A BASIC MANUAL

FOR KEELBOAT SAILING

AT CSC

Introduction

So you've been messing about in dinghies for a while and have your Junior rating and you feel it's time to start sailing on the keelboats. This is intended to be a guide to get you started, and also as a reference as you go through the CSC keelboat lesson series or when getting private instruction. The material covered in this manual will continue to build on the basics learned in dinghies, with attention called to some of the big differences between the two. A keelboat is slower to respond, has a greater turning radius and, with a large mass, momentum will be a big factor in how the boat behaves. The fundamentals are not going to be covered here, as they are thoroughly discussed in Colgate and other basic sailing books listed at the end of this manual. The most important skills to be learned are: recognizing what the boat will be doing before it happens and planning maneuvers before executing them. Having a thorough understanding of basic sail mechanics will also be a good starting point for learning to sail keelboats.

Keelboats and dinghies are not mutually exclusive! It is important to continue practicing on the smaller boats for several reasons. A Junior can get all the tiller time he/she wants to practice universal techniques such as proper sail trim, crew overboard (COB) recovery, rear facing jibes, anchoring, and circles. It is also worthwhile to learn to handle a dinghy when overpowered so when the wind jumps up to 30 knots you will still feel very comfortable.

Editors: Joel Brand, Patrick Flaherty, Peter Kuhn, Yves Parent

Authors: Steven Burchik, Sheldon Coad, Michael Faw, Mark Playsted, Saul Schumsky, Caryl Woulfe

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1. Operating Rules

1.1. Senior Keelboat Area

The operating rules describe the area within which a senior can operate a club keelboat.

The senior keelboat area is the area within the following lines:

- North of a line from the southwest corner of the Emeryville Peninsula to the north end of Treasure Island
- East of a line from the Bay Bridge tower east of Treasure Island to the end of the Richmond Jetty
- ¼ mile south of all of the Richmond Jetty and Brooks Island, and south of a line from a point ¼ mile south of the southernmost point on Brooks Island to Fleming Point.

The most recent definition of the senior keelboat area is in the operating rules, available at https://www.cal-sailing.org/operating-rules.

The characteristics of the Senior Area (and the reasons for its definition) are these:

- It is out of large currents
- It is out of shipping channels
- It is shallow enough that you can anchor in it

Note that it includes the Berkeley and Emeryville marinas but not the Richmond Marina or Clipper Cove at Treasure Island.

2. Signing the Boat Out / Putting the Boat Away Checklist

2.1. Heading Out

2.1.1. Before Leaving Home

- Check weather (including recent rainfall and forecasts, 4 good options for websites: OCSC, NOAA, weather.com, wunderground.)
- Check tides.
- Check current.
- Check wind is below 30 knots (or maybe less, depending on your skill and comfort).

2.1.2. At the Dock

- Assess observed weather. Can you sail safely with your crew?
- "Do Not Sail" status OK. There should be signs on the boats, but you can also check the Keelboat Status on the website. This will also show you any advisories for the boat and any reservations, for example for cruises.
- Look in the maintenance log to see if any recent entries give a clue as to problems you might expect.
- Sign out the boat properly.

2.1.3. On the Boat

- Winches, cam-cleats and tiller functional.
- No burrs, missing pins or slack in shrouds.
- Check under the floorboards for water. Bail if necessary.
- Anchor accessible and tied to mast base. Flukes moveable.
- Bailing bucket accessible.

- Paddles accessible.
- Fire extinguisher accessible, fully charged, not expired.
- Turn off power at dock and then unplug electrical charging cord.
- Look at the battery indicator lights (even if it's daytime it will remind you to hook up the charger when you're done) – RED means discharged. Also, see that the battery is securely strapped down.
- Running lights operational.
- Set the VHS Radio to channel 16.
- Check fuel. If filling needed, take tank off the boat.
- No fuel fumes in rear lazarette (where fuel is stored).
- Run motor, make sure water stream is visible. After warming up, idle in forward, then run the throttle up in forward for 30 seconds (make sure you've checked the bow lines before you do this so the boat doesn't hit the dock).
- Type IV throwable PFD in cockpit.
- Check that there is a 75 jib and it's in good condition.
- Doublecheck using this printable CSC checklist.

2.1.4. Crew & Skipper

- Each crew wearing PFD.
- 2 flashlights (1 floating type).
- 3 day/night flares, not expired (not required in SF Bay, but may be a good idea to carry).
- Horn or sound signaling device.
- Handheld VHF or cell phone.

2.2. Returning: Rigging Down

2.2.1. Upon Returning

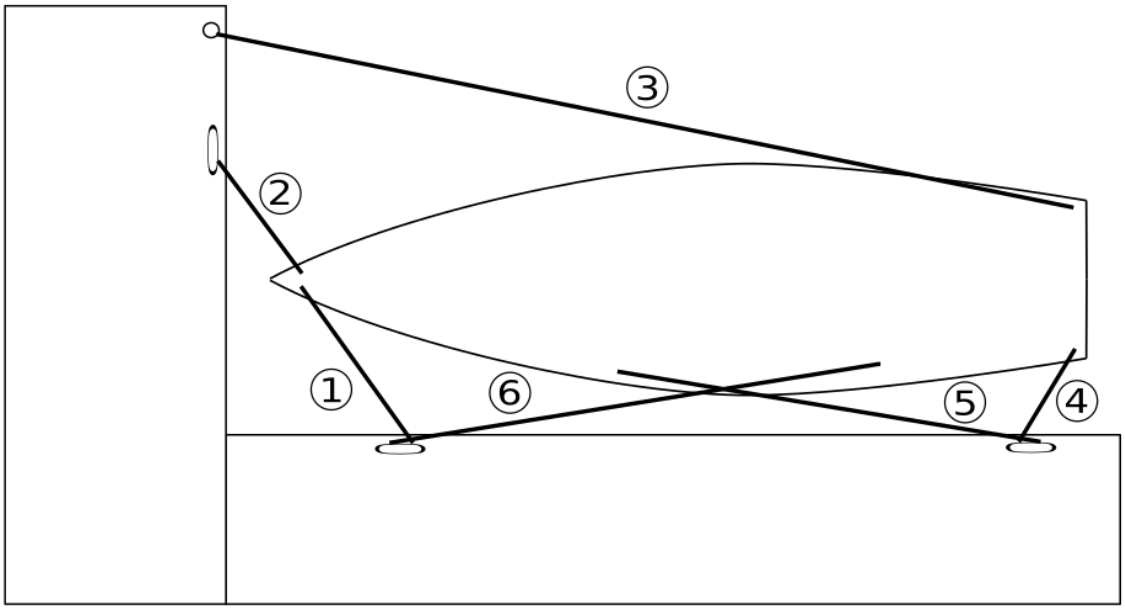
- Take down and stow jib, with tack crinkle attached to bag's draw cord.
- Take down main.

    - First release mainsheet, vang, outhaul, Cunningham.
    - Shake the reefs if reefed.
    - Lower the main after the above is done.
- Completely loosen backstays.
- Tie dock lines (see below for a diagram and descriptions).
- Turn off lights and radio.
- Retrieve gear from below deck.
- Put away PFDs.
- Close gas tank vent (if it has one).
- Coil halyards and mainsheet.
- Make sure lines on mast are tight and not flopping.
- Rinse boat, especially mast, shrouds, winches, motor, and all hardware. Pay attention to the gooseneck and all the hardware in that area.
- Install the main sail cover.
- Plug in battery charger.
- Close and lock cabin.
- Sign-in at dock box. Note any equipment problems encountered in the maintenance log.

2.2.2. Dock Lines

Club boats are normally tied up using lines 1 – 4, where 1 and 2 are bow lines, 3 is a forward spring line, and 4 is a stern line. The bow lines together restrict the boat's movement forward and bow movements from side to side. The stern line keeps the stern close to the finger. The forward spring line both restricts the boat's aft movement and, to some degree, movements of the stern toward the finger. Line 5 is an aft spring line, which restricts the boat's forward movement. It is usually not necessary for the club's slips. Line 6 is a forward spring line, but it is not usually needed except on the end tie, where you don't have the ability to tie any lines on the far side of the boat, so a forward spring line helps stop the boat from moving aft, in the same way #3 would.

In the slip with a finger on both sides, a second stern line is used in place of line 3. The boat can still move aft somewhat unless the stern lines are tight, so the tail of the bow line is sometimes used to rig a forward spring line as shown by line 6.



3. Equipment

This section describes the keelboats that we have at CSC, equipment onboard those boats, safety, and maintenance of the equipment.

3.1. CSC Keelboats

CSC has six keelboats in its inventory. Specifications for these boats including LOA, beam, and draft can be found in Appendix 1. It's a good idea to know the draft for each of these boats before taking them out.

CSC keelboats include:

Merit 25

- Meritorious (bright yellow)
- Dr. Who (white)

Pearson Commander 26

- Daisy (blue)

- Donald (green)
- Sea Horse (teal)

J/80

3.1.1. Maximum Crew Number and Weight Limits

Overloading a keelboat is a very bad idea. Our Commanders can carry up to 10 people, but only under ideal circumstances. Our Merit 25s can carry no more than the lesser of 6 people or 900 pounds, and most often you'll find that even 5 people together exceed 900 pounds. Even these limits should be reduced in some circumstances. Fewer people should be carried if some are less agile and the wind is strong. With a less agile person aboard, reduce the sail area by reefing, and take someone who's extra agile and can help balance the boat.

Always remember that the skipper should be able to handle everyone aboard in case of a severe problem. It's a very bad idea to load 10 people aboard a Commander if you cannot handle them on a trip that extends near the Bay's many submerged rocks, like Berkeley Reef or Brooks Island. In case of a sinking, the skipper may need to make sure everyone is free of all the lines as the hull goes down, and the Commanders will sink fast due to their weight and uncored construction. The Merit 25's are lighter and have some resistance to sinking due to their cored hull and deck, but a sinking will still happen far too quickly to allow the skipper to attend to multiple panicked crew.

The Merits and the J/80 can be knocked down, especially by sailing with too much sail for the conditions. If the wind is strong enough and you think that there is a chance of a knockdown, close the companionway to keep water from rushing into the hull. In the event of a knockdown, the skipper must be prepared to keep the crew from hanging onto the cabin top or rail, and to get their weight over towards the keel so that the keel can right the boat. Carrying 6 people and full sail in over 20 knots of wind is extremely unsafe, and will likely result in the kind of mishap best left to private boat-owners who can afford it. In strong wind, carry fewer crew, and limit your crew to people who are experienced in recovery after a knockdown. Never take extra, untrained people to provide "rail meat" when the Bay is covered with whitecaps; the club can't afford a dismasting or sinking.

3.2. Safety

There are several useful documents on this covering regulatory requirements and practical matters.

- One is from the Coast Guard, and it is a nice summary of recreational boating requirements (all of our activities fall under that category): https://www.uscgboating.org/images/420.PDF.
- Another guide is from the State of California: https://dbw.parks.ca.gov/pages/28702/files/DBW_ABCs_of_Boating_2017.pdf.

3.2.1. Personal Flotation Devices and Appropriate Clothing

Keelboats can lull sailors into thinking they won't get wet or go in the water as they might on a dinghy. Everyone aboard should know that this isn't necessarily the case. Keelboat sailors should be prepared for the dowsing they can get aboard on a windy day, and for the possibility that they will go in the water by falling overboard, sinking, or knockdown. Good foul weather gear over synthetic clothing is the best choice for keelboats. Fleece and wool are also good on especially cold days. Personal flotation devices must be worn at all times on any CSC vessel. Auto-inflating personal flotation devices should not be worn without first-hand experience. There have been failures to inflate, and many of them will seriously impair the wearer's mobility when they inflate.

3.2.2. Winch Safety

Winches have caused severe injuries, and skippers are responsible to ensure that everyone is aware of the danger and is operating the winches properly. Be careful when clearing overrides. The sheets wrapped around the winches are under great load, and they will rip out hair and crush fingers that get caught under the sheets. Hair should be kept tied up and under caps on anyone who is near the sheets where they enter the winches, and fingers should be kept away from everything but the tails of the sheets that exit the winches. Skippers should demonstrate proper use of winches to inexperienced crew.

3.2.3. Dock Cleat Safety

The dock lines used to tie up keelboats are also under heavy loads and can crush fingers. Skippers should never allow anyone to tie up a boat without first making sure that they understand this risk. When tying up a keelboat, always keep your fingers far away from the part of the dock line that is contacting the cleat, so that your fingers don't get trapped between the line and the cleat. There can be high loads on the dock lines, and they can snap off fingertips.

