About Sailing Safely

Arnold Gelb

MIT Blue Water Skipper

Condensed from USCG Auxiliary, About Boating Safely and Sailing Skills & Seamanship, and World Sailing (formerly ISAF) Safety at Sea Seminar. Credits as indicated.

Disclaimer: This presentation may reflect the views of the instructor aligned with the ordinary practice of seamanship and does not necessarily those of the USCG Auxiliary or World Sailing.

Topics

- Before getting underway
- Navigation review
- Operating vessels safely
- Courtesy & legal requirements
- Common emergencies
- Intro to offshore safety
- Q&A

Topic 1

Before Getting Underway

Vessel Safety Check
Start of Season

1. **USCG Auxiliary Vessel Safety Check**
   - Free – and not an enforcement function
2. **Ensures your private vessel meets or exceeds federal & state standards**

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Pre Underway Subtopics

1. Capacity
2. Float Plan
3. Pre-Departure Checks
4. Fueling
5. Boat Maintenance
6. Boating Accessories

Capacity Plate

1. Why is this important?

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Float Plans
(Non-MIT sails)

1. What is a Float Plan?
2. What information does it contain?

FLOAT PLAN

INSTRUCTIONS: Complete this plan before you go boating and leave it with a reliable person who can be depended upon to notify the Coast Guard, or other rescue organization, should you not return or check-in as planned. If you have a change of plans after leaving, be sure to notify the person holding your Float Plan. For additional copies of this plan, visit: www.floatplancentral.org

www.cgaux.org

Do NOT file this plan with the U.S. Coast Guard

www.uscgboating.org

VESSEL

IDENTIFICATION:

Name & Hailing Port

Document / Registration No. HIN

Year & Make

Length Type Draft Hull Mat.

Color

Prominent Features

COMMUNICATION:

Radio Call Sign

DSC MMSI No.

Radio-1: Type Ch./ Freq. Monitored

Radio-2: Type Ch./ Freq. Monitored

Cell / Satellite No.

E-mail

PROPULSION:

Primary– Type No. Eng. Fuel Capacity

Auxiliary–Type No. Eng. Fuel Capacity

NAVIGATION: (Check all on board)

☐ Maps ☐ Charts ☐ Compass ☐ GPS / DGPS

☐ Radar ☐ Sounder ☐

SAFETY & SURVIVAL

VISUAL DISTRESS SIGNALS:

☐ Electric S-O-S Light

AUDIBLE DISTRESS SIGNALS:

☐ Bell

OTHER GEAR:

☐ Drogue / Sea Anchor ☐ Life raft / Dinghy

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Pre-Departure Check

1. Check *before* you go

VESSEL & EQUIPMENT CHECKLIST

Take Time to Reflect on Safety. Safe Boating Begins with You.

Trip Destination

Date

Additional Resources:
United States Coast Guard Boating Safety
http://www.uscgboating.org
United States Coast Guard Auxiliary
http://www.cgaux.org

Information Source:
http://bdept.cgaux.org/wp/?page_id=1032

- ☐ Personal papers; operator's certificate or license (if required) onboard, current.
- ☐ Ship's papers; registration or documentation certificate.
- ☐ Life jacket suitable for each person on board, readily accessible, in good condition.
- ☐ Throwable floatation aid immediately available.
- ☐ Fire extinguishers conveniently placed, fully charged, in good condition.
- ☐ Visual distress signals with current expiration dates.
- ☐ Horn working.
- ☐ Bell (if required) onboard.
- ☐ Anchor and anchor line appropriate to area, depth, conditions.
- ☐ Compass properly adjusted.
- ☐ Charts for the area, up to date.
- ☐ Navigation tools.
- ☐ Boat hook.
- ☐ Mooring lines and fenders in good condition.
- ☐ Paddles or oars.
- ☐ Tool kit and spare parts (including light bulbs, fuses).
- ☐ Bilge free of fuel vapors and excess water.
- ☐ Fuel supply full.
- ☐ Fuel system free of leaks.
- ☐ Engine oil and transmission fluid levels correct.
- ☐ Battery fully charged, fluid level full.
- ☐ Electronic gear in good condition.
- ☐ Engine drive belts tight, in good condition.
- ☐ All navigation lights working.
- ☐ Steering and shift mechanisms in good condition.
- ☐ Outboard motor mountings tight (if appropriate).
- ☐ Grab rails, life-lines in good condition.

VESSEL & EQUIPMENT CHECKLIST

The Coast Guard Foundation supports the men and women of the United States Coast Guard who protect America's shores and save lives at sea.
Learn more about our mission and find out how you can help at www.coastguardfoundation.org.
This guide covers only basic boating elements and does not guarantee the safety of your vessel or its passengers. Please refer to the U.S. Coast Guard for further safety guidelines and requirements for recreational boats.

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Pre-Underway Briefing

- Brief esp. new crew *before* you go
- Location of safety equipment & thru hulls
- Boat-specific operations
- Weather
- Voyage plan
- Crew assignments – back-up skipper

Fueling Safely

1. Check for leaks
2. Close hatches and portholes
3. Keep fuel nozzle in contact with deck plate
4. Use absorbent pad - do not overfill
5. Ventilate bilge after fueling
6. Reopen hatches and portholes

Maintain Your Boat

1. Examine interior and exterior out of the water
2. Check gelcoat and thru-hulls
3. Clean lines and sails
4. Keep small boats covered for storage

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Boating Accessories

1. Anchor and line
2. Spare parts and tool kit
3. Compass and charts
4. Radio, VHF-FM marine
5. Docking lines
6. First aid kit
7. Water for emergencies
8. Flashlight
9. Spare bulbs

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Topic 2

Navigating Safely: A Review

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Navigation Rules Review

1. General responsibility rule
2. No exoneration for neglect of the rules
3. Departure from rules ok to avoid collision

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How To Prevent Collisions (Rule 8)

1. Practice good seamanship
2. Maintain a lookout (Rule 5)
3. Maintain safe speed (Rule 6)
4. Actions to avoid collision (Rule 8)

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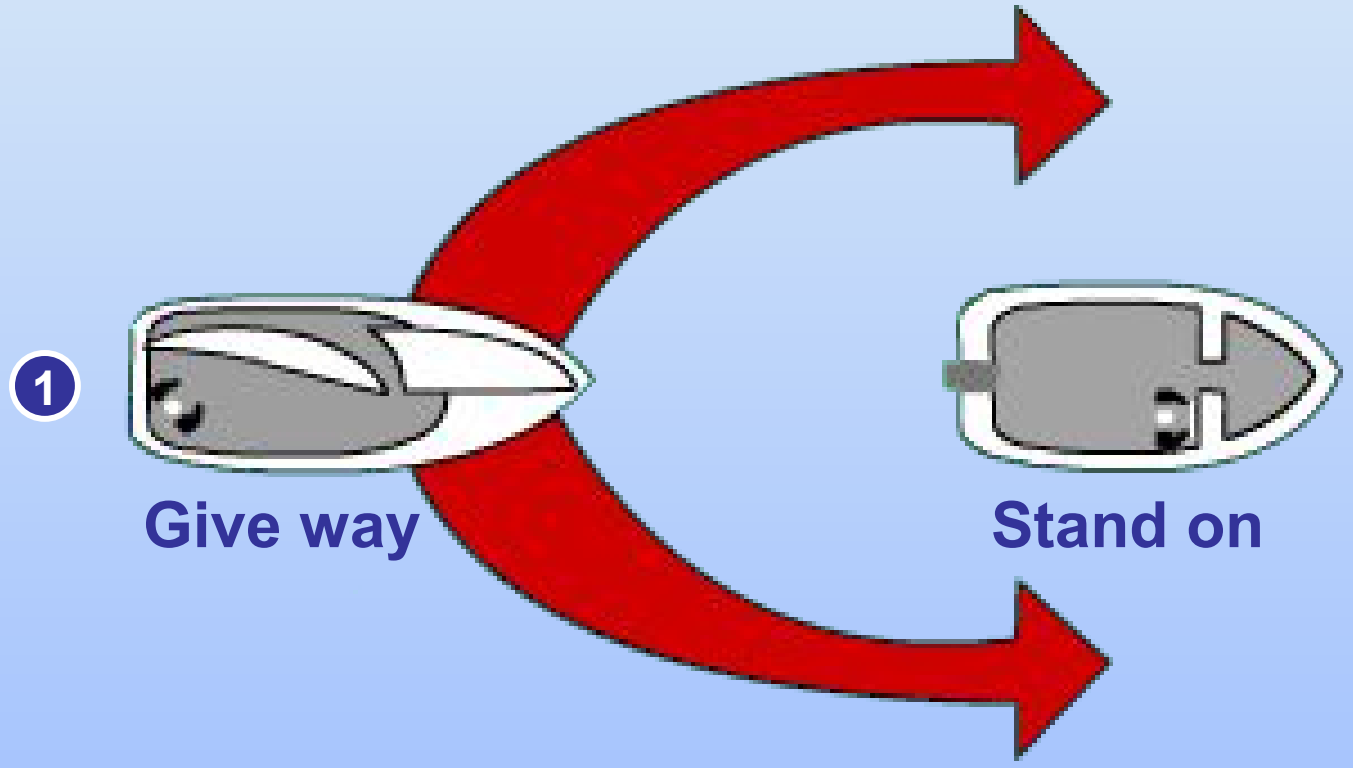
Meeting Other Boats

