Even in moderate breezes, rescuers often speed past the person in the water, prompting many experts to suggest practicing recovery in a variety of conditions, and using the engine, if needed, to make up for any lost momentum.

Rethinking the MOB Recovery

Spate of accidents calls for re-assessment of long-held rescue practices.

By [redacted]

Man overboard recovery failures have become a frequent headline, and details about these tragedies hold lessons worth learning.

Recent, back-to-back incidents have involved safety gear malfunctions, shortfalls in boat handling skills, and lapses in sound decision making. They have also caused several aspects of rescue orthodoxy to come into question.

We've previously covered rescue techniques such as the Quickstep, Figure-8, and towed Lifesling in great detail (see [redacted] January 2010, "Man-overboard Retrieval Techniques,"). However, in the wake of the recent tragic incidents, it is time to reevaluate these skills.

The big question is whether these hallmark safety responses still meet the needs of racers, cruisers and day sailors alike? Are jacklines and tethers keeping sailors safer, and are the narrow bows and wide-open aft decks on modern race boats and cruisers sound ergonomic advancements in sailboat design or an accident-prone advent of naval architecture?

Two years ago, we raised concerns over high stakes sailing adventure charters such as the Clipper Round the World Yacht Race (see [redacted] January 2017, ("Risk Management and Renting Adventure," January 2017).

Recently, the UK Marine Accident Investigation Branch released their evaluation of the fatal MOB incident aboard CV30 "Great Britain." It lends support to the issues we've raised in a multiple reports, and are raising again here (see [redacted] March 2018, "Safety Tethers Under Scrutiny").

On November 18, 2017, the crew of CV30 was comprised of one pro sailor and 16 amateurs. The boat had departed Cape Town, South Africa, and was 1,500 miles from Fremantle, Australia when the crew of the 75-foot, 35-ton boat scrambled to reduce sail. The paid captain was at the helm when a big wave slammed into the port quarter slewing the boat to starboard, precipitating an accidental jibe.

The bowman, who was helping to wrestle down a piston-hanked, No. 3 Yankee (high cut jib) went over the side. He was tethered to the boat and able to quickly climb back aboard. Moments later, another "pay for adventure" crew, Simon Speirs, was also tossed overboard.

Speirs was clipped in, but a longer tether caused him to be pressed against the hull and dragged through the heavy seas at 9.3 knots, even though the skipper had immediately tacked the boat to put Speirs on the high side. The remaining five crew on the foredeck, all of whom had been involved in the sail dousing effort, were unable to hoist Speirs back aboard.

CREW RESPONSE

The bowman handed him a halyard with an open shackle to clip to his harness, but the load on the tether made accessing the attachment point very difficult.

While struggling to connect the halyard's snap shackle and having been dragged through the water for almost five minutes, things got even worse. There was a loud snapping sound as Speirs's tether clip deformed and relinquished its hold on the jackline.

All photos by [redacted]

A ten-foot length of line with a Tylaska shackle can be attached directly to the tether of a person in the water.

Tether Lanyard Simplifies MOB Recovery

For years, safety advocates have touted the use of a four-part block and tackle attached to the end of the boom as the hoist of choice. It affords a great dockside demo, but put to use in a rolling seaway, a crew quickly notes that boat motion causes the boom to flail about and the hurriedly dropped mainsail further complicates using the boom as a hoisting tool.

The lack of a topping lift and the result of overloading a rigid vang can cause the outboard end of the boom to dip so low that the hoisting tackle is chock-a-block before the victim can clear the rail. Adding a preventer and setting up the mainsail halyard as a makeshift topping lift will help tame the boom, but there's a far more efficient way to hoist a victim out of the water. All it takes is a spinnaker halyard and a two-speed self-tailing winch. It gets even more useful if you add a 10-foot pennant with a spliced eye and a small diameter, jawed, heavy duty, latching-type snap shackle.

