Capri 22 National Association

Class Information Package

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Credits: This document owes its existence to the hard work and creativity of Rey Newman, our 2003 Capri 22 National Association Vice Commodore, and a heck of a great guy.

Welcome to the Capri 22 National Assocation

I am very happy to have you on board in our growing Class. No other 22-foot boat will offer you as much family fun and racing excitement as the Capri 22. Your registration with the CP22 NA will keep you informed as to upcoming events, provide a forum to discuss your ideas on activities and growth of the Class, and give us a National body through which to administer Rules and Racing.

In 1983 the Capri 22 was introduced as a high-performance family racer/cruiser that could be trailer-sailed or kept dockside. Designed by Gary Mull (of America's Cup lineage) and Frank Butler, it was intended to be Catalina Yacht's answer to the highly successful J-24. More than 1,000 Capri-22s have been built in the last 20 years, and the new Mark II is very popular. The CP22 has proven to be a stable, safe boat, yet one that is fast and fun to sail. Intense racing can be found with the participating Fleets, and the Class Rules were updated in 1999 to facilitate better racing and handling, while not compromising the 1-D nature. The boat also has a great PHRF rating for those of you in areas without an active Fleet.

Although we focus on racing, we never lose touch with the fact that all of us have a social and fun side as well, so we encourage regional events make just for the cruise of it. Contact your CP22 NA Regional Director with ideas you have for frolick & fun for family and friends.

The CP22 NA has put together this package containing valuable information about the Capri 22, sailing techniques, racing tactics, boat maintenance and other topics we hope will be of interest to you. Please contact your Regional Directors with suggestions for additional content.

I am confident you will enjoy your Capri 22 tremendously and that you will find this Class to be affordable, fun, but with a competitive racing component to the action. Your National and Regional contacts are listed on the next page. Good sailing!!

Sincerely,

G.D. Beckett "Garry"

Capri 22 National Commodore, 2003

2003-2004 Capri 22 National Association Officers

Below is a list of the hard working people that make the CP22 NA happen. It's all volunteer stuff, so recognize we will always do our best, but we have to balance work, family, and this great boat in our personal mix. In other words, no one's perfect, least of all us. If you see something that needs fixing, let us know, or better yet, step up and make it so yourself by taking the lead.

Commodore: G.D. Beckett "Garry"

1740 Thomas Ave, San Diego, CA 92109; 858 483-6709 - hm; 858 583-0186 - cell; g.d.beckett@aquiver.com

Secretary/Treasurer: Reynaldo Newman

7057 Murillo Ln; La Costa, CA 92009; 760-431-7367 - hm; rbknewman@cs.com

Measurer: Larry Baker

5051 Abuela Dr., San Diego, CA 92124; 858-277-4860 – hm; larrybaker@nethere.com

Racing Coordinator: Steve Ross

2830 Keats St. Apt "D", San Diego, CA 92106; 619-523-0717 - hm; 619-957-3814 – cell; srossracer@msn.com

Western Regional Director: Jerry Lewis

15550 Kardale Ct., Grass Valley, CA 95949; 530-272-9380 – hm ; jerryl@editware.com

Northwestern Regional Director: Ivan Andrade

2660 Baindbridge St, Fort Collins, CO 80524; 970-566-9741 – hm; IVEMOE@aol.com

Lakes Area Director: Steve Loomis

949 Warner Ave N, Mahtomedi, MN 55115; 651-426-0621 – hm; ksloomis@comc ast.net

Gulf Coast Director: Don Keeney

598 Roselea Dr., Buchanan Dam, TX 78609; 512-793-5906 – hm; 1keyknee@281.com

Eastern Director: Could/should be you!!

CAPRI 22 NATIONAL ASSOCIATION BY-LAWS

ARTICLE I - FORMATION

The Capri 22 National Association (CP22 NA) is chartered and formed under these organizational By-Laws, as updated January 1, 2003 from the original By-Laws dated May 17, 1989. The CP22 NA is a non-profit organization created solely for the benefit of Capri 22 Owners and sailors. The updates pertain to organizational structure, but not the intent, spirit, or nature of the original By-Laws. The By-Laws are a guide, not a rigid set of laws and edicts, and may be updated as deemed necessary by the participating Capri 22 Sailors through the growth of the Association. The primary purpose of the CP22 NA is to provide a governing and sanctioning organization for one design (1-D) racing of the CP22, and to provide a forum for promoting sailing of the CP22. The overview below from the CP22 Class rules provides the basic philosophy for our 1-D maintenance:

> *The Capri 22 is a one design Class created to fulfill the diverse needs of recreational sailors such as cruising, one design racing, day sailing and handicap racing. These Class Rules are intended to preserve important sailing objectives: a) affordable competitive racing; b) flexibility of use; c) safety.*
>
> *Where racing is concerned, the Capri 22 National Association will administer, maintain, and update Racing Class Rules. The Class Rules are intended to maintain a fair and sporting racing environment where Capri 22s of any vintage can expect to evenly compete. Capri 22s shall maintain their One-Design nature by adhering to the original overall design plan of Catalina Yachts for each of the four subclasses; 1) Standard and tall rigs; 2) Fin and wing keels, and the four combinations thereof. The Capri 22 National Association recognizes that there 2 primary manufacturer variations, the Mark I (hulls prior to December 1999), and the Mark II (from January 2000 forward). In the spirit of a 1-D Class, there shall be no structural or design modifications to the hull, keel, rudder, spars, sail plan, weight, weight distribution or other items unless specifically addressed in the Rules. However, these rules allow flexibility to the skipper and crew in determining comfortable and efficient sailing & deck layouts based on personal preference.*

ARTICLE II PURPOSES

The primary purpose of the CP22 NA is to foster 1-D racing, and general yachting enjoyment of the Capri 22s. The intent is to foster national and international interest and competition in Capri 22 Class yachts, and maintain fair and sporting oversight of the sport and interests of the membership. No part of the CP22 NA activities are part of the facilities or equipment provisions of Section 501 (c) (3) of the Internal Revenue Code of 1954 as amended.

