**Safety Procedures for PCYC Offshore Academy**
**By Sylvia Seaberg**

**SAFE = FUN**

# INSPECTIONS

The Pacific Cup race to Hawaii has often been called The Fun Race to Hawaii. It is the sincere belief of those who coordinate the race that the better prepared an entrant is the more fun they will have. It's no coincidence that participating boats can easily spend over a year in serious preparation for a race that typically takes two weeks or less. When preparing for the Pacific Cup it may appear as if the inspection and safety requirements are simply a long list of items to be acquired or accomplished. In fact, all entrants should view these requirements and recommendations as a process of making sure the boat and crew are prepared for the passage. Good preparation can mean the difference between an emergency on the high seas and an event that was dealt with calmly, safely and efficiently.

This article will frequently reference the following:

1) **ISAF Offshore Special Regulations for Category 1** racing, annotated with amendments made to those rules for the Pacific Cup, along with check boxes to be used for inspection: http://pacificcup.org/pcycosr2012.html
2) **Preparing For an Offshore Race**, by Chuck Hawley, a thorough discussion of the Offshore Special Regulations as applied to races like ours: http://www.pacificcup.org/preparing-offshore-race-introduction

Read them and have them handy for referral.

The Pacific Cup Inspection List is based upon the ISAF Offshore Special Regulations for Category 1 racing (aka Special Regs) plus alterations, modifications and amendments made to those rules for the Pacific Cup.

Although required, inspections are done as a courtesy and performed by dedicated and experienced volunteers; in no way does the inspection absolve the responsible person (owner/skipper/boat manager) of their responsibility to assure the safety of boat and crew for the passage.

Safety is the highest priority of the inspection team. Should a question arise regarding meeting any of the inspection requirements they will always err on the side of safety. They take it seriously and so should participants.

Pacific Cup entrants should view inspectors not as an "Inspector General" out to meet failure quotas (don't worry, there are no quotas), but more as a coach and advisor. The inspectors have a wealth of prep knowledge under their belts and can help you look at the physical capabilities of your boat with an eye to satisfying the Special Regs and then some. There are a number of safety issues

that an inspector can help you consider that are not even mentioned in the Special Regs, such as galley belts, pipe berths, lee cloths, and basically any modification or improvement that will help keep loose objects from becoming dangerous projectiles. For some brilliant ideas along these lines check out Outfitting Tips from Surprise on the Pac Cup website Advice tab.

**Figure 1: Lee cloths, though not required, improve safety and comfort. Note pockets for extra storage.**

Entries as of September 30, 2011 will be assigned an inspector no later than October 2011 and they will be contacted by their inspector shortly thereafter. The role of the inspector is to help insure safety, interpret the rules, and advise and mentor. Many, if not all, the inspectors have either been responsible for their own Pacific Cup program(s) or have participated on other boats. Be assured there is a plethora of history and knowledge within the Pacific Cup committees and they know what it is like to prep a boat for this race. Questions and issues that cannot be resolved immediately by one's inspector will be presented to the committee for determination. Eventually the entry will undergo their safety inspection, but hopefully they will have had discussions with their Inspector and general Boat Mentor so that all their questions and concerns have been addressed and the inspection will progress without drama or significant failures. Remember, your inspector genuinely wants you to pass inspection and they will do what they can to help you get there, they just don't want your safety compromised.

# SAFETY PROCEDURES AND CRISIS MANAGEMENT

At sea, a potential life-threatening situation is treated as an emergency and it can be a mind-numbing experience. Successful corrective action succeeds in downgrading the emergency to an event. Dealing with the emergency should be methodical and practiced with all crew members knowing the location of emergency and survival equipment and how to use it. The only way to adequately prepare for an emergency is to insure that all crew members know the safety procedures and practice the drill of responses beforehand. Please allow adequate time to review, practice and perfect the safety/crisis management drills with all crew members.

Clearly the very best way to deal with emergencies is to prevent them from happening in the first place. Some key steps in prevention are to 1) understand what causes emergency situations in the first place and do your best to prepare against them, 2) communicate your boat's policies regarding the wearing of personal safety gear and posting it, 3) develop your boat's guidelines regarding other race and safety strategies, such as heavy weather sail handling and regular on-the-water systems checks and inspections, and include them in your notebook or playbook for easy reference.