3.2.4. Visual Distress Signals

CSC's keelboats carry inflatable orange flags as our primary daytime VDS's, and battery powered automatic SOS lights as our primary nighttime VDS's. There may be flares on board, but they are only there as secondary VDS's. Flares have killed at least one person in use, and can easily ignite gasoline during an emergency. Flares go out faster than you think so try to carry more than the minimum. It is recommended to carry a combination of parachute and handheld flares so that you can signal from a distance and within line of sight.

3.2.5. VHF Radio

CSC's keelboats carry VHF radios, which should be on and tuned to Channel 16 whenever the boat is underway. For non-emergency radio use, hail on 16 and switch to a non-emergency channel such as 68, 69, 71, 72. All of our VHFs support digital selective calling (DSC), which allows mariners to instantly send an automatically formatted distress alert to the Coast Guard or other vessels with VHF radios supporting DSC. Note that if the radio starts beeping (which it does because it can't get a GPS signal, because our radios aren't connected to GPS), you can push any button to stop it.

3.2.6. Outboard Motors and Gasoline

CSC's keelboats carry outboard motors as backup to the sails. Always test the motors before sailing, to be sure that you can lower and start them quickly when needed. Never store gasoline or motors in the keelboat cabin space, only in the open cockpit or in the ventilated fuel storage compartments of the Commanders. No open flames anywhere within 10 feet of the motors or gasoline tanks. If you need to fill the tank, always take it off the boat first. Always have someone at the motor when it's running, particularly when someone is in the water during a rescue. If there's a person in the water, the person at the motor should shut the motor down immediately if the person in the water gets within 3' of the propeller.

3.3. Common Maintenance Issues

3.3.1. Standing Rigging

- Confirm that the shrouds are reasonably tight and have the same tension on both sides of the mast.
- Confirm that the forestay is reasonably tight (understanding that the tension may vary with backstay adjustment).

- Tap on all shrouds and forestay and ensure that the origin of any rattle is OK.
- Check for broken strands of wire (meathooks) from the base, to as high as you can reach. If there are broken strands, the boat should be marked "do not sail" and the problem should be reported.
- Check the swaged fittings (solid metal piece where the wire connects to the turnbuckle). If there are cracks or significant corrosion, the boat should be taken out of service and the standing rigging replaced.
- Make sure that the cotter pins or small screws that secure the turnbuckles are present and in good condition.
- Avoid problems by hosing down with fresh water after every voyage.

3.3.2. Running Rigging

- Check for signs of wear or fraying, especially halyards.
- Worn/scuffed-up looking line is ok, but if something looks like it's about to tear in half, it should be replaced.
- It is much easier to replace a halyard while it is still intact. If not, you may be the one who gets hoisted to the top of the mast to replace it in a Bosun's Chair.

3.3.3. Shackles

- Check for signs of wear or bending and confirm that the pin is securely locked.

3.3.4. Hanks

- Check for free movement. Rinse with fresh water to keep free of salt buildup.

3.3.5. Winches

- Check for free movement and holding power.
- Need to be cleaned at least twice a year, best quarterly.
- Best preventive solution is to rinse with fresh water.

3.3.6. Bottom Jobs

- Fiberglass hulls need to be inspected periodically to check for problems, such as: scuffs, crazing, delamination, and holes. Minor problems above

the water can be repaired with a moderate amount of skill. Major problems will require the services of a boatyard.

- Another problem in the water is the buildup of organic material, such as algae, barnacles, etc. Two solutions are: (1) the use of a long handled brush to scrub the underwater surfaces from the dock, and (2) the use of a plastic flossing cloth that is placed under the hull and pulled back and forth to remove debris.

3.3.7. Sail Rips

- Tears or holes should be addressed as soon as possible. Rip-stop sail tape can be used as a quick, temporary repair for small tears or holes in light winds, but generally the sail should be de-rigged, removed from the boat and repaired.
- There are now sail repair tags in a clear plastic box in the Keelboat Shed on a shelf right next to the workbench. When you have a torn sail please bring it into the Keelboat Shed, fill out a tag, tie it to the tack of the sail (facing up in the bag), and here is the really important part - let Sheldon Coad know about it. Just send him an e-mail at sjcoad@comcast.net.
- There are instructions on the plastic box as to how to fill out the repair tag. It is really dirt simple: date; sail type; boat it is from (particularly important if it is a keelboat sail); what and where the damage is; and your name. Then let Sheldon know about it. He can then see to it that it gets looked after either by our own member/sailmaker, Cynthia Wight, or via other options.
- Once repaired, the person returning the sail will note that the repair has been done, date it and sign on the back of the tag and let Sheldon know it is back. This is particularly important for keelboat sails as we do not have much in the way of spares.

3.3.8. Electrical

- Simple electrical repairs, such as burned out lights should be completed before taking the boat out. Spare bulbs are stored in the designated dock box.

3.3.9. Motor (manuals are in the clubhouse)

- For motor troubleshooting tips, please take a few minutes to look over the Outboard Motor Guide.

3.4. Required US Coast Guard Equipment

3 items already on boat: Certificate of Number, State Number, Certificate of Documentation

3 items NOT required on our boats: 2 ducts w/cowls for fuel ventilation, backflame arrestor (because we use outboard motors), marine sanitation device (since we do not have an installed toilet).

6 items you MUST HAVE aboard a boat that is more than 16 ft:

Acronym: Senior Vice President of FUN = SVPFUN

- S = Sound device (air horn or athletic whistle)
- V = Visual Distress Signal (3 handheld or floating flares and 1 electric distress light (not required in SF Bay, but we keep flares on our keelboats)
- P = PFD's (one wearable (vest) for each person, plus one throwable)
- F = Fire Extinguisher
- U = Unknown (needed to fill in mnemonic)
- N = Navigation Lights: Red/Green on Bow, White on Stern

3.5. Required CSC Equipment

- 1 Working VHF Radio or Cell Phone
- Anchor, rode and paddles
- Working Compass
- Small Jib (75%)
- Bailing Bucket
- 2 Flashlights (at least one Floating)

Tools = FIKSWAP

- F = First Aid Kit
- I = Ignore (needed for mnemonic)
- K = Knife
- S = Screwdriver
- W = Wrench
- A = And ignore (needed for mnemonic)
- P = Pliers

NOTE on radio: When you are rigging the boat, turn on the on-board (fixed-mount) VHF radio and your handheld radio and set them both to the same channel. Give your radio 2 quick clicks on the transmit button. You should hear 2

clicks on the boat radio. Avoids talking on the radio, but completes communications check.

4. Motors & Motoring

All of our keelboats have an outboard motor, which is required for any club cruise, and it is highly recommended to make sure it is in good working order before taking a keelboat out on any sail. The 3 Commanders and 2 Merits all have Mercury gasoline outboards mounted to the stern. The J/80, which is our high performance and advanced boat, has an electric outboard, stored in the cabin.

We generally sail in and out of our own slips, but when docking anywhere else around the bay, it's safer to motor in and out in less-familiar places. The motor is also often used if the wind dies, once everyone gets tired of bobbing around waiting for the wind to come back. It can also be critical in getting out of a tricky situation, such as a rig failure or boat breakage. For these reasons, you want to make sure the motor is in working order, even if you don't plan on using it.

When checking out a boat, it's a good idea to start the motor as a first step, so it can warm up while rigging the boat. A warm engine will be easier to start later if needed, and letting it run for 10 minutes will tell you if there are any problems to be aware of (if the motor dies in that time, something might be wrong).

For start up procedure and troubleshooting tips, please take a few minutes to look over the Outboard Motor Guide.

5. At the Dock

Before departing or docking, assign tasks to your crew as needed and brief them on what is expected. Make sure everyone understands that as the skipper you are in charge of the boat. In addition, ensure that every crew member can perform their tasks safely and communicate properly. There have been situations where costly accidents would have been avoided simply by proper communication. One crew can be assigned the task of fending off pilings and other boats with

paddles or a boat hook (don't use bare hands). Assign lookouts for boat traffic coming up or down the lanes. Assign crew to trim the sails.

5.1. Docking and Departing

Departing and docking under sail is a hallmark of Cal Sailing. Very few others do it, and sailing schools teach it only as an emergency maneuver (if they teach it at all). It requires considerable skill and a lot of practice.

To get your Senior rating, you will have to depart and dock under sail in almost all wind directions. You will spend a lot of time practicing this before your test, and you should spend a lot of time practicing it after you get your rating. And you should be proud that you can do it.

Both departing and docking depend on both the wind and the slip you are using. For some slips and some wind conditions, it will not be possible. It is a useful exercise to walk around J Dock and imagine a departure and a docking from various wind conditions to particular slips. That will prepare you for doing it for real.

We will discuss various docking scenarios that depend on wind direction (upwind, cross-wind, and downwind). You can practice these on various docks in the Marina in various wind conditions. Probably the most important consideration when you're doing it for real is watching it, understanding whether your plan is going to work, and bailing out early enough if it isn't likely to succeed. Going around and trying it again is a sign of good seamanship.

5.1.1. Upwind Docking

The first example is a typical upwind dock, into a slip (J-dock, for instance), in a west wind. Looking at Figure 1, below, at point 1 you are bringing the boat in on a broad reach to get downwind of the docks just enough for an easy close reach in. At point 2, the boat is turned sharply into the wind to slow the boat way down and also to confirm your estimate of the wind's direction. From here on into the dock it should be a straight shot, *slow-sailing* in before turning into the slip. Be sure to range at this point to be sure the boat's course does not change – leeway made while *slow-sailing* will set you downwind, making it harder to sail in on a close reach.

If you find that at point 2 the boat is too far downwind, immediately sheet back in and sail upwind until it is possible to close-reach as in point 3. On the other

hand, if, at point 2 you turn toward the dock and find you are not luffing, indicating that you are too far upwind, then fall off very hard to a run and then repeat the turn up into the wind for another go at the approach. The key here is to check right away that you can luff as well as your ability to power up – while there is still room for corrections.

On your slow-sailing course, you should aim for a point about half a boat length off the end of the slip. When you get there, you'll have room to turn upwind into the slip without hitting the dock or the adjacent boat.

If you get a gust as you're on your final approach, sheet in hard to avoid the bow being blown downwind and missing the slip.

It's a good idea to have a crew prepared to back the main hard if you come into the slip too fast. Also prepare a breast line (rigged to somewhere near the middle of the boat) to slow the boat down by snubbing it on the aft cleat on the dock.

If you are coming in too fast on your approach, a counter-intuitive method to slow down is to turn hard downwind and then immediately turn hard upwind. The turn itself will bleed your speed if you don't stay downwind after it.

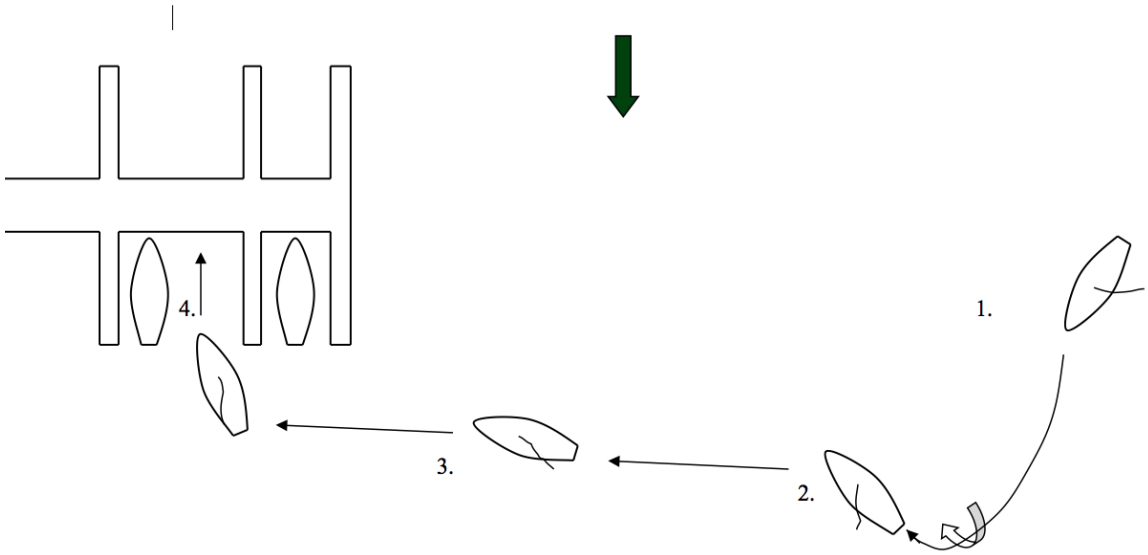


Figure 1. West wind docking (upwind slip)

Note: In most of the following diagrams the curled arrow indicates a sharp turn into the wind for a quick decrease in boat speed, followed by falling back off onto a close reach to continue slow sailing.

