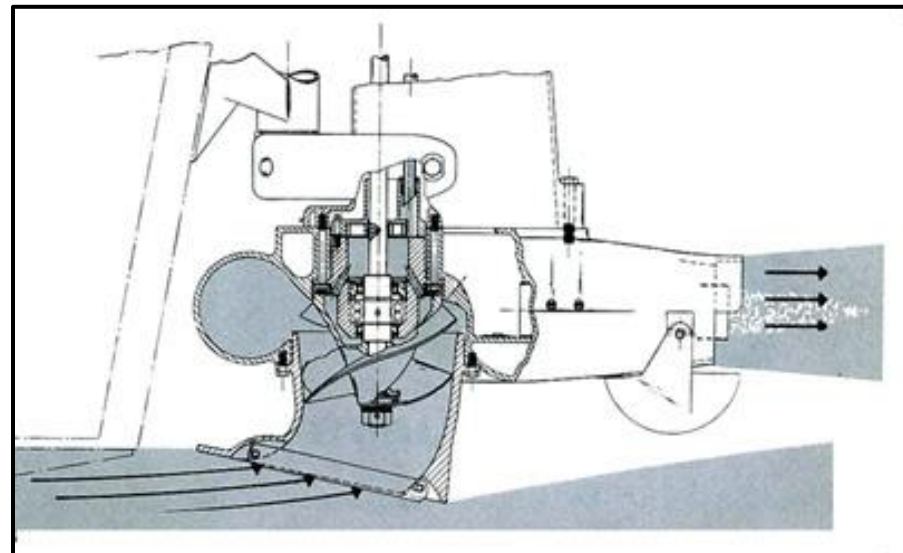
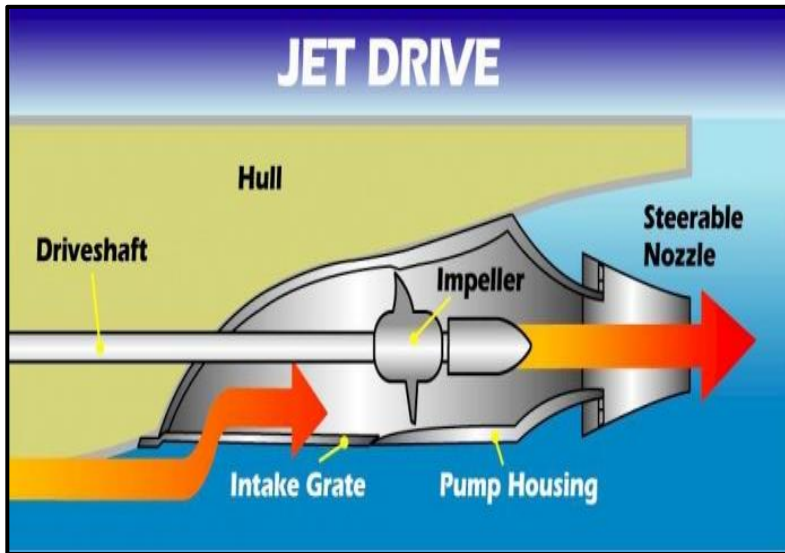
**Symptom: Engine Stalls or Only Idle Speed**

- **Outboard Cooling Issues:**
  - Check Discharge Stream
  - Check Lower Unit Intakes
  - Clean both as needed
  - Change Impeller
- **Inboard Cooling Issues**
  - Check Exhaust Water Discharge
  - Check Heat Exchanger & Jacket Water / Anti-freeze
  - Check Raw Water Intake Valve
  - Raw Water Strainer- Filter
  - Thermostat & Temp Gauge





OSM&I Handout – Example Drive Configurations



COMMON HYDRAULIC STEERING SYSTEMS

TYPICAL PROPELLER CONFIGURATION

**OSM&I (& BO) – Pre-Departure Checks Table (sample)**

Pre-Departure Safety Checks (Sample)				
Year / Make / Model:				
Length:	Capacity:	Hull Design:	Hull Material:	Propulsion:
Small Boat Required Equipment Checks			Small Boat Operational Safety Checks	
Copy of Registration & Display of Numbers:			Battery Connections & Power:	
Location, Number and Type of Life Jackets:			Engine Blower & Fuel System Ventilation:	
Location and Type of Throwable Rescue Devices:			Engine Oil / Fuel Levels / Water Separator Filter:	
Location & Number & Type of Serviceable Fire Extinguishers:			Electrical Fuses & Gauges:	
Location of Sound Producing Device:			Electronics Systems:	
Location, Amount and Type of Visual Distress Signals:			Engine Trim / Tilt:	
Navigation Lights Operational:			Steering & Throttle Linkages:	
Location and Status of First Aid Kit:			Bilge Pump & Bailing Devices:	
Type / Condition of Anchor & Line:			Hull / Scuppers / Thru-Hull Fittings / Boat Plugs:	
Type & Quantity of Mooring /Utility Lines:			Hatches & Doors:	
Deck Equipment: Boat Hook / Paddles / Fenders			Cleats / Rails / Deck Fittings:	
Navigational Equipment: Compass / GPS / Maps & Charts			Winches / Davits / Other:	
Spare Parts & Tool Kit:				

**OSM&I Handout – Boat Log (sample)**

BOAT LOG									
DATE	HULL / BILGE'S <i>(Scuppers &amp; Pumps)</i>	REQUIRED EQUIPMENT <i>(Gear &amp; Electronics)</i>	FUEL LEVEL <i>(Amount Added)</i>	ENG. OIL LEVEL	ENGINE HOURS	ELECTRICAL COMPONENTS	COOLING SYSTEM	STEERING & PROPULSION	ZIRC'S ZINC'S
START									
FINISH									
CREW / MISSION / LOCATION:									
COMMENTS / NOTES: <i>(Include all Observations / Symptoms / Maintenance &amp; Repairs)</i>									

BOAT LOG									
DATE	HULL / BILGE'S <i>(Scuppers &amp; Pumps)</i>	REQUIRED EQUIPMENT <i>(Gear &amp; Electronics)</i>	FUEL LEVEL <i>(Amount Added)</i>	ENG. OIL LEVEL	ENGINE HOURS	ELECTRICAL COMPONENTS	COOLING SYSTEM	STEERING & PROPULSION	ZIRC'S ZINC'S
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START									
FINISH									
CREW / MISSION / LOCATION:									
COMMENTS / NOTES: <i>(Include all Observations / Symptoms / Maintenance &amp; Repairs)</i>									

## OSM&I Handout – Pre-Departure Checklist (Sample)

This document has elements of Boat Orientation and OSM&I

### Vessel (Maintenance) Log Book & Float Plan

- Float Plan in place
- Review maintenance history & status of vessel
- Routine maintenance performed (e.g., engine oil & filter, fuel filter, spark plugs, lower unit, jet pump, other required lubrication)
- Batteries (if on board) fluid-level checked/maintained