Sometimes emergencies happen in spite of our best planning. If and when that happens sound procedures followed up by well-practiced drills can succeed in avoiding tragedy. In the following paragraphs we will discuss some of the inspection requirements, primary Emergency Safety Procedures, ways to prevent potential emergencies, and offer sample procedures for dealing with them.

Finally, making sure that all crew members participate in the drills will go a long way toward alleviating their own personal anxieties in case of emergency, as well as insuring that maneuvers are executed smoothly and with positive results.

**Safety Equipment Location Chart:** It is a requirement that each entry clearly display a Safety Equipment Location Chart, easily seen, with the location of all safety equipment clearly marked. By principle items of safety equipment we mean life raft and grab bags, flares, fire extinguishers, first aid kit, etc. In addition to the "principle items of safety" that are required it might not be a bad idea to add through-hulls, fuel shut-off and other areas that might need to be located quickly in case of emergency.

Even though the chart will be conspicuously posted it is important to go over the details of the chart with all crew members so items can be easily located should the need arise. If safety equipment is located out of sight it is a good idea to stick a label in plain view identifying where the item lives. This doesn't have to be fancy; permanent marker on masking tape will suffice as long as it's obvious.

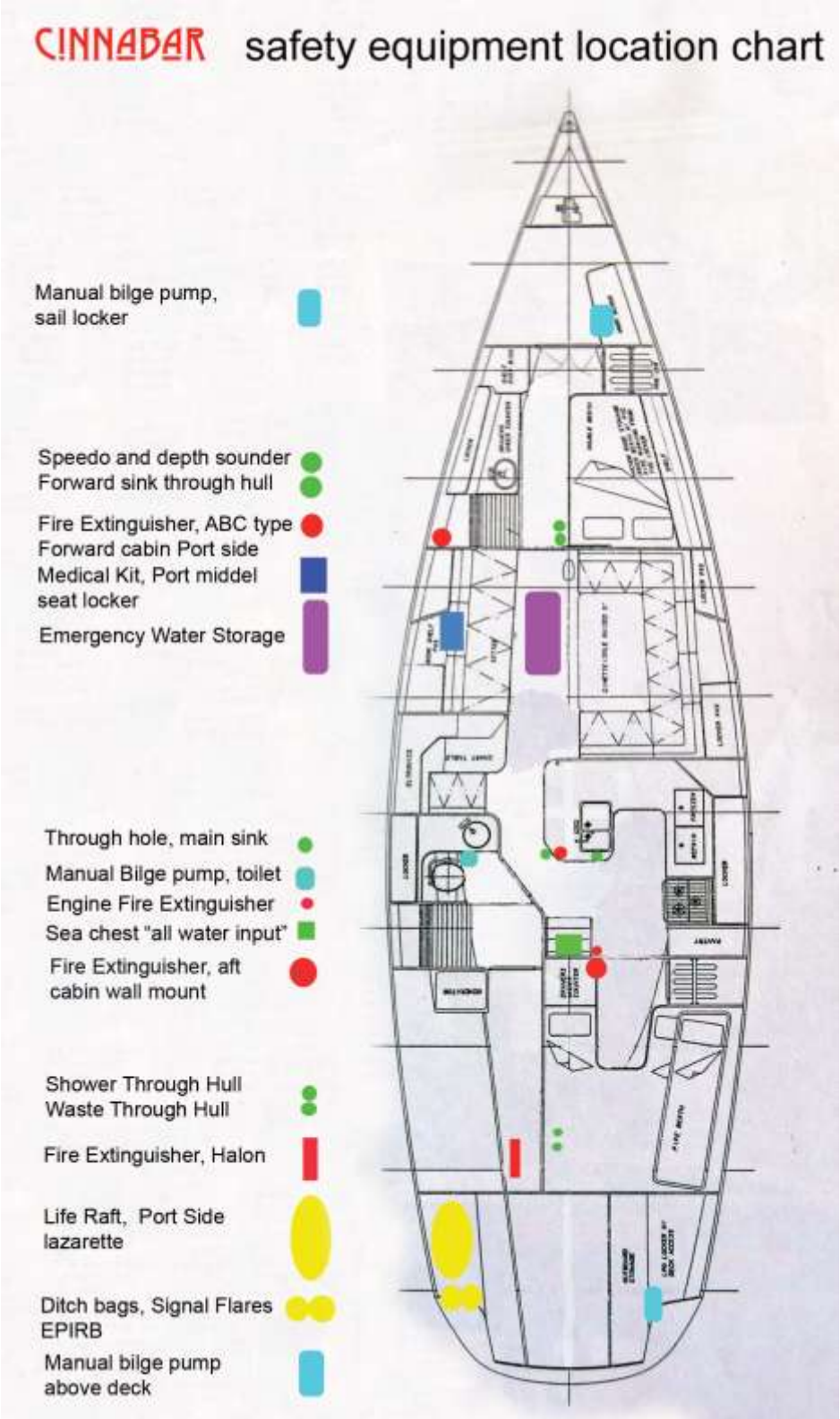


**Figure 2: Sample Safety Equipment Location Chart. This was posted in the companionway next to the watch schedule.**

**Safety Procedures:** In addition to the Safety Equipment Location Chart each entrant should outline their own policies and procedures regarding safety and crisis management. Print your procedures out. Include them in your race notebook and make them easily accessible. Some sample procedures are provided at the end of this article.

In addition to specific Safety Procedures that are required for a Category 1 race it is advisable to clarify and post your boat's individual safety policies such as lifejacket/harnesses, etc.

**Man-Overboard (aka MOB or COB, Crew-Overboard)**
US SAILING prescribes that the "Quick-Stop" man-overboard procedure shall be practiced aboard the yacht at least once annually. A certificate of such practice shall be signed by participating crew members and kept aboard the yacht. This certificate is required at the time of inspection. If using a MOM8 it will also be inspected to make sure it falls within servicing compliance.

Additionally, as of January 2012 it is required that each yacht shall be equipped with an EPFS (e.g. GPS) capable of immediately recording a man overboard position from each helm station.

The best prevention for an MOB emergency is to prevent it from happening by adhering to your boat's PFD and harness policy. However, if a crew goes overboard a recovery method must be immediate. The first step in rescuing a crew overboard is preparation. You should have a well thought out and practiced plan of retrieval that has been practiced by all crew members.