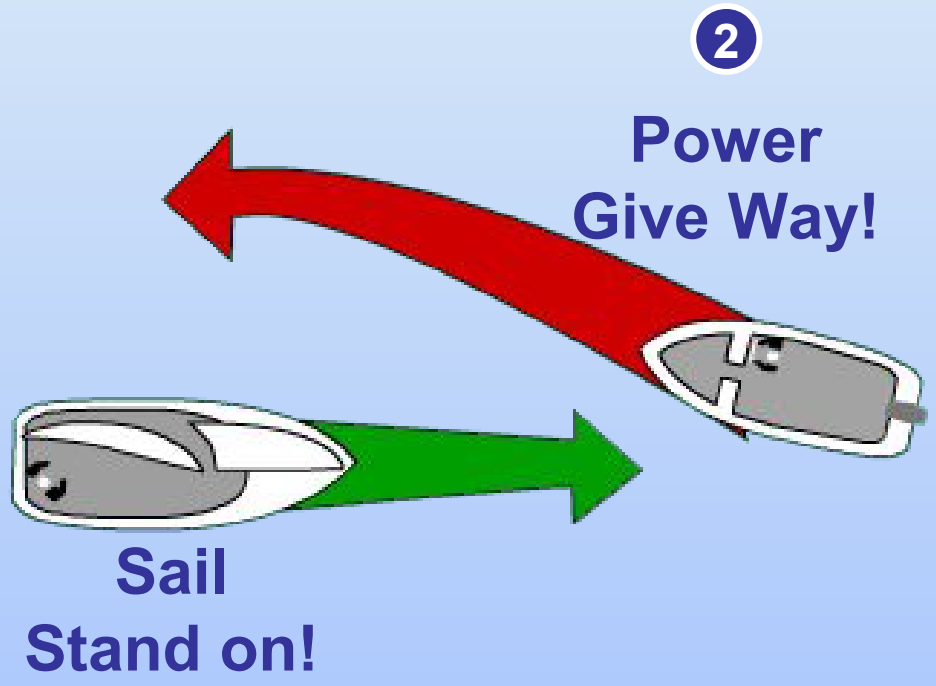
1. Give way vessel
2. Stand on vessel
3. When do these apply?

Overtaking



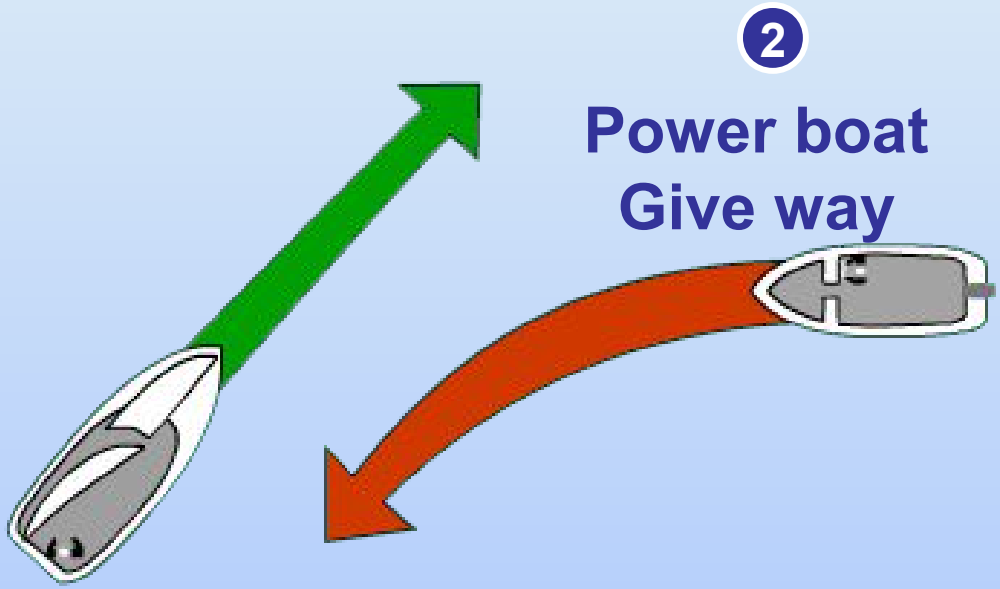
Rule 13

Meeting Head-On



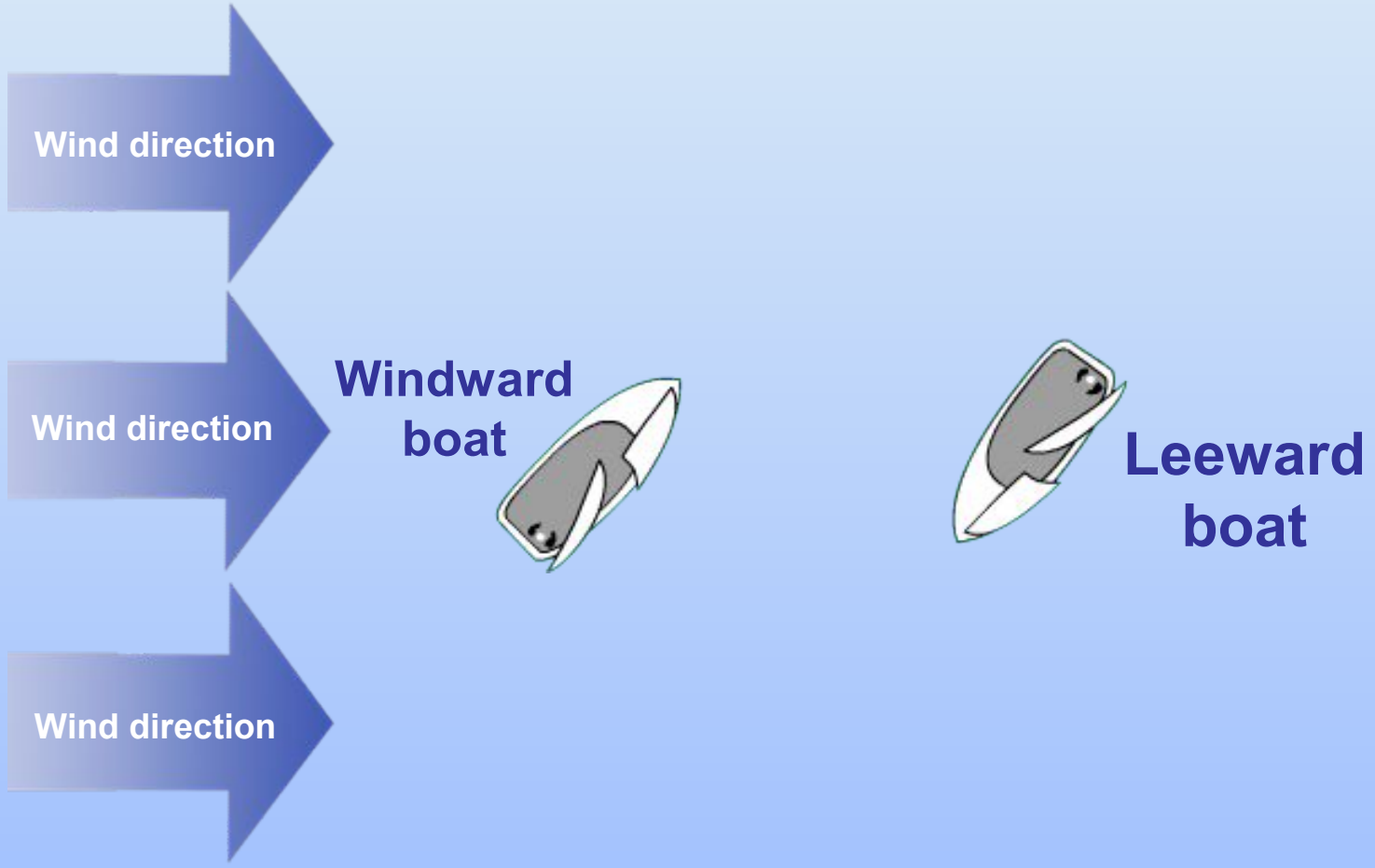
Rule 14

Crossing Situations



Rule 15

Sailboats Meeting



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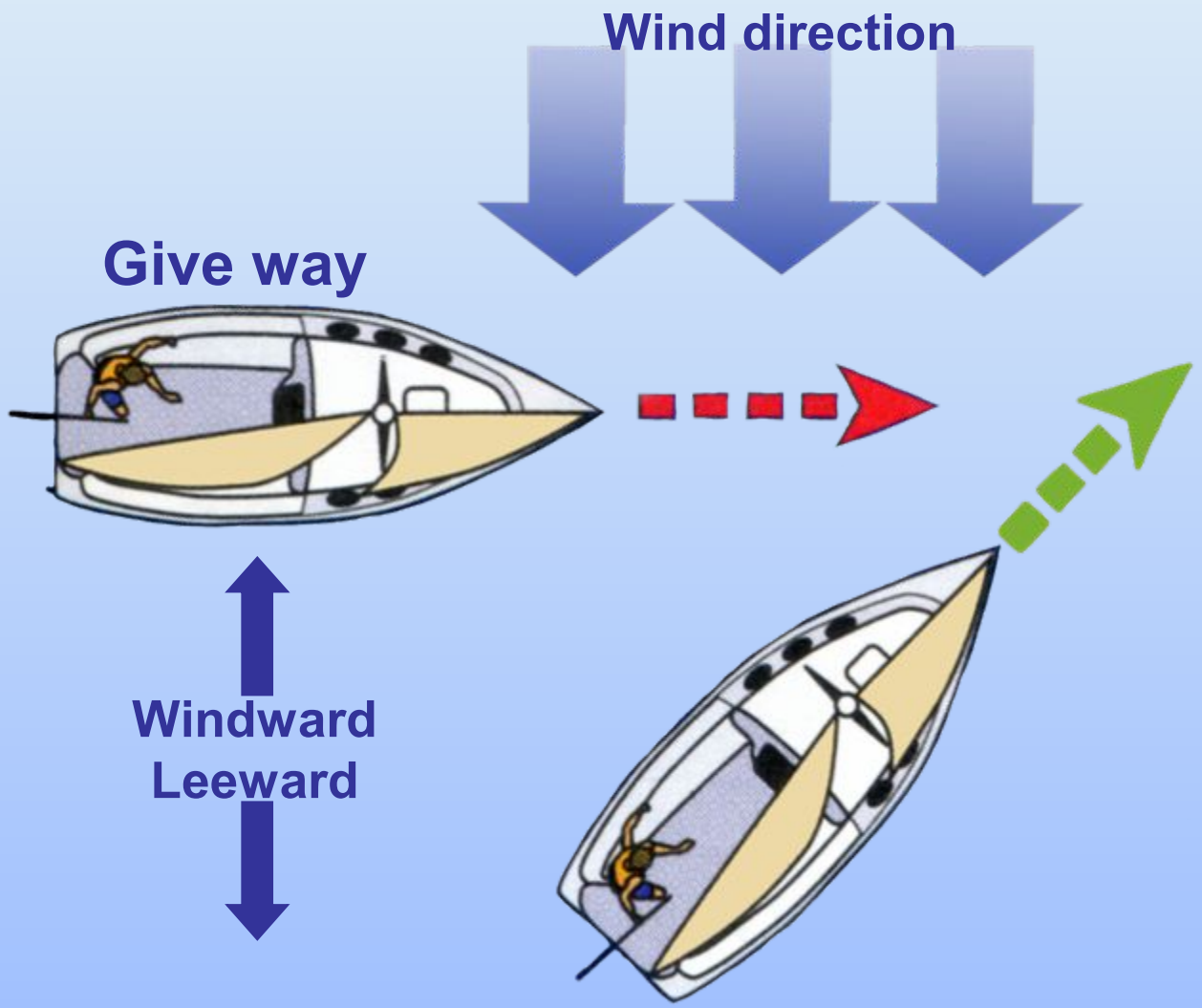
Wind On Same Side



