BRUCE HALABISKY

A Beautiful Balance

Help your long-keeled classic steer herself

by Bruce Halabisky
Illustration by Jan Adkins

The first day I stepped onboard my new 34′ gaff cutter VIXEN, I noticed an outsized 10′-long boathook mounted conveniently alongside the starboard shrouds. It had a nice bronze tip and a robust shaft, and was beautiful except for its ridiculous length.

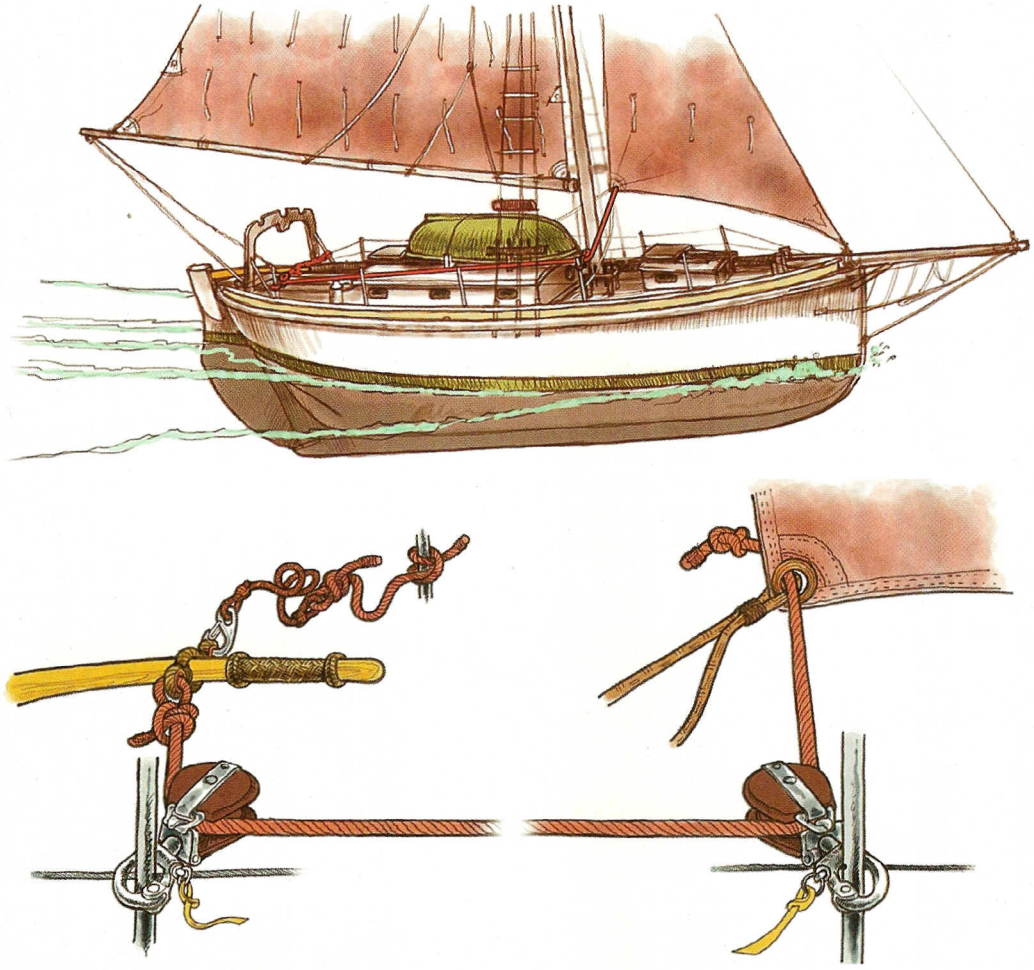
While pondering that big pole on an otherwise perfectly proportioned boat, I started the diesel engine. My wife, Tiffany, went forward to untie the docklines, and I backed out of the previous owner's marina slip, happy to be on my way. As we cleared the finger pier I threw the helm over to turn the stern to port. Nothing happened. VIXEN continued at a stately pace, stern-first toward the opposite line of moored boats. No matter what I did with tiller or throttle, I could not get that long keel to swing. Amid the panic, I tried to remember if our insurance policy would cover the imminent collision, while another more enlightened part of my mind was screaming "Boathook!" Wide-eyed with fear as VIXEN cheekily continued to ignore her helm, I let out a garbled sputter to Tiffany on the foredeck: "Boathook!" She sprang to it with surprising alacrity, pirouetted the cumbersome lance, planted its tip on the nearest piling, and gave a valiant thrust. This smartly turned VIXEN's bow seaward and thus averted the impending disaster astern.

