Chapter 9—Crew Overboard Prevention & Recovery, Peter Isler

Key Concepts: Prevention (5.02), recovery (5.09), and standard search patterns (ISAF OSRs, Appendix D); MOB alarms and locators (4.28)

"Man Overboard" is probably the third most famous nautical hail, after "Land Ho" and "Thar She Blows," but it is by far the most serious and potentially life threatening of the three (unless the whale you spot is a giant white sperm whale and you have a fellow named Ahab on board). All kidding aside, a man overboard/crew overboard (MOB/COB) situation is one that should be avoided at all costs: in 2010, 72% of all boating fatalities were from drowning.

Your mother (or maybe your first sailing instructor) probably provided your first and arguably most valuable golden rules of boating safety: always stay with the boat and always wear your life jacket. These tenets are ubiquitous in the principles of boating safety and they have their application in the man overboard department, too. You can't have a man overboard situation if the crew stays on the boat, but if a sailor does go overboard, a lifejacket will greatly increase his or her chances of recovery and survival.

If, despite all precautions, someone ends up in the water, the challenge is to recover the victim as quickly as possible. Every man overboard situation is unique; though we should learn and practice the general guidelines and principles of a man overboard recovery, we must also know how to be resourceful and flexible. The better prepared and more experienced the crew, the better the chance that they will make the right decisions at crunch time. When the going gets tough, we rely on past training in safety and seamanship. There will be times when decisions

affecting life and death must be made in a split second, under extreme conditions. It will be crucial to have the knowledge gained by study and training. The procedures for reacting to and recovering from a man overboard situation should be as familiar to your crew as a tack or a jibe.

AVOIDING MAN OVERBOARD

Here's a scary thought: imagine you are sailing in the Southern Ocean on a 120-foot catamaran, surfing along at 25 knots of boat speed. The water temperature is less than 40°F and your boat is travelling more than 40 feet every second. Suddenly, you fall overboard. The clothes you wore to stay warm on board significantly compromise your ability to swim any distance—even a few feet. In a mere 10 seconds, the boat is ¼ mile away from you and receding fast. Even if the crew is well trained and all are on deck (not likely), it will take at least 10 seconds for them to recognize the situation and begin the ordered reaction of deploying the man overboard gear and turning the boat around. If the waves are big, you are already out of the crew's sight for seconds at a time (assuming you fell over in the daylight). Got the picture? There's a significant possibility that you have enjoyed your last day of sailing.

Though an extreme situation, this scenario highlights the common problems of any crew overboard incident. Even in a less extreme situation—say a 40-footer sailing from the West Coast to the South Pacific—the distance between a person in the water and his or her boat increases at an alarming rate. At night, the visibility becomes zero almost instantly. In any case, you don't want to be watching your boat sailing away from you.

Here is the distance-over-time a boat travels away from a person in the water at various speeds:

Time-Speed-Distance Chart: Boat to Victim					
	5 kts	7 kts	10 kts	14 kts	20 kts
10 sec.	84'	118'	169'	236'	338
20 sec.	169'	236'	338'	473'	675'
30 sec.	253'	355'	507'	709;	1013'
60 sec.	507'	709'	1013'	1418'	2026'
10 min.	0.8nm	1.2nm	1.7nm	2.3nm	3.3nm

The best way to avoid a man overboard tragedy is to stay on board. Use proper techniques when moving around on deck, understand and avoid the danger areas, and wear (and use) tethered harnesses. These all play a role in staying on board. Safety education will provide you with a hefty arsenal in this department, but the biggest weapon should be the attitude of you and your fellow sailors. You should have an underlying respect (it's okay to call it fear) for the

danger of going overboard.

If you want a little low-octane reality check, grab a buddy, go down to your local swimming pool wearing your sailing outfit, and jump in the shallow end with all your gear on. While you are there, don't forget to practice the HELP posture (see below) to minimize the loss of body heat. And, if you want a real deterrent, take your life jacket off (make sure your buddy is nearby) and try staying afloat without touching the bottom. You will be convinced: an ounce of prevention is worth a pound of cure.