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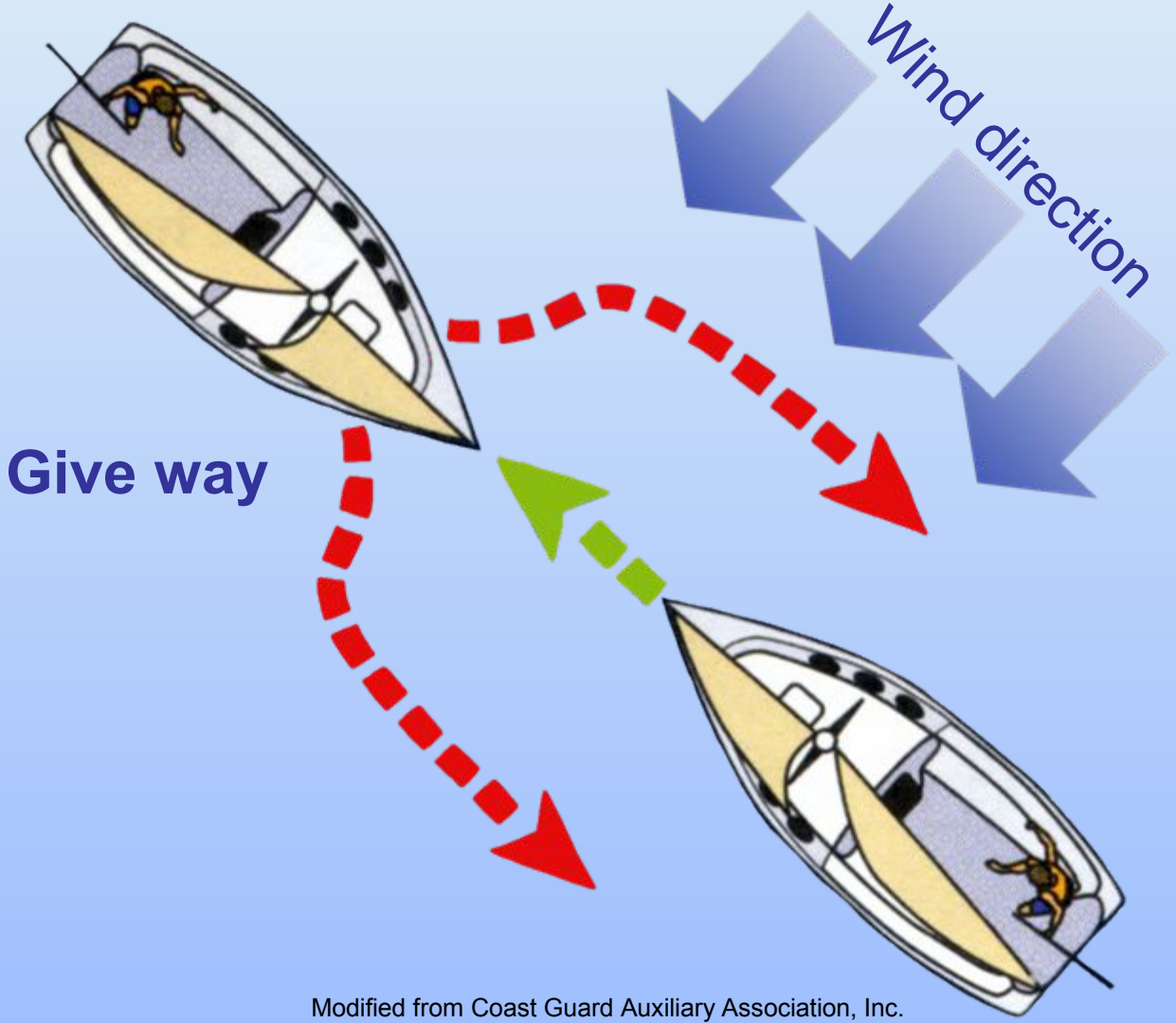
Wind On Different Side



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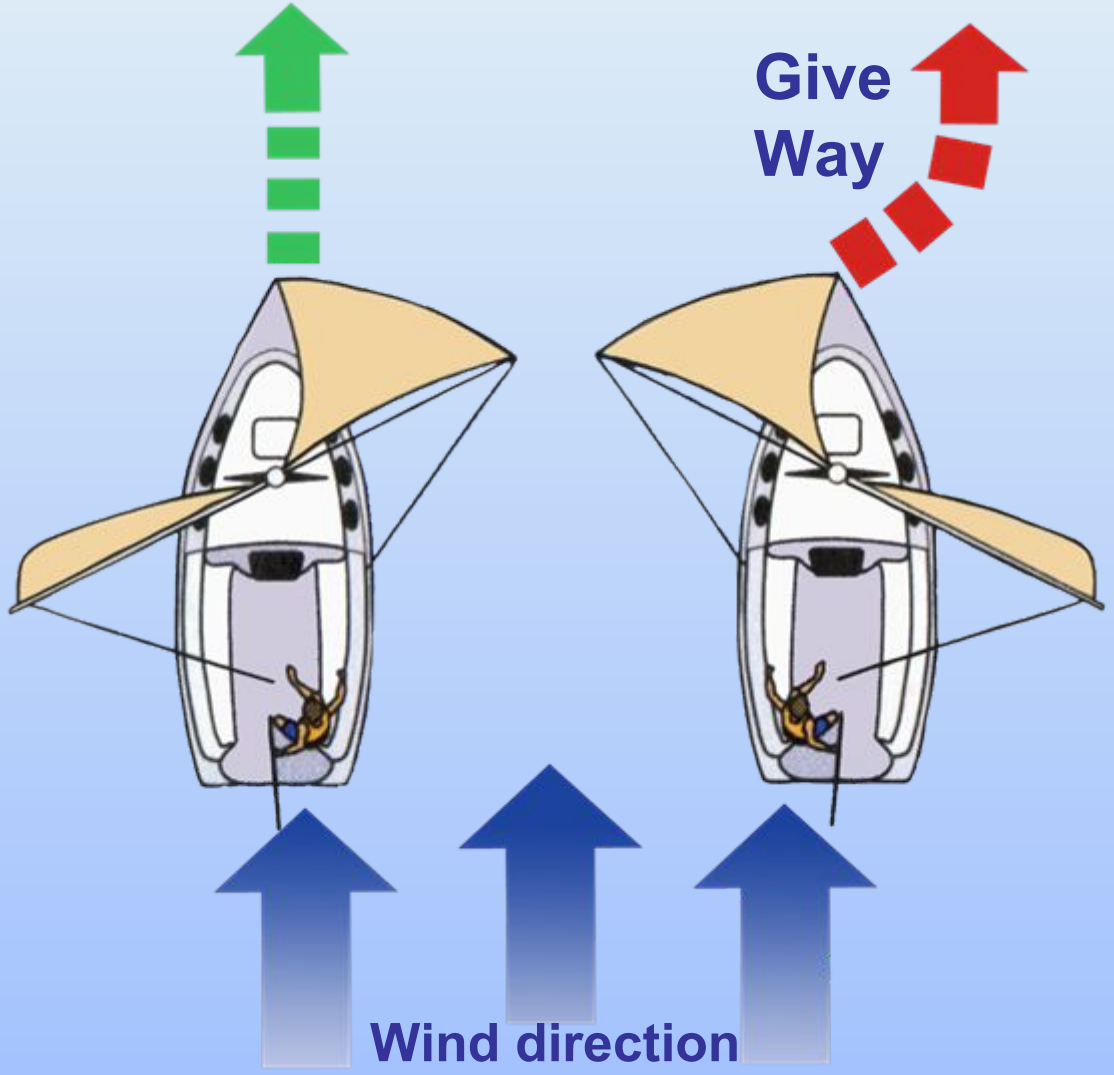
Wind From Stern