5.1.2. Upwind Departure

The upwind departure is straightforward. Both sails can be raised while the boat is in the slip, pointing upwind. When ready, slowly back out and hold at the end of the dock by snubbing the line on the cleat there. The stern can be rotated clockwise by backwinding the main to starboard and the bow is then cast off with either a gentle push or by backwinding/sheeting tightly the jib. An important point is to have the main sheet totally free so the boat does not begin to head up before you're clear of the neighbor's sterns. This can be a problem when the helmsperson backwinds the main too much and turns the boat almost beam to the wind. This can be avoided by watching the main carefully as it is backed. Stop backing the sail if the main gets soft. If you start out too close to adjacent boats, you have several choices depending on the situation, but you have to act quickly. You can use one or more tiller snaps to pull the bow down, but watch the motor as you do that so it does not swing into an adjacent boat. You can also tighten or back the jib. Tightening the jib will pull the bow down and give you forward speed, while backing the jib will pull the bow down harder without accelerating the boat.

5.1.3. Crosswind Docking

As the wind shifts north or south, the standard docking procedure changes accordingly. Think about rotating the approach course with the wind, turning in earlier in a southerly wind and later in a northerly wind, as shown in Figure 2 for a northwest wind.

Departures also change. With a northwest wind, you will need to power up on a close-hauled course to clear the boats on the opposite side of the finger. For some slips, this will not be possible. With a southwest wind, you will not be able to turn the boat by backing the main as much as in a west wind, so you will have to be careful departing to stay clear of the other boats to the north. Judicious use of the jib, maybe backing it, and tiller snaps should do the job.

When the wind turns southerly, the docking situation changes completely. It is no longer possible to close reach in on a starboard tack; you will be heading straight into the wind. However, it is possible to sail (some tacking may be required) past the houseboats to the east and south. See Figure 3. This allows you to position the boat well upwind, turn around and gather some speed off the

wind and then head up just to leeward of the pilings, hopefully now on a close reach (probably under jib alone).

You will need to stay high enough in order to make the slip, so you will need boat speed to do it. In a gust on this approach, you need to ease the jib quickly so that you are not blown down. Note that this docking is not possible for some slips that are too far south, except in lighter wind.

If things go wrong, you have an easy bail-out, which is to turn north and into the turning basin.

If the wind is strong enough, it can blow the bow downwind almost no matter what, if you do not have serious boat speed already. Hence in some wind situations, it may well be that the only safe move is to motor in or out.

A north wind docking is much easier with one caveat. You will be coming in jib only, and it will be easy to douse the main in the turning basin, then sail toward the houseboats on a port tack and gybe around to your final approach. The problem is that you have only one bailout, and it's to go down the fairway and into another slip. With a north wind under jib alone, you could do this fairly easily on either side of the fairway. To avoid this, remember that you will have a lot of leeway on your approach, so take that into consideration and aim farther north of the slip.

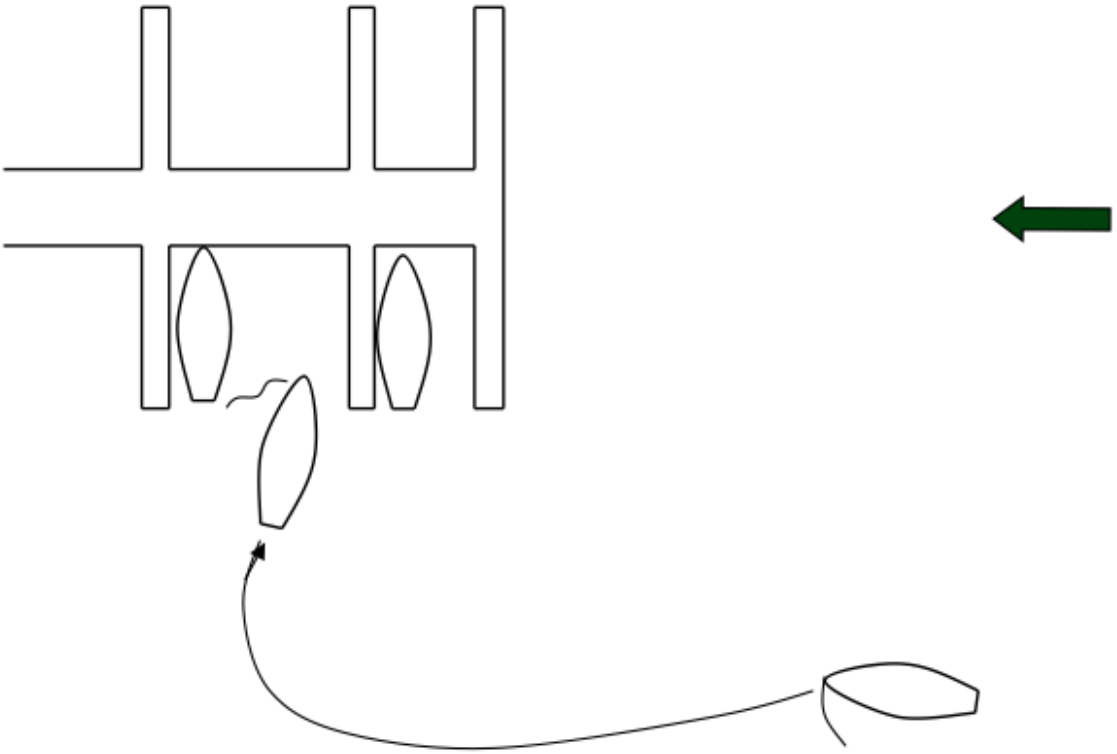


Figure 2. Northwest wind (crosswind docking)

5.1.4. Crosswind Departure

In a north wind departure scenario, the stern-tie method can be very handy once the boat is headed into the wind, but before departure. However, it requires that the path ahead and behind is relatively clear at the dock and that you can tie the boat up fore and aft at the ends of the fingers.

If you had to depart from the dock shown in Figure 2 (like J-dock in a north wind) you would need to exercise good judgment. Either you would turn the boat completely around in the slip and then leave under jib alone or you would have to take the boat out of the slip and hold it off the sterns of other boats while raising the main (not that easy if wind is slightly pinning the boat against the docks as in a NNE). If leaving under jib alone it is important to have had some experience with this type of sailing before casting off and hoping for the best.

5.1.5. Downwind Docking

The downwind docking is shown here (Figure 4) to illustrate that many times it is necessary to sail into the channel with both sails up for close reaches or even close hauled. Well before position 1 the crew should be thoroughly briefed on what will be done and the following preparations made: halyards flaked and ready to run free; vang and outhaul are both eased; fenders are out; and sail ties are ready to keep the main from crowding the cockpit. Once the boat is passing the desired downwind slip, a slow 270° turn is made into the wind during which your crew has been instructed to expeditiously lower all sails at point 3. You can choose to lower the jib or not depending on the wind speed and variability. At this point you should be directly upwind of the slip and turning in for a nose first landing, checking speed, if need be, with alternating tiller shifts. This technique is worth a mention. It works best if the tiller is brought hard over on one side, held for several seconds and then put hard over to the other side. Sometimes you will favor, and hence hold the tiller a bit longer, on the side which turns you more into line with your docking. But please do not scull the tiller as this will only increase speed!

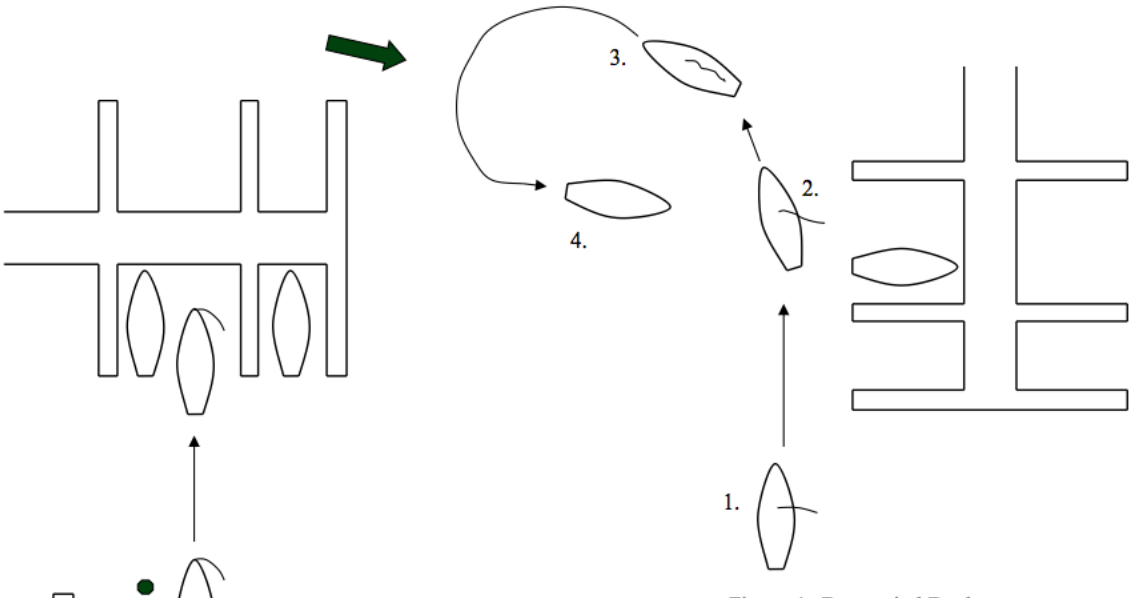


Figure 4. Downwind Dock

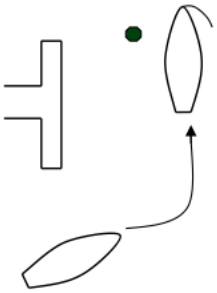


Figure 3. Crosswind docking

5.1.6. When Things Go Wrong

Ideally, you will have a point in your docking approach where you can bail out if you know you can't make it, for example tacking out into the turning basin on a west wind approach if you don't have enough speed to make it into the slip.

But wind shifts and other factors can eliminate your clean bail out options, and you'll have to do something else. What you can do depends on the wind.

On a west or northwest wind, if you can't make the slip and don't have enough speed to make a tack out, you can go down the finger and dock in some other upwind skip. There are many empty ones, and it's a good practice to scan the empty slips as you're walking down J Dock to get to the boat. You should be able to do a standard departure out of the slip you've chosen, and sail into the correct slip.

On a north wind, you're probably doing a jib-only approach to the slip and missing it by having too much leeway, blowing you down south of the slip. Your only option is to go down the finger and go into another slip, which should not be difficult. You will have to motor back to the correct slip.

On a south wind, your bail out will be a sharp turn north. Use tiller snaps and get a lot of weight to windward to turn the boat as hard as possible.

5.2. Other Departing/Docking Maneuvers

5.2.1. Boom Push

You may want to cast off forward, directly into the wind. In this case a boom push can be useful. With the mainsail up, you push the boom forward and away from the dock, stepping on the boat after you do this. The idea is to get both forward speed and turning away from the dock. Ideally, you will go forward and through the wind. Depending on the wind angle, this may involve a tack. The more the wind is across the boat, the more difficult this will be.

5.2.2. Stern Pull

A stern pull is an alternative in a similar situation. In this maneuver, the person on the dock pulls a stern line forward along the dock toward the front of the boat. The idea is the same, to get forward speed and turning away from the dock.

5.2.3. Spinning the Boat

In some departures, you may need to spin the boat in the slip. How you do this depends on the wind direction, but here are the things to consider:

- Think the maneuver through before you do it. Assign crew responsibilities and make sure everyone knows their job.
- Think about the lines you'll need, which side of the boat they need to be attached to, and how long they will need to be. Most likely, you will need extenders to existing dock lines. Use a strong, stable knot to connect the extenders (like a double sheet bend tucked).
- If possible, a person should be on the boat during the spin to use the tiller to facilitate and to fend off.
- Use the wind to your advantage. Think about how the wind will affect the boat during the maneuver, how you can use it, and what you might need to do to correct for it.
- Be sure that the outboard motor doesn't hit anything, and beware of hitting motors on other boats, especially coming into the slip.
- Have fenders out on all sides.
- Note: You may not be able to do this in high winds.

5.3. Docking Problems

5.3.1. Stopping the Boat When You're Too Fast

You can come in too hot for a lot of reasons, and how you handle it depends on the wind conditions and the approach you are using. If you are doing an upwind docking, you can slow the boat significantly by backing the main, but you have to be prepared to do it. This means briefing the crew to be ready to back the main hard on your command.