The first step is to mark the spot with a GPS, immediately spot the crew over-board keeping an eye on their location at all times, and alert the crew for an all hands on deck. In addition to hitting the GPS MOB function it is time to drop the MOM and anything else to mark the area. The rescue should go according to drill with someone controlling the helm, another to maintain a constant spot on the victim, another to prepare the Lifesling, and others to prepare to lift the victim into the boat using whatever methods have been practiced, i.e. throw rope, halyard, block and tackle, etc. Retrieving a crew in the water is difficult even if the victim can help with the rescue, which odds are they cannot due to inhibiting foul weather gear and inflated PFD. Retrieving an unconscious or hypothermic victim presents added complications which can make rescue even more challenging. This is why a sound procedure, appropriate safety gear and knowing how to use it, and sufficient practice are imperative.

Be sure to allow plenty of on-the-water time to practice your MOB drills and make sure every crew member gets a turn at the helm and other positions. This practice can be surprisingly time-consuming for a large boat with a crew of 5-7 in moderately challenging conditions. If time permits you might practice other on-

the-water maneuvers such as heaving-to, drogue or sea anchor deployment prep, and Emergency Steering practice (required).

You can review the Lifesling® Owner's Preparation Guide on the Cruising Club of America's (CCA) website. This site also includes excellent articles on selecting PFDs, helicopter rescue, and a presentation by Stan Honey on his 2006 Volvo Ocean race which details the challenge, even for the ultimately prepared yacht, in retrieving a crewmember overboard in heavy weather at night: http://www.cruisingclub.org/seamanship/seamanship_safety.htm

**Rig Failure**

Read Ralf Morgan's article Masts and Rigging for specific advice regarding pre-race rigging inspection/prep (i.e. prevention), inspections underway and spares and tools for the trip.

Other good articles on this subject are found on the Pacific Cup Website under Rigging Advice:
Running Rigging for Offshore Sailing - Schwab, Bruce
Rig Integrity (Chafe, Rattle and Roll) - Antrim, Jim

Many boats include a checklist in their notebook of items to be inspected regularly during the race, for example high load areas such as vang attachments and gooseneck, turnbuckles, cotter pins and rings, etc. In addition to visual inspection keep an ear open for new and unusual sounds. If your boat is talking listen to her!

A forestay or backstay failure can be temporarily repaired by the use of a spare halyard attached to a strong place of attachment on the bow or stern. If a dismasting occurs, the boat motion changes dramatically as it loses the inertia of the rig high above the hull. The motion can be quick and jerky making it difficult to stand and work on deck.