### Trailer

- Trailer lights - working
- Trailer ball and coupler are same size
- Trailer hitch locked with pin, bolt, or trailer lock
- Tow chains attached and crossed
- Tire pressure correct
- Wheel bearings sufficiently greased
- Boat properly secured to trailer
- VHF antenna lowered for transport
- Jack stand is raised and locked in place

### Safety and Survival Equipment

- Federal required safety equipment on board and functioning/in working condition (e.g., PFDs, Fire Extinguishers, Lights, Sound Producing Devices, Ventilation, Backfire Flame Arrester, VDS, Pollution Placards)
- Agency/Program-required safety equipment on board (e.g., anti-exposure gear)
- Check First Aid kits, ensure no expired medications
- Inspect anchor ( all shackles are moused, anchor line is in good condition, tag end of line is attached to boat, and anchor is ready to deploy)
- Inspect lines (bow line, dock lines, tow line, anchor line)
- Communication equipment operable
- Diver down & Code Alpha flag (if supporting dive operations)
- EPIRB (if required) on board and battery within expiration date
- Toolbox optimally equipped (including spare parts)

### Condition of Vessel

- Inflatable – Inspect hull/sponson
- Inspect deck
- Inspect hardware (cleats, bow eye, transom eyes, railing, etc.)
- Inspect Bilge (if applicable)
- Drain plugs in place
- Scuppers clear (for IB and RHIB)
- Sacrificial anodes at least 50% of original size

### Electronics

- Turn on battery switch (if applicable)
- Test all electronic equipment (VHF radio, GPS, Navigation Lights, Horn, etc.)
- Test power to engines
- Test bilge pump(s)
- Test wipers
- Test heater if equipped

## Helm Controls

- Steering has full range of motion
- For tiller steered motors, set steering- and throttle-friction adjustment(s)(if equipped).
- Throttle arm has full range of motion
- Return throttle arm to neutral position
- Keys on board
- Kill switch (if required) in place
- Trim tabs functioning (if equipped)

## Fuel

- Fuel tank(s) not leaking
- Fuel level optimal (rule of thirds)
- Fuel hose fittings match gas tank and engine
- Fuel hoses free of cracks/leaks
- Fuel/water separator drained of water and/or within replacement date/hrs.
- Fuel vent open (if portable tank)
- Fuel bulb functioning
- If Inboard, blower functioning.

## Engine/Lubrication

- If OB – Lower engine to run position
- Engine free of leaks (external and internal)
- Engine oil optimal (2- & 4-cycle)
- If inboard, coolant level optimal
- Throttle arm is engaging transmission
- If OB – Water intake and overboard discharge free of obstructions
- For pull start engines, cord extends and retracts fully
- For portable engines, clamps tightened down and safety chain is attached
- Engine raised for trailering to launch ramp

## Propulsion

- Propeller free of damage
- If Jet, impeller free of damage & unobstructed
- If Jet, reverse gate and linkage functioning

### Start-up Procedures

1. If Inboard (IB) – Check engine compartment (no water/fuel leaks).
2. Check electronics (e.g., bilge pump, horn, Nav. lights, wipers, depth gauge).
3. If Outboard (OB) or I/O – Lower Engine & ensure water intakes are submerged.
4. OB - Check fuel fittings to ensure good connection. Prime fuel bulb.
5. Ensure kill switch (if equipped) is in place.
6. Ensure engine is in starting position (e.g., neutral if OB).
7. For cold start, follow throttle and choke procedures (see motor manual).
8. START ENGINE (key or pull cord).
9. IB – Check engine compartment (no water/fuel leaks, exhaust manifolds stay cool to touch).
10. OB – Once engine is running, ensure overboard discharge is flowing.
11. Let engine warm up for 10-15 minutes before throttling past idle.

## MOCC Field Teaching Aid – Fire Suppression

### Overview

In this session, students learn the common components of a fire extinguishers used on boats and practice using an extinguisher to put out a fire. Be sure to notify local authorities (e.g., emergency dispatch) about the session beforehand.

### Equipment

There are different types of fire-demo systems (e.g., liquid fuel mix, basic propane, computerized propane, vendor-supplied).

Refer to the MOCC student manual for information on liquid fuel mix.

With commercially available systems refer to the manufacturers operating instructions.

With custom-built propane systems, have at least two instructors for the demo, one operating the system and one managing/teaching the students.

With all demos, conduct a safety briefing and establish safety protocols.

Have each student attempt to put out the demo fire using a B-I extinguisher. If an extinguisher still has pressure when one student is done with it, the next student will use it.

Have students wear appropriate PPE while going thru drill.

### Content

- Review when, where, and for what boats, fire extinguishers are required, including FWS policy (i.e., what they were taught in the classroom).
- Review and show different sizes of approved extinguishers.
- Discuss where you should mount an extinguisher and that they must be mounted to meet USCG approval.
- Review the types approved agents, contrasting the pluses and minuses of the most common types, and give information about extinguishers themselves.
  - Working parts.
  - The downside of extinguishers with plastic parts and no gauge.
  - What the dry chemical looks like, ability to pack down, and proper storage and maintenance (keeping chemical fluid).
  - How a dry chemical extinguisher functions, thus how to (and not to) hold them.
- Present do's and don'ts for extinguishers.
  - Do inspect them.
  - Don't test them and put them back.
  - Do carry extra's.
- Discuss protocol in case of fire.
  - Self, partner, victim (in this case whatever is on fire).
  - Face the wind (be aware smoke toxicity can be extreme).
  - Shut down motor and turn off master switch.

- Eliminate fuel source, or another essential element (e.g., heat, oxygen).
  - Aggressively fight the fire (follow smoke to source).
  - Set a fire watch after flame is extinguished.
- Discuss the protocol for putting out a fire with an extinguisher.
  - PASS (Pull, Aim, Squeeze, Sweep).
  - Spread the agent (dry chemical) on what's burning.
  - Don't turn your back on a fire.
  - Don't splatter the burning fuel.
- Clothing considerations when fighting a fire
  - Synthetic clothing that melts to skin (PFDs, Waders, Rubberized rain gear)



## MOCC Field Teaching Aid – Visual Distress Signals (VDS)

### Overview

This session, students observe the use of USCG and SOLAS grade VDS and learn about risks and benefits associated with each. Notify and get approval from authorities (Emergency dispatches, and USCG) beforehand. Broadcast (or have USCG broadcast) a Security on VHF 16 as part of the demonstration.

### Equipment

SOS Flag, SOS light (if available), and USCG and SOLAS grade smoke flares, hand flares, aerial flares (rockets). PPE to protect skin, eyes, and ears.

### Content

- Review what VDS do (i.e., alert people that you're in trouble, provide a homing signal to aid in locating you).
- Review when, where, and for what boats, VDS are required (i.e., what they were taught in the classroom).
- Review the types (i.e., Pyrotechnic, Non-pyrotechnic).
  - Contrast the pluses and minuses of each in terms of effectiveness and safety.
  - Review requirements (number, expiration) if pyrotechnics are chosen.
- Explain that there are two standards for pyrotechnic (USCG, and SOLAS).
- Describe what SOLAS is, and where SOLAS grade VDS is required.
- Verbally contrast USCG v. SOLAS grades in terms of effectiveness and safety, cost/benefits.
- Discuss safety concerns – Pyrotechnics and spilled fuel, burning slag, smoke and wind.

