

Modern sailboat hardware works as well aboard older boats as it does on the latest boat show fleet



# Defeating friction

Story and photos by Ralph Naranjo

The latest line-handling gear will make sailing your boat easier, reducing fatigue and making for more precise sail trim.

New cordage running through old sheaves can be a win-lose scenario, a situation in which chafe and friction can quickly eat up expensive line, and add little if any increase in efficiency. Solving this running rigging challenge involves a close look at line leads and a careful inspection of all of the blocks, fair leads and jammers found along the way. Good timing is

on the side of those contemplating such a retrofit. The marine hardware industry has made huge strides forward, and has actually come up with a full line of better nautical mouse traps. The latest iteration of blocks, tracks, clutches, and winches are more efficient and user friendly than ever before. Creative in-house engineers have taken computer aided design and manufacture

to a whole new level, and sailboat owners on a quest to defeat friction have a wide array of hardware with which to solve the problem.

A well planned rigging retrofit will deliver a performance upgrade, improve sail handling efficiency and even elevate boating safety. It's also a solid investment in stainless steel, not a risky bet on an over leveraged security. But

before picking out parts and placing an order, ask yourself a couple of key questions. The first is just how important is efficiency under sail? Be honest about your sailboat's potential for alacrity. A vintage ocean racer gone cruising requires a different approach than an overloaded heavy displacement ketch. In some cases an extra fuel tank, rather than a sprit and an asymmetric spinnaker, makes most sense. But even if performance isn't paramount, the safety and seamanship value of making an existing sail plan more manageable makes a great deal of sense. A wise investment in hardware begins with an understanding of where you'll get the most bang-for-the-buck.

## The jobs at hand

Two key objectives in any running rigging retrofit is the elimination of chafe and the increase of efficiency — a duality that makes sail handling easier and sailing more fun. The best place to start is with a top down look at line leads that begins at the masthead. Adding new sheaves and carefully hunting for halyard chafe points is as important as choosing the right cordage for new halyards. Over the years, corrosion and frictional wear take their toll, causing sheaves to bind, stick and even damage halyard covers. All too often, new rope halyards are

used to replace wire, but no attention is paid to the scarred up V-shaped wire sheaves that are anything but a friend to the new all rope halyards. Harken, Ronstan, Schaefer and others offer a wide selection of sheave styles and materials, and when replacements are chosen, care should be taken to make sure that the sides of each sheave fits snugly in the box that they run in.

Mast exit boxes can add significant friction to halyard pull with only a slight misalignment. All it takes is a couple of degrees of bend as a halyard passes through an entry slot, or a worn or frozen sheave to add significant friction.

When your boat's spar is un-stepped and horizontally supported on horses, use a bright light to sight up the tube and check for chafe points. Make sure each halyard runs fairly and be especially careful when running new rigging not to twist one halyard over another. If this occurs and there's no load on

either halyard, the pull may seem free and easy, but put tension on both and the load along with the chafe and issues will quickly escalate.

Jammers and rope clutches can lessen the number of winches needed to handle halyards, reef lines, topping lifts etc., but be sure that you



These modern blocks use a combination of ball bearings and roller bearings. Spreading the load means less friction and less wear and tear on each bearing.

don't end up like the juggler with too many plates in the air. Shuttling multiple lines on and off a single winch is expedited by efficient rope clutches, however in heavy air reefing situations or anytime the "over canvassed" alarm is on, a dedicated winch trumps a clutch hands down. A good balance is to have dedicated





genoa and day-dream of electric winches. The real problem however, was that their boat was launched with skimpy primary winches and an upgrade in size will do wonders for weary arms, back and crew attitude.

Over the years, wear and corrosion sap winch efficiency and give rise to

make your own version of the material by laying it up on a flat surface (layers of woven roving (18 or 24 oz. with mat between layers) about 4 or 5 units add up to about a quarter of an inch. Polyester resin is fine for the layup, but bond either type of backing plate in place with an epoxy putty. Use a hardware mount bolt hole and a waxed or greased nut and bolt to clamp it in place. Withdraw the fastener when cured, redrill holes and secure hardware with 3M Marine 101 or other sealant.