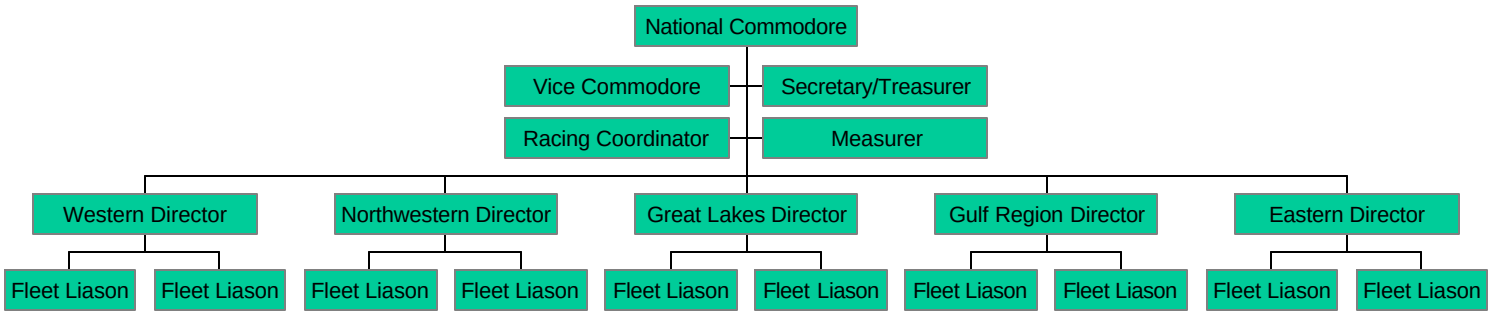
The CP22 NA mission to promote Class racing under uniform rules is governed by this Association through its officers and voting members. The CP22 NA shall have jurisdiction over all sanctioned Class racing, all of which will follow the Capri 22 Class Rules and applicable rules of sailboat racing. The Class Rules allow for local-area modification, but any such modifications will be void in races sanctioned by the CP22 NA unless a 2/3-consensus of racing is achieved, as specified in the rules. Flexibility and fairness is at the heart of the association, these By-Laws, and the Class Rules.

ARTICLE III CAPRI 22 NATIONAL ASSOCIATION OFFICERS

The organizational structure of the CP22 NA is shown in the organization chart below. The five national officers responsible for the administration are: 1) National Commodore; 2) Vice Commodore; 3) Secretary/Treasurer; 4) Racing Coordinator; 5) Measurer. A single individual may occupy multiple offices in the temporary absence of other volunteers to assist in these areas. These officers will work together to promote 1-D racing and other CP22 events for sailing enjoyment. CP22 NA officers will be owners in good standing of a CP22 sailboat and shall be elected by CP22 NA members; election procedures for all CP22 NA officers are described below in Article IIIa. The responsibility of each of the officers is provided subsequently, along with a calendar of execution.

Because the needs and conditions affecting the CP22s, racing and events varies by geographic region, Regional Directors will be elected whose responsibility will be to manage and promote the diverse needs of CP22s in each region. Fleets in each region will also elect a representative as a liaison between the local sailors and the regional directors. To the degree possible, Fleets will encourage membership in their local area to attract and organize individual CP22s that may not have a nearby Fleet. As regions become developed, more sub-divisions or reorganization may be warranted at the request of the regional commodores and their CP22s.

Capri 22 National Assocation Structure



ARTICLE IIIA: OFFICER ELECTIONS

Election of National Association Officers shall occur every two years. Nominations for National Officer positions will be made by the Regional Directors, in coordination with their regional fleet liaisons and in contact with their regional fleets. Candidates for Office will be CP22 NA members in good standing, an owner, co-owner or family member thereof as defined by the Class Racing Rules, and active in racing for at least 1 year prior to their nomination. Nominations will be received in writing to the Capri 22 NA Secretary by November 30th of the year preceding the election year, and posted to the Capri 22 National Association Website. Capri 22 NA members will be notified of the nominations and asked to vote by December 30th. The CP22 NA Secretary will tally the votes, and notify the CP22 NA of the Election results and new officers, including their contact information. Newly elected Officers shall be installed on January 1st of the subject year.

Election of CP22 Regional Directors shall occur every two years. Regional Fleets and/or Fleet Liaisons shall nominate Capri 22 Regional Directors, at the discretion of CP22 members in each Region. The votes for the incoming Regional Director shall be directed to, tallied, and administered by the present Regional Director in question, who will notify the CP22 NA of the Election results. On January 1st of the subject year, the newly voted Regional Director will take office. New Regions or realignment of Regions will be considered at annual CP22 NA meetings.

Any CP22 NA Officer may be removed by a 2/3-majority vote of CP22 NA members in good standing. A formal request for removal of office shall be provided to the CP22 NA Commodore, unless that person is the subject of the removal vote, in which case the Secretary/Treasurer will administer the request for Officer Removal. The removal process will follow the general election procedures above, except they will be initiated at the time of the request for removal.

The CP22 NA Officers, including the National administration positions above, and the Regional Directors, shall for the voting Board for deciding matters of executing the National Association business. National Association matters before the Board will be ratified by a simple majority quorum (51% or greater), and in the event of a tie vote, the present National Commodore will decide the matter.

Written resignations of CP22 Officers will be accepted by the Secretary/Treasurer, and new elections for that position will be held at the next election period and follow the general procedures above. The CP22 Board on a quorum vote may appoint interim Officers in any capacity pending the next elections. Any CP22 Officer may be removed by a 2/3-vote of the Directors, followed by a Quorum of the voting Membership.

Fleet Liaisons are encouraged to assist in communications and growth of the Capri 22 Class. Fleet Liaisons are not CP22 NA officers, but are the important link between members and participants, and the CP22 NA. Their positions are administered at the local Fleet level and at the discretion of those local Fleets. Local Fleets are asked notify of the CP22 NA Regional Directors of their participation.

There will be no salary or other monetary compensation for any CP22 Officer, Director, or other associate. However, the Secretary/Treasurer or Commodore will reimburse authorized and documented expenses. Spending limits and protocols are discussed in Article IV below.

ARTICLE IIIB: OFFICER RESPONSIBILITIES

Commodore: The CP22 NA Commodore is responsible for the administration of the association, to coordinate racing and other events with the regional commodores, and to promote the CP22 nationally. The commodore will maintain communications with regions, fleets, and members, and will help expand the organizations knowledge base and promote growth in membership. At a minimum, the Commodore will hold discussions with the National Officers and Regional Directors on a quarterly basis to ensure issues are brought forward and discussed. The commodore will provide quarterly newsletters to update members on the status of the CP22 NA, upcoming races, notices from Catalina concerning the CP22s, and rules/racing updates. The commodore will represent the interests of the CP22s on a national level, and will help guide the annual agenda with the help and assistance of the regional representatives and members. Along with the Vice Commodore and Secretary/Treasurer, the Commodore will prepare an annual anticipated budget consistent with the annual agenda for the CP22 NA.

Vice Commodore: The CP22 NA Vice Commodore is responsible for executing tasks that support the CP22 NA agenda and shall assist in creating that agenda with the Commodore. The vice commodore shall stand-in for the Commodore on his/her behalf at functions where the Commodore is absent.

Secretary/Treasurer: The CP22 NA Secretary/Treasurer shall keep the written minutes of each quarterly meeting of the CP22 NA officers and regional commodores. The Secretary/Treasurer will have custody of all pertinent and important documents for the CP22 NA pertaining to organization, proceedings, and action items of record and their deposition. The Secretary/Treasurer will keep records of CP22 NA membership, dues and Mainsheet subscription status. Treasury duties, tracking incoming and outgoing expenses, and budget maintenance will also be the responsibility of the Secretary/Treasurer.