### Demonstration Options

There are a variety of ways to conduct the VDS demonstration. The approach should be determined based on safety.

Consider sending a team of two instructors out in a boat and have them contrast the various types of VDS (calling for them in a pre-arranged order), while students observe from shore.

This can also be demonstrated on land or from dock in front of students.

The order typically followed is:

- 1) Flag
- 2) SOS light
- 3) Display USCG and SOLAS grade smoke flares
- 4) Display USCG and SOLAS grade hand flares
- 5) Display USCG and SOLAS grade rockets

**Notes**

Be cautious about putting live pyrotechnics in the hands of students.

Discuss other (non USCG required) signaling devices and techniques (mirror, laser flare, improvised, dyes, streamer, signaling kite, strobes).

Be cautious of errant turns with SOLAS rockets, and that you should not store aerial flares horizontally.

Those firing pyrotechnic VDS need to wear adequate PPE (e.g., skin and eye protection, gloves, hearing protection).

## MOCC Field Teaching Aid – Trailer Orientation

### Overview

In this session, students learn/observe the common components of boat trailers, how they function, and general information on maintenance and use.

### Equipment

- Select the most complex boat trailer (e.g., one with surge brakes, and dual axels), and the lightest trailer (for using the D-jack).
- Have a block of wood for demonstrating dual axel tire change, and D-jack for single axel if available.
- Other teaching aids: Example coupler (cut out), trailer light adapter(s), example hub assembly.

### Content

Starting at the coupler, take the class as a group and walk them around the trailer as you cover the different components/topics:

- **Boat weight** – Generally a good idea to know what your boat and trailer weigh fully loaded. Essential with larger vessels. Use a truck scale.
- **Trailer and vehicle weight capacities** - Check trailer capacity on the trailer frame, vehicle towing capacity in the vehicle manual.
- **Proper weight distribution** – 60% forward of the wheels.
- **Trailer hitch rating** – Indicates the maximum trailer load and tongue weight of the hitch: Examples - Class I handles a Gross Trailer Weight (GTW) up to 2,000 lbs., Class II a GTW to 3,500 lbs., Class III to 5,000 lbs., & Class IV up to 10,000 lbs.
- **Coupler** – Explain there are different ball sizes and the need to make sure the ball and coupler match (use example coupler and ball to show how the mechanism works).
- **Receiver hitches** – Explain the advantages of receiver hitches versus bumper hitches. Describe the value of drop hitches and the importance of having dual-axle trailers ride horizontally.
- **Locking mechanisms** – Describe the locks available for receiver hitches, couplers, and tongues.
- **Safety chains** – Explain that hooks are facing aft, chains crossed and length allows tongue to be cradled and not hit the pavement, and for the trailer to track behind the truck if the couple/ball connection is lost. Discuss options for shorting chains (e.g., twist chains, add threaded links or snaps).

- **Wiring** – Recommend using a flat-four (or -five) connector with adapters and the benefits of doing so to allow the use of a variety of adapters. Also note there is a standard for wiring color and use, and that it should be maintained.
- **Boat-to-trailer attachments (winch, tie downs)** – Bow positioned properly on trailer. Emphasize caution needed when working winch (stored load, and lock mechanism), and value of inspecting springs, locks, strap/cable, before departure, and periodically while in transit.
- **Trailer frame** – Look for wear (cracks).
- **Tires/wheels** – Check inflation, including spare. Wheels should be balanced if heavy use and/or routinely traveling long distances. Discuss the need to periodically check for wheels heating up as an indicator of problems with tires or bearings.
- **Hubs** – Describe different types (e.g., simple with buddy bearings, flow through, encased). Describe general maintenance. Emphasize need to check with dealer specs. Discuss options for repair and replacement in the field (i.e., can carry a spare). Discuss the need to check for signs of bearing failure (heat).
- **Surge brakes** – Describe form and function. Discuss the need for to lock-out the surge brakes for steep grades and backing uphill. Discuss the mechanisms for that.
- **Washout systems** – Describe or point out if present.
- **Lighting checks** – Describe how to check lights using running lights and emergency flashers.
- **Bunk types** – Describe function, advantages, and disadvantages, of trailers with bunks versus rollers. Describe options (e.g., UHMW polyurethane on bunks).
- **Demonstrate trailer jack techniques** – Driving onto a block for dual axel, and D-Jack for single axle.
- **Specialized trailers** – Trailers with extensions or pivot points.
- **Transom saver/engine brace** – Protects transom and motor stress especially under rough road conditions.
- **Emphasize that vehicle operator is responsible for securing the trailer.**

## MOCC Field Teaching Aid – Jet Pumps (inboard and outboard)

### Overview

This session familiarizes students with jet pumps, how they work, and how to maintain them. The jet pump should be presented for the types of jet boats (inboard, outboard) present at the course. This session is not taught in regions where jet pumps do not exist.

### Equipment

Inboard and outboard jet boats, if available. An outboard jet unit can be used if no outboard jet is available, or instead of an outboard jet with motor.

### Content

#### Jet Pumps

Jet pumps allow the boat to be operated in shallow water utilizing an impeller that pulls water up through an intake positioned at, or slightly below, the lowest part of the hull, and shoots it out behind the boat.

#### Typical components of a jet pump

**Intake** - The intake is where the water first enters the pump.

**Intake grate** - Metal slats designed to allow water to pass while preventing large debris from entering the pump.

**Impeller** - The jet pumps equivalent to a propeller.

**Wear ring** - A replaceable sleeve around the impeller that is designed to wear as the pump ages.

**Nozzle** - The long tube where the water exits.

**Reverse gate (cup)** - Designed to redirect water while passing exhaust.

**Impeller shaft/shear pin/nut/shims** - There may be a shear pin on the impeller shaft. The shear pin is designed to break if the impeller gets bound. The impeller is held on with a nut, and shims are located between the nut and impeller (these are spares) and the impeller and pump housing. Often there is a pin that holds the nut in place.

**Efficiency** - Jet pumps are relatively inefficient. In general they are 30-40% less efficient than a prop. Because jet pumps are inefficient it is very important to keep the edges of the impeller smooth and sharp.

**Response at idle** - At slow speeds (idle), jet pumps are slow to respond compared to motors with propellers. Because there is no skeg on jet pumps, steering response is dependent on the amount of water moving through the pump.

**Sliding** - Because there is no skeg on a jet pump, boats with jet pumps tend to slide on turns while planing more so than propeller driven outboards.

**Neutral** - Neutral is achieved by the proper adjustment of the reverse gate and not a transmission. Therefore, it's common to encounter boats with jet pumps that move (either forward or backward) while in "neutral".

Although all jet pumps work on the same basic principal, there are many different designs, each suited for a different application.