HELP Position (single victim)

HUDDLE (multiple victims)

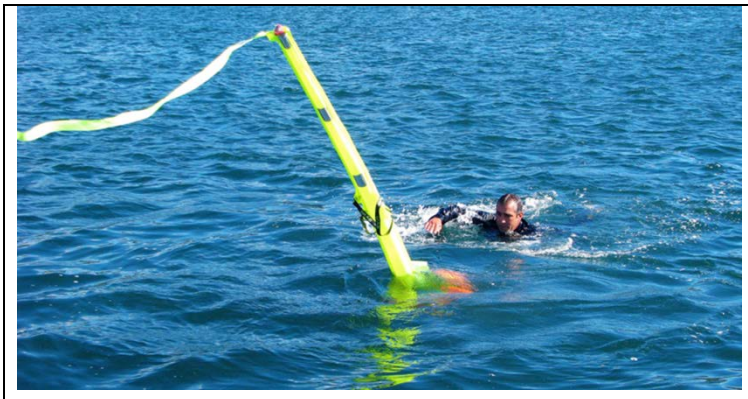
MAN OVERBOARD RECOVERY PROCEDURE

Although we should keep in mind that every situation is different, man overboard procedures are often broken down into the following areas:

1. Initial Reaction on Board
2. Safely Turning the Boat Around and Returning to the Victim (I prefer the term "swimmer")
3. Approaching and Recovering the Victim

<u>1 – Initial Reaction on Board</u>

The first priority is to provide the victim with additional flotation to increase his or her odds of surviving until the boat returns. Be sure to also "litter the water" with any other floating paraphernalia that will increase visibility of the location, making it easier to find the victim. From our previous example and the simple speed, time, and distance equation, we know that time is critical when it comes to deploying any sort of safety or flotation gear if we want it to be within dog paddling distance. This requires proper preparation and training so that the right equipment is easily available and deployable by any/every member of the crew.



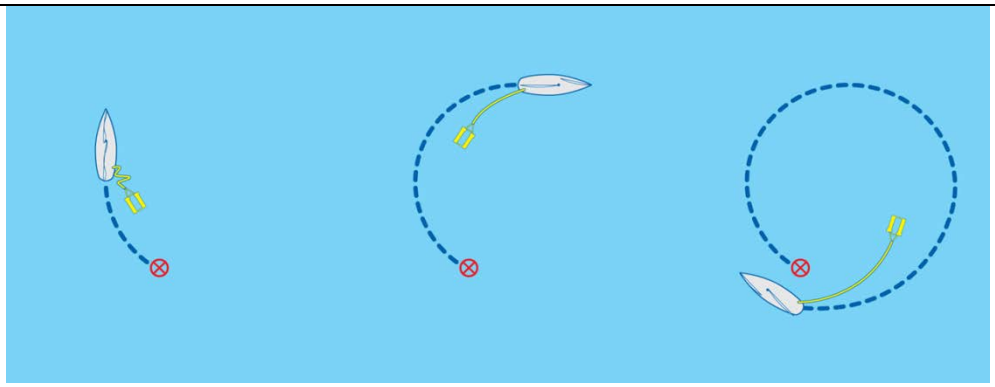
The Dan Buoy

Concurrently, the entire crew must be notified with that bone-chilling hail so the wheels of recovery can begin turning. Meanwhile, the person who first sees the victim in the water must maintain a laser-like focus on his or her location in the water and continually point out that position to the helmsperson. It's the luck of the draw when it comes to the roles being played on board. Although your crew should have default "emergency" positions, a man overboard will alter this because at least one crew is gone from the boat, while another is doing his or her best Superman impersonation to see through the waves and keep the victim in sight. Short-handed crews have an even bigger challenge in a man overboard situation with perhaps half the crew missing.