Racing Coordinator: The Racing Coordinator will be responsible for execution of regional and national CP22 racing events. The RC will assist the hosting regional Fleet(s) in ensuring there is

a proper race notice and that participants are in good standing with the Class Rules. The Racing Coordinator will keep a record of all CP22 NA sanctioned races, the participants, scores, and status of CP22 NA trophies and awards. The Racing Coordinator will work with the Secretary/Treasurer to ensure the record tracking is seamless with the membership and other tracking information that the Secretary/Treasurer collects on behalf of the CP22 NA. The Racing Coordinator will also assist in determining CP22 NA sanctioned Regatta entry fees, with 65% of the proceeds above cost returned to the hosting Fleet, and 35% provided to the CP22 NA to assist in promotion of future Regattas and sailing events.

Measurer: The CP22 NA Measurer is responsible for ensuring all racing CP22s meet the letter and intent of the Class Rules. The Measurer will measure and inspect all yachts according to the same process, and will issue a "Certificate of Measurement" to all CP22s meeting the Class Rule specifications. The certificate is honored as perpetual unless there are significant repairs, modifications, or a change of ownership for the yacht. Racers at any CP22 NA sanctioned must be in compliance with the Class Rules. A certificate shall verify that compliance in the absence of changes to the vessel after the issuance of the certificate. The Measurer will also be responsible for delegating measurement duties to local Fleets and Regions, and will ensure consistency in the application of the Class Rules. Any CP22 not meeting measurement standards will receive a "Notice of Deficiency", and will have the opportunity to correct or protest any deficiencies before a sanctioned racing event.

Regional Directors: Each CP22 NA Regional Commodore will be responsible for promoting racing, sailing, and learning at a regional and local level. The regional commodores will be the primary communication link between the CP22 NA and the local Fleets, and will assist through their understanding of local issues in guiding the CP22 NA in directions suited to meet the regional needs.

ARTICLE IV: CAPRI 22 NATIONAL ASSOCIATION FUNDS

The CP22 NA will raise funds through membership dues, racing fees from Nationally Sponsored Capri 22 Races, and from commercial sponsors. Funds will be used at the discretion of the CP22 NA Officers for use in promoting the Capri 22 Class, promulgating official Class business, and other function associated and required by the Administration of the Class. The CP22 NA Commodore and Secretary/Treasurer are the signatories on the CP22 NA accounts.

All spending on behalf of the CP22 NA will be documented according to standard bookkeeping practices, and presented annually to the Directors and membership by the Secretary/Treasurer, or in their absence, the Commodore. The Secretary/Treasurer and the Commodore have spending authorization up to $250 per action on behalf of the CP22 NA without a voting quorum. Amounts greater than $250 but less than $1,000 will be confirmed by a quorum of the Directors, and spending greater than $1,000 must be authorized by a quorum of the full voting membership of the CP22 NA. All spending will be fully documented, including the voting record where spending authorization is required of either the Directors or the voting Membership.

ARTICLE V: CAPRI 22 NATIONAL ASSOCIATION MEMBERSHIP & FLEETS

Membership is open to any person interested in the Capri 22 National Association. A member in good standing is so recognized by being currently registered with the CP22 NA, and having paid their annual dues. The Capri 22 National Association reserves the right to update or modify the membership structure as suggested by the Class members. All current members may vote on administrative matters and other related items placed before the Membership. An exception is that votes for issues pertaining to Racing and Class Rules will be open only to boat owners, with one vote counted per Capri 22 yacht in such matters.

Fleets may form wherever there are 3 or more participating Capri 22 yachts. Fleets must register in writing with their Regional Director and the National Secretary/Treasurer. Each new Fleet will be assigned a Fleet Number in sequential order to the requests and relative to existing Fleets. Members in each Fleet are encouraged to register with the National Association to ensure full communication with respect to the Class, but this is not a requirement for Fleet recognition. Fleets are encouraged to prepare Fleet By-Laws and ensure those By-Laws are consistent with these National Association By-Laws, while accounting for flexibilities in local area needs and diversity. The National Assocation supports its member Fleets, but is in no way responsible for the administration, funds, or actions of local Fleets that operate solely at their own discretion and desire. Fleets will appoint a Fleet Liason to communicate with the appropriate National Association Officers.

ARTICLE VI: ADMINISTRATION OF THE BY-LAWS & CLASS RULES

The sequence of administration for both the CP22 By-Laws and the Class Rules shall be similar. Suggestions for changes or updates to either set shall be given annually by the Membership and organized and presented through the Regional Directors to the full CP22 Board during its annual meeting. Requests for updates and considerations can also be made directly to any National Officer, but working through the Regional Directors is encouraged to make sure there is adequate discussion among the Members of a given region that will be affected by a Rule change. The CP22 NA Board of Directors will document requested changes, and vote on such changes to be recommended to the Membership. The proposed changes and the Board's recommendations on acceptance will then be provided to the full Membership for voting, with a quorum sustaining any specific change to the By-Laws or Class Rules. As mentioned above, only one vote per Capri 22 yacht will be tallied for issues pertaining to Racing or the Class Rules.

Administration of the Class Rules is a key duty of the CP22 NA Officers, and in particular, the National Measurer. There are 2 key facets to administering the Rules: a) Hearings to determine a Rules Violation or Clarification under the existing Class Rules; b) Changes and updates to the Class Rules, and maintenance of a safe version of the Rules that at all times is available on a public-domain forum (currently the Capri 22 National Association Website; www.capri22.net). Questions and clarifications on the intent and meaning of specific rules shall be provide to the National Measurer with a request for a hearing at the next quarterly meeting of the CP22 Officers.

Proposed changes to the Class Rules will be addressed at the annual meeting of the CP22 NA Board. The National Measurer will document and report all request for Rules changes, and present to the Board for a vote. As noted, the results of the Board's findings and vote will then be put before the Members for confirmation by quorum, with a voting deadline of the end of the 1st quarter (March 31 of each year). Yachts that do not vote by the deadline will be considered as an affirmative vote for the Board's findings.

The Capri 22 National Association will consider special sessions of the Board if there are significant Rules considerations affecting an event sanctioned. The event, its organizers, and the association Regional Director(s) will provide a special written request of the CP22 Board for a hearing, which will then be organized by the National measurer to ensure that findings are completed before the event in question. In this specific and unique case, the quorum findings of the CP22 Board will be binding for the event, and the full membership will not be asked to vote. If the issue persists and is worthy of permanent consideration, it may again be addressed at the annual meeting of the CP22 Directors.