A priority is to prevent any broken pieces of mast, still attached with rigging, from puncturing the hull or decks. Try to recover as much of the mast as possible for a jury rig. If recovery is impossible or threatens the integrity of the hull cut away what you must using bolt cutters and/or hacksaw.

Construct the jury rig according to your research and improvise with what is available. Communicate your situation to the Communications Boat to keep the fleet apprised of your progress.

**Emergency Steering**

The first piece of advice on the subject is make sure your primary rudder is robust enough to make the 2,000 mile trip, downwind, in powerful swells from San Francisco to Hawaii. When you haul your boat before the trip perform the

“Self Survey Tips” outlined by Jim Antrim in his article Hull and Deck Integrity for the offshore academy. If you have concerns then employ a professional to inspect your rudder. It is a lot easier to replace a rudder in a boat yard than on the high seas. Your backup emergency rudder is a very poor second to your primary rudder. You might be able to steer but you will no longer be racing.

The Special Regs mandate that crews must be aware of alternative methods of steering the yacht in any sea condition in the event of rudder loss. At least one method must have been proven to work on board the yacht. The NOR amendments require that in addition, a yacht's skipper and crew shall test the alternative method of steering under sail in no less than 10 knots of wind and demonstrate the ability of the method to steer the yacht both upwind and downwind. Following a successful test and prior to starting the race, the skipper shall submit to his/her inspector a written and signed form that states that this test was performed successfully. This form will be found with other inspection materials at: http://PacificCup.org and is required at the time of inspection.

Yachts and/or skippers that have never participated in a significant offshore sail should be prepared to demonstrate on-the-water the functionality of their emergency steering, usually emergency rudder and tiller, to their inspector.

The Emergency Rudder and Steering requirement is one that seems to induce a great deal of angst and head-scratching amongst the entrants. However, considering that the Pacific Cup has a long history of rudder and steering failures, this is an area that mandates careful thought and planning. See Chuck Hawley’s article, OSR Section 4, on possible applications and solutions for this requirement. Keep in mind any special considerations that might apply to you such as ease of deployment in a double-handed situation, strength appropriate to size of boat, storage, etc.

Once you have chosen your method for meeting the Emergency Steering requirement, figure out your storage and deployment and document the procedure. Make sure all crew members participate in the drill.

If a steering failure does occur you can bet it will likely do so at the worst possible time, at night and in challenging conditions, so keep that in mind when designing your solution. If you find that you need to complete the race using your emergency steering consider throttling back so that you do not compromise your situation. Be sure to communicate your event to the Communications Boat according to the plan and be prepared to provide daily status updates.

**Water in Boat**

For obvious reasons the NOR is very concerned with keeping water out of the boat (e.g. permanently attached companionway hatch boards) and getting water out of the boat (e.g. manual bilge pumps and handles attached with lanyards).

Adequate prevention for water in the boat includes more than meeting the NOR requirements. It is advisable to perform an adequate leak check by taking your boat out in snotty conditions and making a list of any areas that are suspect. Pre-race inspections should include all bilge pumps to make sure they are in good working order. Inspect seacocks and valves and replace corroded hose clamps.

If ingress of water is discovered the first order of action is to deploy and man the pumps. Keep in mind that electric bilge pumps run on battery power and batteries are usually kept low in the boat, hence the requirement for manual pumps in case of electrical failure. Locating the source and stopping the intrusion is the next order of business. The source of the leak may not be obvious so suspect a broken engine-cooling water hose or toilet hose, or a failed seacock or through-hull fitting. If from a hose, turn off the seacock and be prepared by having a wooden plug tied to the seacock (required). If the seacock fails, use the tapered plug to block the hole.

If you experience water in the boat as a result of hitting something such as a container or large floating debris, then that will pose a more serious problem. A six inch diameter hole can sink a keelboat quickly, so your procedure should include preparations to abandon ship including emergency communication and readying the liferaft, EPIRB and associated gear. If unable to stop the ingress of water and sinking is imminent prepare to abandon ship.

**Fire Suppression**

For a fire to exist it must have three things, fuel, oxygen and heat. If you remove one of these you can put out a fire. Briefly, the most common types of fires aboard ship are Class A, B and C fires or a combination thereof.

Class A fires involve materials which leave an ash, such as wood, cotton, fiberglass, cushions, and sails. Effective extinguishers for Class A fires include tri-class (dry chemical), water and carbon dioxide. These types of fires are especially susceptible to re-igniting if not completely smothered so a re-flash watch is advisable.