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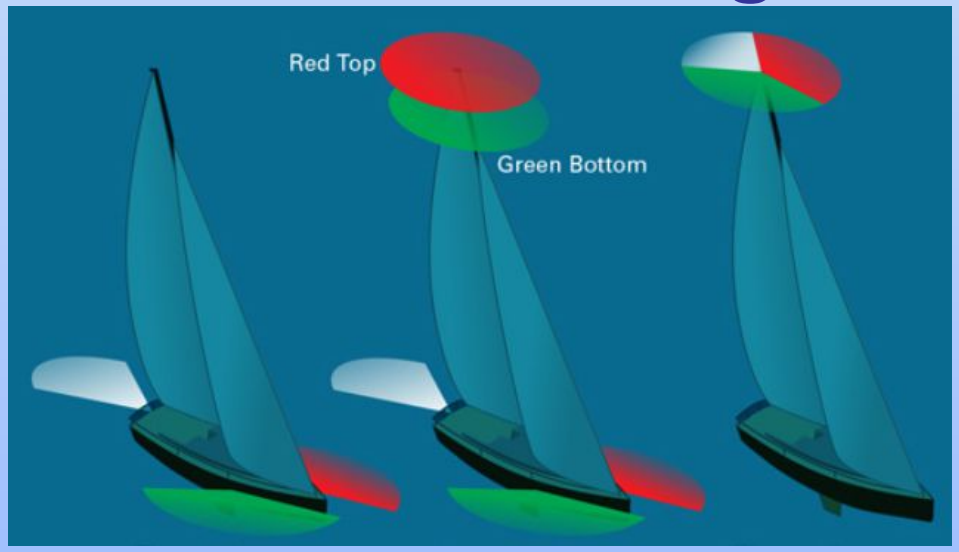
Navigation Lights

1. Side lights
2. Stern lights
3. Masthead light
4. All round white light



Rule 25 – Under Sail

Rule 34 – Under Power

Rule 30 – At Anchor

Lights On Tows

1. Yellow lights
2. Yellow over white stern light
3. Flashing yellow

Never go between yellow lights

Sailboat At Night

1. **Green or red only observed**
   - May be a sailboat under sail
   - Give way
2. **Sailboat under sail only**
   - Always stand-on except when overtaking

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Night (Fog) Navigation

1. Make sure navigation lights work
2. Use all round light at anchor
3. Reduce speed
4. Proceed with caution
5. Be alert
6. Stop if visibility becomes severely restricted

Sound Signals

1. Why have Sound Signals?
2. When do you use them?

Sound Signals
(Maneuvering)

1. **Inland Rules**
   - Narrow waters – channels, rivers
   - Signals indicate intent
2. - Require an answer of agreement
- **International Rules**
  - Open water
  - Signals indicate execution
  - No response required unless there's danger

Sound Signals

(Restricted Visibility)

1. What will a powerboat underway sound?
2. A sailboat?

Locks

1. Commercial traffic has priority
2. Communication: typically channel 13

Traffic Signal At Some Locks

stand clear →

approach →

enter →

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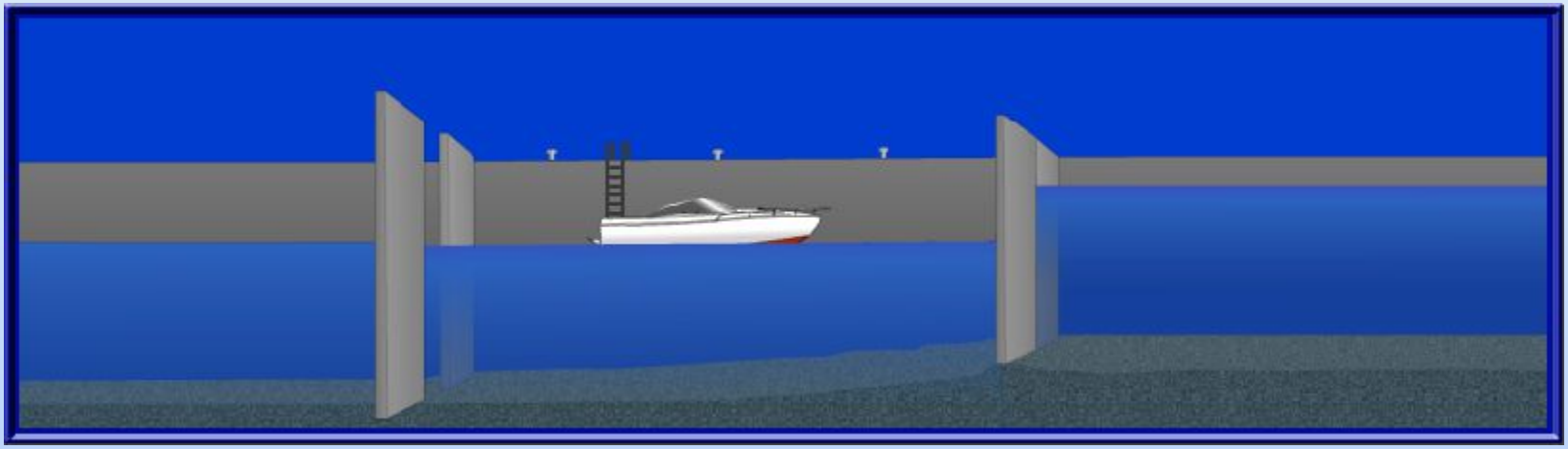
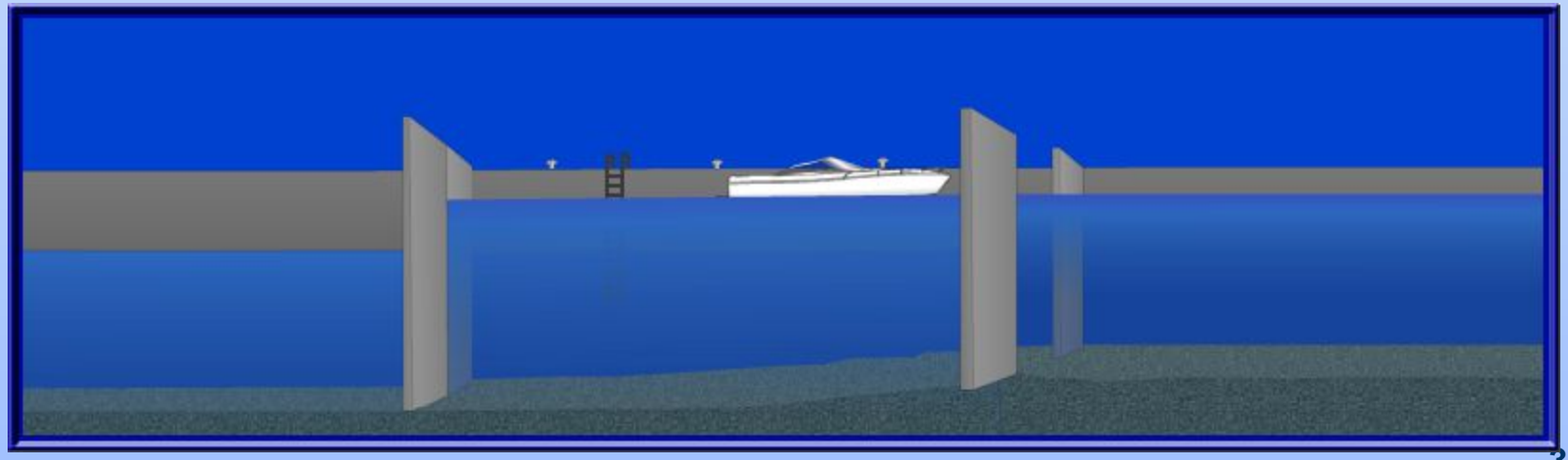
Transiting Locks





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Bridges

1. What needs to be considered?

Check Clearance

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Tides On Coastal Waters

1. Gravitational forces of the moon and sun
2. Tides fluctuate by feet – Rule of Twelfths
3. Docking affected by tide
4. Local knowledge
5. Don’t run aground

Topic 3

Operating Vessels Safely

Safe Loading

1. Keep centered in small boats
2. "One hand for you, one hand for the boat"
4. Pre-underway check loading for passage
5. Load gear from the dock – don't overload

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Running Into Waves

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Running Before Waves

- Modulate speed
- Surf
- Use drogue

Maneuvering with an Auxiliary Engine

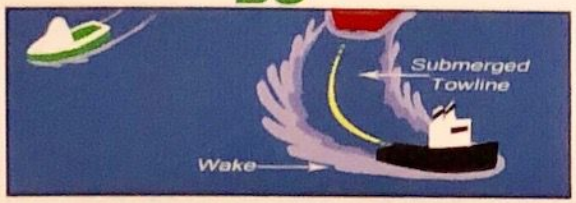
1. **Turning**
   - Controlled speed
2. **Backing**
   - Slow, firm hand, stern may veer (single screw)
3. **Stopping**
   - Requires distance
   - Slowly!
     - Avoid stern wave

Close Quarters Maneuvering (The 3 Escapes)

- Operating in reverse
- Three point turn
- Back and fill

LARGE VESSEL AWARENESS

DO

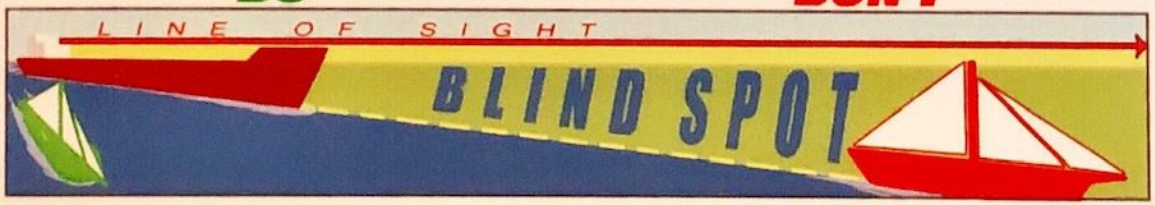


Stay a safe distance from tug boats and keep an eye out for barges in tow. Tug boats can create severe wake turbulence hundreds of yards behind the vessel.

DON'T

Never pass closely behind a tugboat. **Under no circumstances should you ever pass between a tug and it's tow!** The tow line may be submerged and hard to see.