### **Inboard jet pumps**

**Impellers** - One major feature that determines the performance of inboard jet pumps is the number of impellers. In addition to single impeller (commonly referred to as "single stage") pumps, there are two- and three-stage pumps. The more stages there are the better the pump handles white-water, although multiple stage pumps are more expensive to purchase and repair, and louder than single stage pumps.

**Engine/boat/pump/impeller/nozzle combinations** - Matching the engine/boat/pump/impeller/nozzle combination for the best performance and economy is not an exact science. As a result, there is wide variability in how different boats perform. It's important to keep detailed records of how a jet boat operates when new. Note the rpm at which the vessel gets on plane under a given load, and whether you can "punch it" without the motor winding up, and what the max rpm is. If these values begin to change over time, it may be a sign that parts in the pump need replacement or adjustment (reduce the gap between the impeller and wear ring).

**Wear ring** - Some inboard jet pumps have a replaceable wearing (e.g., American Turbine), and with others (e.g., Hamilton), the impeller needs to be built up and machined.

**Debris** - A change in pitch, vibration, sudden loss of speed, usually (not always) indicates there is debris (sticks, leaves, ice, slush) blocking the pump.

### **Methods for removal**

Methods for removing debris from the pump include:

**Flush** - Shutting down engine while the vessel is still moving sometimes allows the obstruction to be swept away.

**Access plate** - With many inboard jet pumps you can access the area between the intake grate and the impeller through a removable plate. The access plate can either be on the dry or wet side of the transom. If inside the engine compartment, it may be below the water line. If so, it may be necessary to shift the load forward, beach the vessel, or work real fast (*If the access is in the engine compartment, turn off the master switch before working in the vicinity of the drive shaft.*).

**Rake** - There are rakes designed to reach the intake grate from the stern of the boat.

**Mask and snorkel** - If the air and water are warm enough, a mask and snorkel can prove to be the quickest fix (also very valuable if repairs need to be made on the wet side of the pump.)

**Reverse gates** - There are different styles of reverse gates, each with different performance characteristics. In general, the style where the nozzle changes direction while the reverse gate remains stationary is the most responsive. And with that type, the style with a "whale tail" reverse gates is the most responsive.

**Hydraulic systems** - Some reverse gates are hydraulically controlled. Hydraulic reverse systems are easy to operate and allow faster maneuvering (stopping), but are not easily repaired in the field, can be noisy, and cause a power drain.

### **Outboard jet pumps**

Nearly all of the outboard jet pumps on the market today are designed the same, and vary only in size. They replace the lower unit of an outboard motor.

**Exhaust** - One major difference in outboard pumps (compared to inboard pumps) is that the exhaust pipe is located within the pump nozzle (exhaust systems in an inboard are separate from the pump). Outboard jet pumps are loud compared to propeller driven boats because the exhaust exits above the water line when the boat is on plane.

### **Maintenance**

**Lubrication** - Most pumps have a grease fitting above the bowl. Typically there is a short section of hose that allows grease to exit. The pump should be greased after each use. Grease should be added until all water is evacuated through the exit tube.

**Intake** - The intake should be kept free of any debris. Due to the inherent inefficiency of jet pumps, a very small object blocking the intake can result in a large reduction in performance.

**Wear ring** - Because the wear ring is designed to slowly wear, adjustment is needed periodically using shims. Typically on a new pump there will be two to three shims between the pump and the impeller. One way to determine if a shim needs to be added is by checking the rpm's of the engine. If the engine rpm is operating within specs, then the impeller is likely adjusted correctly. If the rpm's are high, then a shim may need to be added to reduce the gap between the impeller and wear ring. Extra shims are typically stored between the nut and impeller. After adding shims, check to see if the impeller is making deep gouges in the wear ring. If so, remove a shim, or re-diagnose the problem.

**Reverse gate** - Due to normal wear, the reverse gate may periodically need adjustment to maintain neutral. There's typically an adjustment nut.

**Spare parts and tools** - Some spare parts should be carried. These include spare impeller nut, shims, shear and cotter pins, and spare impeller. Carry a wrench (or wrenches) to fit the nuts for the intake and impeller shaft. Also, carry a screw driver or other prying device to remove debris from the intake grate and the area between the exhaust pipe and nozzle walls. A file can be useful for sharpening the impeller.

### **Modifications and options**

There are various modifications that can improve performance of jet pumps. These include welding aluminum extensions to each side of the intake (angling out), and to the back of the intake that (angling forward). This improves the loading of the pump with water. Another modification involves welding a keel to the bottom of the intake to improve slow-speed steering.

Standard impellers are made of aluminum. Stainless steel impellers are available which improve the efficiency of the pump, but are more expensive and may increase the likelihood of damage to the motor in case of impact.



## MOCC Field Teaching Aid – Prop Change

### Overview

In this session students are shown how to change a propeller while in the field.

### Equipment

- Adjustable wrench/prop tool.
- EMPHASIZE that a spare prop, cotter, locking washer, thrust washer and bushing needs to be part of the tool kit for an outboard.
- Block of wood.
- Small outboard motor, either mounted on a boat or stand-alone demonstration model.
- Anti-corrosion grease (optional).

### Content

Steps for propeller replacement:

- Shut down engine (master switch, remove key)
- Move gear shift to neutral.
- Straighten and remove cotter pin or tab washer.
- Place block of wood between gear case and propeller to hold propeller and remove propeller nut.
- Pull propeller straight off shaft, remove front thrust washer.
- Coat propeller shaft with grease, wipe off extra and keep it clean.
- Check to make for items wrapped around the prop and for possible damage to grease seal.
- Install front thrust washer, propeller, rear thrust hub, and propeller nut onto shaft.
- Place block of wood between gear case and propeller to prevent rotation and tighten nut. Secure propeller nut to the shaft with cotter pin.

### Discussion Topics

- Pitch and slip.
- Propeller materials (aluminum, stainless, brass, synthetic).
- Innovations - Variable pitch, replaceable blades.

## MOCC Field Teaching Aid – Anchoring & Beaching

### Overview

The purpose of this is to familiarize the student with anchors and anchoring protocols, and how to beach a vessel. This demonstration is usually done in a parking lot where you can stretch out the ground tackle.

### Equipment

- 2 or 3 different anchors or as many different examples you can find from the boats used in the class.
- Chain and appropriate hardware necessary to attach the chain to the anchor.
- Anchor line, it is best to have ½" nylon available as the example and other types of anchor lines that may be available for the course.

### Content

- Terminology (e.g., "setting" the anchor; using a bit or cleat).
- Types of anchors and bottom substrates – Their design and uses based on substrate type:
  - Mushroom/mud; Danforth/multipurpose – sand mud rock grass; Plow/rubble; Grapnel/rocks; Kedge/multipurpose
- Bottom types and where to and not to anchor – Damaging resources.
- Wind and current and effects on boat swing.
- Chain and line – Function and types. Determining chain length (equal to the length of boat is one standard. 6-8 ft. is specified in the MOCC manual).
- Stowing methods (anchor bags). Accessibility. Ready for emergency use.
- Hardware – shackles and mousing.
- Anchoring points – Primary off the bow. Emphasize to never solely anchor off stern.
- Choosing rode based on conditions.
- Using a bit or cleat.