Adding the rescue pennant increases the reach of the spinnaker halyard and allows a rescuer to clip onto a victim's har-

The double-action clip had been caught under a bow cleat laterally loaded and failed due to the unanticipated angle of pull (see [redacted] March 2018).

With the headsail only three-quarters of the way down, and an override on the mainsheet winch, the CV30 was far from under control and ready for tight MOB recover maneuvering.

The crew's response to the situation included deploying MOB gear, electronically marking the position, starting the engine, and coping with running rigging damage that hampered maneuverability.

The initial attempt at recovery failed, the partially doused Yankee started to self-hoist in the strong breeze and pitching seaway. And just as another crew went forward to cope with the flogging sail—he too was pitched over the lifelines. Fortunately, he had both his long and short tether clipped and was quickly hauled back aboard.

It took three approaches and a total of 32 minutes to recover Speirs, who was unresponsive when brought back aboard. The recovery was completed in half of the time of the rescues on Lake Michigan during the 2017 and 2018 Chicago Mac Races. It was twice as fast as the recovery of Sarah Young's body in the 2015-16 Clipper Race. The MAIB report mentioned that since the introduction of the CV-70s there have been 15 reported MOB incidents in which crew have gone overboard tethered to jacklines and quickly hauled back on board. It seems that not separating from the boat can be a big plus, but being towed alongside at speed has a danger all its own.

The safety valve in such scenarios is the ability to immediately tack into a heave-to position or at least slow down by coming head to wind. Unfortunately, when racing with a spinnaker up, runners set and/or a preventer engaged, such an abrupt change in direction and change in rig load, can lead to more trouble—even a dismasting.

DRAG-AND-DROWN EFFECT

The drag-and-drown effect first came to the forefront in the 1999 doublehanded Farallon's Race when Harvey Shlasky and Van Selst were pitched from the J-29 they were sailing during a severe knock down. Both men were tethered and wearing inflatable PFDs. Selst's life

ness, Lifesling or tether. There's an extra value provided by this approach. The small-jawed snap shackle will trap a laterally loaded and twisted free tether clip (see adjacent photo). Plus, it's easy to set up by a rescuer rather than needing the victim to secure the halyard.

For example, in the CV30 incident, Simon Speirs was dragged alongside the big sloop for five minutes while those on the foredeck were unable to haul him back aboard. The bowman had the right idea when he went for a spinnaker halyard. Unfortunately, Speirs's webbing attachment point on his inflatable PFD was pulled taught and was so hard to access that Spiers was unable to clip on the halyard. To expect a victim being dragged in the water to make this connection—whether or not the tether is taught—is bound to fail.

An alternate approach, afforded by the halyard pennant eliminates the victim's role in attaching the halyard. This approach eliminates the need to connect directly to a ring or webbing on the victim's inflatable life jacket.

The halyard snap shackle is clipped to the spliced eye in the pennant and the pennant's snap shackle is clipped around the victim's tether webbing by a person on board. As the halyard is tensioned, the PIW's head and shoulders lift out of the water.

In the CV30 situation, the fouled, laterally loaded jackline clip failure may still have occurred. But the victim would have remained attached to the boat via the small diameter, robustly built, snap shackle (Tylaska T-12 pictured). Such a heavy duty snap shackle would have prevented the damaged tether clip from slipping through its latched jaws. This would result in ongoing attachment to the boat and a means of lifting the person back aboard. It does not require the PIW to clip themselves on and it prevents a laterally loaded, failed tether clip, from releasing the victim.

No technique is perfect, and when employing a halyard recovery, especially in a significant seaway, it's important to keep the victim from becoming an active pendulum. They can be accelerated by pitch, roll and yaw and their three cousins surge, heave, and sway.

The best way to accomplish this is with another crew using a short line to keep the victim from swinging as the rig gyrates in the seaway. Ideally, there's enough crew to handle the vessel and still have at least two people available to cope with the halyard connection and winching up the victim.