Meetings of the CP22 Directors will be held quarterly. A meeting is considered to be any communication forum allowing participation by each Director. This might include, but is not limited to, Internet meetings, email forums, teleconferencing, or meetings in person. People will be considered to have attended if they have had an adequate opportunity to participate in discussions pertaining to CP22 NA business, and that can include written or verbal participation at any time before the end of each quarter. The Capri 22 National Association's main items of business will be addressed at the Annual meeting held in January of each New Year.

Catalina Capri 22 (by Sail Magazine)

Designer
Catalina Design Team

LOA/LWL 22'/20'
Beam 8'2"
Draft (fin/wing) 4'/2'8"
Ballast (fin/wing) 650/700 lbs
Displacement (fin/wing) 2,200/2,250 lbs
Sail area (100% fore triangle) 229 sq ft
Batteries (1) 96-amp
Displ.–length ratio 125
Sail area–displ. ratio 21.3

Construction
Hull is a solid laminate of hand-laid fiberglass, with knitted fabrics and vinylester resin skin coat; hull has structural inner liner. Deck is balsa-cored composite with knitted fabrics and vinylester resin; deck has inner liner. Five-year blister and structural warranty on hull and deck.

Builder
Catalina Yachts, 21200 Victory Blvd., Woodland Hills, CA 91367; tel. 818-884-7700, fax 818-884-3810, www.catalinayachts.com

Price
$11,800. Base price (FOB Woodland Hills, CA) includes mainsail and 135 percent genoa, jiffy reefing and low-stretch halyards, "Soft Touch" hull liner with 4 zippered storage compartments, stanchions and bow and stern pulpit, ice chest, electrical system (cabin and running lights).

The Catalina Capri 22 shows that the designers and builders at Catalina Yachts have not been resting on their laurels. A 22-foot daysailer is nothing new for the California-based company, but the redesigned and retooled Capri 22 earned its spot in SAIL's Top 10 because it is a simple, efficient, handsome, easy-to-handle, and well-equipped entry-level keelboat—the package includes sails, but the trailer is optional—at an entry-level price.

Sailing in light air, SAIL's judges agreed that the Capri 22 was comfortable and easy to handle but were surprised by the boat's relatively generous sailplan and slippery-fast hull form. Equipped with a standard 28-foot-tall aluminum rig (a 30-foot-tall rig and spinnaker are options), the new hull design incorporates a fine entry forward, a relatively flat run aft, a deep, tapered rudder with your choice of a 4-foot-deep fin keel or a 2-foot, 6-inch wing keel. Go for the performance package and fin keel if you're interested in one-design racing, or the wing keel if you plan to cruise shoal waters or want to make trailering easier.

Below deck, four 6-foot-long bunks, an ice chest, storage pockets in the soft vinyl hull liner, and an optional galley unit and Porta Potti make the Capri a legitimate weekend cruiser. It's also equipped with a basic electrical panel and an adequate battery (96 amps) to power cabin and running lights.

While SAIL's judges awarded the boat high marks for performance, they found that the low boom requires adults to duck during a tack or gybe. Also, the factory-supplied sails rated below average in quality, and the optional trailer is not equipped with brakes. However, in the same way that the original Catalina 22 started the 70s generation sailing, the Capri 22 could start a whole new generation sailing into the new millennium.

—Bill Springer

Courtesy Sail Magazine, 2001

CATALINA

CAPRI 22

CATALINA CAPRI 22

Known for its sweet sailing performance in nearly all conditions, the Catalina Capri 22 has been winning sailors since it's introduction. For the 2001 model year, a major design update has made the Capri 22 more comfortable, safer at sea and easier to maintain.

The striking new deck profile is flared across the stem and has wider cockpit curves for crew comfort during and after sailing. Under the full reclining length seats is a new storage locker and separate battery locker

Maintaining one-design hull and rigging still allows for increases in efficiency and reduction in effort. Halyards now raise the sails with less effort, thanks to the elimination of deck turning blocks.

A 12 volt electrical system with control panel offers all the conveniences of information and entertainment at the touch of a switch

An complete racing package is available, including: asymmetrical spinnaker, sheets, pole and backstay tension adjuster

The enclosable head and available galley module make the Capri 22 suitable for extended daysailing or weekending.

Catalina Yachts
21200 Victory Boulevard Woodland Hills, CA 91367
Phone (818) 884-7700 Fax (818) 884-3819
e-mail: catalina@catalinayachts.com
http//www.catalinayachts.com

Sold and Serviced by:

CATALINA CAPRI 22

PRINCIPAL SPECIFICATIONS

LOA		6.71m	22' - 0"
LWL		6.01m	20' - 0"
Beam		2.49m	8' - 2"
Approx. Basic Weight			
	Fin Keel	999kg	2,200 lbs.
	Wing Keel	1022kg	2,250 lbs.
Fin Keel	Draft	1.22m	4' - 0"
	Ballast	295kg	650 lbs
Wing Keel	Draft	0.81m	2' - 8"
	Ballast	318kg	700 lbs

Rated Sail Area Standard Rig		
(100% Foretriangle)	20.40m²	229 sq.ft.
I	7.62m	25' 0"
J	2.49m	8' 2"
P	7.92m	26' 0"
E	2.97m	9' 9"
Rated Sail Area Tall Rig		
(100% Foretriangle)	22.28m²	250 sq.ft.
I	8.84m	29' 0"
J	2.49m	8' 2"
P	8.53m	28' 0"
E	2.97m	9' 9"

All measurements are approximate and subject to change without notice.

Catalina Capri 22

Catalina Yachts Sport Series
Effective 12.16.00
Not Valid after 5.31.01

EQUIPMENT LIST & ORDER FORM

STANDARD EQUIPMENT AND FEATURES

- Five Year Gel Coat Blister Protection *(2)
- Five Year Hull Structure Warranty *(3)
- 135% Jib with Sheets
- Mainsail w/Sheets, Class Insignia and Numbers
- One Piece Fiberglass Hull, White
- One Piece Fiberglass Deck, White
- Molded-In Non-Skid Surface
- Molded-In Gel Coat Waterline Stripe
- Boom Vang, Adjustable
- Anodized Aluminum Mast and Boom
- Forward Hatch
- Lead Ballast Keel
- Primary Winches (2)
- Zippered Storage Compartments (2)
- Jiffy Reefing on Boom
- Steaming and Anchor Light on Mast
- Fiberglass Rudder
- Fuel Locker
- Stainless Steel Standing Rigging
- Low Stretch Halyards
- Trailer Bow Eye
- Large Self-Bailing Cockpit
- Stanchions, Stern Rails, and Lifelines with Pelican Hooks
- Halyard Pockets on Cabin Bulkhead
- Interior Cushions
- Cockpit Mounted Traveler with Controls
- Winch Handle, 8"
- Bow Pulpit
- Teak Trim Interior
- Stainless Steel Mast Step
- Ice Chest
- Main & Jib Halyards Led Aft to Cockpit
- Internal Halyards
- Electrical System with Panel, Cabin, Running Lights and Deep Cycle Battery
- Manual Bilge Pump with Through Deck Handle