DO

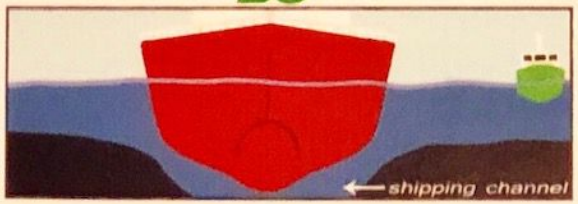


Stay as far to the side as depth allows when a ship approaches. Anchor at safe locations outside of the shipping channels and away from navigational aids.

DON'T

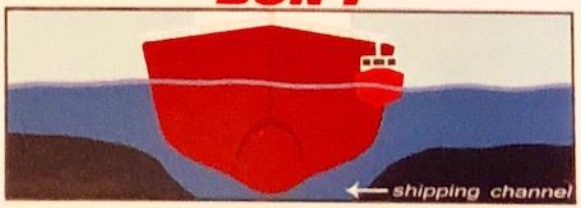
Never assume that a ship can see you! *A vessel's blind spot can extend for hundreds of feet. Each year many boats are hit while operating in unsafe and illegal manners.*

DO



Always pay attention to where shipping lanes are, and take care not to loiter in them. Watch for vessel side lights. If you can see both sidelights (red and green) you're directly in the path of danger!

DON'T

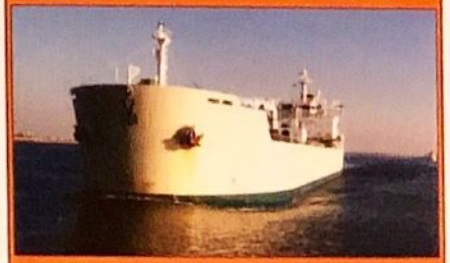


Never assume that a ship can steer to avoid you. Large ships are limited by their draft and may only have a few feet of wiggle room. Do not rely on trying to hear a vessel approaching at night.

CAN YOU SEE THE SAIL BOAT?

Even though it might look like a large vessel has plenty of room from a lower perspective, from the bridge you may be hard to see or even completely invisible! Do not take the chance and stay a safe distance from large ships.

SPEED CAN BE DECEIVING



A boater 1000 feet (3 football fields) ahead of a moving ship or tug has less then one minute to get out of the way! The sounding of 5 short blasts from a vessel is the "Danger Signal" indicating immediate need of corrective action to avoid collision.

Anchoring

- Sea bottom and conditions
- Type of anchor and rode
- Approach and scope
- Hand signals and maneuvering
- Setting the anchor

Topic 4

Courtesy & Legal Requirements

Courtesy on the Water

1. What does courtesy on the water mean?

Legal Responsibility

- What is the Coast Guard's role?
- What may states and local jurisdictions do?
- Who is responsible to comply?

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Registered Vessels
State

- **No other numbers forward of amidships**
- **Registration Certificate**
  - Must be on board when underway

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Numbering & Decals

- How must number be applied?
- Format AB 1234 CD
- Size: 3” high
- Contrasting color

Documented Vessels
Coast Guard

- U.S. Citizens only may have a large vessel documented
- Documentation number must be clearly visible on the interior structure
- Name and hailing port 4” high on hull

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What is Negligent Operation?

- Operating in restricted areas
- Obstructing navigation – Rules of Road, anchoring in channel/ under bridge, tampering with ATONs
- Failure to regulate speed – hull out of water
- Operating while under the Influence of drugs or alcohol
- Failure to avoid collision

Personal Flotation Devices

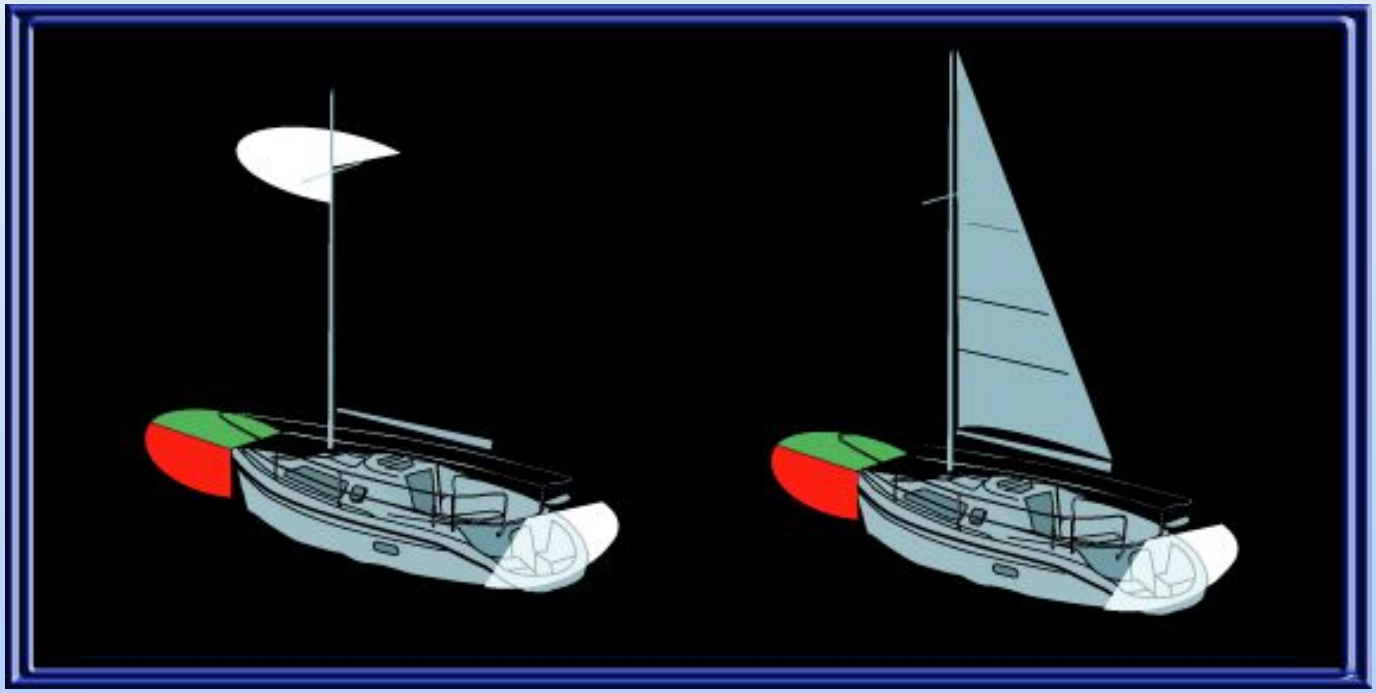
1. What are the requirements?

Federal Rules For Fire Extinguishers

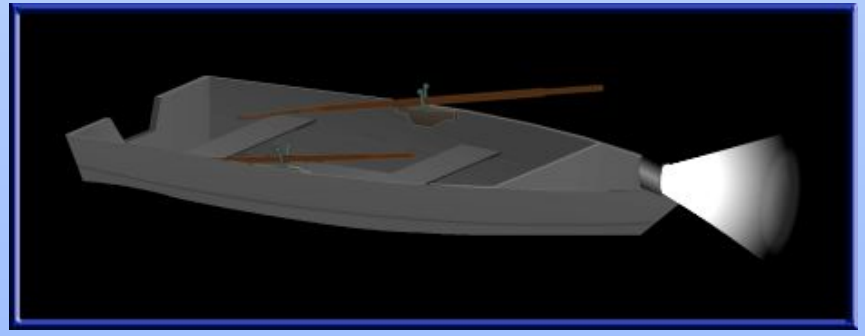
<26 feet	1 B-1
26 feet to <40 feet	2 B-1
40 feet to <65 feet	3 B-1

Note: These are *minimums*

Nav Lights – Sailboat



Oars or sailboat < 7 m



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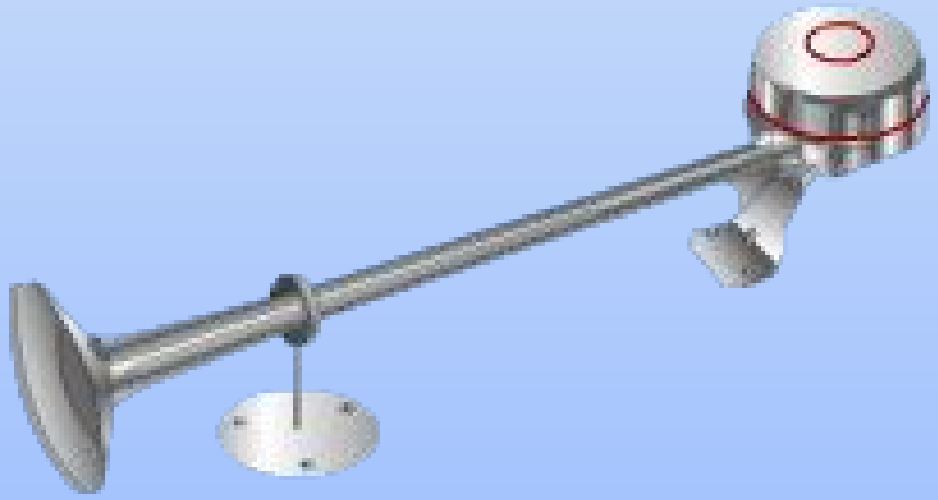
Visual Distress Signals

- How many?
- What kind?
- Who must carry them?