Other high priority steps include:

- ***Save a GPS location*** to facilitate returning to the scene. If your victim is wearing and has activated an AIS-based personal locator beacon, he or she will be easier to find. Before a man overboard emergency occurs, make sure every member of the crew knows how to operate the hardware (GPS/computer) to navigate back to the AIS beacon and the GPS's man overboard waypoint. Ideally, one of the items your crew "litters" into the water will be a floating AIS locator with a sea anchor.
- ***Call for help.*** Any man overboard situation is life threatening, so there is cause for issuing a "Mayday," or at the very least, "Pan Pan" on the VHF to get nearby boats on your team. The importance of this step must be weighed with the actual situation (e.g., it's blowing 3 knots and you are at anchor in the Virgin Islands with the swim ladder set over the side) and how much it will impact/slow down the crew's ability to turn the boat around as soon as possible.
- ***Position the crew*** to turn the boat around. Ideally, this will follow the procedures that you have determined are ideal for your boat in the current conditions and that you have practiced with your crew.
- ***Immediately turn the boat into the wind, if appropriate for your boat and conditions,*** then tack, and stop/slow the boat. This is the first stage of the "Quick Stop" method that revolutionized sailing's "science" of man overboard a few decades ago (see sidebar). The logic was indisputable: the closer you keep the boat to the victim, the better the odds of a swift and successful recovery. Today, the Quick Stop

remains a valuable rescue option for *most* boats, but like so many of the possible return and recovery techniques, it has its time and place. It may be exactly the right approach for our 40-foot displacement sloop on the way to the South Pacific, but may not work on a boat with different handling characteristics. For example, on a 60-foot racing sloop blasting downwind under spinnaker, a rapid round up could cause significant damage that inhibits the boat's capability to return to the victim. It also risks throwing more crew overboard in the process. Once again, as in any safety-related emergency, it is important to be flexible. Well before any possible MOB, accurately assess the best way to rescue a victim overboard as swiftly and safely as possible. Seamanship, experience, sound judgment, and thorough training all increase your odds of success.

Quick Stop Maneuver with Lifesling: Good short-handed solution. Low skill required.		
		
1: Immediately head into the wind to stay close to victim, reduce speed. Toss Lifesling.	2: Circle victim; drag sling around victim with sails sheeted in until victim has sling.	3: Stop boat. Pull victim to boat and hoist aboard with halyard or tackle.

Every step of the recovery benefits from practice, but this first "reaction" stage is perhaps the most crucial. A real emergency is not the time to figure out where the "launch" button is on the man overboard gear, or how to best organize the remaining crew to safely turn the boat around. Practice safety drills as a team before you need to act.

2 – Safely Turning the Boat Around and Returning to the Victim

The Quick Stop method highlights the ultimate goal of man overboard recovery: stay as near to the swimmer as possible. But you have to do this maneuver safely so that you can successfully complete the rescue. Every situation is different depending on the boat, which sails are set, the crew size and experience, and the conditions.

Recently, I attended a US Sailing Safety At Sea course at the US Naval Academy and watched the midshipmen demonstrate some of the overboard recovery variations aboard the Academy's 44-foot sloops. Conditions were ideal: the water was smooth, the winds were light, and the victim was a Navy diver in full wet suit. But it was still impressive watching the crews perform their recovery in swift fashion. Clearly, they had practiced and their demonstration went according to plan. Even as I mentally critiqued the well-rehearsed and simplified presentation, I had to admit, these sailors were pretty darn good—especially the 110-pound female midshipman who singlehandedly steered her 44-foot sloop back to the diver, secured the sails, stopped the boat, and hauled him back on deck with the aid of a block and tackle system and a Lifesling harness. I'd want her aboard my boat if I fell over. Sure, the degree of difficulty increases exponentially when you throw in heaving ocean swells, strong winds, and the element of surprise, but I'd rather go overboard on a boat where the crew has done a ton of recovery training—even if it was only in smooth water and light air.