☐ CD 0220 C 22 with Standard Equipment and Sails ..... _____

OPTIONAL EQUIPMENT

FITTINGS AND EQUIPMENT

☐ CD1511 Two-Tone Deck, White and Grey, In Lieu of Standard _____
☐ CD 0122 Wing Keel ..... No Charge
☐ CD 0121 Fin Keel ..... No Charge
☐ CD 4001 Cockpit Cushions, Vinyl, White ..... ____
☐ CD 9909 Safety and Equipment Package ..... ____
☐ CD 2901 Mast Carrier ..... ____

SAILS & RIGGING OPTIONS

☐ CD 2709 Mainsail Cover ..... ____
☐ CD 2707 Tiller Cover ..... ____
☐ CD 3507 Whisker Pole ..... ____
☐ CD 3301 Headsail Furling Gear ..... ____
☐ CD 3801 Tall Rig Mast with Sails, Main and 135% Jib, In Lieu of Standard ..... ____

SAILS FOR STANDARD RIG

☐ CD 3707 155% Genoa w/ Sheets In Lieu of Standard Jib ..... ____
☐ CD 3709 150% Furling Genoa with U.V. Panels and Sheets In Lieu of Standard Jib ..... ____
☐ CD 3711 .75 oz. Radial Head Spinnaker Specify Color Option A _____, B _____ ..... ____
☐ CD 6803 Self Contained Head and Privacy Curtain..... ____
☐ CD 4404 Galley Unit with Basin and Stove..... ____
☐ CD 2803 Stern Boarding Ladder ..... ____
☐ CD 5002 Outboard Motor Bracket ..... ____
☐ CD 9605 Trailer Galvanized with Support Wheel ..... ____

SAILS FOR TALL RIG

☐ CD 3807 155% Genoa w/Sheets In Lieu of Standard Jib..... ____
☐ CD 3809 150% Furling Genoa with U.V. Panels and Sheets In Lieu of Standard Jib ..... ____
☐ CD 3811 .75 oz. Radial Head Spinnaker Specify Color Option A ____, B ____ ..... ____

PERFORMANCE PACKAGE

☐ CD 2000 ..... ____
- Spinnaker Gear Including Pole Sheets, Foreguy and Halyard Lead Aft to Cockpit
- Main & Jib Halyard Winches on Cabin Top, with Clam Cleats
- Adjustable Hiking Stick
- Backstay w/ Adjustment Purchase

Total_____

Waterline, sheer stripe and cushion color package: A _____ , or B _____

Dealer _____ Deliver to _____ P. O. No. _____
_____ _____ Deposit $_____
_____ _____ C.O.D. _____
Date _____ By _____ Customer _____ Bank Finance _____

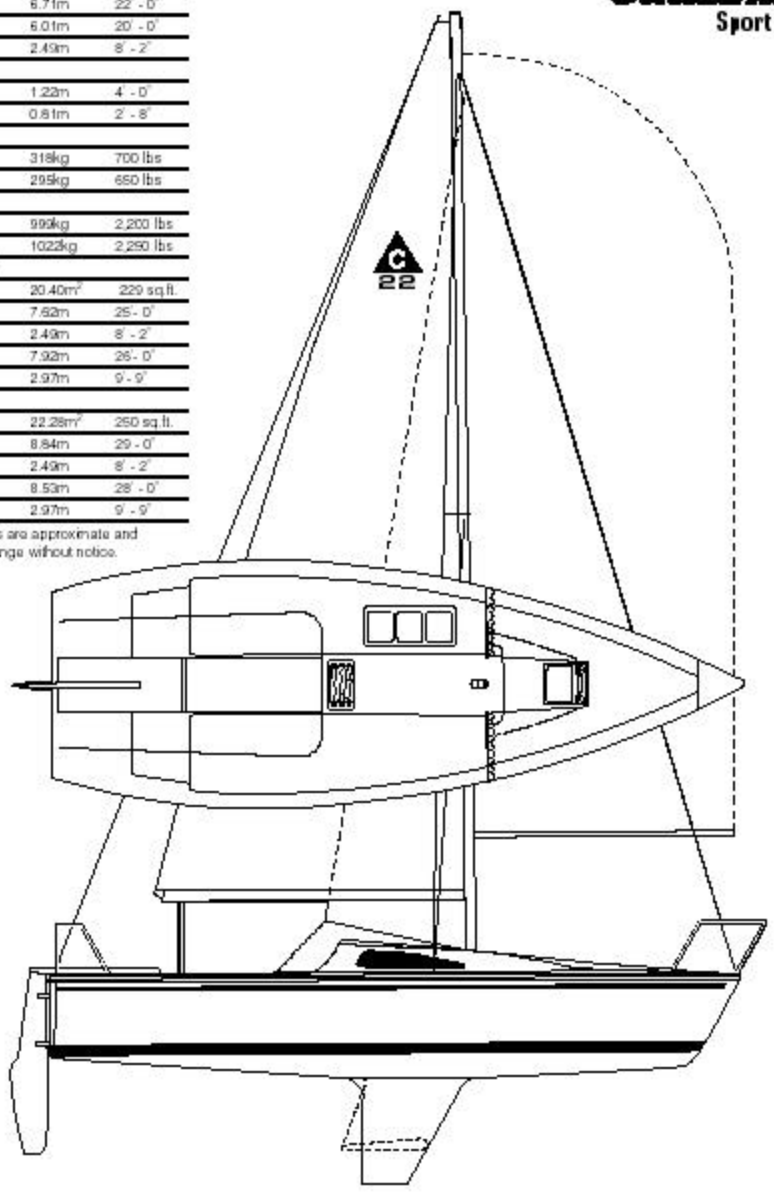
NOTE: (1) All prices and specifications are subject to change at any time including after receipt of the customer's order, until final delivery to the customer.
*(2) Five year gel coat blister protection provided by Catalina Yachts Gel Coat Five Year Limited Warranty against below the waterline gel coat blistering. for precise terms, please refer to the Gel Coat Limited Warranty Booklet.
*(3) For precise terms of Catalina Yachts Five Year Hull Structure Limited Warranty please refer to Catalina Yachts Limited Warranty booklet.
(4) Export models may have different equipment or specifications in order to comply with prevailing regulations.