Sound Producing Devices

- Boats <12 meters must carry a whistle or horn



Reommended if Near Coastal or Offshore

- Emergency Position Indicating Radio Beacon (EPIRB)

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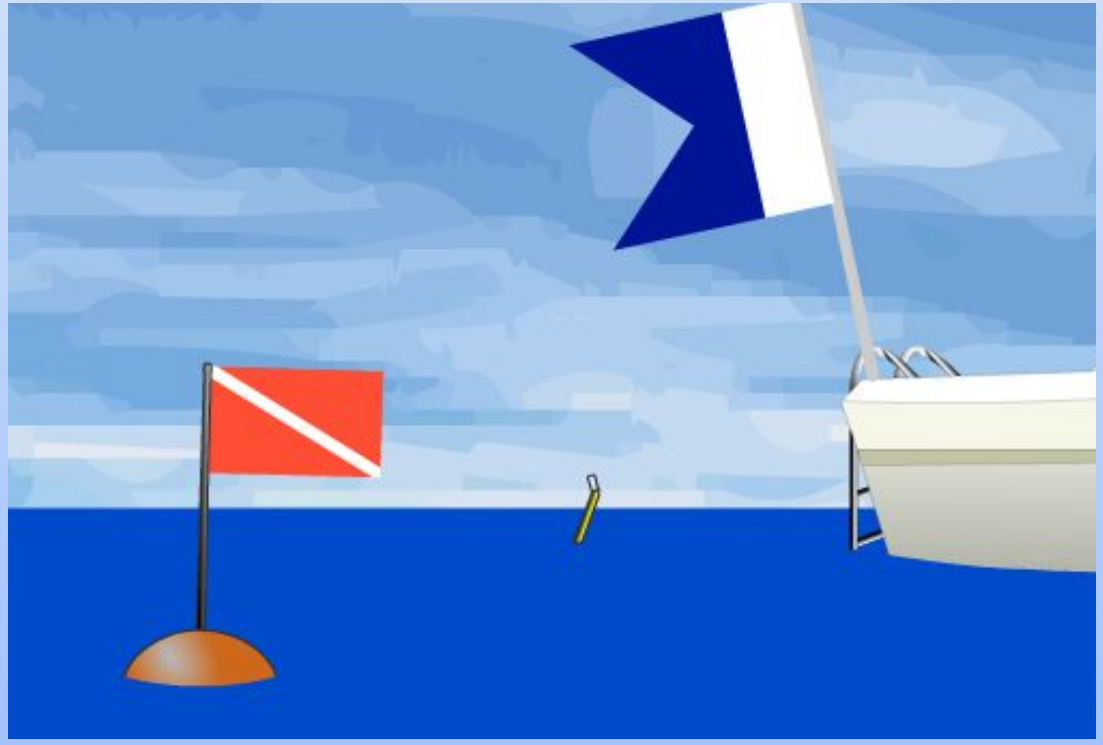
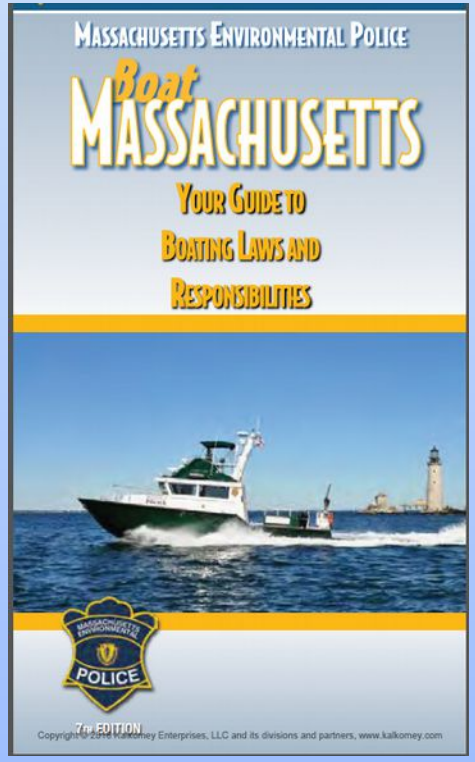
Diving/Snorkeling Flags

- Required by Nav Rules



State/Local Regulations

- Know your state requirements
- Do you need a VHF radio/ license?
- Know any other local regulations?



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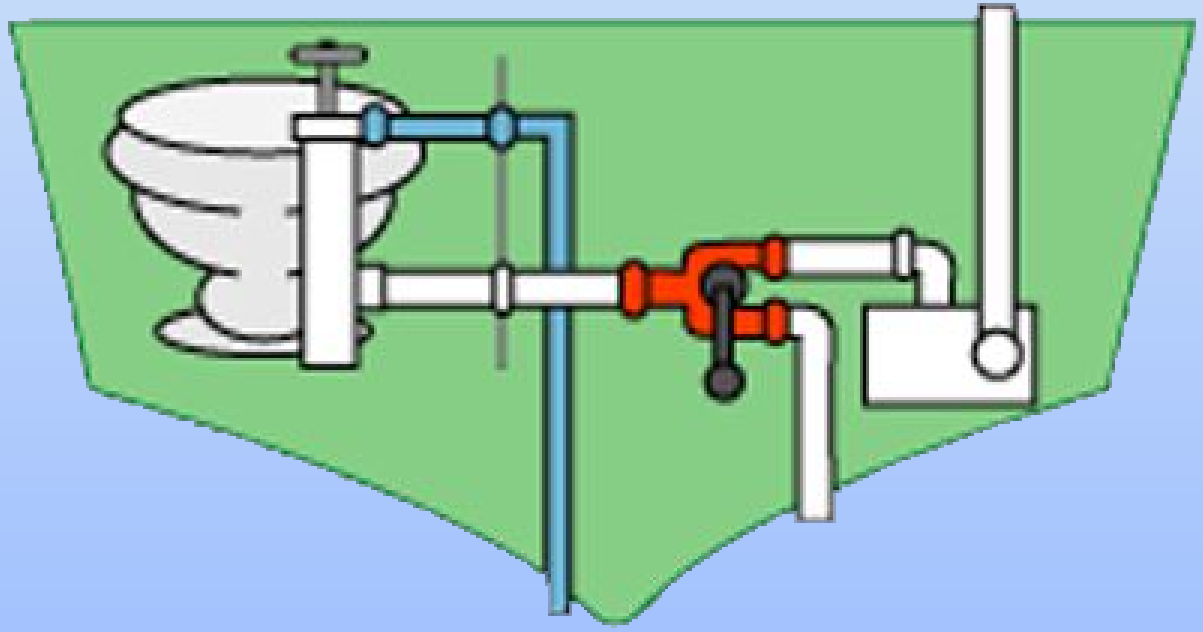
Waste and Trash

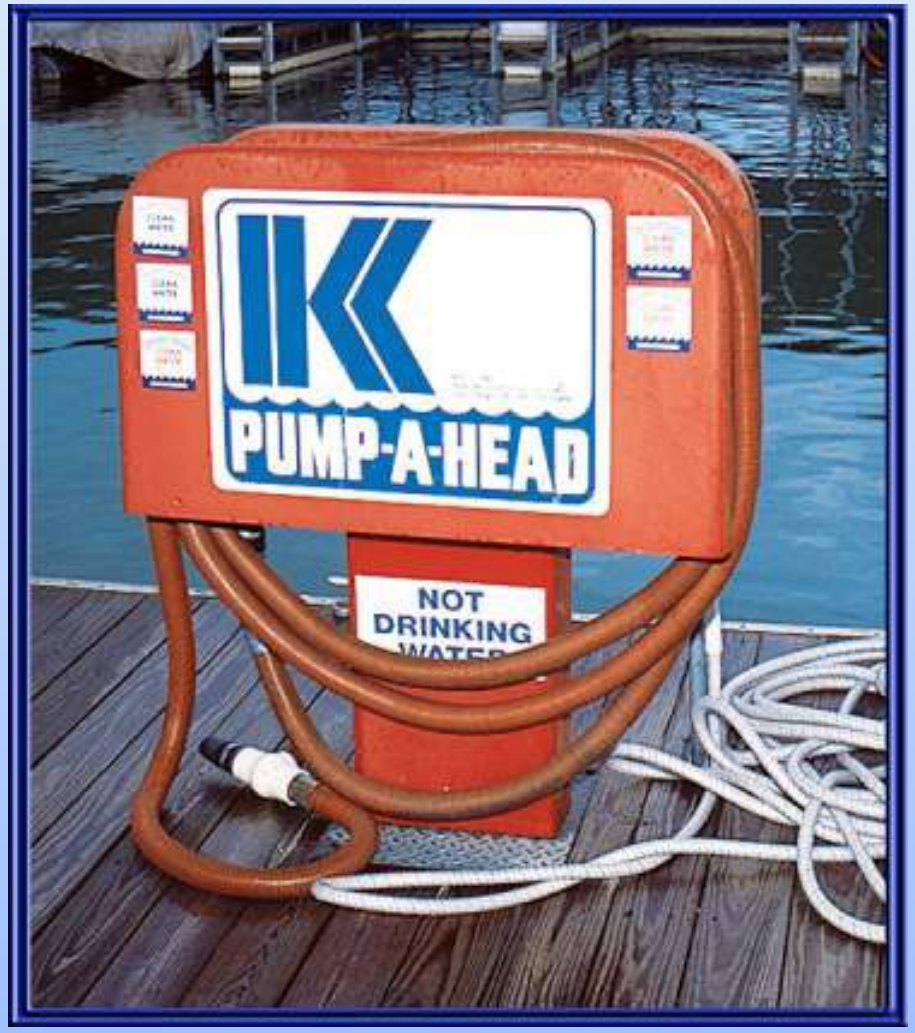
- What is the law for boaters?