The double handing crew that loses a person overboard becomes a single hander and faces a major challenge when it comes to the recovery maneuver and getting the victim back aboard. The Lifesling, or a similar device, is their best friend, because it provides a streamlined means of making contact with the victim, adds extra floatation and is keeps the PIW connected to the boat ready to be hoisted from the water.

If the hook disengages from the jackline or hard point on deck, the lifting lanyard will still be attached, since the tether hook (blue) can't pass through the Tylaska snap shackle.

jacket inflated and he was able to climb back on board, but Shlasky's PFD did not inflate and Selst was unable to haul him out of the water.

Shlasky was being towed astern at just a few knots of boat speed due to sails not being completely doused. Being towed through a rough seaway, even at slow speeds, significantly increases chance of aspirating water and drowning.

One of the lessons learned from this tragic incident was the importance of not running jacklines all the way to the very stern of the boat. Terminating them further forward prevents a person in the water (PIW) from being dragged in the turbulence of the stern wake.

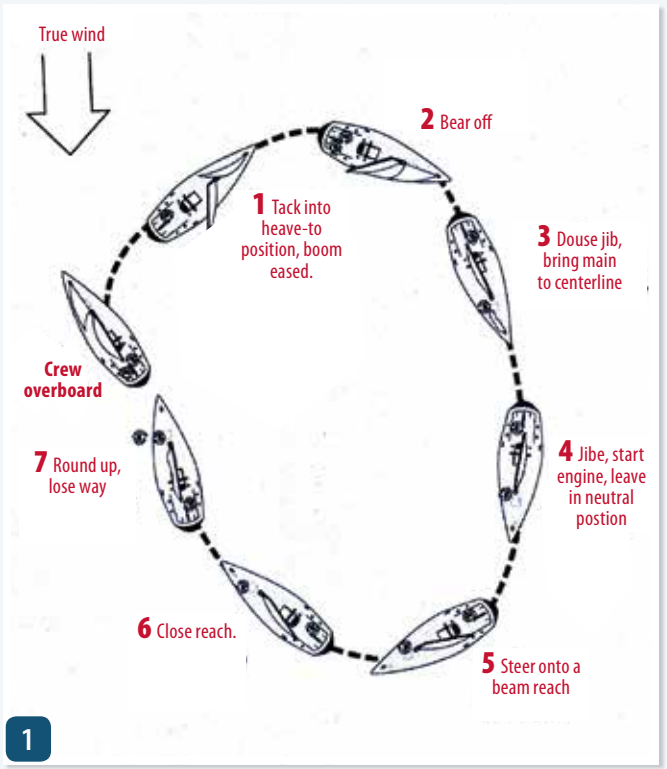
A subsequent lesson was the value of a taught, inboard jackline and a short tether that will keep the head of a MOB as close to the toerail as possible. And finally, there's the age-old sail-dousing challenge. Bolt rope luffs, piston hanks, slides, slugs and various furling systems each have their own idiosyncrasies. Having a low-friction track and car set up to handle the mainsail or a down haul line on a piston-hanked jib help to get the sails down *in extremis*. Well-maintained roller furling headsails are like an extra set of hands for the short-handed crew.