Catalina Capri 22

Catalina Yachts
Sport Series

PRINCIPAL SPECIFICATIONS		
LOA	6.71m	22' - 0"
LWL	6.01m	20' - 0"
Beam	2.49m	8' - 2"
Draft		
Fin Keel	1.22m	4' - 0"
Wing Keel	0.61m	2' - 8"
Ballast		
Fin Keel	318kg	700 lbs
Wing Keel	295kg	650 lbs
Approx. Basic Weight		
Fin Keel	998kg	2,200 lbs
Wing Keel	1022kg	2,250 lbs
Sail Area (Standard Rig)		
Total (100% Fore)	20.40m²	229 sq.ft.
I	7.62m	25' - 0"
J	2.49m	8' - 2"
P	7.92m	26' - 0"
E	2.97m	9' - 9"
Sail Area (Tall Rig)		
Total (100% Fore)	22.28m²	250 sq.ft.
I	8.84m	29' - 0"
J	2.49m	8' - 2"
P	8.53m	28' - 0"
E	2.97m	9' - 9"

All measurements are approximate and subject to change without notice.

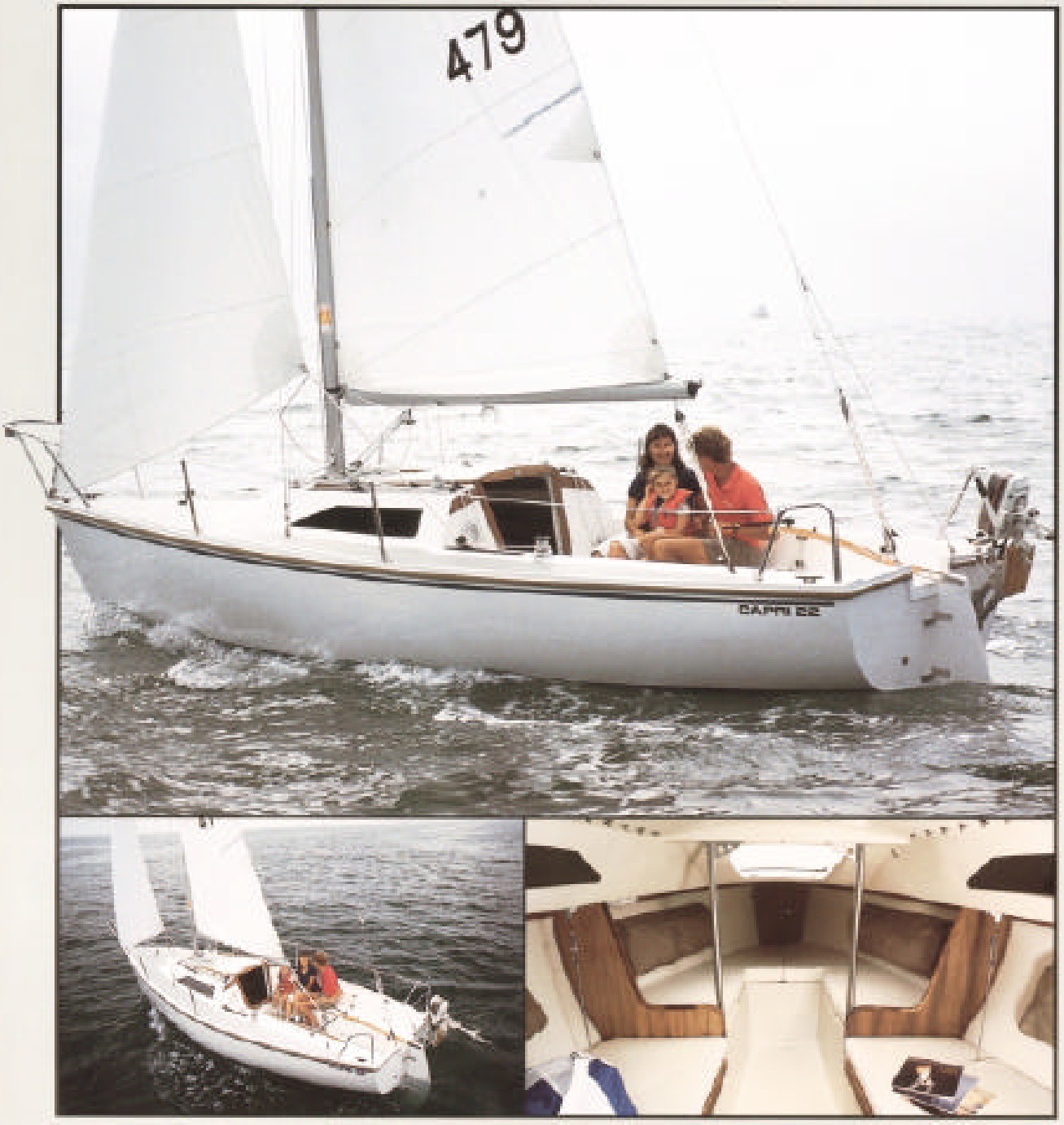


21200 Victory Boulevard • Woodland Hills, California 91367 • www.catalinayachts.com

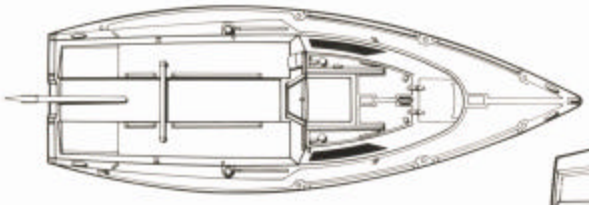
CAPRI 22

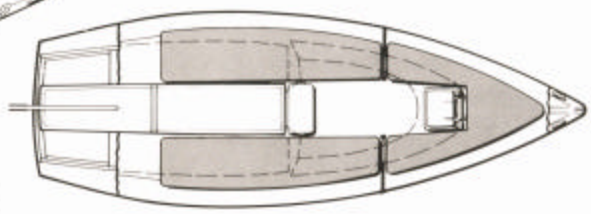
by Catalina Yachts

THINK FAST! THINK FUN! THINK CAPRI!



CAPRI 22





The Interior

The cabin is designed for relaxing after the race and comfortable weekending for the family. Midship are two extra long berths and forward is a vee-berth which makes a double bunk. The available head fits under the vee-berth and can be enclosed for privacy. There is storage below all the berths and in the four large zippered compartments in the hull liner. A large removable cooler with teak step pad is standard equipment.

Deck Hardware

The adjustable ball bearing traveler, recessed genoa track with the low lead cars, inboard genoa tracks on the cabin top, internal halyards led aft, bow pulpit, lifelines and stanchions are all standard on the Capri 22.

The deck is finished with an attractive non skid pattern for secure footing.

The cockpit has been designed with the human body in mind. The seat backs are angled and contoured to provide comfortable seating at any angle.

The molded-in fuel locker in the cockpit keeps fuel for an outboard safely on deck. The available spring-loaded stainless steel outboard bracket makes engine handling easy.

The Capri 22 sucessfully combines a comfortable secure cockpit, handsome styling and a functional, well detailed deck design in an intelligent affordable package.