The bottom line of turning the boat around is that it must be done as swiftly as practical (time is the enemy of the victim in the water) and must be done safely so that the crew can efficiently shift into recovery mode. There will be some trade-offs involved, e.g., making an out of control Quick Stop vs. a controlled dousing of the big sails—and the driver/skipper must make these critical decisions. What sails (if any) should be left flying? Should the engine be employed? And if so, are all the lines clear and out of the water so they don't foul the prop? When can we safely tack the boat? Are the conditions safe for us to jibe the boat? A strong and well-honed chain of command can help in these crucial decisions, but remember the "x-factor" of a man overboard situation: the skipper could be the swimmer!

3 – Approaching and Recovering the Victim

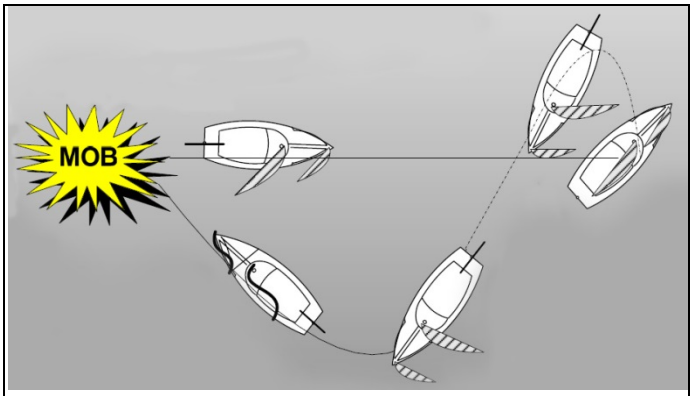
The priorities in this stage of the procedure are:

- ***Find the victim.*** This can be extremely difficult and time consuming—and time is not the friend of the victim. If it is daylight and the conditions are mild; if the victim is healthy, wearing a PFD, blowing a whistle, wearing or floating near an AIS-transmitting locator, flashing a light, and has made contact with the boat's man overboard gear; and if the boat has a good man overboard position to navigate back to—then the odds are pretty good

Switlik MOM 600

that you will find him or her, even if it takes a few minutes to get the boat safely turned around. But that's a lot of "ifs" and this highlights why having the boat and crew prepared for a man overboard incident is so important. Locating the victim can be extremely difficult. So, that call you made on the VHF to rally immediate support from nearby boats can be a life-saving step in certain situations.

- ***Approach carefully*** and at a controllable speed. The close reach is by far and away the safest point of sail to make the approach because of the ease at which speed can be increased or decreased without making course changes. Try picking up a mooring on any other point of sail and you will soon agree.

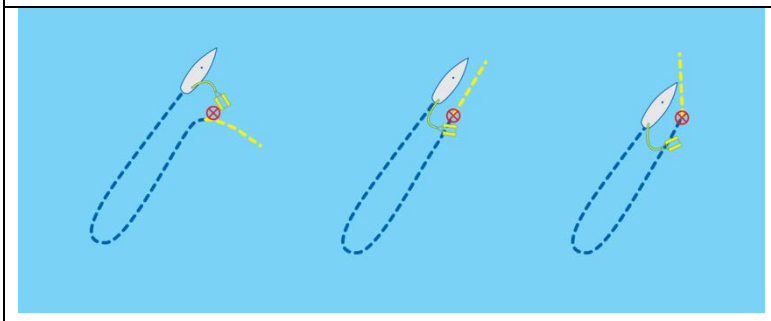


"Figure of 8" MOB Maneuver: Image from U.S. Navy

- ***Make contact*** with the victim. This doesn't mean smashing the victim with your hull or chopping him or her up with your propeller. It means making a connection, most likely by rope and possibly a Lifesling or other lifting/flotation device.
- ***Retrieve the victim*** and get him or her safely on board. There are a number of potential methods that vary in their efficacy depending on the boat, conditions, crew size and strength, condition of the victim, and equipment available (see next section).
- ***Apply appropriate care*** for possible near drowning, hypothermia, or any other injuries.