### Setting steps

- 1) Finalize plan
  - a) Location
  - b) Roles and responsibilities
  - c) Decide on communication between operator and crew (rate of set, amount of line out, direction line). Consider use of hand signals, marking line-length segments.
  - d) Other factors: water depth. If operating in ocean mention tide and effect on anchoring, both depth and current.
- 2) Prep equipment
- 3) Head into wind or current
- 4) Lower (care not to foul)
- 5) Drift or power back
- 6) Set.

**Safety** – Line handling

**Safety** – Never throw an anchor

Drive home the importance of a knife (knives) on board boats, and emergency release plans.

## Retrieval steps

Releasing options – Move up on the anchor, and using engine power versus hand.  
Safest method is dependent on size of anchor and amount of rode.

## Other points on anchoring

- Light to use at night.
- Anchoring to mooring systems.
- Anchoring using buoy retrieval devices.

## Beaching

- Boat design/material (suitability)
- Weight distribution
- Crew assignments
- Resource damage risks
- Water depth
- Substrate type
- Shore type, steepness
- Tide/flow considerations
- Holding position using engine thrust once contact is made
- Exiting the beach - Reverse the process
- Using too much stern propulsion (eroding ramp/shore, cavitation)
- Pointers – Be wise about possible injuries and pushing-off boats
- Other: Policy on beaching in surf zones

## MOCC Field Teaching Aid – Towing (Rendering Assistance)

### Overview

This session informs students on duties and responsibilities to render assistance and provides an overview and specific techniques used to tow with an emphasis on safety. The towing talk is typically conducted on land, near a boat on a trailer, and using a flip chart. Use of boat models (toys, cut-outs) laid out on the ground are recommended to illustrate towing examples. An alongside tow can be rigged by instructors for students to see.

### Equipment

A boat on land and enough towing line and hardware to set up the basic tows taught in the MOCC, minus the alongside tow. Two boat models or two cutouts with cleats and lines to illustrate tows including the alongside tow. Two boats positioned in the water with enough lines, hardware, and fenders to conduct an alongside tow.

### Content

- Towing – Responsibility:
  - Duties related to marine casualty – 46 U.S.C. 2303
  - Duty to provide assistance at sea – 46 U.S.C. 2304
- When to tow:
  - If immediate threat to life or property exists.
  - If a safe tow is possible
- When NOT to tow:
  - When agency policy does not allow
  - If disable vessel is sinking, burning, or a danger to towing vessel.
  - If it is unsafe to tow.
  - If tow is only for personal convenience.
- Alternatives to towing:
  - Anchor
  - Call for commercial tow
  - Standby and relay information (e.g., to USCG)
- Factors to consider when deciding whether or not to tow:
  - Draft of both vessels relative to water depth.
  - Size and weight of vessel being towed.
  - Skill level of both crews, and need for putting a crewmember on disabled vessel.
  - Availability and condition of attachment points.
  - Numbers and condition of crew available.
- Other options:
  - Rescue passengers if condition is life threatening.
  - Protect life first, property second.
- Towing Equipment:
  - Towline – 75 ft. of ½ or ¾ inch double-braided nylon.

- Hooks or carabiners – ensure breaking strength greater than line.
- Bridles – rig these ahead of time; use same type of line as for towline.
- Mooring lines, fenders, boat hook, lights, knife, ax.
  
- Approaches
  - Varies with conditions and their effect on the disabled water craft.  
Conditions/tow = Calm/Parallel; Moderate/45 degree; Heavy/Crossing-the-T;  
Special circumstances (large disabled vessel)/backing down.
  
- Tow types
  - **Single-line straight** – Single attachment points to both vessels. Attach in line with center of boats. Concentrates stress on single contact.
  - **Single-line V** – Double attachment to towing vessel. Easy to adjust.
  - **Multiple-line Y-Bridle** – Good when the towing vessel has an outboard engine. Arms of Y should be 3 X's the width of the towing boat.
  - **Multiple-line Alongside** – Excellent maneuverability. Need multiple fenders and contact points. One line usually takes most of the load.
  
- Other Content
  - Make sure all have PFDs on.
  - Assess risk (before communication with disabled vessel occupants and after).
  - Circle disabled vessel while assessing and planning.
  - Need for planning and communication/signals (within and between boats).
  - Advantage of having the towed vessel steer.
  - Use of tow bits and cleats (1/2 turn for light load; round turn for heavier load; don't finish with cleat hitch).
  - Alongside line-tightening technique using forward and reverse power.
  - Additional hazards – Vessel at anchor or aground.
  - Always have a quick way to disconnect or cut tow line, knife or axe

## MOCC Field Teaching Aid – Trailer Parking and Backing

### Overview

This session is accomplished in three rotations during the field days. An overview & do's/don'ts and tips should be conveyed to the entire class before the first session. The traditional approach is to have two courses set up, one straight and one in an arc or other challenge. However, a recommended approach is to progress students from backing a trailer with no boundaries to showing they can back a trailer down a ramp on their own and maneuver a trailer in a variety of situations.

### Equipment

Two or three truck/trailer combinations depending on available space, and traffic cones.

### Content

#### Information to give students

- Put steering hand on the bottom of the wheel.
- Use side mirrors (don't look over shoulder) while backing.
- Don't put the tailgate down on pickups.
- Honk horn before backing if not 100% sure there's not anyone behind you (or between your truck and trailer/boat).
- Don't use your seatbelt when backing a boat down a ramp.
- Open windows and turn off the radio.
- Spotters – use one if you need it. And if you need a spotter, tell them what you need (examples signal and position).
- When setting up for backing up, if possible, make the inside of the arc on the driver side.
- Stay close to a guidance feature (e.g., edge of ramp, seam in concrete). It will help keep you in line.
- At ramps, if none exist, make your own guidance feature (e.g., spray paint, place rocks to mark the top edges...).

#### Tips for instructors

- When you first get students in their first rotation, and when a new challenge is presented (e.g., approaching a ramp), illustrate by performing the maneuver.
- Have students work from simple to complex.
- One way students can learn quickly is to have the truck/trailer continually moving, and routinely making minor adjustments to the wheel at a pace that allows the driver to see a change in the trailer direction as soon as the wheel is adjusted (versus, stopping, thinking, turning the wheel, moving, and repeating that over and over). With this approach students can "snake" the truck/trailer slightly in a roughly straight line. The more times they see where the trailer moves when they move the wheel the better.
- In the beginning, walk alongside the vehicle and talk students through how to make the minor adjustments.