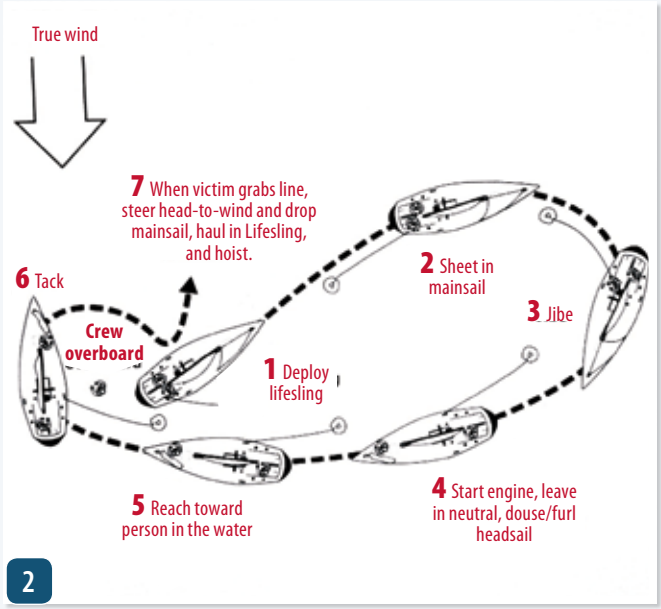
SLOW YOUR APPROACH

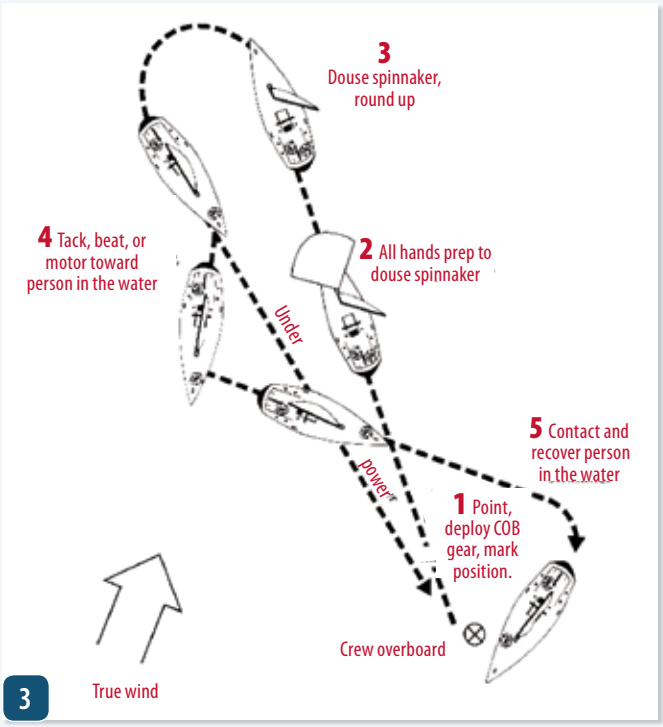
"Fast is fun," is a slogan popularized by Bill Lee, the Wizard of Santa Cruz and a key player in the development of ULDB ocean racers. He coined the phrase to highlight the exhilaration found in speed under sail, and I agree completely.

However, in a recent email exchange, Bill and I also concurred that there are times when speed is just what you don't want. We were focused on the final part of a MOB recovery approach and the difficulty that arises in making contact with the person in the water (PIW).

Post incident analysis has revealed that in many cases too much boat speed hampers rather than helps the recovery. The final approach to the PIW needs to conclude with an "as slow as possible" contact with the victim. We concluded that recent incidents on the Great Lakes, Monterey Bay and in the Clipper Cup highlight a need for boat-handling skill that's more akin to picking up a mooring under sail than it is to extra







Revisiting Recovery Techniques for MOB

Ocean sailing in a modern race boat or multihull with a high horsepower rig makes double-digit boat speed attainable and complicates a MOB rescue. Our research suggests that no single MOB tactic works for all occasions.

The higher speeds attainable by modern boats is one of the most compelling arguments for re-examening overboard practices. If a crew goes over the side at double-digit speed and is not tethered to the boat, it becomes a guaranteed "*adios*" encounter. How far you leave the PIW behind depends upon how long it takes to slow the boat, cope with a spinnaker douse and get things turned around.

To continue to sail away at the start of a rescue seems counterintuitive, however, abrupt maneuvering can result in spin outs, knockdowns and create a chance for boat damage and more people in the water—further lessening the chance of a good outcome.

At the cry of "man overboard!" rescue gear is immediately jettisoned, a lookout is assigned, buttons pushed, radio calls made, and all hands rally on deck with three things in mind: get the boat slowed down, reduce sail, and head back to the victim.

speed at the starting line.

In many cases, the wild card is the seaway. It complicates even momentarily holding a vessel head-to-wind.