The Capri 22 was designed to be easy to sail and rig, while incorporating all the performance and sail handling features experienced sailors expect.

The fractional rig sail plan puts most of the "horsepower" in the easily controlled mainsail.

A small lapper jib can be used for short-handed sailing, allowing you to enjoy excellent performance without working too hard.

The high aspect ratio lead fin keel is encased in a fiberglass jacket for optimum shape control and outstanding windward performance, the optional wing keel provides optimum performance for minimum draft.

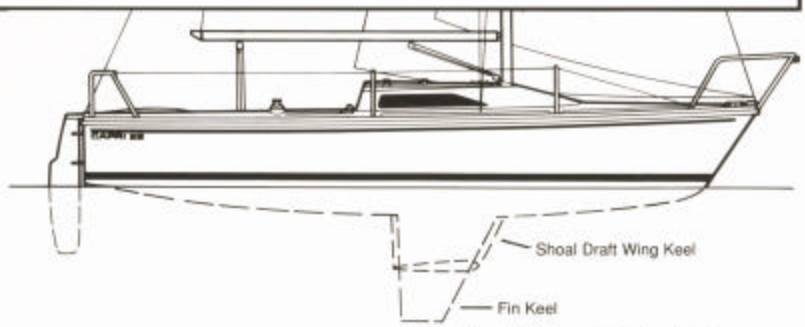
The state-of-the-art eliptical rudder provides full control and a docile, well-balanced helm.

The available racing package provides all the rigging necessary for competition in the toughest fleets at a modest price.

SPECIFICATIONS

Length Overall			22'-0"
Waterline Length			20'-0"
Beam			8'-0"
Draft			
Fin Keel			4'-0"
Wing Keel			2'-6"
Ballast			
Fin Keel			650 lbs.
Wing Keel			700 lbs.
Designed Weight			
Fin Keel			2200 lbs.
Wing Keel			2250 lbs.
Sail Area (Standard Rig)			
100% Foretriangle			228.75 sq.ft.
I	25.00 ft.	P	26.00 ft.
J	8.16 ft.	E	9.75 ft.
Sail Area (Tall Rig)			
100% Foretriangle			250.00 sq. ft.
I	29.00 ft.	P	28.00 ft.
J	8.16 ft.	E	9.75 ft.

All measurements are appproximate12/88



Catalina Yachts

SOLD AND SERVICED THROUGH:

21200 Victory Boulevard.Woodland Hills, California 91367

Catalina Capri 22

Catalina Yachts Sport Series

Effective 4.1.00
Not Valid after 6.1.00

EQUIPMENT LIST & ORDER FORM

STANDARD EQUIPMENT AND FEATURES

- Five Year Gel Coat Blister Protection *(2)
- Five Year Hull Structure Warranty*(3)
- 135% Jib with Sheets
- Mainsail w/Sheets, Class Insignia and Numbers
- One Piece Fiberglass Hull, White
- One Piece Fiberglass Deck, White
- Molded-In Non-Skid Surface
- Molded-In Gel Coat Waterline Stripe
- Boom Vang, Adjustable
- Anodized Aluminum Mast and Boom
- Forward Hatch
- Lead Ballast Keel
- Primary Winches (2)
- Soft Touch Hull Liner with (4) Zippered Storage Compartments
- Jiffy Reefing on Boom
- Steaming and Anchor Light on Mast
- Fiberglass Rudder
- Fuel Locker
- Cockpit Locker
- Stainless Steel Standing Rigging
- Low Stretch Halyards
- Trailer Bow Eye
- Large Self-Bailing Cockpit
- Stanchions, Stern Rails, and Lifelines with Pelican Hooks
- Interior Cushions
- Cockpit Mounted Traveler with Controls
- Winch Handle, 8"
- Bow Pulpit
- Teak Trim Interior
- Stainless Steel Mast Step
- Ice Chest
- Main & Jib Halyards Led Aft to Cockpit
- Internal Halyards
- Electrical System with Panel, Cabin, Running Lights and Deep Cycle Battery
- Manual Bilge Pump with Through Deck Handle

☐ CD 0220 C 22 with Standard Equipment and Sails ..... _____

OPTIONAL EQUIPMENT

FITTINGS AND EQUIPMENT

☐ CD1511 Two-Tone Deck, White and Grey, In Lieu of Standard _____
☐ CD 0122 Wing Keel ..... No Charge
☐ CD 0121 Fin Keel ..... No Charge
☐ CD 4001 Cockpit Cushions, Vinyl, White ..... ____
☐ CD 9909 Safety and Equipment Package ..... ____
☐ CD 2801 Mast Carrier ..... ____

SAILS & RIGGING OPTIONS

☐ CD 2709 Mainsail Cover ..... ____
☐ CD 2707 Tiller Cover ..... ____
☐ CD 3507 Whisker Pole ..... ____
☐ CD 3301 Headsail Furling Gear ..... ____
☐ CD 3801 Tall Rig Mast with Sails, Main and 135% Jib, In Lieu of Std. ..... ____

SAILS FOR STANDARD RIG

☐ CD 3707 155% Genoa w/ Sheets in Lieu of Std. Jib ..... ____
☐ CD 3709 150% Furling Genoa with U.V. Panels and Sheets in Lieu of Standard Jib ..... ____
☐ CD 3711 .75 oz. Radial Head Spinnaker Specify Color Option A _____ B_____ ..... ____

☐ CD 6803 Self Contained Head and Privacy Curtain ..... ____
☐ CD 4404 Galley Unit with Basin and Stove ..... ____
☐ CD 2803 Stern Boarding Ladder ..... ____
☐ CD 5002 Outboard Motor Bracket ..... ____

SAILS FOR TALL RIG

☐ CD 3807 155% Genoa w/Sheets in Lieu of Std. Jib ..... ____
☐ CD 3809 150% Furling Genoa with U.V. Panels and Sheets in Lieu of Std. Jib ..... ____
☐ CD 3811 .75 oz. Radial Head Spinnaker Specify Color Option A ____, B ____ ..... ____

PERFORMANCE PACKAGE

☐ CD 2000 ..... ____

- Spinnaker Gear Including Pole Sheets, Foreguy and Halyard Lead Aft to Cockpit
- Main & Jib Halyard Winches on Cabin Top, with Clam Cleats
- Adjustable Hiking Stick
- Backstay w/ Adjustment Purchase
- Halyard Pockets on Cabin Bulkhead

Total_____

Waterline, sheer stripe and cushion color package: A _____ , or B _____

Dealer_____ Deliver To_____ P.O. No. _____

_____ _____ Deposit $ _____

_____ _____ C.O.D. _____

Date_____ By_____ Customer _____ Bank Finance _____

NOTE: (1) All prices and specifications are subject to change at any time including after receipt of the customer's order, until final delivery to the customer.
* (2) Five year gel coat blister protection provided by Catalina Yachts Gel Coat Five Year Limited Warranty against below the waterline gel coat blistering, for precise terms, please refer to the Gel Coat Limited Warranty Booklet.
* (3) For precise terms of Catalina Yachts Five Year Hull Structure Limited Warranty please refer to Catalina Yachts Limited Warranty booklet.
(4) Export models may have different equipment or specifications in order to comply with prevailing regulations.