- When a student gains confidence in backing up in a generally straight line, then have them purposely “mess it up” on your command, then correct the mess up right away. By doing this the student doesn’t become a “victim” to a mistake. And it teaches them how to make turns.
- After a student gains confidence making turns and following their trailer after “messaging it up”, use a cone (or another object) as a long-distance target they need to approach, but not worrying about getting there in a straight line.
- Then have them go to the long-distant target following a straight line, prescribing an increasing level of competence (i.e., minimal distance they need to stay near the line) as their skill progresses.
- Then use multiple cones to create a space to back the trailer into at an angle, increasing the angle (difficulty) as they progress.
- Progress to a boat ramp and show students how to approach and set up to back down (without driving farther forward than necessary or ending up at a sharp, or blind, angle). It can be useful to have the student make multiple approaches at the top of the ramp before they attempt backing down.
- If there is time (typically the last rotation if students have mastered backing down a ramp), allow students to back up to, and hook up, a detached trailer. Walk them through the techniques (e.g., multiple walk-back checks, putting a coin on the ground below the driver as a distance aid to determine distance from the ball to trailer).
- If you have an arc of cones set up for teaching how to make corners, and students have trouble over-steering, have them watch how much they have to turn the wheel going forward through the arc. Sometimes seeing that makes them realize how simple backing up can be.
- Challenged students – let them know that the second field day is often vastly easier than the first. It’s common for someone who really struggles the first field day to do very well on the second.

## MOCC Field Teaching Aid – Boat Trailer Launch & Retrieve

### Overview

This session demonstrates how to launch and retrieve a vessel by powering off/on the vessel if possible/allowed.

### Equipment

One vehicle with trailer, and launch site that is close to the trailer-backing course (if possible) and that is uncongested and away from public access.

### Content

- Briefly go over the trailer you are using and all tie down points and hitch.
- Tell student to prep the boat for launching before blocking the ramp (boat plugs, tie downs, load boat with equipment necessary for trip, weight and balance etc.).
- In vehicle - Windows down and radio, seatbelt, PFD off. Use of four-wheel drive as needed/available.
- Establish communication means (hand signals) between vehicle and boat operators and/or spotter.
- EMPHASIZE the importance of never unhooking the bow contacts (pulley strap and safety chain) until the boat is in the water, and hook up before pulling boat away from the water.
- Check launch site for people, objects/debris and general condition, and ramp end/edges/drop offs.
- Dealing with variables (current, wind, unimproved ramps).
- Make sure the operator is prepared to handle the boat once it is launched (lines, waders, boots etc.).
- Make sure the boat runs before it is removed from the trailer, and forward pressure applied before unhooking the winch strap if powering off. Make sure lines are not tangled on trailer. EMPHASIZE moving slowly.
- Retrieval is the opposite of launching. However, discuss what to take into account regarding slippery ramps.
- Pull drain plugs.
- Discuss loading – Powering on versus not, dealing with sticky or slick bunks, the dangers of people balanced on trailer when launching/retrieving, and use of aftermarket platforms for the trailer tongue.



## MOCC Field Teaching Aid – Teaching in Boats

### Overview

This Field Teaching Aid contains tips and reminders for instructors for the field rotations in boats.

### Content

#### Pre-departure topics

- Orientation of vessel.
- Terminology (e.g., helm before throttle, helm commands, knots/hitches used).
- Operator and crew responsibilities.
- Kill switch (attached to operator and instructor).
- No use of hands (use fenders, boat hook) to stop vessel impact with dock or other boats.
- Stress operating at a speed that allows separation of throttle and helm changes, and operating mainly on momentum while in neutral (prop drive, & OB jet), or “rocking the gate” (IB jets with dual controls). The instructor should always be prepared and have enough time to put out a walking fender as needed.

#### Underway

- Operator needs to have a plan and communicate it before leaving the dock.
- Give student time to get used to handling the vessel without a specific task to complete.
- Have students work from simple to complex.
- Ask the group if they have seen/done the task before, and if not, spend a short time to set an example. It’s good to show students what you want them to do as long as you know that you can perform the task. It isn’t good to demonstrate inability.
- For challenged students, let them know that the second field day is often vastly easier than the first. It’s common for someone who struggles the first field day to do well on the second.
- Make sure all students get familiar and are comfortable with finding the gears (for example reverse on the tiller). Especially make sure they know how to find neutral. On jumpy shifters, suggest using two hands initially.

- When working students at the helm, consider putting weakest (least experienced) person second, and the best (most experienced) last.
- It is often good to have more experienced students start the rotations, first they set an example and also they will need less time to complete the skills, thereby giving less experienced students more helm time. Plus the instructor can focus on those student's needs knowing that the other students are done (though all get helm time).
- Consider rotating students often with nervous, low experienced teams. This can reduce the buildup on a single individual, and puts the pressure to perform a task equally on the group.
- Before the student starts a task, ask if they would like dialogue (tips/ instruction) from the instructor, or silence while in the middle of the task. Be aware that for some, a silent instructor puts more pressure on.
- Often a calm voice (..... "Neutral. Now reverse") will reduce/mitigate most collisions, and keep the student from going into the "red". Ramming a dock/ another boat/ fixed object is a humbling learning moment for the student and the instructor should do his/ her best to make it a positive and constructive moment. Avoid criticism at the time.
- On day two, if the students are getting some tasks but not others, focus the boat time on their weakest tasks.
- In general accidental scrapes, bumps, dings while docking and mild rev's of the throttle (especially on tiller boats) happen a lot; are best to acknowledge but "focus" on more serious issues that arise.
- For circle and docking, set students up for success by emphasizing taking into account wind current direction.

## MOCC Field Teaching Aid – Victim Recovery & Rescue Scenarios

### Overview

This outline is for the MOCC rotations of the two victim recovery sessions and the rescue scenario session.

### Equipment

Boat hook, line, cargo net, lifting strap, webbing, Type IV PFD(s), throw rope(s).

### Content

#### First rotation – Object & Personnel Recovery

- Boat Introduction & Handling Familiarization.
- Explain Object & Personnel Recovery Theory & Methodology.
- Demonstrate Object Recovery (explain importance of bare steerage-way into prevailing elements to avoid damage/injury and to avoid multiple approaches and excessive stern propulsion).
- Demonstrate why the drive must be in neutral, and the helm turned so propeller won't impact the victim if forward power is accidentally engaged.
- If boat operator has to leave the helm, engine should be shut down.
- Emphasize: Operator Responsibility (Operator is responsible for all aspects of the rescue). Need to assign Crew Duties (lookout and tasks). Need for Strong Verbal Communication (within vessel and between vessel and victim). Value of Crew Preparations before Approach. Considering Vessel Safety related to surrounding Hazards.
- Review priorities: Self>Crew>Victim, and Talk>Reach>Throw>Row>Go

#### Second rotation – MOB and Personnel Rescue Recovery

- Rotation Brief; Procedures for Personnel Overboard & Personnel Recovery
  - (Sound Alarm / Turn in direction person fell to avoid contact with stern / Throw Type IV for flotation and mark location, GPS if available also / consider calls for assistance / Five short blasts. danger signal for heavy VSL traffic / provide crew roles & instructions, provide verbal description for personnel recovery relative to surrounding conditions and hazards, direct or indirect pick up).
- Each student performs MOB minimum twice, at least one direct recovery: (Direct: Cargo Net / Bounce & Lift / Par buckle or Sling Lift).
- One indirect recovery using throw bags, (Crew: good throwing practice for finding range and knowing limitations and need for communication with operator. Operator: good boat positioning practice, avoid allowing throw bag line to fall astern of vessel).