Safety experts have long worried about the risk of the propeller harming the PIW, but there clearly instances in which the engine can be essential to quick recovery. The real killer is the inability to stay on station and connect with the person in the water.

All too often we hear about multiple misses, excess time in the water and the recovery of a lifeless body. It's clear to everyone that it's not wounds from propellers that is claiming lives. It is the inability to make secure contact with the person in the water.

DESIGN IMPLICATIONS

Part of the risk of a MOB incident in-

Spinnakers present special difficulties, and one approach worth trying is the controlled "letterbox" method of dropping a spinnaker. This involves hauling the chute through the slot between the mainsail foot and the boom (loose footed main only). This leads and flattens out the sail, sending it directly below through the main hatch. With the spinnaker down, the main centerlined, and all lines out of the water, the engine is started and the vessel is headed on a reciprocal course back toward the victim.

The crew uses every position-finding asset available to augment the search for the person in the water. These include AIS beacon, GPS MOB position, VHF voice/DSC, FLIR scope, the victim's visual light, (7x50) binos, whistle, and mirror. When sighted, an approach plan is used that sets up the vessel so contact is made just as the boat loses way and is in a nearly head to wind position.

Even with a tethered victim, lifting them aboard presents several challenges. As pool practice sessions revealed, it is possible for the victim to slip out of a loose harness.

Bridging the gap, making contact,and securing the victim to the vessel is crucial. But tall-rigged, light-displacement vessels don't like to slow down and holding them on station is difficult. This means that the window of opportunity to connect the victim to the vessel closes quickly.

Having multiple crew ready with throw lines can be a big plus, as is the deployment of a Lifesling, just in case the final approach is a little too fast. The big debate is whether or not to use a rescue swimmer.

On one hand putting more people in the water can elevate rather than mitigate risk. But if a trained lifesaver is aboard, especially if they have had actual ocean surf rescue experience, the risk may be justifiable.

Often the person in the water is fatigued, hypothermic, and panicked enough to have trouble doing their share in the rescue. If a rescue swimmer is used, they should be tethered to the boat, meaning there's another loose line in the water. But if that's what it takes to get a victim securely attached to the boat and ready to be hoisted, it may be worth putting a rescue swimmer to work.

CREW OVERBOARD STRATEGIES

SKILLS	PROXIMITY	EASE	FULL CREW	SHORTHANDED
QUICK STOP	Excellent	Good	Very Good	Fair
FIGURE 8	Fair	Excellent	Very Good	Good
FAST RETURN	Very Good	Good	Very Good	Fair
LIFESLING	Very Good	Good	Good	Excellent
UNDER POWER	Very Good	Very Good	Very Good	Excellent

None of the tested maneuvers are ideal for all circumstances. On a fully-crewed raceboat, the Quick Stop can be very effective, but for shorthanded cruisers, motoring back to the victim might well be the best choice. Some maneuvers will work better for certain boats, or certain circumstances. For more detailed descriptions of each recovery routine, see the text and illustrations on the adjacent page.

volves the success of sailboat design. Performance, in a boat speed context, has greatly improved. Double-digit velocity creates more multi-axis acceleration due to seaway impacts. These energy transfers require a faster reaction time regardless of how quickly the helmsman can adjust or how adeptly the crew can cope with a foredeck that's falling into a wave trough. These amplified energy transfers increase the likelihood of a sailor being launched in an unwanted direction. Harnesses, tethers and jacklines can mitigate the risk, but there's a learning curve involved in getting the most from such gear.

Along with the faster boats comes a growing preference for wide-open spaces astern. Big race boats with Laser-like profiles feature wide sterns and not much of a cockpit well. Handholds

Tips to Preventing a Crew Overboard Incident

Some simple steps can reduce the risk of a crew overboard incident.

SMALLER BOATS

• Keep low and use one-meter tether going forward. Double tether when working. Sit down. Some days the only smart way to move forward of the mast is to scoot.