Friction is the arch enemy of all running rigging hardware. Unfortunately, the over relied upon “no-load” line pull or winch drum spin are two of the most misleading tests of all. With little or no tension in a line, it almost floats over the hard bends and friction-inducing chafe points. The result, akin to the roulette wheel-like spin of an unloaded winch drum, is the miscued belief that all’s well with the gear.

A good example of this false state of security once unfolded in front of me as I strolled along a peaceful New England waterfront. I was watching a single-hander with a very old ketch, sporting equally antique hardware make its way to a nearby pier. The skipper led a stern line through a turning block to a small museum exhibit quality winch, and started grinding away. The worn block

squealed, the line rubbed against the coaming thanks to an unfair lead, and as the load increased, the lower lip of the winch drum actually pressed against the base. The crew, the block and the winch groaned and ground to halt while the stern remained well away from the pier. Noticing the apparent lack of tension in the line, I bent over and pulled the stern of the ketch to the pier. The impromptu demonstration was more about mechanical inefficiency than brute strength. The ketch’s winch, block and line lead added up to a negative mechanical



When most lines are led aft, rope clutches allow one or two winches to handle numerous jobs.

The more blocks a line runs through the greater the drag. When lines have to make multiple turns, new blocks make sense.

winches for headsail and mainsail trimming, and for the preventer and runners if they are used. Clustering halyards with rope clutches and a single winch makes sense, as does doing the same with reefing lines, asymmetric tacks and other not too often handled lines.

### Winches

Super sizing at fast food restaurants may be bad for your health, but doing so with winches makes much more sense — especially aboard older masthead rig sailboats designed to regularly make use of a 150 percent genoa. Many production boats came with undersized primary winches that make each tack a chore. It has caused quite a few voyaging couples to abandon larger

the illusion that your genoa has grown larger. Actually, friction increases as bearings become misshapen and spindles wear unevenly. Parts for antique Bariant, Barlow and Merriman winches are all but impossible to find, and a new set of “self tailers” can be the most welcome of all upgrades. Don’t worry about fitting the exact bolt holes of the existing winch base, simply rotate the new base so its holes are as far as possible away from existing holes. Plug the old holes with an epoxy putty such as West resin and 403 filler, or Marine-Tex.

If there’s any question about the thickness of the FRP laminate in the area, add a solid FRP backing plate, cut from G-10 of self laminate and epoxy bond it to the under deck. You could also

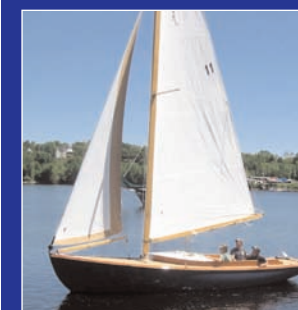
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Another factor in voyager fatigue is undersized primary winches. Make sure they have the size to handle heavy genoa loads.

advantage. Unloaded all seemed fine, but as tension in the system climbed, the bad habits of worn bushing, corroded metal and binding surfaces added up.

### Blocks

Well engineered, highly efficient, butter smooth turning blocks have revolutionized line management. Today, high molecular weight plastic roller bearing and ball bearing blocks grease the proverbial skids, making line leads more efficient than ever before. And with current trends toward leading more and more lines aft to the cockpit, friction

can add up. Halyards often run over four or more sheaves as they wind their way aft to a cockpit winch. Each contributes to the total friction load and the more efficient each happens to be, the easier the sail is to hoist. Naturally, the same goes for sheet handling and other line management. Modern blocks, with catchy names like Black Magic, Synchro and Orbit offer more than spin to the line handling repertoire. In fact, these products are so improved that it's hard not to do a block swap even if a full rerig is not currently in the cards. Harken, for example, has a new line of flip-flop leads and five

and six sheave deck organizers that add even more versatility to deck layout options and line handling.