Marine Sanitation Devices

- Must be USCG Approved
- Y valve must be secured



Use Pump Out Stations



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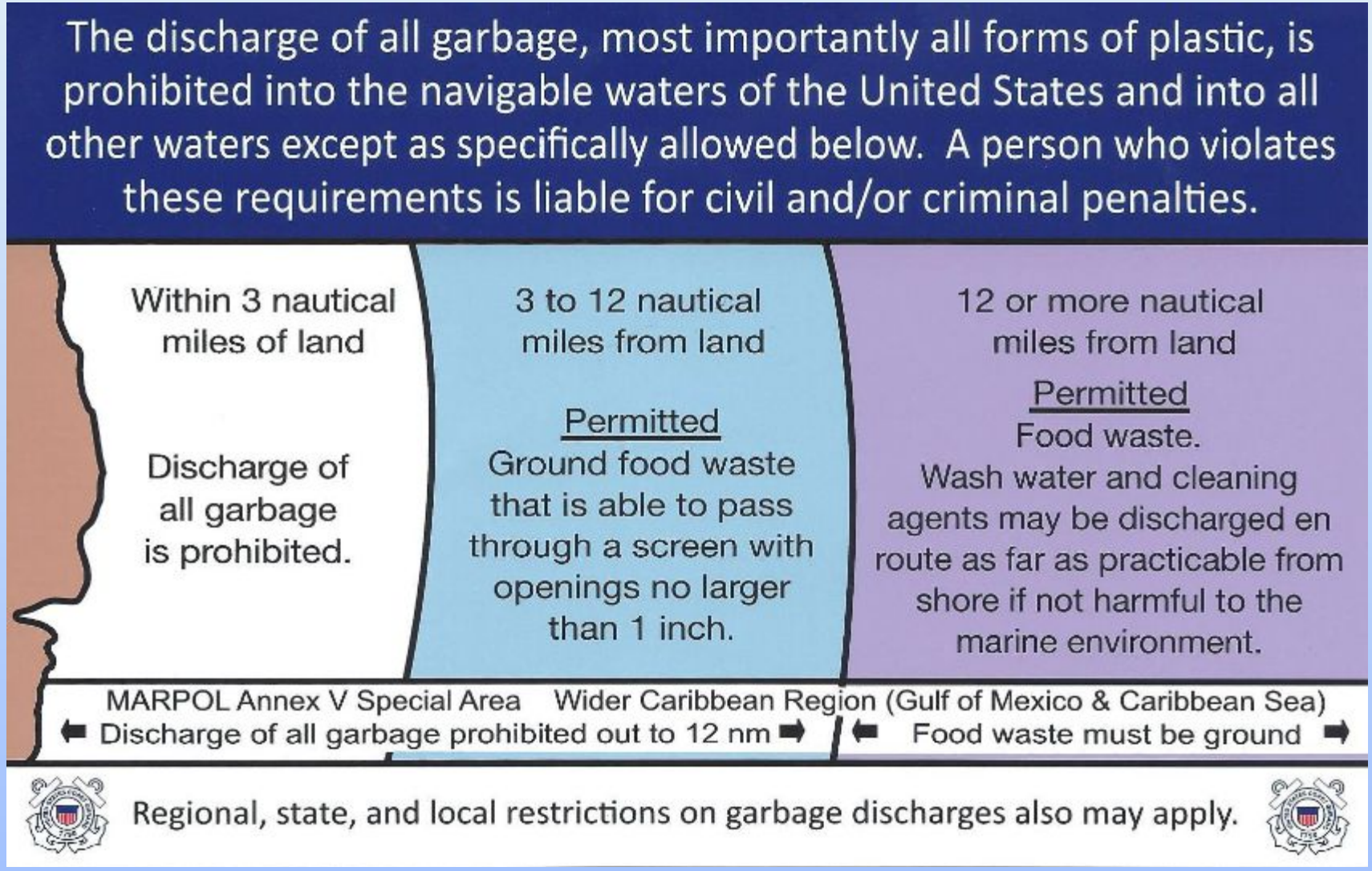
Environmental Protection



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Oil

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Reporting Accidents

- **What is the law?**
  - When someone dies?
  - When an injury requires more than first aid
  - When vessel damage is over $2,000

Boating Accident Report

- Forms: paper, CD or internet
- To whom do you send this report?

BOATING ACCIDENT REPORT

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Topic 5

Common Emergencies...What To Do

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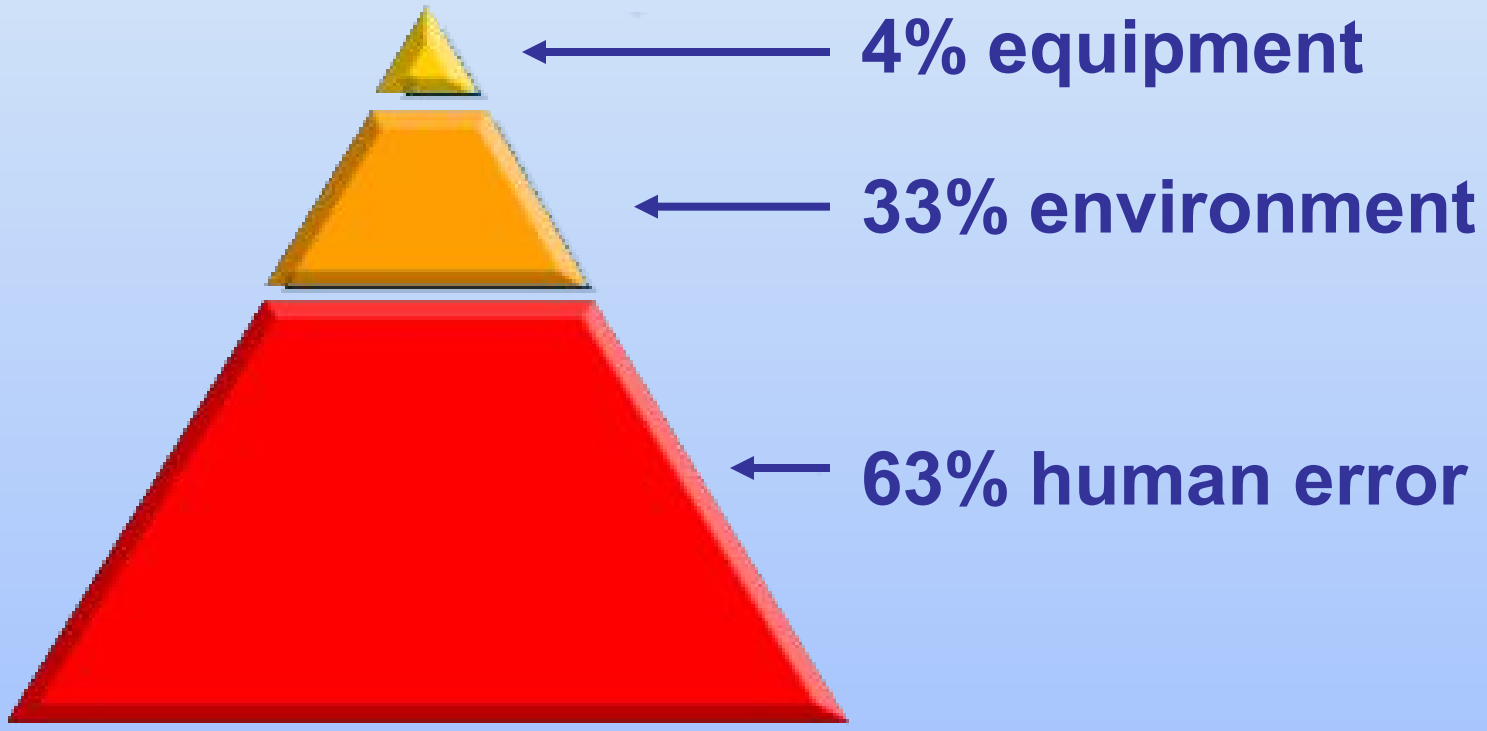
Most Accidents Are Preventable!



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Stressors & Risks

- **Weather**
  - Sun: hydrate, shade, sunglasses
  - Rain & cold: proper gear (eg, layers)
- **Wave motion**
- **Noise and vibration (auxiliary engine)**
- **Fatigue**
- **Alcohol**
- **Lack of situational awareness**
- **Many boaters underestimate effects**

Falling Overboard

1. What are some ways to prevent persons from falling overboard?

2. What should you do if someone does fall overboard?

In Case You Go Overboard

- Cold water can kill- WEAR your PFD
- Light and sound signals
- Tether and PLB if coastal
- Stages of cold water immersion

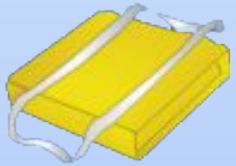
Heat Escape Lessening Position

Huddle

Reduce exposure of high heat loss areas of body

Overboard

1. Reduce speed
2. Throw PFD
3. Point
4. Technique- sail vs engine
5. Approach from downwind
4. Stop engine
5. Pull aboard



Prevent Collisions

1. Follow rules of navigation
2. Who remembers what we said about following the rules of navigation?

Don’t Run Aground

- **Know water depth**
- **Location of submerged objects**
  - Chart/ chartplotter

If you do run aground?

- Check hull for damage
- Check tide – wait if rising
- Shift weight to reduce draft
- PFDs and safety lines
- If have dinghy, kedge off
- If stuck, use radio or visual distress signals

Fires

Causes: galley, electrical
Actions: escape first then use fire extinguisher

Pull pin
Aim at base of fire
Squeeze handle
Sweep side to side

Carbon Monoxide Poisoning

- Common causes?
- What are some of the symptoms of Carbon Monoxide Poisoning?
- How can you protect yourself and your passengers?
- How can you try to prevent this from happening?

Serious Injuries

- **If a person is injured on the boat what should you do for the following:**
  - Not breathing
  - Bleeding
  - Burns
  - Broken bones
  - Head or neck injuries

When Caught In Bad Weather - Coastal

- **What can you do?**
- **Put on PFD- if not already on**
- **Reduce speed/ reef (reduce sail area)**
  - Consider seeking shelter – anchor/sea anchor, avoid lee shores
- **Close hatches and portholes**
- **Keep weight low**

When Caught In Fog

- **Know position – take a last fix**
- **Turn on navigation lights**
- **Use sound signals**
- **Ensure radar reflector hoisted**
- **Use radar and AIS if boat equipped**
- **Reduce speed**
- **Post extra lookout(s) – bow and stern**
- **MRASS (Marine Radio Activated Sound Signal)**
  - Added to some lights, ATONs
  - Channel notated on chart (eg, 81A, 83A)
  - Microphone keyed 5 times activates for 30 min
- **Put on PFDs**
- **Consider modifying route, anchoring, safe haven**

Distress, Urgency, & Safety Messages

- What radio call would you use for the following situations?