This will not work on a downwind or crosswind docking. It's helpful to have a line rigged as a breast line to stop the boat. This is a line running to something near the middle of the boat. The crew stepping off can snub the line on a cleat near the aft end of the slip to stop the boat. If you did this with a bow line, the stern would swing out, possibly into the adjacent boat. And it would be impossible to do with the stern line, as there wouldn't be enough room to do it.

You should rig it to something very sturdy near the beam of the boat, like a cleat or a winch (NEVER a stanchion or a shroud). You have to

be careful when you snub it if the boat is moving fast, as the force could break the cleat on the dock or whatever you've rigged it to on the boat. Use three-strand rope if possible, as it will stretch with load. And when you snub it, ease it as it takes up the load.

Another technique is to get onto the dock ahead of the shrouds and push aft against the shrouds with your body.

A last resort is to pull the boat toward the dock using the fenders as brakes. This is a last resort because it will damage the fenders.

5.3.2. Not Aligning With The Slip

You might have a perfect docking, but not be close enough for your crew to step off. Have the crew prepared to get off at the bow if necessary.

6. Sailing the Keelboat

The top priority when sailing a keelboat is to have the boat under control in a safe and efficient manner. Efficiency means that you are sailing with the least effort of your crew, expending the least amount of energy to get where you're going with a boat that has its sail trim and weight balanced for optimal performance. Safety has everything to do with judgment and good planning as well as the ability to recognize and react to situations before they become hazardous. Last but not least, there is the issue of being in control. This does not mean you have to be stoically cool (it is highly recommended that you be excited about sailing and show it). This does not mean you need to be like a military general in ordering about your crew. It means that you know what the boat is doing, where the boat is going, and why it is behaving the way it is at all times. Two very good examples of this are: being aware of sailing by the lee and allowing room to bail out when speed is marginal.

6.1. Light Wind Sailing

Let's begin the discussion of efficiency as it relates to light-wind sailing. In order to be in control of the boat you must get it moving, preferably forward, with some sort of speed. You will want to make the most of any wind to acquire and

maintain forward speed. In light winds, a boat will accelerate and maintain speed best on a beam reach or higher (close reach or close hauled) due to the fact that *apparent wind* will increase as you gain boat speed. Do not point too high or trim the sails too much until steady forward progress is being made and then only do so slowly and with very gentle tiller and sail trim movements.

When it comes to tacking in light winds, the importance of maintaining forward speed cannot be over emphasized. This should be accomplished using the following techniques. Always begin the tack sailing in a straight line from the most windward point of sail that can be made without *luffing or pinching*! This means keeping the sails full and the course straight right up until you begin the tack. The turn should then be initiated with additional crew weight to the leeward side and just the bare minimum amount of tiller. Slowly complete the turn, being careful not to over-steer (pushing the tiller too far too fast, causing the boat to slow down), while ensuring that the jib does not backwind and that both the main and the jib are not over-trimmed on the new tack. Once on the new tack, you'll need to fall off below close hauled and increase speed and pointing as was mentioned earlier, trying to keep sail trim, tiller movements, and weight distribution as steady as possible.

6.2. Boat Speed

This leads into the next related topic, which is probably one of the most important factors in sailing: boat speed. People get nervous when a boat is screaming toward the dock, but there seems to be no concern when the boat is slowing down. It should be just the opposite! More speed equals more control. Typically, the critical element of speed is accelerating quickly in tight quarters while trying to get upwind. It is essential to recognize that sailing upwind, while making minimal leeway, requires forward speed to generate hydrodynamic lift from the keel and rudder. Short tacks upwind in a narrow channel is the proving ground for keeping a keelboat moving at safe speeds (read: the most speed you can get!). So, for initial acceleration, don't try to point too high or trim the sails in too hard until the boat starts moving forward. Then begin to head up and sheet in. Keep your tiller as steady and centered as can be so that the boat will continue to gain and maintain forward speed.

6.3. Loss of Speed

Now, let's discuss the what happens when you lose speed, or, in other words, "being dead in the water" or losing way. A loss of speed usually results from stalling, luffing, using too much tiller, or inefficient boat/sail trim angles.

However, please note that whenever you slow-sail to a dock or MOB recovery you are deliberately losing boatspeed, and the potential exists to lose control as well. When all speed is lost, use backwinding techniques to get the boat in position to sail again. If you are stopped in irons (straight into the wind), back the jib on the side that will push the bow into clear, unobstructed water. You will need to get the boat back up to speed, and this requires room! Pushing the mainsail out and against the wind will usually swing the stern in the opposite direction from where the boom is held out- except when the wind is strong and has already begun to swing your bow as it wants to. A quick note on safety: at the first sign that you may be running out of speed (due to luffing, wind shifts, not completing a tack or being stalled) quickly choose the actions that will put the boat on the tack with the most clear distance to leeward. If you hesitate and try to get back to a close-hauled course only to head up again and tack you will almost surely have lost the speed needed to complete a tack, and then you will be at the mercy of the wind. Don't be concerned that you didn't call out "hard a lee". However, if room allows, quickly fall off and regain speed.

6.4. Slowing and Stopping

All right, we have discussed acceleration and what to do when you have no speed. The opposite situation is how to deliberately slow the boat down in the most effective manner. This skill is essential for docking, emergencies and senior tests. The following are methods for slowing down. Which one(s) you choose will depend on the situation at hand.

- Slow-sailing on a close reach with main and jib luffing in a controlled way.
- Luffing up quickly into the wind until most of your speed has been lost.
- Alternately pushing the tiller hard over to port and then starboard.
- Backwinding the mainsail.
- Dowsing all sails and allowing the wind and the waves to slow you down.
- Motoring in reverse when you have an auxiliary (i.e., outboard motor). Note that with our outboards, it may take some time (and distance) to slow to a stop (multiple boat lengths), unlike more powerful inboard engines.

With a boat already moving at or close to hull speed, the fastest way to slow down is to turn the boat through the largest angle possible and end up pointing above a beam reach with the sails luffing. In this case we're talking about spinning the boat hard with excessive tiller – precisely the things that are inefficient for acceleration. When maximum braking power is called for,

backwinding the main will help considerably. *Slow-sailing* on a close reach will eventually slow the boat down, but this should be avoided because luffing the sails, especially in strong winds, is bad for the sails. Also, if leeway is not taken into account, the desired destination will become more and more of a beat, and pinching, with no speed or power, will be the result. To stop a boat when entering a slip, use dock lines snubbed (wrapped once, so that you can ease the boat to a stop) around dock cleats. Don't snub hard all at once or the cleat could rip out of the dock. Have fenders out, as the boat will rotate in toward the side of the dock. A better method of stopping the boat in a slip is to use a breast line attached near the center of the boat.

6.5. Heavy Wind Sailing

In heavy winds, other than reducing sail area (*reefing*), you should be doing things exactly as in lighter winds, but be aware of some key differences:

- Acceleration and maneuverability become easier with more wind; however, things happen a lot quicker, so be alert.
- The effect of windage on the boat will be more pronounced, causing more leeway and more forces on the bow if you're not in control or if you are heeled over too far.
- Rudderless sailing and jib-alone sailing are generally easier in high winds, but pointing becomes more difficult. Be aware of where you need or want to go!
- Large gusts, especially with a boat that is not up to speed yet, can push you downwind into unfavorable spots in a hurry. In gusty conditions, look for lulls and time departures and other tricky maneuvers to avoid the strongest gusts.

The boat will accelerate faster in high winds, but the boat will still make leeway before heading up, and as speed picks up, you will run out of room that much quicker. As already stated, you should always try to get as much forward speed before heading up a lot or tacking. In high winds, when you begin to slow down for docking, there will be a much more pronounced effect of the wind blowing your bow away from the wind. This will require you to keep more speed and point high enough to overcome these forces. You will find that you do not need to slow sail for as long when docking in high winds because the boat will lose speed faster heading up into a strong wind.

Be aware of the strong increase in *weather helm* (the condition where the boat tries to round up into the wind due to more force aft of the center of lateral resistance). Also, avoid the tendency to spill wind by heading up sharply. Both of these things will cause luffing. This, combined with the high wind of the gust, will cause the boat to lose speed very quickly. Instead, try sheeting out a bit or heading up just enough to almost luff. Due to increased forces on the bow, it will help to use more tiller when tacking to make sure that the boat will get through the eye of the wind. Finally, avoid *lee shores* and lee docks by keeping as safe a distance upwind of them as is practical.

A sailboat is most unstable when sailing off the wind, on a run or a deep broad reach. On these points of sail, waves, especially on the boat's quarter, will try to swing the boat around, creating the danger of an accidental jibe or a broach. This is more pronounced when flying a spinnaker.

To avoid an accidental jibe, watch the telltales to be sure the boat is not *by the lee*. The telltales on the shrouds are strongly affected by wind spilling off the main when off the wind, so use the telltale on the backstay.

A broach causes the boat to head up and heel over sharply. The boat can be knocked down and can ship (take in) a lot of water over the side, especially when flying a spinnaker. When sailing downwind, should you feel the boat start heeling to leeward and heading up, try easing the sheets and falling off to bring it back upright. In heavy winds it is also useful to have someone holding onto the vang and release that if the boat suddenly heels. Should the boat broach, release all sheets and bail out any water taken in.

In general, and especially when flying a spinnaker, try not to overcompensate for wave action, as you could get into a death roll, heeling back and forth. It is better to undercorrect than to risk overcorrecting. Remember that the boat takes a second or two to respond to the helm, so anticipate, and give the boat time to answer.

When sailing on the wind into high waves, you will probably get wet. Water breaks over the bow and the forward gunwales as the boat falls off of one wave and crashes into the next. The best way to avoid this crash and the water it brings is to fall off (i.e., head down) a bit at the crest of the wave so that the boat slides smoothly down the wave. In practice, as the boat climbs the wave, start to fall off so the boat slides down the other side without pitching down rapidly and then head up to your course until the next wave. You will end up sailing a zigzag course and your arm will get tired, but you and your crew should get less wet.

6.6. Leeway

When sailing on a reach or higher, a boat will almost certainly be making some *leeway*. An experienced sailor usually has a good sense of when the boat is making excessive leeway. You can observe leeway by simply focusing straight ahead as you sail upwind. You should notice that the boat is slightly slipping to leeward. Next, look for fixed objects ashore that can be used for ranging. *Ranging* is the practice of lining up (in the direction you are heading) two objects, one nearer and one farther. For example, pick a mast of a boat and a tree in the distance. If they appear to stay in line then your course is steady in the direction of the ranging objects. If one object appears to be moving relative to the other, then your boat is getting off your intended course, usually because of leeway (note: it helps if you decide on a destination/dock/buoy/person overboard etc. before you pick out range objects).

When a keelboat has lost speed or is in the process of accelerating, particularly when sailing upwind, the boat will make the most leeway. Account for leeway by sailing a course slightly higher than where you intend to go. This is especially true when slow-sailing in heavy winds. When close hauled and sailing into a channel, always stay on the upwind side to allow for leeway (and wind shifts). Remember, when a boat is making excessive leeway, the keel and rudder are stalled and you must regain forward speed to regain control. This means that you must fall off a bit, so make sure you've given yourself some room to leeward!

6.7. Jib-Alone Sailing

Jib-alone sailing can be very boring and frustrating and make a student feel like they are wasting their time, but it is an exercise that is highly instructive and will make you a much better helmsperson. Just as in light wind sailing, it is important to have the boat begin to move forward with some speed before sheeting the jib in tighter and heading up higher. You should be able to sail a fairly respectable close reach and complete tacks if energy is conserved, crew weight is used to help steer, and overuse of the tiller is avoided.

6.8. Circles

You can make a very tight circle in a keelboat by just throwing the tiller hard over with the main sheeted in all the way. Why you would want to do this is to slow down and get out of the way of other boats, for example, when coming

down the fairway in the marina. It's an easy maneuver, but you have to watch out for leeway, as you'll be pushed more downwind with every circle.

6.9. Crew Overboard Recoveries

You've learned how to do COB recoveries in a dinghy, so we'll build on that for keelboats.

The main idea, regardless of the type of boat, is to come to a stop alongside the COB to retrieve them safely. There are various methods of doing this, and each has its advantages and disadvantages. For your Senior rating, you will need to demonstrate competence in several of these, but that is mainly to demonstrate your sailing skills generally. In real life, you should be very skilled in one method, and you should use it automatically if someone falls off the boat.