New-boat lesson number one: This boat does not like to turn.

Fortunately, in the eight years Tiffany and I have owned VIXEN we have spent very little time maneuvering in and out of marinas. What we have done is sailed in a straight line for thousands and thousands of miles across the Pacific, Indian, and Atlantic Oceans. Remarkably, we have sailed these ocean miles without having to hand-steer and without the aid of an electronic autopilot or wind vane. VIXEN sails herself.

The one bit of gear we use to fine-tune VIXEN's

***Above*—The 34′ Atkin-designed cutter VIXEN has sailed nearly around the globe in the past five years. For thousands of these world-roaming miles, she has steered herself with a simple system controlled by a line linking the headsail to the tiller.**



The elements of VIXEN's self-steering system are these: a steering sail; a control line run aft though two stanchion-mounted blocks; and a bungee cord set to leeward to dampen the tiller's motion. As the boat heads up, increased pressure on the headsail tightens the control line, which gently hauls the tiller to windward, correcting the course.

natural steering ability consists of two blocks, 40′ of ⅜″ line, and a length of shock cord. We use this to set up a "sheet-to-tiller" self-steering system that keeps VIXEN on track for weeks at a time on all points of sail and in any wind from a light breeze to a full gale. Although she's not able to nimbly turn like a boat with a fin keel, our long-keeled sailboat's lack of maneuverability becomes an asset on long downwind passages, especially with a short-handed crew.

How to Set Up a Sheet-to-Tiller System

- Fix a light block to windward of the clew of the headsail at least a foot off the deck. (The headsail would be the staysail on a cutter, or the jib on a sloop. Either way, I'll refer to this sail as the steering sail.) A snap-shackle to the stanchion is usually the most obvious attachment point.
- Fix a second block to windward of the end of the tiller.
- Run a light line (I use ⅜″, three-strand Dacron) through both blocks and secure it to the clew of the steering sail. This could be done with a bowline, but I find it easier to run the line through the eye in the clew, then tie a figure-eight knot to keep it from pulling back through.
- Take the other end of the line and secure it to the tiller. I loop a grommet over the tiller grip and run the steering line through the grommet, then tie it back onto itself with an adjustable rolling hitch.
- Take a length of shock cord and attach one end to the tiller and the other to a point to leeward of the tiller. Here I use another grommet around the tiller to attach the shock cord, and a length of light line with a rolling hitch to make the shock cord tension adjustable. Shock cord in the form of surgical tubing is surprisingly available in the more remote corners of the world because it is used in spearfishing guns. That said, a piece of bungee cord works equally well.

For years we sailed with exactly this setup—essentially a control line running from staysail to tiller along the windward side of the boat. Every time we changed tack, the system was re-rigged on the new

windward rail, which is not a big deal on an ocean passage when you are jibing only once a week. Eventually, we upgraded to blocks and line set up on both the port and starboard sides. One control line is active while the other is slack. The system works by transmitting the pressure of the steering sail to the tiller. As the boat heads up, there is more pressure; this pulls on the tiller and turns the boat downwind. The sail pressure then eases and the control line slackens. Changes initiated by sudden gusts or waves are dampened by the shock cord. These minute adjustments to the tiller appear to happen instantaneously.

Our self-steering arrangement works both on and off the wind. As we come more onto the wind, the bungee cord to leeward has to be tightened up, and when hard on the wind the control line from the staysail is almost slack while the bungee cord is taut. When sailing downwind on a deep reach, the bungee cord is slacked right off and the control line tightened up.

It is important to note that the steering sail is not significantly backed to windward by the pull of the tiller. The sail is first trimmed correctly with the sheet before the control line is set up. When the control line is tensioned by the tiller, it pulls the clew of the sail only slightly to windward.