- Time permitting, students approach rescue victim in confined area requiring them to safely secure victim alongside boat, slowly re-position boat out to a safe area for victim recovery.
- Emphasize: Communication and Situational Awareness / Have realistic understanding of self and vessel limitations during rescues / Know when to radio for help or request Medical Aid.
- Explain relevance of rotation pertaining to upcoming Rescue Scenarios.

### **Last rotation – Rescue Scenarios**

The Emergency Procedures practical must be done on the water. Students must use the techniques taught in this session to solve practical scenarios dealing with victim rescue from a boat.

*(Instructors should, if possible, use a large boat that allows students not actively involved in the scenario to observe. Jet drives are most desirable for this exercise)*

**Suggested scenarios** (these scenarios are to be done with two or three person teams):

- 1) Passive victim that needs assistance (*no resistance*).
- 2) Passive victim that can't understand the language.
- 3) Unconscious victim.
- 4) Conscious victim who needs help but refuses the assistance (*fear, panic*).
- 5) Blind/deaf/burned, victim.
- 6) Hostile, drunk victim.
- 7) Serious back, leg or both injuries.
- 8) Multiple victims (*possibly some conscious some unconscious*).
- 9) Classic victim in imminent danger of drowning (*this is good to use this example in concert with another victim that is not in immediate danger of drowning*).
- 10) Couples fighting during rescue.
- 11) Victim that is capable of self-rescue.
- 12) Victim suffering from hypothermia.

### **Guidelines:**

This exercise **REQUIRES** two instructors or an instructor and a competent volunteer in the water acting as the victim.

One instructor **MUST** always be in the boat positioned to take control or shutdown the boat if safety concerns arise. This would typically mean the instructor is connected to the kill switch in addition to the student. A student causing any injury or harm to the victim as a result of deficient boat operation **WILL** fail the course.

In the spirit of extra safety precaution, we will teach the students to turn the boat engine/s completely off when the actual victim rescue begins. We should advise the students that in an actual rescue situation you would in most cases place the engines in neutral but you might not actually turn the engine(s) off. (Heavy seas, strong current, near a dangerous obstruction etc.)

All scenarios should be realistic.

Within a group, start with simple rescue then advance to more difficult problems as you work with different teams.

Make sure that students assess possible injuries that are not readily apparent.

Students should show proper use of VHF channel 16 to notify CG or other authorities of the emergency or other radio equipment that is available.

In some scenarios the victim(s) may have such serious injuries that the proper solution is for the rescue team stand by with the victim until professional assistance can arrive. The location of the hypothetical scenario would be the determining factor (e.g. is assistance available).

# MOCC Field Teaching Aid – Communications & Risk Management (C&RM)

## Overview

To ensure safety and mission success, the vessel operator must effectively communicate the mission plan and ongoing status to inform the crew. Use VHF-FM marine radios to maintain safety communications with other vessels and shore contacts, and identify other means to effectively establish emergency communications.

## Content

### Pre-departure Communications

- Mission Plan
- Emergency Management Plan
- GAR Risk Assessment and Risk Management Parameters
- Float Plan
- Communications Tools & Equipment
- Communications Call Signs & System Checks

### Underway

- Turn on radio, tune and adjust control features and functions.
  - Memory
  - Lock
  - High / Low Power
  - Channel Selection and Scan Features
  - US / Canada / International frequency bands
  - Digital Select Calling (DSC)
- Identify and Select an authorized working channel
- Perform mission essential communications between boats and/or shore using radio call signs and proper radio procedures.
- Identify the international hailing and distress frequency.
- Select and monitor channel for the area NOAA weather radio station.
- Describe three types of mariner information broadcasts and the levels of priority/importance.
- Communicate the 5 essential items for an emergency call:
  - Position/Location

- Nature of Distress
  - Physical Description
  - Number of People
  - Actions Being Taken
- 
- Describe the use, requirements, functions and purpose of an E.P.I.R.B.
  
  - Discuss telecommunications technology options and the benefits -vs- limitations.
    - Cell & Smart Phones (Text/Talk/Apps)
    - Citizen Band Radio
    - Satellite Phones
  
  - Provide and demonstrate use of the phonetic alphabet.

## C&RM Handout – GAR Model

### Risk Calculation Worksheet - Calculating Risk Using **GAR** Model (**GREEN-AMBER-RED**)

To compute the total level of risk for each hazard identified below, assign a risk code of 0 (For No Risk) through 10 (For Maximum Risk) to each of the six elements. This is your personal estimate of the risk. Add the risk scores to come up with a Total Risk Score for each hazard. **\*NOTE: Any category rated > 5 should receive specific mitigation.**

**SUPERVISION** –Supervisory Control considers how qualified the supervisor is and whether effective supervision is taking place. Even if a person is qualified to perform a task, supervision acts as a control to minimize risk. This may simply be someone checking what is being done to ensure it is being done correctly. The higher the risk, the more the supervisor needs to be focused on observing and checking. A supervisor who is actively involved in a task (doing something) is easily distracted and should not be considered an effective safety observer in moderate to high-risk conditions.

**PLANNING** – Planning and preparation should consider how much information you have, how clear it is, and how much time you have to plan the evolution or evaluate the situation.

**TEAM SELECTION** – Team selection should consider the qualifications and experience level of the individuals used for the specific event/evolution. Individuals may need to be replaced during the vent/evolution and the experience level of the new team members should be assessed.

**TEAM FITNESS** – Team fitness should consider the physical and mental state of the crew. This is a function of the amount and quality of rest a crewmember has had. Quality of rest should consider how the ship rides, its habitability, potential sleep length, and any interruptions. Fatigue normally becomes a factor after 18 hours without rest; however, lack of quality sleep builds a deficit that worsens the effects of fatigue.

**ENVIRONMENT** – Environment should consider factors affecting personnel performance as well as the performance of the asset or resource. This includes, but is not limited to, time of day, temperature, humidity, precipitation, wind and sea conditions, proximity of aerial/navigational hazards and other exposures (e.g., oxygen deficiency, toxic chemicals, and/or injury from falls and sharp objects).

**EVENT or EVOLUTION COMPLEXITY** – Event/Evolution complexity should consider both the required time and the situation. Generally, the longer one is exposed to a hazard, the greater are the risks. However, each circumstance is unique. For example, more iterations of an evolution can increase the opportunity for a loss to occur, but may have the positive effect of improving the proficiency of the team, thus possibly decreasing the chance of error. This would depend upon the experience level of the team. The situation includes considering how long the environmental conditions will remain stable and the complexity of the work. **Assign a risk code of 0 (For No Risk) through 10 (For Maximum Risk) to each of the six elements below.**

<b>Supervision</b>	_____
<b>Planning</b>	_____
<b>Team Selection</b>	_____
<b>Team Fitness</b>	_____
<b>Environment</b>	_____
<b>Event/Evolution Complexity</b>	_____
<b>Total Risk Score</b>	_____

The mission risk can be visualized using the colors of a traffic light. If the total risk value falls in the GREEN ZONE (1-23), risk is rated as low. If the total risk value falls in the AMBER ZONE (24-44), risk is moderate and you should consider adopting procedures to minimize the risk. If the total value falls in the RED ZONE (45-60), you should implement measures to reduce the risk prior to starting the event or evolution.