At this point in your study of man overboard procedure, I highly recommend a mental reality check. I've written and edited a number of books and articles describing the various "classic" recovery patterns and methods, including the aforementioned Quick Stop and the venerable "figure eight" pattern. It all seems so doable on paper.

But let's put ourselves in the shoes of a full crew on one of the US Naval Academy's 44-foot sloops, sailing in 35-knot winds and hail during a thunderstorm. You must quickly revert to good

Deep Beam Reach Alternative: Advantage—No Jibing Required		
Method: From any point of sail, change course to a deep beam reach, tack and return to victim on close reach to control speed of approach.		
		
From Upwind	From Broad Reach	From Running

seamanship, simple and basic sailing tactics—no jibes in 35 knots! And you will have your hands full even getting close to the victim as the keel loses grip and the boat blows sideways at low speed. There's no way you can heave a line any distance upwind, but it's so rough that you don't want to approach within a quarter boat length to windward of the victim for fear of smashing him or her to bits as the bow bucks in the waves. Again, this is where practice, good seamanship, and sailing experience are essential to stand any chance of recovering the victim.

In extreme conditions or when shorthanded, the "waterski tow rope" method of making contact with the victim is invaluable. A few decades ago, the Sailing Foundation of Seattle developed the Lifesling device and its unique method of victim recovery. Although the hardware has been refined over the years, it remains an icon in man overboard training with a long history of success, especially assisting small people in rescuing large people on boats of all sizes and types. The Lifesling employs the same method the driver of a water ski boat uses to return the tow rope to a fallen skier for another try. It involves circling safely and slowly around the victim until they grab the floating tow rope and work their way to the floating harness that can double as a lifting sling—pretty nifty.

The Sailing Foundation's Lifesling

But if the victim is injured or if it's too windy to jibe (a sailboat can't circle without doing a jibe), you will have to adjust your tactics. You may even have to break another "rule" of man overboard and send a second crew member into the water (firmly tethered to the boat) to help the victim. (Editor's note: Not recommended unless the victim has serious injuries or is a child.)

Do I sound like a broken record yet? It's all too easy to discuss man overboard theory and practice in a vacuum, extolling the virtues of a certain piece of equipment and/or sailing technique. But every situation is unique. In all likelihood, the crew will not be able to follow a perfect, cookie cutter method. They will be forced to adapt and make important decisions very quickly under pressure. This is where training, practice, good seamanship, and boat sense all play a crucial role.

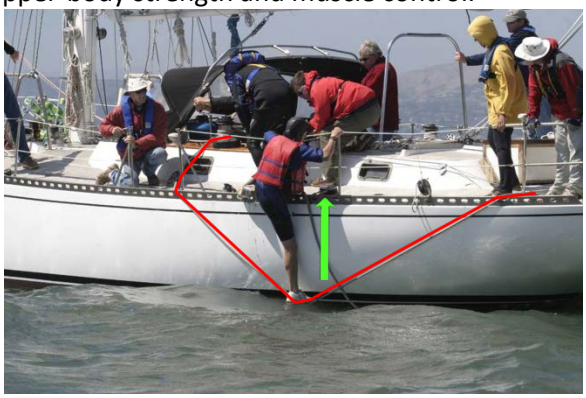
In summary, read books and take courses. Go to the chandlery and look at the latest equipment. Get your crew together and practice, practice, practice. Then cross your fingers you'll never have to learn whether you have the right stuff to save a life because everybody on the crew remembers that lesson their mother taught them: always stay with the boat!

Possible methods of retrieving a COB from the water:

Hoisting with a Lifesling is a reliable, easy retrieval method.

Hoisting a victim with a Lifesling:
Note that the Lifesling fiddle block is hoisted at least 10 feet off the deck of the sailboat before the retrieval tackle is attached to Lifesling to hoist the victim.