Obviously, this system works best with a steady breeze. I allow VIXEN to wander 10 degrees off course before making any adjustments. Usually, she will sniff her way back on course without my help. In light air and large seas, the steering precision deteriorates. An unbalanced sail plan will also cause trouble. On VIXEN, if we strike the jib we also think about reefing the mainsail for optimum balance. Another gremlin that will jeopardize the system is friction from squeaky blocks, poor leads, or sticky rudder hangers.

For effective self-steering, a boat should have:

- ***Heavy Displacement***—VIXEN, 34′ on deck, weighs 13 tons. This mass makes her less susceptible to waves and gusts tossing her off course.

- ***Low-Aspect Rig***—VIXEN's gaff-cutter sail plan is low and long with a boom running out past the sternpost and an 8′ bowsprit that places the jib far forward of the hull's center of lateral resistance. A low-aspect rig like this lacks the long airfoil of a tall marconi rig, and this limits VIXEN's performance to windward. However, a low-aspect rig will round up less when heeled in a gust, and this helps to keep a steady course on long ocean passages.

- ***Hull Shape***—A long keel and deep forefoot inhibit veering off-course and encourage tracking.

- ***Tiller Steering***—Fewer and fewer oceangoing sailboats have tillers, but tiller steering is essential for a "sheet-to-tiller" steering system to work well. A wheel and its accompanying gears simply have too much friction to properly send information from the headsails to the rudder.

- ***Steering Sail***—Although not essential, a divided rig like a cutter allows the staysail to remain unreefed and used for steering, while sail can be added and reduced by setting or striking the jib and reefing the main. In storm conditions we will strike the staysail and continue to self-steer using the storm jib set on the forestay in place of the staysail.

It was no accident VIXEN was designed with all of the above features. John Atkin, VIXEN's designer, wrote of VIXEN after she was launched in 1952:

The long drag of her straight keel and relatively deep forefoot allows her to hang on to the wind in fine fashion and eliminates the need for constant steering, for VIXEN will sail herself on any point for hours on end. The modern racing-cruising yacht with her extreme cutaway forefoot necessitates the use of various complicated self-steering devices observed on a number of contemporary singlehanders. Properly designed and balanced, the need for such delicate, though often ingenious, devices is completely unnecessary.

When VIXEN first circumnavigated the world in the 1950s, wind-vane steering was still evolving and an electronic autopilot for small sailboats was not an option. In fact, VIXEN originally used a sheet-to-tiller system slightly different from the one we use today, but the idea was still the same: use the sails to steer the boat. On boats with an electronic autopilot or wind vane, I would still want an understanding of how to rig a backup system using a length of line and a couple of blocks. Even if used only for emergency situations, the concept is worth understanding.

There is a long tradition of small sailing craft self-steering across oceans; from Slocum to the Hiscocks, long-distance passages have been made without the aid of wind vanes or electronic autopilots. In a previous era, self-steering was not an afterthought but rather was at the core of a well-thought-out oceangoing vessel. Today, only few classic boats like VIXEN are crossing oceans. During our six-year voyage, I've encountered only one other sailboat using a sheet-to-tiller system. Despite being a near-forgotten skill, the sheet-to-tiller system is simple, inexpensive, and, with the right boat, extremely reliable.

It is a great pleasure to watch any boat steer herself. When I sit back to admire VIXEN racing downwind in the trades while she appears to anticipate each wave and gust, it is easy to imagine some animate force at the helm. If you are lucky enough to own one of these classic boats, thousands of ocean miles may slip under your boat's long keel without you ever touching the helm. But beware: When land approaches and a marina (with a U-turn entrance requiring you to spin on a dime) lures you into its secure embrace, check the currents, check the wind direction, scan the docks for potential line handlers, and have ready the longest, stoutest boathook you can muster.

Regular contributor Bruce Halabisky wrote about reefing a gaff rig at sea in WB No. 218. He and his young family have sailed VIXEN nearly around the world (see www.VIXENsvoyage.com). At this writing, his most recent correspondence was from Antigua, and we'll see him in Maine this summer.