The dinghy maneuvers you learned for COB all work on keelboats, with some adjustments. At Cal Sailing, we teach the broad reach out/close reach back technique. You go immediately to a broad reach, then tack back and sail to the COB. You should be on a close reach, so you can slow-sail to the COB and stop right next to them. There is more detail in the Cal Sailing Dinghy Manual.

This maneuver works on a keelboat, but you pick up the person on the leeward side instead of the windward side, as it's lower and easier to do. Note that on a dinghy, you do the maneuver pretending to pick up the person on the windward side (for reasons we won't discuss here), but they will usually come in over the transom because it's easiest. On a keelboat, you will actually retrieve the person over the side of the boat, and the leeward side is easiest.

The keelboat is bigger and heavier, and there are potentially things flogging, like jib sheets, so you have to pay attention to where on the boat you recover the person in the water. Ideally, it will be amidship (the widest part), and no farther forward. his affects your approach, and there are several ways to visualize it. One is to keep the person in the triangle formed by the boom, the mast, and the vang as you approach. Another is to think about sailing the leeward shrouds to the COB. When you practice this, you will get very close to the target, but in real life you generally don't want to be that close, as you risk hitting the COB. In general, keep sailing just upwind of the person. Line tossing distance is fine as long as the person is conscious and able to grab and hold a tossed line. You should have lines ready and crew prepared as you approach the person.

Another issue on the approach is the jib. You're slow-sailing, so you typically don't want any power from the jib. On a boat with roller furling, you can just furl it. Our keelboats (other than the J/80) don't have roller furling, so you don't have that option. If you let the jib loose, it flogs, and that creates problems. One is that the sheets flog with a fair amount of force, enough to injure someone on the boat or the COB if it hits them. The other is that it creates a lot of noise. If a person falls overboard it's a stressful situation, and all that noise makes it even more stressful. So a flogging jib is the last thing that you want.

The answer is to back the jib; in other words, just leave the sheet cleated when you tack around from the broad reach to your slow-sailing course. You will have to make sure the jib doesn't pull you downwind too much, but you can just ease it after the tack enough to just prevent flogging, and you should be fine.

Students often ask how far to go away from the COB before you tack. The answer is as little as possible in order to do the maneuver. When you are learning COB recovery, you will tend to go farther away, as it allows you more time and space to get set up, but in real life you should try to stay as close to the COB as you can. The farther you go, the more stress you create in the COB, the longer they will spend in the water, and the higher likelihood you will lose them in the wind and the waves. With practice, you can do a broad reach out/close reach back procedure without getting very far from the COB.

As you approach the person in the water, turn into the wind by moving the tiller hard toward the person. This may seem counter-intuitive, but it swings the stern toward the person as you turn into the wind.

Another method, developed by the US Naval Academy called the Quick Stop method, is designed to keep you close to the COB throughout the maneuver. We teach and practice it, and you can find out about it here.

Mainly we focus on COB maneuvers and don't often practice getting the person back in the boat, which is much different on a keelboat than it is on a dinghy. If the COB is a larger size, it complicates things. All of our keelboats carry a Life Sling, which can be used to hoist a person onto the boat. The information is here. You can practice using the Life Sling at the dock. You do not want to try to figure this out when it happens to you on the Bay.

At night, you have to be careful not to lose the person in the waves. Some skippers require all passengers at night to carry a waterproof flashlight or a water-activated strobe light. Others have a floating lantern handy that they can toss into the water to mark the location. Most marine GPS systems have a button to mark a location.

The key to successful COB recovery is practice, and you should continue to do it after your training is completed. If it happens to you in real life, your response should be automatic.

6.10. Night Sailing

Sailing at night is different from sailing during the day. It is more difficult to tell the wind direction, especially on a moonless night. The telltales and the sails are harder to see, and a slight luffing of the sails may be hard to detect unless the wind is strong. You may shine a flashlight on the sails periodically to see if they are luffing, but you must rely more on the feel of the boat than on visual cues. Familiar landmarks appear very different at night. Details seen during the day disappear and are replaced by patterns of lights. An important example of this is the entrance to the Marina, which can be difficult for the novice to spot amongst the background lights. The cement breakwater has two flashing lights, while the rock breakwater has three. The Marina entrance itself has two flashing lights that are higher and usually lost in the glare of the parking lot lights. The characteristics of the breakwater lights are, from north to south:

- northeast end of concrete breakwater, 4 second flashing red
- southwest end of concrete breakwater, 4 second flashing green
- north end of rock breakwater, 2.5 second flashing red
- center of rock breakwater, quick flashing white
- south end of rock breakwater, quick flashing green

Other hazards to watch for are:

- the "3" mark: flashing green light near the pier
- the Berkeley Pier: the concrete fishing pier is well lit with lampposts, but there is only a dim red flashing light at the west end of the wooden part of the pier, which is mostly just pilings now. There is no safe passage through except at the end of the lit portion.

- the Berkeley "reef": a green flashing light north of Marina
- Olympic circle buoys: unlit

6.11. Anchoring

A keelboat is somewhat more difficult to anchor than a dinghy since the keelboat can't be sailed backwards with any degree of control and the forces involved are larger. The procedure is the same as with a dinghy, except that the anchor should be let go just as the boat loses forward speed. A keelboat will be more stable at anchor with the sails down, especially the jib. An alternate method for anchoring is to lead the anchor line (and anchor) forward to the bow chock then around the outside of the shrouds to the stern. Sail upwind of the desired spot, lower the main and sail down wind, luffing the jib. Drop the anchor over the stern and let out enough line to set the anchor. Snub the line around a cleat to set the anchor. When the anchor is set, lower the jib and release the line from the stern, allowing the boat to swing around.

If you expect to leave the boat anchored for a while (like overnight), it may be desirable to set out two anchors to help keep the boat from dragging. If your anchor line is long enough, this is easy. Simply let out the line to the end and drop the second anchor off the stern. Pull in on the first anchor and set the second anchor by giving it a smooth but firm tug. Be sure to allow enough slack in the lines for the tide to come up. If the main anchor line isn't long enough, you should set the second anchor using a dinghy.

Some of the key points to anchoring are:

- Know the depth and let out plenty of scope, typically 5:1 or more.
- Under sail, you will need to let the boat blow downwind, usually with jib only or bare poles if the wind is strong, and paying out scope from bow (over the side) or stern.
- “Set” the anchor by snubbing easy at first and then hard to kill all boat speed and spin the boat back around head into the wind.

6.12. Reefing

Reefing on the keelboats is similar to reefing on the dinghies. Although it can be done with the help of the crew, you should be able to do it by yourself (you will need to demonstrate this in your practical keelboat test). Single-handed reefing can be done in one of two ways. The first method is to heave to. After easing the outhaul and completely slacking the vang, heave to and reef the main. You might

experience some difficulty in getting the reefing clew down to the boom if the main isn't completely luffing. This method would also be inappropriate near the sea wall or pier. The second method is to sail tillerless. It should be possible to get the boat balanced so it maintains a course with no one at the helm while you reef. Since you'll want the main to be fully luffing, try countering the tendency of the jib to push the bow off the wind by getting the crew weight to leeward. To speed things up a bit, you can take the end of any convenient line and use it to measure the distance between the regular tack cringle and the reef tack cringle. Then, measure out this distance on the tail of the main halyard, starting from the cleat. You can let out just the right amount of halyard, cleat it off and then go to the mast, pull down the main, and attach the Cunningham. Sweat your reefing line to get the clew tight against the boom, cleat it, sheet in the main, and then go back and clean up halyards, the vang, the Cunningham, and the reef ties.

6.13. Headsail Changes

Instead of reefing, as is done with the mainsail, a different jib is rigged. Normally, this is done on a close reach. The jib sheet is eased until the sail luffs, then the halyard is eased as the jib is dowsed onto the foredeck. The halyard is undone, securely fastened, the sail is derigged, and the new sail is rigged.

Changing jibs underway is pretty straightforward, although in higher winds and waves, this can be challenging for the crewmember on the foredeck. They will need to coordinate with the crewmember controlling the jib halyard when dowsing the jib. It is vitally important that the crewmember have a firm grip at all times to avoid going overboard. When removing or clipping hanks on the forestay, it is a good idea to wrap your arms around the forestay. If the boat is heeling a lot, you may need to brace one foot against a cleat, the toe rail, or the base of a stanchion. The helmsperson should try to keep the boat as flat as possible. The jib coming down and the jib going up should always be connected in some way to the boat when they are on deck. It is sometimes easier to keep the new jib in its bag when carrying it to the bow.

Changing jibs on a reach or even downwind will make it more comfortable for the person on the foredeck. The downside is that you will lose upwind distance.

6.14. Spinnaker Usage

The purpose of this section is to introduce and familiarize students with the rudiments of spinnaker usage and its related terminology. Obviously, some things cannot be learned simply by reading about them; therefore, you are encouraged to observe and practice with skippers experienced in handling spinnakers. Whatever happens, don't be discouraged – spinnaker handling is probably the most challenging aspect of keelboat sailing.

6.14.1. Launching the Spinnaker

The first step is to determine which side you want to set the spinnaker on (i.e. your intended course) so you can place the spinnaker pole, afterguy, and sheet accordingly. For example, if you wish to broad reach on port tack, then the pole and the afterguy will be on the port side and the sheet and the halyard will be on the starboard side. Feed the afterguy through the spinnaker block, outside the jib sheet, shrouds, and jib (if up), and attach to the forestay. Next, similarly run the spinnaker sheet through the spinnaker block, then take it to the forestay, outside everything, and attach the end to the forestay or the afterguy. Attach the spinnaker turtle bag, which should be packed with the three corners showing (see "Folding the Spinnaker" below), to the forestay. Attach the halyard to the head of the spinnaker, the sheet to one clew, and the afterguy to the other clew. The head and the clews are often marked as such, but symmetric spinnakers are nearly always made with tape of different colors sewn on the edges that allow you to identify the corners of the sail. One leech usually has red tape, and the other has green or blue tape, while the foot usually has white tape. Ensure that the halyard and sheets will not cross when raising the spinnaker.

Take the pole from the cockpit to the foredeck. Attach the topping lift to the pole bridle. The jaws on the ends can be up or down; some prefer one way or the other. Attach the foreguy to the other pole bridle. Attach one end of the pole to the ring on the mast and the other end to the afterguy. When not in use, the topping lift is attached to the mast ring and the foreguy is usually clipped to the block on the foredeck or itself, around the block.

Raise the pole to the horizontal position with the topping lift while easing the foreguy.

The sail is now ready to be raised. As one crewmember hauls in the halyard, another hauls in the guy until the windward clew of the sail is tight against the outboard end of the pole and the pole is approximately in line with the boom. The guy slides through the pole jaw (end fitting) until it reaches the knot where the guy is attached to the clew of the sail. As the sail fills, the pressure on the pole

allows the guy to control the pole. On a beam reach, be careful that the pole does not touch the forestay. It is important to hoist the spinnaker completely as quickly as possible. As the sail fills, there is more tension in the halyard. Also, if the head of the spinnaker is not touching the mast, so that part of the halyard is visible between the head and the mast, the sail can begin to oscillate, causing the boat to start rolling.

Now sheet in the sheet, which has been allowed to be slack. If the sheet is not trimmed enough, the sail will collapse (it won't luff like a jib), but if the sheet is over-trimmed, the sail is stalled, which causes drag and pulls sideways and could cause a broach. Normally, you play the sheet by easing it just enough that the luff of the spinnaker starts to curl, then sheet in to smooth out the curl.

The two clews should be the same height above the deck. How low or high they are will affect the sail shape.

With the sail set, think of it as a big jib. When you fall off, ease the sheet but in addition bring in the guy. Conversely, when heading up bring in on the sheet and ease the guy. Try to keep the pole square to the wind (you can tie a telltale to the pole to help guide you).

6.14.2. Folding (Packing) the Spinnaker

In order for the spinnaker to be properly launched, it must not be twisted or tangled. To ensure that the spinnaker is not twisted, it is necessary to make sure the foot and both leeches are all free of each other. One way of doing this is as follows: one person sits with the spinnaker bag in their lap, locates both clews, and sits on them. He/she then gathers the foot, making sure that it is free of the rest of the spinnaker. The foot is then stuffed into the bag and the leeches are gathered, again making sure they are free of the rest of the spinnaker. At this point it helps to have a second person gather one of the leeches. While holding the leeches so they don't tangle, the spinnaker is then stuffed into the bag (it's usually best to put the leeches on top) leaving the head and both clews out. For a larger spinnaker (especially if only one person is packing) it may be necessary to stuff the middle of the spinnaker into the bag first, then recheck the leeches before stuffing them into the bag.