The Elevator Method has pros and cons. Pros: it's fast, powerful (requires minimal strength of the rescuer), and uses available gear. Cons: it is difficult to balance in rough conditions, and the victim needs upper-body strength and muscle control.



Elevator Method:
Line leads from the stern, over the side to the victim, back to the cockpit. Any winch will do. It may help to put a line around the back of the victim when hoisting—it's easy to fall backwards.

Crew Overboard Prevention, Michael Jacobs and Chuck Hawley

Following these rules can prevent virtually all man-overboard incidents:

1. Remain sober, especially if you expect to go on deck for any reason.
2. Wear nonskid footwear when working on deck and have nonskid paint or pads in critical work areas.
3. Walk or crawl on the uphill windward side in a crouched position with a low center of gravity and wide-based stance when the boat is rolling, heeling, or pitching.
4. If the boat's motion is too violent to allow a person to stand, then crawl or slide along the deck.
5. Use a safety harness (with two shackles) as a "third hand," secured to a strong attachment point, with a quick release shackle at the body end of the harness.
6. Use a safety harness whenever going aloft in the rigging or climbing any superstructure.
7. Avoid leaning overboard with all your weight on a lifeline or stanchion.
8. Know the location of secure handholds and grab rails so you can find them at night.
9. Know the safe routes to avoid tripping on deck hardware, vents, and hatches, especially at night.
10. Do not urinate from the afterdeck in rough weather unless you are kneeling and attached with a safety harness.
11. Wear a safety harness whenever seasick; vomit into a bucket rather than leaning overboard.
12. In heavy weather, sleep in the harness and be ready to attach the tether to a cockpit padeye before coming on deck.

From Auerbach, Wilderness, Chapter 83, "Safety and Survival at Sea"

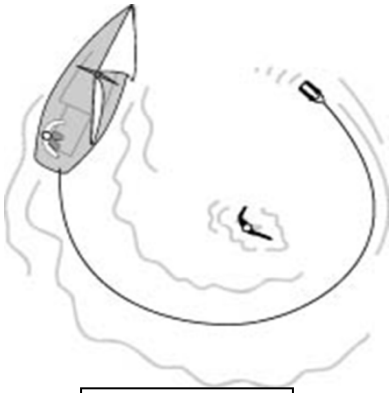
Crew Overboard Procedure Summary, Chuck Hawley

1. Have one person in charge:
    a. Chain of command should be established in advance; identify at watch change
    b. Captain (or helmsman) should coach the crew through the rescue, clearly, with authority
2. Challenges of COB rescues:
    a. Victim staying afloat
    b. Delivering flotation to victim
    c. Returning the boat to the victim
    d. Finding the victim
    e. Contacting the victim
    f. Reboarding
3. Traditional MOB gear:
    a. Horseshoe PFD
    b. MOB pole with strobe light, drogue, dye marker, whistle, launcher
    c. Dan Buoy/MOM (Man Overboard Module)

4. Difficulty finding victim increased by:
    a. Large seas
    b. Reduced visibility in fog, night, squalls
    c. Long distance between boat and victim
    d. Fewer or no spotters to maintain visual contact with victim
5. Challenges of downwind crew overboard recovery:
    a. Spinnaker, poles, preventers in use
    b. Reduced number of crew (possibly half) remaining on the vessel
    c. High speeds increase distance quickly
    d. Delicate sails; carbon rigs may fail
    e. High seas, winds make maneuvering difficult
    f. Night sailing impairs visibility
    g. Squalls reduce both maneuverability and visibility
6. Strategies for successful rescues:
    a. Victim: wear flotation
        i. Increase visibility with: strobe light, laser flare, flashlight, headlamp, pocket flares, and retro-reflective tape. Bright colors on upper body.
        ii. Don't panic—take action ASAP before losing full use of your hands; don't swim unnecessarily; minimize movement if wearing a PFD; and conserve heat (HELP posture)
    b. Rescuers: immediately throw flotation, alert crew, point at COB, and shout encouragement
        i. Mark location with GPS; use locators

ii. Minimize distance away—return quickly, but safely
iii. Use gear to make contact; anticipate reboarding
iv. Have a good command structure
v. Practice