• The long tether may be used in cockpit, but only rarely on deck.

• The decks are thinner; every attachment requires a backing plate to spread the load.

• With outboard-powered boats, the tether must never reach past the transom. Propellers kill.

MULTIHULLS

• Run the jacklines well inboard when possible.

• Stop jacklines 4 feet short of front edge of tramps or front beam; the greatest MOB risk is a sudden stop when the boat slams into a wave.

• Tramp lacing must only be used as a hardpoint if it is at least 7 mm and is tied off at frequent intervals to prevent a zippering failure.

FAST BOATS

• Don't fall in. The tether must make it impossible to fall off. If this is not possible, remember that at over 15 knots the harness and tether will tear you in half; you will be better off without a tether if you go over the rail. PFD and PLB always.

• Rigging must be foolproof at speed. Over time, you become accustomed to the speed and it is easy to become complacent.

• In-shore and supervised racing. If MOB recovery is fast and dependable, it is probably safer to fall cleanly into the water than to be caught by a tether, hanging over the side. This is NOT an excuse for lax sailing practices; use short tethers that will keep you onboard and move carefully. Be certain of your MOB recovery drill. PFDs and personal locator beacons are essential. Night and bad weather can invalidate this exception very quickly.

OTHER TIPS

• Some sailors add chest-high lifelines between the shrouds—a practice that has its cons (see [redacted] June 2018).

• Add non-skid anywhere your foot can go. Areas around hatches and cleats are too often left slick.

• Add non-skid on steep slopes. Often sloping cabin sides become walking surfaces when heeled. And even if a surface is too steep to walk on, when a foot is placed there in a stumble, good non-skid will make the slide considerably slower and often times recoverable.

• A swimmer-accessible ladder is a must for cruisers and short-handed racers. There have been serious incidents, even at anchor, when a sailor suddenly learned how difficult it is to reboard a high freeboard boat from the water. A ladder can be a great aid to recovering an uninjured MOB. However, it may not be usable in rough weather and do not assume the victim will be able to get to it.

• Lines in the water. A common reason for not being able to start the engine during MOB recovery is the risk of fouling the prop with lines in the water. Keep the tails tidied up at all times so that this is not a risk. If you need the engine, spend just a few minutes hauling the line in. Shorthanded or with less skilled crew, using the engine may be the safest way.

• A parting thought, many of us reach a balance of risk that we are comfortable with and become complacent. Experience alone does not automatically make you a safer sailor.

are few and far between and there's not much to reach for when a breaking wave sweeps the stern quarter.

Tales of sailors being knocked over or washed through leeward lifelines are growing more common. When it comes time to cope with a crew overboard incident, step one has already failed.

It is the designer, builder, skipper, and victim's effort to prevent the MOB incident in the first place. Contributory factors can include poor nonskid, insufficient handholds, poor jackline setup, and tether use, bad decision-making,,and crew agility. Once a person goes over the side, a well-practiced reflex action is needed and time is the big enemy. When it comes to rescue maneuvers, the right choice depends on vessel design, crew size and skill, and the conditions at hand.

CREW CAPABILITY MATTERS

Last spring, noted author and marine safety expert John Rousmaniere and I participated in the Hampton Mariners Museum Safety at Sea Seminar. Just before the session began, we chatted about the findings of the 2005 San Francisco MOB Symposium—a large-scale training/research project put together by Chuck Hawley and other West Coast safety advocates.

One of the lingering memories from that symposium was how the game plan had to be changed on the very first day. Initially, the project was envisioned to be a crew recovery technique test bed, with attendees demonstrating varied rescue techniques and evaluators using GPS recorded data to quantify results.

From the start it became clear that most participants didn't have a clear understanding of the rescue maneuvers and 75 percent of those executing a quickstop maneuver were flying by victims on a beam reach. Organizers quickly shifted gears and the first day became an instructional experience rather than a data gathering opportunity.