6.14.3. Jibing

The spinnaker pole has a line or lines that open the jaws at the ends of the pole for the "end to end" jibing method, first open the jaw at the mast end. Move the pole across the boat (it may be necessary to ease the foreguy) and clip the jaw to the sheet, so it becomes the new afterguy. Release the pole from the old afterguy

(now the sheet). Push the pole out and clip the free end to the mast eye. Snug the foreguy if needed. The main may be jibed as soon as the new afterguy is secured, but it is usually better to wait until the pole is reattached to the mast eye. During a jibe, the crew must be alert to prevent the spinnaker from wrapping on the forestay.

6.14.4. Taking Down a Spinnaker

Change course to blanket the spinnaker behind the main or jib. Allow the afterguy to run free, and gather the foot of the spinnaker behind the main (the halyard may be eased slightly to help). Let the halyard out as fast as the crew can gather the sail into the cockpit. Don't let the spinnaker drag in the water as it can be very difficult to retrieve.

6.14.5. Miscellaneous

The spinnaker can get wrapped on the forestay. There are three ways to get it off without lowering the sail. First, head up and see if it will clear itself (this only works if there's only one wrap, otherwise it could make it worse). Second, fall off, sailing slightly by the lee, so the spinnaker is blanketed by the main, and tug on the sheet and the afterguy (not too hard or you will rip the sail). Head up as soon as the spinnaker is free, or it might wrap again. Third, send a crewmember to the foredeck to unravel it (this may require you to lower the sail part way).

A jib may be set in addition to a spinnaker. This depends on the conditions and the course. Jibs are more useful on beam reaches and shallow broad reaches than on a deep broad reach or a run. In very light winds, never set the jib with the spinnaker because the jib will disrupt the airflow around the spinnaker, and though you are carrying more sail, you actually go slower.

Spinnakers are great fun, but they are also large, powerful sails and must be respected as such. Experienced crew can use them safely on the keelboats in winds up to 15 knots. Inexperienced crews are likely to broach in this much wind. It is wise to have experienced crew aboard if you wish to fly a spinnaker in winds over 10 knots.

A broach is when the boat heels excessively such that the boat will alter course of its own accord. In extreme cases the skipper is unable to control the boat without proper action from the crew. If the broach is severe enough, the boat may take on water and possibly sink. Depending on the course, the boat may broach to windward or to leeward (defined by which way the boat heels). Of the two, a broach to windward is more dangerous since the boat will fall off and may accidentally jibe. The spinnaker pole can also go in the water, causing it to break.

A broach to windward usually occurs when the boat is on a run with the spinnaker out to windward. If the boat starts to broach to windward, head up slightly. If that doesn't work, ease the afterguy forward and pull the sheet in. This moves the spinnaker toward the center of the boat, reducing the pull on the mast to windward.

A broach to leeward usually occurs when the boat is on a beam reach or beamy broad reach. If the boat starts to broach to leeward, fall off. It may help to ease the sheet slightly and bring the pole back. You should also let the main out and release the boom vang to reduce the force on the main. If the skipper is unable to get the boat to fall off, the spinnaker sheet must be pulled in to pull the bow downwind.

With practice and experience, the spinnaker is not difficult in theory or operation. It is a skill worth knowing, but in stronger winds one must remember that it is a fast, powerful sail. Skippers not wholly familiar with its operation are urged to be respectful of the sail's power.

7. Sail Aerodynamics and Trim

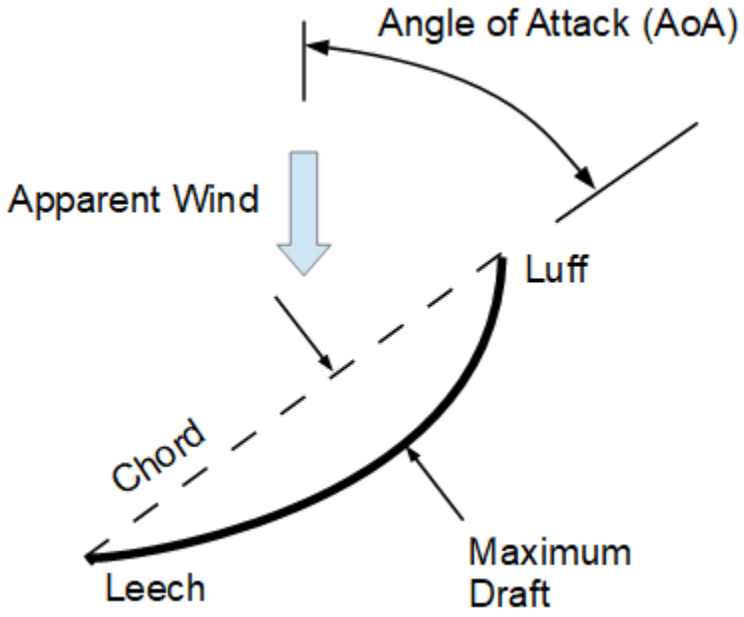
This is a very brief discussion. For more details on sail trim and spinnaker handling, see The Annapolis Book of Seamanship by John Rousmaniere.

7.1. Airfoils

Sails, like airplane wings, have a specific shape to generate lift. The sail's cross section creates an airfoil. Sails, being flexible, allow sailors to change the shape of the airfoil of the sail, thus generating more or less lift as the conditions require. The same principles apply to rudders, centerboards, etc. that are in the water.

The contour of a sail has a lot to do with how much "power" (lift, actually) it generates. The wind flows essentially horizontally over the sail, so we need to look at the sail shape from the wind's point of view. Imagine if the sail were rigid and you were to cut through it in a horizontal plane (in other words, the cross section from a view looking along the mast). Because sails are made mostly of fabric or plastic film, what you see is basically a 2D curve, as shown in the figure. Sailboat rigs are very much like airplane wings, and although this curve does not look like the kinds of airfoils you typically think of for airplane wings or other lift-generating surfaces, it is nevertheless an airfoil. Because sails are so thin and flexible, sailors can change the shape of this curve, thus generating more or less

lift as the conditions require. The curve can be different in different parts of the sail, too.



As shown in the diagram above, the chord is an imaginary line between the luff and the leech. At the foot of the sail, the boom is pretty much the same as the chord. The angle between the chord line and the apparent wind is known as the angle of attack. The angle of the boom essentially defines the angle of attack in the lower part of the sail (which affects the angle of attack in the upper part of the sail). The angle of attack is another parameter that controls the amount of lift generated by the sails. The angle of attack can be different from the bottom of the sail to the top, too. This is known as twist.

The draft, or camber, refers to the curvature of the sail, when viewed from above/below. Generally, the point of maximum draft should be slightly forward of the midpoint. The maximum draft should be around 10 percent of the chord, but this varies a lot depending on the conditions. In general, more draft generates more lift, but less draft is less sensitive to puffs.

The draft is partly determined by the cut of the sail, but all of the control lines for a sail, and even the mast, can be used to change the tension in different parts of the sail and thus alter the draft, the angle of attack, and the twist.

7.2. Sail Trim

To systematically trim the sails, shape the jib before the main sail. Then adjust, in the following order, the Cunningham, the outhaul and the boom vang. You can use the acronym COB to remember the order. Then use the feel of the tiller as a meter of how the boat is balanced.

The main controls available for changing the draft in the mainsail are the outhaul and the Cunningham. The outhaul controls the amount of draft in the bottom part of the mainsail. The Cunningham is used to adjust the location of the maximum draft. More Cunningham tension will move the point of maximum draft forward; less tension will move it aft. If the boat has a mast that is set up to bend, that can also be used to change the draft. If the sail has a leech line, that also has an effect. On jibs, the sheet tension affects the draft.

The mainsheet and the traveler control the angle of the boom, and together with the vang, they control the tension in the leech of the sail, which controls the twist in the sail. On jibs, the sheet and the fairlead car position control the angle of attack and twist.

As the wind comes up, you will want to reduce heel. The most obvious way is to ease the sheets. This will reduce the angle of attack but will also change the twist. Easing the traveler on the main without easing the mainsheet reduces the angle of attack uniformly. Another way to reduce heel is to increase the twist in the sail so that the angle of attack in the upper part of the sail is reduced, thus reducing the lift force generated there. On the mainsail, you have the controls already mentioned. With the jib, you can adjust the sheet tension and the position of the car. Moving the jib cars aft reduces the downward tension of the jib sheets, which creates more twist in the jib.

7.3. Mast Bend

On some boats, it is possible to control the fore-and-aft bend in the mast. Bending the mast reduces the mainsail draft (i.e., flattens the sail) and moves the draft farther aft. Less draft depowers the sail. It also increases the tension in the forestay, which tends to flatten the jib too.

The rigs on the Merits and the J/80 are designed to allow mast bend; the rigs on the Commanders are not. Increasing the backstay tension will cause the mast to

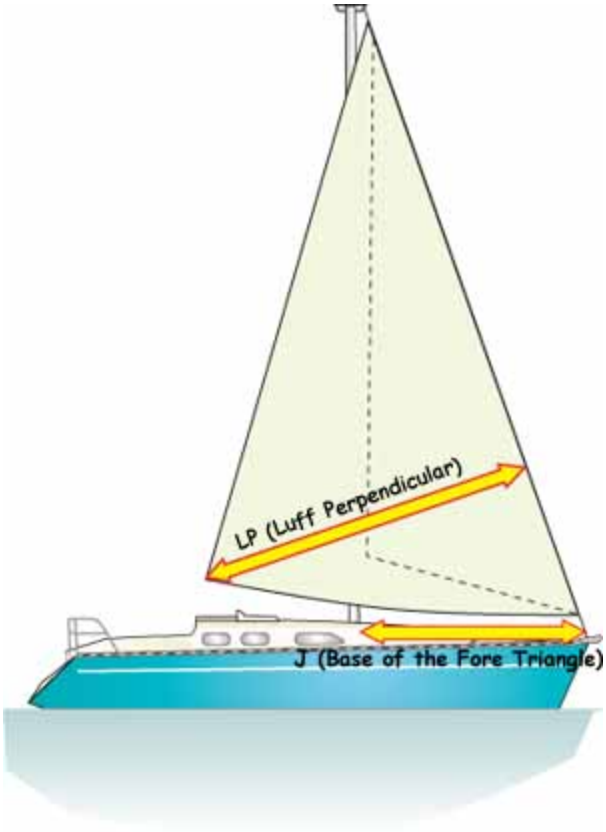
bend. Tightening the boom vang puts bend in the bottom part of the mast. Tightening the mainsheet puts bend in the top part of the mast.

7.4. Sail Area

Another way to control the amount of lift that the sails produce is to change the sail area. This means reefing/un-reefing the mainsail and changing the headsail (jib).

Most dinghies have a single reef on the mainsail. Keelboats usually have more, allowing you to shorten sail further. Most of the club's keelboats have two sets of reef points and two reefing lines . The first reef will reduce the mainsail area by 25-30%, while the second will reduce it by almost 50%.

Jibs are made in different sizes. Sometimes, jibs will be referred to as #1, #2, etc., This refers to the sails for a specific type of boat, so the actual sizes will differ among boat types, but #1 is the largest jib, called a genoa, and higher numbers mean smaller jibs. The other way to refer to jib sizes is with a percentage; common sizes are 75%, 95%, and 110% (often, sailors simply say the number). The percentage is the ratio of the sail's luff perpendicular (the shortest distance between the clew and the luff, which will be perpendicular to the luff) to the boat's "J" measurement, which is the horizontal distance between the bottom end of the forestay and the mast. In practical terms, a 100% jib will have a clew that is nearly even with the mast when rigged. A 95% or 110% jib is a good first choice for an average day on the Bay. A 75% jib is small and is rigged for high winds. On light-air days, you can break out the 130. Our boats generally have 3 jibs on board: a 75, a 90 or 110, and a 130 or 140. The Commanders also have a drifter, which is a very lightweight genoa intended for when the wind is so light you have a hard time getting a jib to fill (5kn and under). Often called the yellow screecher, because it is so large and yellow it screams at you visually.



7.5. Heel Angle

The recommended heel angle is 15 degrees for the Merits and 20 – 25 degrees for the Commanders. In addition to the sail controls already mentioned, you have the option of shortening sail—reefing the main and changing to a smaller headsail—if the boat consistently has too much heel.

7.6. Weather Helm

Weather helm - having to pull the tiller to windward to maintain your course - is an indication of how well the sail forces are balanced. A little weather helm is okay, but a lot indicates that you are overpowered, which is not fast. Excessive weather helm usually accompanies excessive heel.