7. Use a COB recovery maneuver appropriate for the boat and situation:
   a. Circle with trailing line/Lifesling
      i. Boat can be sailing in a circle without tending sails
      ii. Boat does not get close to victim
      iii. Stop boat when victim contacts line or Lifesling: don't tow!
      iv. Somewhat slower than direct approach
      v. Boat can run over retrieval line

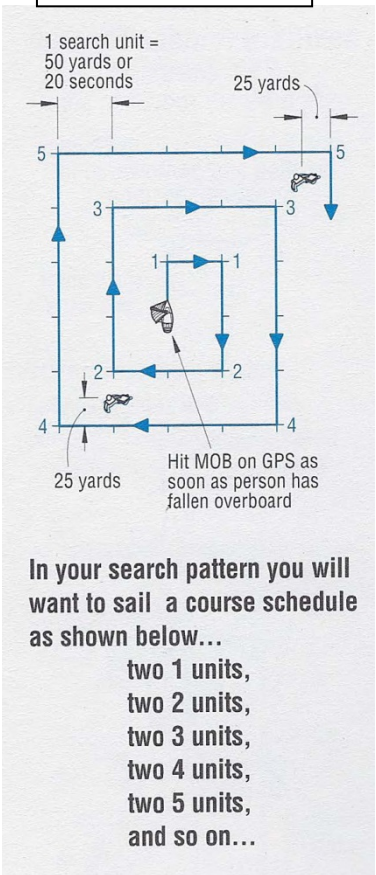


Circle with line

   b. Approach and throw
      i. Generally used by boats under power
      ii. Quicker to find victim
      iii. Danger of hitting victim or prop strike
      iv. Can retrieve Lifesling if throw is bad
      v. Can also use a throw rope bag (OSR 4.24)

Approach and Throw

   c. Upwind Quickstop Maneuver (see diagram above)
      i. Shorthanded
      ii. Low skill requirement
   d. Deep beam reach (see diagram above)
      i. Easy to teach, but requires tacking
      ii. From any point of sail, change course to a deep beam reach
      iii. Tack and return on a close reach to the victim
   e. Spinnaker on heavier, slower boat
      i. Round the boat into the wind immediately
      ii. Ease the pole to the headstay
      iii. Let the halyard run when the boat is head to wind
      iv. The spinnaker should drop (mostly) on deck
      v. Sail upwind to the victim
   f. Spinnaker on sled or other planning boat
      i. Douse sails while keeping boat under control
      ii. Reduce sail area as needed to sail upwind
      iii. Consider maneuvering under power
   g. If contact is lost and other data unavailable, use the expanding square search method: increase the legs of your square search pattern incrementally to gradually expand the area covered.



Expanding Square

8. Acquiring contact with the victim:
    a. Approach on a close reach to allow speed control
    b. Don't tow the victim
    c. Consider having the engine running for more options, especially in light air; beware of propeller strikes or fouled lines
    d. Contacting methods: throw rope bags, heaving lines, running rigging, and Lifesling
9. Reboarding challenges:
    a. Greater weight of water-soaked victim
    b. No equipment for reboarding
    c. Insufficient strength from crew or victim
    d. Difficulty coming close enough to victim
    e. Effects of hypothermia
        i. Loss of: motor skills in hands, coordination
        ii. Failure to keep face out of water or time breathing
        iii. Reduction of mental skills, judgment, and (eventually) consciousness
        iv. Colder water acts faster and greatly reduces time available for recovery.
    f. Victim or crew panics causing inability to make decisions or follow directions.
10. Reboarding methods:
    a. Elevator Method: (see photo above)
        i. Pros: fast, uses available gear, powerful—does not require much strength on part of rescuers
        ii. Cons: difficult balancing in rough conditions; victim needs upper-body strength and muscle control
    b. Rope Ladders:
        i. Difficulty with fingers and feet pinched between ladder and hull
        ii. Not reliable for hypothermic victims
    c. Lifesling and Lifesling Inflatable (see photo above)
        i. Reliable
        ii. Easy to use