Class B fires involve flammable liquids such oil, gasoline, resin, paint, kerosene and diesel. Effective extinguishers for Class B fires include tri-class (dry chemical) carbon dioxide and Halon replacements. If the fire is being supplied with fuel by an open valve or broken fuel line you must first shut down the source of fuel. This action alone may stop the fire.

Class C fires involve electrical equipment and are caused by the heat of an electrical short. Effective extinguishers for Class C fires include tri-class (dry chemical) and carbon dioxide. Always attempt to remove the source of electricity to remove the chance of shock and the source of ignition. Electrical fires can be hard to put out because the source of the heat (a shorted wire) can reignite the

fire even after a fire extinguisher has been used, which is why your boat must have a main battery switch and/or AC breaker to turn off the boat's entire electrical system.

Less common are Class D fires which involve burning metals; however they are worth mentioning because they can be caused by flares. The most effective extinguisher is to get it off the boat or isolate it.

The Special Regs for Fire Extinguishers call for a minimum of two extinguishers, 2 kg each of dry powder. This is the type of extinguisher most commonly found as it can extinguish all three major classes of fire, alleviating the worry about selecting the right extinguisher for the fire. The most frequently found failures when inspecting extinguishers are 1) the extinguisher does not meet the 2 kg minimum size, and 2) the extinguisher is not current or the needle has fallen below the green area.

Preventing fires from starting is the best defense, so with that in mind here is a rundown of the most common causes of marine fires according to the insurance claims of Boat U.S.:

1) 55% Poorly installed electrical systems
2) 24% Engine and Transmission Overheating
3) 8% Gasoline fuel leak
   95% of fuel-related fires involve gasoline
4) 7% Miscellaneous (did not fit into a category, but only one could **not** have been prevented, cause was lightning)
5) 5% Unknown (boat burned beyond ability to identify cause)
6) 1% Stove (has dramatically lessened with declining use of alcohol stoves)

When installing fire extinguishers give serious thought to their placement. You will want an extinguisher easily accessible from all occupied places of the boat, plus the cockpit, plus the engine room. Install extinguishers above the floor, i.e. keep them away from water. You should install them near your exit or escape; you don't want to cross a fire in order to get to your extinguisher.

If you should discover a fire aboard ship then time is off the essence; fire volume can double every 7 seconds. If you have a well-practiced fire suppression strategy then you will be able to deal with a fire quickly and methodically.

The first consideration should be to find the cause/location and to inform the skipper and/or crew. This doesn't mean hysterically shouting "FIRE!" at the top of your lungs; it means informing others of the situation and setting your boat's well-practiced procedure in motion. Consider having one crew assigned to radio duty should you need or decide to communicate your situation to the Coast Guard or other vessels. After identifying the location and cause of the fire attempt to restrict it by disabling the cause. Meanwhile other crew should prepare to activate the extinguishers.

If disabling the fire does not fix the problem then evacuate the remaining crew from the area and proceed with extinguishing the fire. Aim the extinguisher low and at the base of the fire. Have a backup person with extra extinguisher(s) nearby. Stay low and avoid breathing smoke. Have an exit plan!

Once the fire has been extinguished ensure that the cause of fire has been properly disabled. Account for all crew to see if anyone needs medical attention. If you have communicated your situation to the Coast Guard or other vessels follow up with a status update. Perform clean up and repairs and set a re-flash watch.

**Abandon Ship**

If an emergency situation develops with the decision to abandon ship it must be carefully considered because unless the yacht is in imminent danger of sinking it is safer staying aboard than taking to a life-raft. There are many documented stories where a boat survived and the crew did not. In other words, getting into the liferaft should be your last option; the danger is getting into the raft too soon. The golden rule: always step UP into the liferaft.

Section 4.20 of the annotated ISAF Offshore Special Regulations for Category 1 racing (which you have already read) discusses the requirements and regulations for Liferafts specific to the Pacific Cup. If you do not own a liferaft that meets specifications then your options are to buy, borrow or rent.

If renting be sure to reserve your raft early and make sure the rental agency is aware of the NOR requirements to ensure you get a raft that meet specs. The rental agency will provide you with an agreement for you to show your inspector. Once you get your raft and certification make sure to include your cert in your notebook for inspection upon reaching Kaneohe. If purchasing or borrowing, make very sure that the raft is able to meet specifications.