The attendees were retaught the Quickstop, Figure-8, Reach-Return and Lifesling recoveries. It improved proficiency, but there was still a high incidence of rescue attempt failure due to excess speed during the final approach. It resulted in too little time to effectively secure the victim to the vessel. All the testing was done inside the Bay, so the complexity added by a significant seaway was not experienced.

HEAVY WEATHER RESCUES

A few years later, while working at the U.S. Naval Academy, I had a chance to take a fit, agile, midshipman crew to sea and observe dexterity put to good use.

It was during the winter "offseason," and we had prepositioned two Navy 44 sloops in Jacksonville, Fla. Over spring break, a couple of crews of midshipmen were shuttled south filled with the expectation that their "sortie" would be a run to Key West's "Margaritaville." Instead, after a couple of daysail training sessions, we set off with intentions to do some winter Gulf Stream crew overboard recovery practice.

Once the person in the water above is being hoisted aboard, the violent motion of a boat in a storm can put them at risk of injury (right). Getting into a lifesling while wearing your PFD is more challenging than it may seem, especially if conditions are rough (above).

Our dummy was appropriately named Oscar. "Oscar," used to denote the letter "O" in the phonetic alphabet, is also the maritime code (and signal flag) used to announce that there is a person overboard. Our "Oscar" was a large fender with a big bucket tied to one end. Training involved the familiar use of the Quickstop maneuver, a tactic that works well with these heavy displacement, ruggedly built 44-foot sloops (see [redacted] August 2008).

Crews were quite familiar with the maneuver, but the 20-knots plus conditions and typical eight-foot Gulf Stream sea state caused considerable difficulty. The key lesson learned was that the familiar, close reach approach to the victim (jib doused) needed to be sailed just a little deeper, in order to use the mainsheet as an effective throttle or brake. This helped keep headway maintained as the bow pitched in the confused seaway. The engine was started in the final approach, but kept in neutral unless a final nudge was needed. Recovery involved using a boat hook to snag the fender.

Success indicated that the crew did get close to the victim and kept boat speed to a minimum, but if Oscar was life size, the actual reboarding would have been much more complex. The maneuver greatly benefited from having an eight-person crew.

Attempting a shorthanded Quickstop in a building sea, would have been a much greater challenge and a Lifesling tow would have been the preferred approach.

We also tested the no-jibe, reach-and-tack type of recoveries, and found it interesting to note that one of the key challenges was the same as what hampers the Quickstop. In both there's a need to maintain an awareness of where the victim is situated in relation to the boat and to true wind.

Often the boat turns toward the victim when it is still upwind of the PIW and as the approach unfolds, the crew can't depower without turning upwind and away from the victim. Even with the mainsheet fully eased, there's enough flow over the sail to provide too much boat speed and the result is a victim "flyby".

Boats with sharply swept back spreaders are more prone to this problem. The cure lies in steering deep enough during the initial phase of the recovery to allow a close reach approach to the PIW and to use the mainsheet to accelerate and decelerate during the final approach.

CONCLUSION

One thing is certain, when it comes to a MOB incident—the deck is stacked against shorthanded crews. In a double-handed cruising or racing context, one of sailors becomes a victim and the other a single-hander. The person still on board has twice the obligation he or she had just a few moments ago. The sail handling requirements alone are daunting. Rescue maneuvering adds a whole new level of complexity. At this juncture, a Lifesling and a reliable engine become the tools of the trade for the cruising or racing sailor.

For more on man overboard recovery techniques, see ([redacted] January 2010, "Man Overboard Retrieval Techniques." Our digital eBook "MOB Prevention and Recovery" available in our online bookstore (www.practical-sailor.com/books) integrates retrieval technique with our testing and research into harness, tethers, and other MOB prevention gear.

Voyager, writer, educator, and a frequent [redacted] contributor, [redacted] is the former Vanderstar Chair at the U.S. Naval Academy. His book The Art of Seamanship, *is available at the [redacted] online bookstore (www.practical-sailor.com/books).*