Conclusions:

1.	Minimize distance to victim, if possible, with orderly take-down and return.
2.	Use debris field to calculate drift.
3.	Practice with your crew and customize for your boat/situation.
4.	Have a trustworthy command structure.
5.	Increase crew visibility with lights, flares, retro-reflective patches.
6.	Use alarms and carry personal signals capable of storing waypoint, providing range and bearing to COB.
7.	Finally, remember prevention is easier than rescue. Use harnesses/tethers, deck shoes, and good practices.

Crew Overboard Alarms and Locators (also, see Chapter 2)

Understand the difference between alarms and locators. An alarm only notifies you that someone has gone overboard, while a locator tracks and communicates the location of the person in the water. The technology in both categories of devices is advancing quickly, so rather than list specific products with their advantages and disadvantages we will provide some guidelines for you to keep in mind when choosing a solution to suit your needs.

For offshore races (category 1 and 2), ISAF now requires a COB button be available at the helm to immediately record the position where the person fell overboard (OSR 4.28). This is not necessarily a part of a COB alarm system and also does not require a tracking system on the person in the water.

There are four categories of COB tracking devices:

- **406 Personal Locator Beacon (PLB):** The signal emitted from the person in the water goes directly to the SAR authorities via satellite. The coordinates of the person in the water are not available to those on the boat trying to return to the spot, or to other nearby vessels.
- **DSC PLB:** The signal goes to the boat and other nearby vessels in the form of Lat-Lon coordinates, which appear on the VHF and may have to be entered into a chart plotter to ascertain range and bearing from the boat's current position. A few VHFs are able to communicate the DSC position to a chartplotter automatically, and a few chartplotters are able to receive this information and plot the position automatically. Further, a few VHFs can even display range and bearing to the COB themselves. If you choose to use DSC PLBs, make sure you know how you are going to determine the range and bearing to the DSC coordinates. A COB incident would be a stressful time to enter coordinates into a chartplotter.
- **Beacon on the COB used in conjunction with a direction finder on the boat:** This system has limited range from a person in the water compared to an AIS or DSC receiver using a masthead antenna. It requires practice and specialized direction finding equipment. It is a direction finder only: it does not provide the range to the COB and provides bearing information only to the operators of the direction finder, not additional SAR help.
- **AIS PLB:** For boats that already have an AIS receiver or transponder in use, interfaced to a chartplotter, this device provides a ready view of the range and bearing to the person in the water. Nearly all current chartplotters are capable of being interfaced with an AIS receiver or transponder and display AIS positions. The position of the person in the water is also visible to other AIS-equipped vessels within range. To enable maximum range to an AIS PLB, a yacht should use their masthead VHF antenna for their AIS receiver or transponder via an AIS VHF antenna splitter.

Whichever system you choose, it is essential to practice its use before needing it. As with any emergency situation, when you are frantically dealing with a life-or-death crisis is not the time to pull out the instruction manual to learn how to use the equipment.

Further resources:

For an excellent review of COB methods conducted on San Francisco Bay, see FINAL REPORT: 2005 CREW OVERBOARD RESCUE SYMPOSIUM By John Rousmaniere, found at: http://offshore.ussailing.org/Assets/Offshore/SAS/Images/Photos/Final+Report.pdf.

This study reviews the challenges for a successful recovery, required skills of the crew, preferred recovery maneuvers, and equipment that can be helpful in locating and retrieving the victim. It is a must-read for every boater.