8. Tides & Navigation

8.1. Tide Data

With the keelboats, we do not have to worry about running out of water as we do with the dinghies. However, it is still important to know the tides because certain places, particularly around the marina entrance, can be a problem at low tide.

Tide information is available online. Printed tide tables are available at local chandleries as well as some sporting goods stores and fishing gear shops at low cost (sometimes free!). Note that the tide predictions given in the tide tables are made for the Golden Gate Bridge. Corrections are then added for the water level and the time at different locations around the Bay. These corrections are listed in the tide tables. The water level at Berkeley is not much different, but the time is around a half hour later. Note that tide predictions are based on long time frames and do not consider shorter term factors such as rainfall, river runoff, etc.

8.2. Tide Rule of 12

1st Hour	1/12
2nd Hour	2/12
3rd Hour	3/12
4th Hour	3/12
5th Hour	2/12
6th Hour	1/12

The change in tide is not equal across the 12 hour cycle. It moves slowly in the first hour, increases in speed, moves the most rapidly in the third and fourth hour, and then slows from the fifth hour till it reaches the peak/trough. Each six hours follows the same cycle.

Currents in the Senior Keelboat Area are generally weak since it avoids the deeper shipping channels.

8.3. Common Hazards in Senior Keelboat Area

- The Berkeley pier. There is only one gap that is safe to traverse, and that is the one closest to land. Even there, stay clear of the west side of the gap, as there are old supports that go down diagonally from the west side.
- The Ashby Shoal. This is just to the west of the channel to the Emeryville Marina between the first two sets of channel marks.
- The Berkeley Reef. This is north of the Marina entrance, roughly west of the north tip of Cesar Chavez Park, and is marked by a green lighted daymark, which can be hard to see. Stay well clear of it, especially on the east side.
- The Berkeley Marina entrance. Pay attention to the tides. Avoid the north entrance in lower tides, and use the south entrance in very low tides. There is a shallow area parallel to the rocky sea wall, and it's now marked by white buoys.

8.4. Piloting & Ranging

- Ranging: select 2 stationary objects in line on the horizon and see if they are moving or rotating with respect to one another. You can use this when docking to line up your approach, to make sure you're not drifting sideways in current.
- Waves always break parallel to a beach. If you see the waves change direction abruptly, you may be approaching a shore.
- Waves break when the water gets shallow and can be used to find a position on a chart based on water depth.
- Drift: look behind the boat at the wake. The wake will shift due to the current flow.
- Collision course: Look at the approaching boat, imagine a line going from your eye to that boat, and see where that line intersects a fixed point on your boat, like a shroud. If that point doesn't move as the boat comes closer, you are on a collision course.

9. Rules of the Road

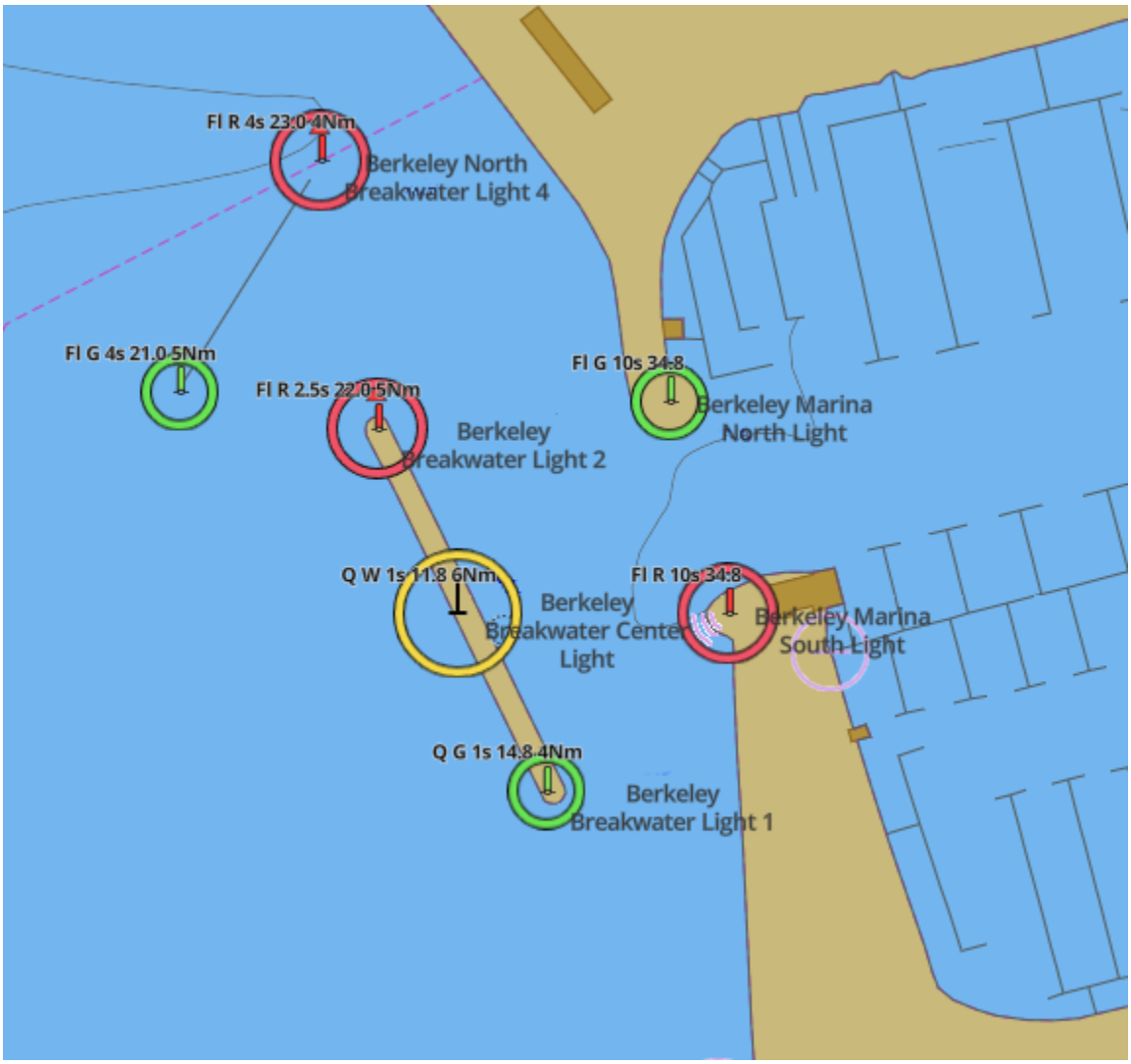
- The rules of the road (US Coast Guard, Navigation Rules International – Inland) are US law and you can be fined for violating them. The important ones for us are:
  - Rule 5: Maintain a proper lookout
  - Rule 6: Travel at a safe speed
  - Rule 7: Actively assess risk of collisions
  - Rule 8: Take positive corrective maneuvering action in proper time
  - Rule 12: For two sailboats, port tack gives way to starboard tack
  - Rule 13: Overtaking –A boat of any type overtaking another boat of any type must give way to the boat being overtaken
  - Rule 18: Motor boats (including sailboats motoring) must give way to sailboats, but sailboats must give way to large vessels in narrow channels or shipping lanes; vessels engaged in fishing; or vessels not under command
  - Rule 25: At night, sailboats above a certain length (all of our keelboats) need to display specific running lights: a stern light (white) and sidelights (a red light on port and green light on starboard); if motoring, they also need to have a steaming light.
  - Rule 30: Use all around light when anchored.
  - Rule 33: Have equipment for making sound signals (air horn or athletic whistle), as listed in the appropriate section of this manual

10. Aids to Navigation (ATONs)

An Aid to Navigation (ATON) is a visual structure or item used to assist with orientation and navigation.

The following are the important ATONs for the Marina entrance. There is a rock wall in front of the entrance with red and green lights, as well as a white light in the middle. There is also a concrete wall to the north, oriented SW marked by red

and green lights, and marina entrance lights behind the breakwalls. See NOAA Chart 18649 for details.



The Berkeley reef ATON is: Fl G 2.5s 3M “1”.

The “D” marker for the Olympic circle is: Fl G 4s 15ft 4M “3”

The outer end of the Berkeley pier is marked with: FL R 4s 15ft 4M “2”

11. VHF Radio Communication

Channel 16 is reserved for (1) emergencies and (2) *establishing* communication from vessel to vessel.

It's important to conduct your communication efficiently. Think about what you want to say before you press the talk button.

To hail another vessel, listen to the channel before talking to determine if anyone else is talking or an emergency is going on. Don't interrupt emergency traffic (unless you have another emergency).

Communicating with another vessel proceeds as follows:

1. "[Other boat name] this is [Your boat name]." If the channel is not loud and clear, say "[Other boat name] [Other boat name] [Other boat name] this is [Your boat name] [Your boat name] [Your boat name]."
2. Wait for a reply. If there is no reply, try again in 2 minutes.
3. The other boat should reply with "[Your boat name], this is [Other boat name], over." When the other boat replies, say: "[Other boat name] switch [channel number], over." Say the number of the channel as two distinct numbers. e.g. six nine. Use the channels listed in the back of your tide book to communicate with recreational vessel traffic.
4. Say "Over" at the end of each transmission to let the other vessel or station know you are listening for a response. When you no longer wish to communicate, say "[Your boat name] Out." Therefore, NEVER SAY "Over and Out"; this is a contradiction.

Types of Calls for Hazardous Situations

- Mayday - Used for emergencies when there is grave injury or immediate risk of loss of life or vessel.
- Pan Pan - When there is a potentially dangerous situation that could lead to a mayday but no immediate danger exists yet.
- Sécurité - Used to alert the Coast Guard or other vessels to a danger, like a floating log in a channel or a broken navigation light.

Emergency

If you have an emergency, the coast guard will ask you:

- Who are you?
- Where are you?
- How many people are on board?
- Are they wearing PFDs?
- What is the nature of your distress?

12. Glossary

apparent wind. The direction of the wind felt on a moving boat. For you scientific types it is the vector combination of the wind due to boat speed and true wind.

boom lift. A line that lifts the boom, rigged to the aft end of the boom.

by the lee. When sailing on a run and the wind direction is beginning to get on the same side of the boat as the boom you are sailing by the lee. The risk of an accidental jibe is high. Jibe or head up at once and keep all heads down.

CLR (Center of lateral resistance). The point on the boat hull where the sum of all the forces applied to all the hull components, including the keel and the rudder, are applied.

COE (Center of effort). The point on the boat's sail plan where the sum of all the forces applied to all the boat topsides, rigging, and sail plan components, are applied.

foreguy. Prevents *spinnaker pole* from lifting up.

guy or *afterguy.* The windward spinnaker *sheet* is called the guy because it functions to harness both the sail and the *spinnaker pole*, whereas the *sheet* controls the leeward clew of the sail only, much as the leeward *sheet* of a jib.

lee helm. The boat feels as if it wants to fall off, or turn downwind, and compensating action with the tiller to lee is required to go straight. The opposite is weather helm.

lee shore. That shore being buffeted by onshore winds. From the boat it is the shore directly downwind of your boat. Always give a wide berth to lee shores and anchor or motor if unable to sail away.

leeway. The difference between where you're pointing and where you're going. Due to the side forces on boat and rig not in balance with resistive forces of hull, keel and rudder. Most noticeable at slow speeds when the keel is stalled.

luffing or pinching. If the sails are fluttering along the luff (leading edge of sail), you are luffing and must sheet in more. If already sheeted in tight, the boat is sailing too high into the wind (pinching), and you must fall off to a close hauled course.

reefing. When the wind builds and you begin to notice lots of *weather helm*, you need to reduce sail area. If you start with the maximum sail area, I would first change from a Genoa jib to a working jib, or 110%. After that, it is time to take

your first reef in the mainsail (note: Merits have only one reef point, while the Commanders have two). When this becomes too much to handle, again, change to small/er/est headsails. Finally, consider storm jib alone and if God forbid that is too much go bare poles.

sheet. A line used to control the movable corner(s) (*clews*) of a sail.

slow-sailing. Technique, where, on a close reach, you ease sails sufficiently to keep steady, controlled but quite slow boat speed. It is critical to maintain close reach course, typically by pointing a bit higher than what you're aiming for to account for leeway.

spinnaker. A triangular, balloon-shaped foresail used for reaching and running. It is rigged with a *spinnaker halyard,* the *spinnaker blocks,* a *spinnaker sheet,* a *spinnaker pole,* a *guy* or *afterguy,* a *topping lift,* and a *foreguy* or *downguy.*

spinnaker blocks. There are two of these, located aft of the tiller. *Spinnaker sheet* and *guy* are run through them to the winches.

spinnaker halyard. Like other halyards it raises the sail.

spinnaker pole. Holds one clew to windward.

spinnaker sheet. Line that adjust the orientation of the leeward corner of the foot of the *spinnaker*. On small yachts such as the CSC keelboats it is interchangeable with the *guy* when the *spinnaker pole* is moved from one corner of the *spinnaker* to the other.

traveler. A traveler is a part of the rigging of a boat or ship that provides a moving attachment point for a rope, sail or yard to a fixed part of the vessel. For our keelboats, it is a movable car on the deck or in the cockpit that the lower end of the mainsheet tackle attaches to, controlling the position of the mainsheet block across the boat.

topping lift. Raises the *spinnaker pole*.

weather helm. The boat feels as if it wants to head up into the wind and compensating action by the tiller is required to go straight. The opposite is lee helm.