Chuck Hawley discusses liferafts in his OSR Introduction and OSR Section 4.

In addition to a liferaft you will need to include Grab Bags and their required contents outlined in Section 4.21 of the annotated ISAF Special Regs. Carefully review the requirements and prepare your Abandon Ship Procedure according to your boat's requirements, liferaft storage and crew abilities. If you require more than one liferaft due to the number of crew, make sure to clarify details such as the skipper of each raft, who goes into which raft, and that there are sufficient Grab Bags and lifesaving gear for each.

Although an abandon ship is very rare in the history of the Pacific Cup it has happened. In July 2006 the ILC 40 *Mureadritta's XL* was rammed by a whale and sank on the return trip. You may read about it in the August 2006 edition of

Cruising World: http://www.cruisingworld.com/how-to/voyaging/be-prepared-should-be-everyones-motto

**Training**
Safety at Sea: The Special Regs Section 6.01 require that at least 30% but not fewer than two members of a crew, including the skipper shall have undertaken training within the five years before the start of the race in both Section 6.02 topics for theoretical sessions, and Section 6.03 topics which include practical, hands-on sessions. Our advice: Plan on having your whole crew attend these sessions. PCYC is sponsoring an official SAS (Safety at Sea) seminar on May 12, 2012.
Those who attend the SAS seminar will likely be able to witness a live, in-the-water liferaft demonstration accompanied by a discussion on the subject. Other SAS demos usually include pyrotechnics, in-the-water PFD trials, and helicopter rescue.

Medical: In addition, the SAS requires at least two members of the crew shall hold a current Senior First Aid Certificate or equivalent and should be familiar with the management of medical emergencies that may occur at sea, including Hypothermia and radio communications operations for obtaining medical advice by radio. The subject of Marine Medicine will be explored in a subsequent Pacific Cup Offshore Academy seminar and at the SAS seminar.

# SAMPLE POLICIES AND PROCEDURES

(Thanks to *Surprise* for sharing their procedures.)

**Harness/Lifejacket Policies**
**Sample Policy #1:**

- Harness/Lifejacket must be worn by all crew who are up on deck. No exceptions
- Tether must be clipped into pad eye prior to entering cockpit area
- Each crew will have a minimum of 1 rearming kit for their PFD

**Sample Policy #2:**
Harness/Lifejacket must be worn in the following conditions:

- At night
- Whenever foul weather gear is worn
- Whenever there is a reef in the mainsail
- Whenever true wind is above 25 knots on a sustained basis
- Whenever someone is on the foredeck
- Whenever an emergency maneuver is being performed on deck

**Crisis Management Procedures**

**Man overboard:**

- GPS
- Spotter
- Drop MOM or equivalent device
- Helm
- Lifesling
- Throw rope
- Halyard
- Treat victim - Reference "Cold Water Immersion/Hypothermia – Survival and Rescue": http://www.pacificcup.org/hypothermia
- Communicate if necessary

**Rig failure:**

- Check for injuries
- Clear debris
- Rig sail
- Communicate

**Rudder/Tiller Failure:**

- Deploy emergency steering according to boat plan and practice
- Communicate

**Water in boat:**

- Deploy and man pumps
- Find source and stop intrusion
- Communicate
- If unable to stop ingress of water prepare to abandon ship

**Fire Suppression:**

- **F**ind the fire, the location, and its size
- **I**nform the Skipper and crew immediately
    - Communicate - make distress call to Coast Guard and nearby vessels
- **R**estrict the fire
    - If possible, disable cause of fire
        - De-energize electrical systems in affected space
        - Shut off fuel supply and ventilation
    - Prior to activating extinguishers ensure that all crew have been evacuated from the space
- **E**xtinguish the fire
    - Account for crew and assess for possible burns or injury
    - Follow-up communication with Coast Guard and other vessels

    - Overhaul (clean and repair) and set re-flash watch
    - If unable to control fire, prepare to abandon ship

**Abandon ship:**

- Prepare raft for launch
- Trigger EPIRB
- Communicate MAYDAY
- Grab bags
- Water
- Lifejackets

**Emergency Communications:**

- Reference “USCG Emergency Radio Procedure”
    - http://www.uscg.mil/pvs/docs/Brocures/MAYDAY.pdf
- Reference “Pacific Cup Radio Resources Packet” for an example of this procedure included in one boat’s notebook
    - http://www.pacificcup.org/archive/04/PDF/PacRadioGuide.pdf