Skeptics can easily test for themselves the improvements in block design. Start with two older blocks and run an eight or 10 foot line through both, connecting the ends with a sheet bend or two bowlines. The next step is to set up a tensioning capability that can be as simple as stretching the rigged blocks athwartship, and using short pieces of line to add a tail to each block. Wrap the tails to opposing cockpit winches and tension the system using either winch. This side to side lash up allows you to put some load on the line loop that runs through

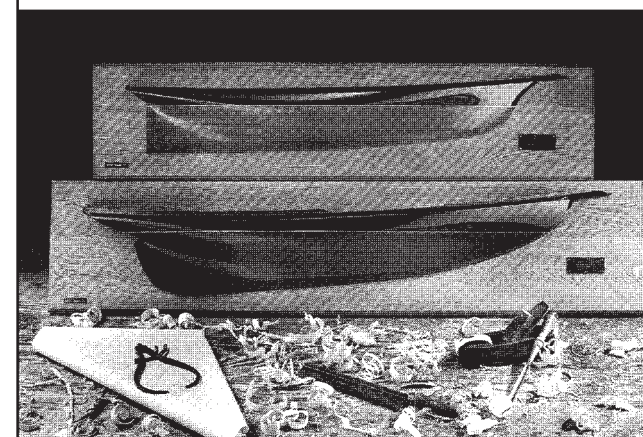
both sheaves. Theoretically, the easy pull nature of the loop stays in effect, even when tension is applied. Strain gauges make the test more empirical, but a simple seat-of-the-pants reference such as a one-handed easy crank of the winch and then a tug on the loop will clearly drive home how block friction increases with overall load. Substitute a set of high efficiency blocks like Harken's Black Magic or a competitor's product, and repeat the test. You'll see why it makes sense to upgrade blocks and eliminate as much friction as possible.

Today, there's even a snatch block revolution going on that's redefining how latching systems function. Ron-



This simple test rig shows how modern blocks have far less friction than older blocks.

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Above, snatch blocks come in a variety of sizes and styles. They come in handy for changing jib sheet angles.

Opposite page, hefty, self-tailing winches, adjustable cars and rope clutches all make for better line handling for the voyagers in this cockpit.

bearing block frame that's so user friendly it can be operated with one hand. Many of these snap shackle attached blocks also offer a trunion joint that provides a universal alignment feature,

stan's traditional top latching heavy duty blocks also come with camlocks that help prevent unintentional opening. Antal and Garhauer have gone to an innovative rotating side plate opening design, while Harken has pioneered a front latching system on a roller

greatly reducing the chance of side loading the snap shackle.

### Tracks, lead cars and travelers

Sheet lead location is a fundamental part of sail trim, and it's vital to offshore voyagers as well as racers. The low hanging

fruit in the art of shaping sails starts with trimming sheets and adjusting the point from which they lead. Reducing friction induced by control blocks and in the car to track connection helps with the former, and an improvement in the slipperiness of the genoa lead itself addresses the latter.

Voyagers often label a genoa lead car adjusting system as "strings for race boats," but in truth they're an equal benefit to the cruiser. Most voyagers use roller furling headsail systems in a reefing context and lose much of the sail's drive as well as harm the material by partially rolling it up, and not changing the sheet lead. The poor lead angle caused by the clew moving forward calls for an adjust-

ment of the genoa lead. A simple block and tackle arrangement on a roller bearing lead car can solve the problem, and allow a crew in the cockpit to change headsail sheet leads with just a pull of the line.

The same convenience comes with an easy to handle mainsheet traveler, a control device that spans as much athwart-ship distance as possible. Mainsail shaping options are significantly improved through the use of such a traveler system. It's a valid recipe for cruisers as well as racers. For example, many voyagers complain about their self-

steering gear's lack of power to hold a course, a problem that can often be resolved with better mainsail trimming, shaping and reefing controls. In the case of the latter, upgrading from high friction sewn in or pressed rings in the leech of a mainsail to small light roller bearing blocks improves reefing efficiency. Once again, the old refrain proves true — reducing friction increases efficiency, and sail handling becomes much more fun. ■

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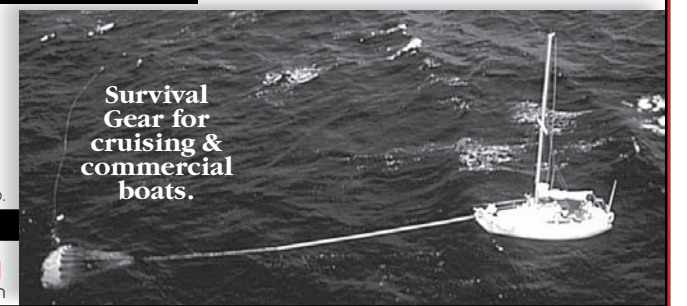
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