13. Recommended Reading

- Steve Colgate, Fundamentals of Sailing, Cruising and Racing.
  https://www.amazon.com/Fundamentals-Sailing-Cruising-Racing-Colgate/dp/0393038114

  Standard book for going for senior that goes over anything sailing related you should need to know for the test.

- John Rousmaniere, The Annapolis Book of Seamanship
  https://www.amazon.com/Annapolis-Seamanship-Completely-Revised-Expanded/dp/0684854201

  A little more detailed and bigger than Colgate's, and more keelboat specific. If you read this, you don't need to read Colgate.

- Frank Bethwaite, High Performance Sailing
  https://www.amazon.com/High-Performance-Sailing-Faster-Techniques/dp/1408124912

  A more advanced book on sail trim and boat speed

- Charles B. Husick, Chapman Piloting & Seamanship
  https://www.amazon.com/Chapman-Piloting-Seamanship-69th/dp/1950785491

  More of a reference for all things sailing and sailboat related. Not something you'll want to sit down and read, but good (almost required) to have on any sailors bookshelf.

- San Francisco Bay Tides and Currents (get from Harbormaster's office)
- NOAA Chart 18649 Entrance to San Francisco Bay
  Purchase:
  https://www.amazon.com/NOAA-18649-Entrance-San-Francisco/dp/B000GUUP68
  View: https://charts.noaa.gov/PDFs/18649.pdf
- NOAA Chart 1 Nautical Chart Symbols Abbreviations and Terms
  Purchase:
  https://www.amazon.com/U-S-Chart-No-Abbreviations-Navigational/dp/1937196291
  View:
  https://nauticalcharts.noaa.gov/publications/docs/us-chart-1/ChartNo1.pdf

- US Coast Guard Navigation Rules International – Inland https://www.navcen.uscg.gov/sites/default/files/pdf/navRules/navrules.pdf
- Cal Sailing Club Operating Rules https://www.cal-sailing.org/operating-rules

14. Appendix 1 – Boat Specifications

14.1.Pearson Commander 26

Hull Type:	Long Keel		**Rig Type:**	Masthead Sloop	
LOA:	26.00' / 7.92m		**LWL:**	18.50' / 5.64m	
Beam:	8.00' / 2.44m		**Listed SA:**	311 ft^2 / 28.89 m^2	
Draft (max.)	3.70' / 1.13m		**Draft (min.)**		
Disp.	5400 lbs./ 2449 kgs.		**Ballast:**	2500 lbs. / 1134 kgs.	
SA/Disp.:	16.21	**Bal./Disp.:**	46.30%	**Disp./Len.:**	380.74
Designer:	Carl Alberg				
Builder:	Pearson Yachts (USA)				
Construct.:	FG		**Bal. type:**		
First Built:	1965	**Last Built:**	1967	**# Built:**	310
RIG DIMENSIONS KEY					
I:	31.50' / 9.60m		**J:**	9.50' / 2.90m	
P:	27.00' / 8.23m		**E:**	11.90' / 3.63m	
PY:			**EY:**		
SPL:			**ISP:**		
SA(Fore.):	149.63 ft^2 / 13.90 m^2		**SA(Main):**	160.65 ft^2 / 14.92 m^2	
Total(calc.)SA:	310.28 ft^2 / 28.82 m^2		**DL ratio:**	380.74	
SA/Disp:	16.18	**Est. Forestay Len.:**		32.90' / 10.03m	
BUILDERS (past & present)					
More about & boats built by:			Pearson Yachts		
DESIGNER					
More about & boats designed by:			Carl Alberg		
SEE ALSO:					
Related Boat:			ARIEL 26 (PEARSON)		
NOTES					
Same hull as Pearson ARIEL but with a longer cockpit and shorter coachroof. The designer (Carl Alberg) owned a COMMANDER himself, in his later years. An Atomic 4 inboard was available as an option. Standard boat has an outboard well.					

14.2.Merit 25

Hull Type:	Fin w/spade rudder		**Rig Type:**	Fractional Sloop	
LOA:	24.50' / 7.47m		**LWL:**	20.00' / 6.10m	
Beam:	8.00' / 2.44m		**Listed SA:**	277 ft^2 / 25.73 m^2	
Draft (max.)	4.00' / 1.22m		**Draft (min.)**		
Disp.	2900 lbs./ 1315 kgs.		**Ballast:**	1950 lbs. / 885 kgs.	
SA/Disp.:	21.85	**Bal./Disp.:**	67.30%	**Disp./Len.:**	161.83
Designer:	Paul Yates				
Builder:	Merit Marine Inc.				
Construct.:	FG		**Bal. type:**		
First Built:	1978	**Last Built:**		**# Built:**	780
RIG DIMENSIONS KEY					
I:	28.75' / 8.76m		**J:**	9.66' / 2.94m	
P:	28.00' / 8.53m		**E:**	9.75' / 2.97m	
PY:			**EY:**		
SPL:			**ISP:**		
SA(Fore.):	138.86 ft^2 / 12.90 m^2		**SA(Main):**	136.50 ft^2 / 12.68 m^2	
Total(calc.)SA:	275.36 ft^2 / 25.58 m^2		**DL ratio:**	161.83	
SA/Disp:	21.72	**Est. Forestay Len.:**		30.33' / 9.24m	
BUILDERS (past & present)					
More about & boats built by:			Merit Marine Inc.		
DESIGNER					
More about & boats designed by:			Paul Yates		

14.3. J80

Hull Type:	Monohull fin keel w/transom hung rudder		**Rig Type:**	Fractional Sloop	
LOA:	26.25' / 8.0m		**LWL:**	22.00' / 6.71m	
Beam:	8.30' / 2.51m		**Listed SA:**	338 ft^2 / 31.40 m^2	
Draft (max.)	4.90' / 1.49m		**Draft (min.)**		
Disp.	2900 lbs./ 1315 kgs.		**Ballast:**	1400 lbs. / 635 kgs.	
SA/Disp.:	27	**Bal./Disp.:**	48.28%	**Disp./Len.:**	121.59
Designer:	Rod Johnstone				
Builder:	J Boats				
Construct.:	FG		**Bal. type:**		
First Built:	1992	**Last Built:**		**# Built:**	1600
RIG DIMENSIONS KEY					
I:	31.50' / 9.60m		**J:**	9.50' / 2.90m	
P:	30.00' / 9.14m		**E:**	12.50' / 3.81m	
PY:			**EY:**		
SPL:			**ISP:**		
SA(Fore.):	149.63 ft^2 / 13.90 m^2		**SA(Main):**	187.50 ft^2 / 17.42 m^2	
Total(calc.)SA:	337.13 ft^2 / 31.32 m^2		**DL ratio:**	122	
SA/Disp:	27	**Est. Forestay Len.:**		32.90' / 10.03m	
BUILDERS (past & present)					
More about & boats built by:			J Boats		
DESIGNER					
More about & boats designed by:			Rod Johnstone		
SEE ALSO:					
Related Boat:					
NOTES					

15. Appendix 2 – What-If Situations

Catastrophe/What If Scenarios

from Cruising Skippers David Fraser, Caryl Woulfe, Mark Playsted

1. DOUBLE NIGHTMARE: You're sailing in the Marina. A shroud breaks just as a Horrible Hornblower steamer pulls out and heads for you. It's 10 meters away, coming fast. Doesn't see you. What should you do?

2. JIB GRANNIES: You're using the 150 Genoa. The wind picks up suddenly. It's choppy as hell. It's time for the 75. But you're on Daisy (no lifelines). It's Open House. Crew is kids and grandmothers. Nobody knows squat about sailing. Gotta change the jib. Should you go up to the foredeck while granny sails? Or send her up? What to do?

3.
    3.1. LIGHTS OUT: You're night sailing in the Senior area. It's pitch black and there is no moon. Your lights go out; electricity has failed. There's traffic. You wish you had listened to Caryl. What do you do?
    3.2. [DENIZENS OF THE DEEP: You're sailing at night. It's a sliver of a moon. Suddenly, hideous tentacles reach into the boat, plucking your first mate out of the cockpit. It's ….it's a Prehistoric Giant Squid, the size of Albany. What do you do?

4. UTTER DISMASTER: You're sailing a Quest at the far edge of the Sr. area. A bad combination of wind and waves leaves you dismasted… 5 feet above the deck. How do you handle this? What if the mast shears off AT the deck? What's the self-rescue procedure?

5.
    5.1. DOCK TROUBLE 1: You (name of David) misjudge the wind. Full sails, missed docking. It's 15kt from the NW and your 26'

Commander is speeding down the fairway toward the parking lot. What's up?

5.2. DOCK TROUBLE 2: You tell dock crew: Wait till I tell you to cast off. They hear "cast off" and do so. Boat spins, swinging toward the (expensive) boats across the fairway. Sails are untrimmed, nobody's ready. You have about 5 seconds. Can you avoid disaster?

6. LOOK OUT!: Opposite tacks. Other skipper is an idiot, knows no rules. Collision imminent. You both turn to avoid it…. toward each other. What are the best nautical words to express the moment? What to do?

7. FOG OVER BERKELEY, AND IT'S NOT COMING FROM PETER: You're out in the Circle, fog rolls in, cutting off the Berkeley hills. You can't see a thing and you need to get back to the marina. Your GPS is dead. How would you get back to the marina safely? How should you warn other boats nearby of your presence?

8.

8.1. NEPTUNE'S PISSED, PART 1A: You're south of the pier near all those barges. A serious wind shoots in, going from 14 kts to 27 in a couple of minutes. What are 3 indicators that you should have reefed (other than crew screaming at you)? How to return safely?

8.2. What if you are in a dinghy? What are your options regarding equipment? Crew?

9. "SKIPPER, I DON'T FEEL SO GOOD": You're far from land. How would you handle (1) Seasickness/vomiting? (2) a Major Medical Emergency?

10. MOB RULE: Give solutions for (1) skipper O.B. (2) crew O.B., in high winds. What should you tell a totally novice crew just in case you take a dunk?

10.1. Now: they're unconscious and 300 pounds. How do you get them in safely?

11. ASSHOLE ALERT: You're returning from Angel Is., working on Cruising Skipper. Your supervisor's in the other boat but you got separated, they're out of sight. How would you handle (1) someone acting like a jerk upsetting the passengers? (2) a real nasty drunk aboard?
    11.1. Also: how do you manage someone who insists on giving orders to crew while you're teaching?

12. PREPARE TO BE BOARDED: You're about to be boarded by 1) the Coast Guard. What equipment & information should you have? Where is it located? 2) Same question but it's aliens from the planet Abplanalp.

13. DISEMPOWERED: You're motoring 3 miles from Berkeley, no wind. The Iron Donkey conks out. It's too far to paddle a Commander. What's up?
    13.1. ALSO: You're returning close-hauled through the South entrance to the Marina. The wind dies. Sails are slack. You're sliding toward the rocks N of Skates. The motor jams, won't go down. Ideas?

14.
    14.1. NEPTUNE'S PISSED PART 2A: Wind is increasing past 30 kts. You're in the Circle w/ a boatful of scared people. Despite reefing, your sails are blown out. What can you do to get home safely? On a N wind? West? South? Oh, yes, your motor is busted.
    14.2. PART 2B: You're flying a kite and something goes wrong. Now your kite is dragging and the boat is broaching. It's like the America's Cup trials. How can you avoid disaster?

15. FAR OUT: You're skippering a Quest way way out, running the gennaker. First you capsize with the thing dragging in the water. Then you find you can't get the centerboard down to right the boat. You call for Mark … no answer. What's up?

16. MIERDA HAPPENS: Give solutions: Your rudder breaks? Your tiller breaks? Your main halyard breaks? Your keel breaks off? Your coffee cup breaks?