GAR Evaluation Scale			
Color Coding the Level Of Risk			
0	23	44	60
1	23	24	44
45	60		
<b>GREEN</b> <b>(Low Risk)</b>	<b>AMBER</b> <b>(Caution)</b>	<b>RED</b> <b>(High Risk)</b>	

The ability to assign numerical values or "color codes" to hazards using the GAR Model is not the most important part of risk assessment. What is critical to this step is team discussions leading to an understanding of the risks and how they will be managed.





## National Department of Response

### Surface Operations Risk Calculation Worksheet Calculating Risk Using the GAR Model (GREEN-AMBER-RED)

This Worksheet should be used for all surface operations unless other GAR forms have been mandated by local OIAs.

**GAR IS BASED ON A TEAM DISCUSSION TO UNDERSTAND AND EVALUATE THE RISKS ATTENDANT TO A MISSION AND HOW THEY WILL BE MANAGED.**

**RISK MANAGEMENT IS WHAT IS IMPORTANT; NOT THE ABILITY TO ASSIGN NUMERICAL VALUES OR COLORS TO RISK ELEMENTS.**

Assign a risk code of 0 (For No Risk) through 10 (For Maximum Risk) to each of the six elements below. The discussion should start with the junior (least experienced) members first on each category.

<b>Supervision</b> - qualifications / experience / communications	
<b>Planning</b> - details / clarity / vessel selection and condition	
<b>Team Selection</b> - qualifications / experience	
<b>Team Fitness</b> - physical / mental state	
<b>Environment</b> - seas / visibility / wind / current / temperatures	
<b>Event/Evolution Complexity</b> - details / tasks	
<b>Total Risk Score</b>	

GAR Evaluation Scale - Color Coding the Level of Risk

0	23	44	60
10	20	30	40
GREEN (Low Risk)		AMBER (Caution)	
		RED (High Risk)	

If the total falls in the green zone, risk is at a minimum. If the total falls in the amber zone, risk is moderate and you should consider adopting procedures to minimize risk.

**IF THE TOTAL FALLS IN THE RED ZONE, YOU NEED TO IMPLEMENT MEASURES TO REDUCE THE RISK PRIOR TO STARTING THE EVENT/EVOLUTION.**

**THE GAR MODEL SHOULD BE USED AS PART OF PLANNING OPERATIONS, AND SHOULD BE CONTINUALLY REASSESSED AS WE REACH MILESTONES WITHIN OUR PLANS, OR AS ELEMENTS CHANGE.**

August 2009

## C&RM Handout – VHF Channels List

Channel Number	Ship Transmit MHz	Ship Receive MHz	Use
01A	156.05	156.05	Port Operations and Commercial, VTS. Available only in New Orleans / Lower Mississippi area.
05A	156.25	156.25	Port Operations or VTS in the Houston, New Orleans and Seattle areas.
6	156.3	156.3	Intership Safety
07A	156.35	156.35	Commercial
8	156.4	156.4	Commercial (Intership only)
9	156.45	156.45	Boater Calling. Commercial and Non-Commercial.
10	156.5	156.5	Commercial
11	156.55	156.55	Commercial. VTS in selected areas.
12	156.6	156.6	Port Operations. VTS in selected areas.
13	156.65	156.65	Intership Navigation Safety (Bridge-to-bridge). Ships >20m length maintain a listening watch on this channel in US waters.
14	156.7	156.7	Port Operations. VTS in selected areas.
15	--	156.75	Environmental (Receive only). Used by Class C EPIRBs.
16	156.8	156.8	International Distress, Safety and Calling. Ships required to carry radio, USCG, and most coast stations maintain a listening watch on this channel.
17	156.85	156.85	State & local govt maritime control
18A	156.9	156.9	Commercial
19A	156.95	156.95	Commercial
20	157	161.6	Port Operations (duplex)
20A	157	157	Port Operations
21A	157.05	157.05	U.S. Coast Guard only
22A	157.1	157.1	Coast Guard Liaison and Maritime Safety Information Broadcasts. Broadcasts announced on channel 16.
23A	157.15	157.15	U.S. Coast Guard only
24	157.2	161.8	Public Correspondence (Marine Operator)
25	157.25	161.85	Public Correspondence (Marine Operator)
26	157.3	161.9	Public Correspondence (Marine Operator)
27	157.35	161.95	Public Correspondence (Marine Operator)
28	157.4	162	Public Correspondence (Marine Operator)
63A	156.175	156.175	Port Operations and Commercial, VTS. Available only in New Orleans / Lower Mississippi area.
65A	156.275	156.275	Port Operations
66A	156.325	156.325	Port Operations
67	156.375	156.375	Commercial. Used for Bridge-to-bridge communications in lower Mississippi River. Intership only.
68	156.425	156.425	Non-Commercial
69	156.475	156.475	Non-Commercial
70	156.525	156.525	Digital Selective Calling (voice communications not allowed)
71	156.575	156.575	Non-Commercial
72	156.625	156.625	Non-Commercial (Intership only)
73	156.675	156.675	Port Operations
74	156.725	156.725	Port Operations
77	156.875	156.875	Port Operations (Intership only)
78A	156.925	156.925	Non-Commercial
79A	156.975	156.975	Commercial. Non-Commercial in Great Lakes only
80A	157.025	157.025	Commercial. Non-Commercial in Great Lakes only
81A	157.075	157.075	U.S. Government only - Environmental protection operations.
82A	157.125	157.125	U.S. Government only
83A	157.175	157.175	U.S. Coast Guard only
84	157.225	161.825	Public Correspondence (Marine Operator)
85	157.275	161.875	Public Correspondence (Marine Operator)
86	157.325	161.925	Public Correspondence (Marine Operator)
87	157.375	157.375	Public Correspondence (Marine Operator)
88A	157.425	157.425	Commercial, Intership only.
AIS 1	161.975	161.975	Automatic Identification System (AIS)
AIS 2	162.025	162.025	Automatic Identification System (AIS)

## C&RM Handout – Phonetic Alphabet

A = Alpha

B = Bravo

C = Charlie

D = Delta

E = Echo

F = Foxtrot

G = Golf

H = Hotel

I = India

J = Juliet

K = Kilo

L = Lima

M = Mike

N = November

O = Oscar

P = Papa

Q = Quebec

R = Romeo

S = Sierra

T = Tango

U = Uniform

V = Victor

W = Whiskey

X = Xray

Y = Yankee

Z = Zulu