- Distress
- Urgency
- Safety

Important Channels

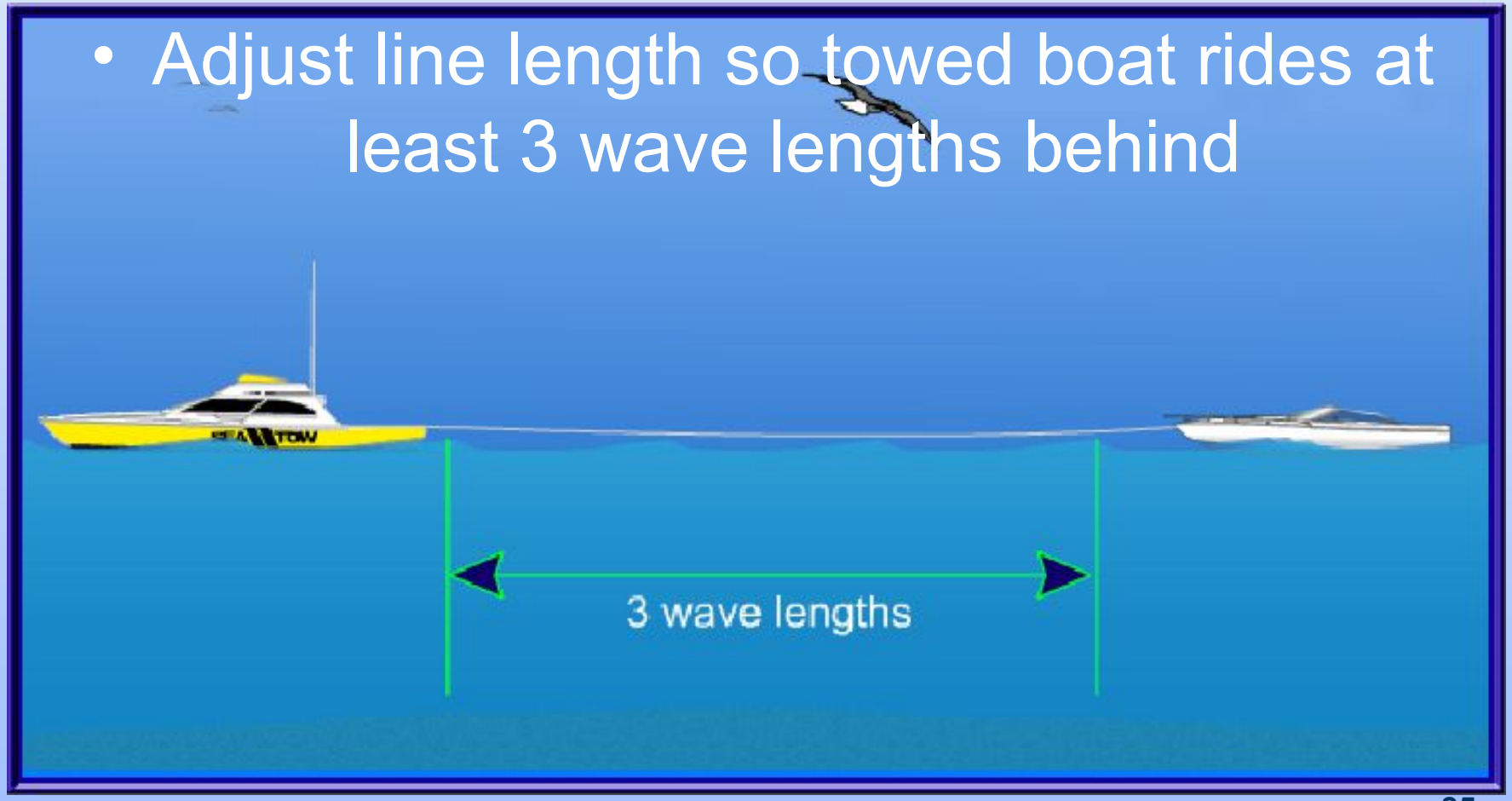
- **VHF channel 16**
  - International distress, safety and calling
  - Widely monitored by USCG, Coast Guard stations, and vessels
- **VHF channel 13**
  - Intership navigation safety (bridge to bridge)
  - Ship 20 meters maintain listening watch in US waters
- **VHF channel 22**
  - Coast Guard liaison and maritime safety
  - First make contact on 16
  - Information broadcasts first announced on channel 16
- **Weather channels**
  - WX-1 - WX-7
- **(DSC channel 70)**

Helping Others

- Standing by until professional help arrives often best course of action
- What are some of the things you must remember if towing another boat?

When Helping Others

- Adjust line length so towed boat rides at least 3 wave lengths behind



Topic 6

Intro to Safety Offshore

Fastnet Disaster

- Offshore race – Australia, 1979
- “Perfect Storm”
- 303 started race – 86 finished – 18 died

Factors from Official Report

- Weather: Beaufort scale Force 10
- Inadequate personal safety gear & training for offshore conditions
- Errors in seamanship negotiating shoals on a lee shore
- Limited communications
- Flaws in race management protocol created uncertainty during search & rescue

“The biggest lesson I learned that day wasn’t about any piece of equipment,

it was about taking personal responsibility for my own safety”

--Bryan Chong, Survivor
Low Speed Chase Disaster

San Francisco, 14 April 2012

Offshore Safety

- Boat
- Equipment
- Commitment
- Leadership
- Culture
- Knowledge
- Drills

Semper Paratus
(Always Prepared)

- **Correct boat, equipment & gear**
  - eg, EPIRB + grab (ditch) bag/ life raft
    - Offshore Special Regulations Handbook
- **Proper Knowledge, Training & Periodic Drills**
  - Adv. Coursework: Bareboat, Navigation, Coastal Passage Making, Offshore Passage Making
  - First Aid & CPR (Marine Medicine)
  - World Sailing (ISAF) Safety at Sea Seminar
- **Maintaining situational awareness & taking personal responsibility are vital**

Skipper Responsibilities

- Assessment of risks
- Briefing crew - standing orders
- Appoint a second in case incapacitated
- Approach to safety
- Seamanship
- Legal

Standing Orders

- MOB
- Fire
- Medical issues
- Weather
- Failure
- Radio

Crew Responsibilities

- Know boat & safety gear
- Maintain equipment
- Honest appraisal of skill level
- Actively participate in safety briefing
- Watch out for others
- See something, say something-
  Report problems - “two challenge rule”

MOB Offshore

Crew

- Shout MOB
- Throwables
- Point
- MOB button/ DSC distress/ MAYDAY (ch 16 VHF/ 2182 MF SSB)
- Recover: horizontal lift, crossed hands, get line around & use winch, use dingy/ life raft if so instructed
- First aid

Helmsman options

- Crash stop, motor back, recover leeward side
- Heave to, start engine, drop headsail, motor back, stop boat to windward
- If no engine, reach-tack-reach, approach at 60 deg wind angle, stop just to windward, recover leeward side
- LifeSling

When Caught In Heavy Weather - Offshore

- **PFD and tether should already be on**
- **Try to keep forward boat speed at 4 kn as long as possible to maintain steerage**
- **Use storm sails**
  - 40 kn: lower main, secure to deck, hoist trysail
  - 45 kn: change headsail to storm jib
  - 50 kn: take down storm jib
  - 55 kn: take down trysail (bare poles)
- **Deploy drogue**

Tropical Revolving Storm (Hurricane/ Cyclone)

- **If barometric pressure drops 5 mb below area norm, TRS is ≤200 NM away**
- **Heave to, determine direction of low using Buys Ballot law plus wave/swell direction and sail for safety**
- **Rule of thumb (Northern hemisphere):**
  - If in danger semicircle, keep wind on starboard bow (45 deg) and make best speed
  - If in safe semicircle, keep wind on starboard quarter

When taking on water

- **Put wood or foam bung in failed through hull**
- **Switch on electric bilge pump if not activated**
- **Use manual bilge pumps**
- **Dewatering pump**
- **Engine inlet/ seawater pump**
- **If all else fails use**
  - Sea toilet
  - Buckets
  - Pots

Capsizing
Wave Height: Beam Ratio key

- When the significant wave height* =

beam (width) of vessel and the vessel becomes abeam to the sea, the vessel will exceed its righting moment and most likely capsize.

(*Mean height of highest 1/3 of waves)

Modified from World Sailing/ ISAF Safety a Sea

Capsizing

- Don’t overload the boat
- Controlled turns esp if into waves
- Anchor from bow only
- Stay with boat
- Try to re-board
- Deploy life raft when you have to “step up” into it

Helicopter Rescue

- Communicate on VHF
- Pilot/ aircrew will give course under power or sail (usually wind on port bow)
- Brief crew before gets too noisy
- Beware of down draught
- Weighted hi-line (winch wire) lowered: ground in sea or on boat before handling- do NOT make fast
- Pull as directed – stow loosely in bucket
- Aircrew or diver must touch boat first to ground – may send down a strop

Abandonment

Before

- PFDs (Type I or II)
- TPA/ AES
- Water
- Extra clothing/ blankets/ sleeping bags
- Carbs
- Grab (ditch) bag

Life Raft

- Secure painter to strong point on deck
- Clear path to launch
- Unlash
- Two people lift and carefully toss horizontally
- Double-check attachment
- Jerk painter to inflate raft (~20 sec)
- Avoid sharp objects
- Board one at time by ladder or rope
- Strongest crew first and last to help others
- Take headcount
- Cut painter
- Deploy drogue

Survival

- Protection: heat, cold, drowning, suffocation
- Mitigate sea sickness: pee, take meds, hydrate
- Energy: carbs
- Attract attention: radio, distress signals when SAR may be in range
- Will to survive is key

Questions?