Catalina Capri 22

By: Catalina Yachts

PRINCIPAL SPECIFICATIONS		
L.O.A.	6.71 m	22' - 0"
L.W.L.	6.01 m	20' - 0"
Beam	2.44 m	8' - 0"
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Wing Keel	0.81 m	2' - 8"
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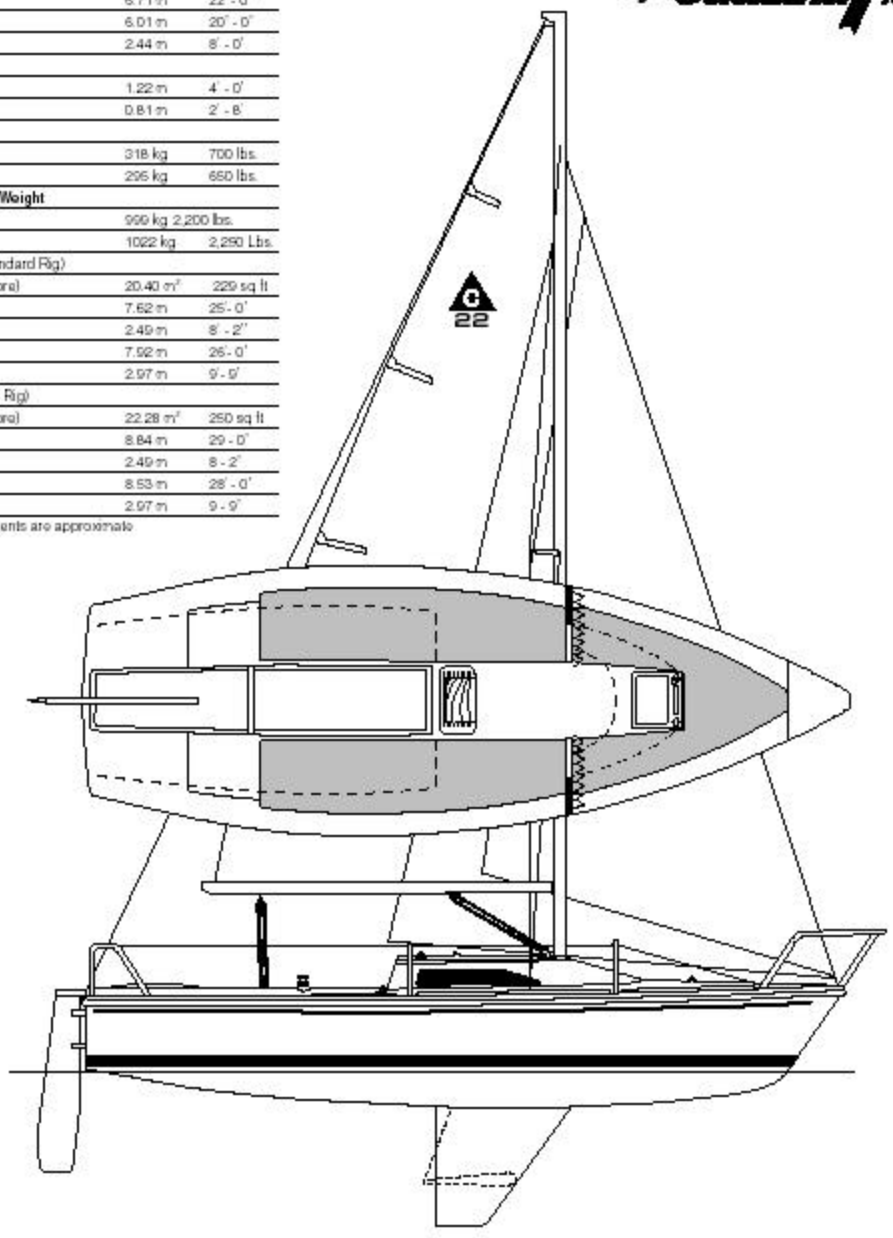


Capri 22 Class Rules

Last revised: 15 August 2001

Capri 22 National Association

1.0 INTRODUCTION

The Capri 22 is a one design Class created to fulfill the diverse needs of recreational sailors such as cruising, one design racing, day sailing and handicap racing. These Class Rules are intended to preserve important design characteristics: ease of handling, low cost of ownership, safety, comfort, and the one design nature of the boat. Where racing is concerned, the intent of the Class Rules is to encourage and maintain fair sporting and let racing results reflect the skills of each crew in pitting their boat against the elements and other racers. These new Class Rules for 2001 supersede and replace the former Class Rules from the mid-1980s. The new Rules reflect an awareness that changes in sailing materials, cost, and availability now allow more flexibility to skippers and crew in determining their best deck and rigging layout to make their sailing functional and comfortable without giving an undue competitive advantage. These new Class Rules are intended as a living document that will continue to be updated as materials and sailing technology evolve.

Capri 22s will maintain their One-Design nature by strict adherence to the original overall design plan of Catalina Yachts for each of the four subclasses; 1) Standard and tall rigs; 2) Fin and wing keels, and the four combinations thereof. There will be no structural or design modifications to the hull, keel, rudder, spars, sail plan, weight, weight distribution or other items unless specifically addressed in the Rules below. However, these rules allow more flexibility to the skipper and crew in determining comfortable and efficient sailing layouts based on personal preference. The sailing character and safety of the vessel will not be compromised by any such changes.

2.0 ADMINISTRATION

The administrative rules are intended to be flexible, and to recognize that the Capri 22 National Association (C22NA) and Catalina Yachts may not always be available to direct the Capri 22 Fleets. Therefore, Fleets will look to the C22NA and Catalina Yachts for leadership, but in that absence, Fleets will have the right to administer and maintain these rules per their own leadership.

2.1 The Class rules are to be administered through the Capri 22 National Association (C22NA) or Catalina Yachts, unless those entities are not fulfilling their responsibilities to administer the rules, under which case, these rules will be administered by the local fleets. No alterations, modifications, or additions are permitted unless explicitly stated in the current Rules. The Rules may be modified

locally by a 2/3-consensus of a local Fleet or Fleets. However, in regional or national sailing events, the Class Rules herein will have precedence and all boats racing will be in adherence with the rules at race time, or a consensus will be reached on applicable rule variances by the race participants. In this latter condition, a consensus will consist of agreement of 2/3 or more of the racing skippers. In the absence of a 2/3-consensus, race results may be contested by boats adhering to the rules herein. These rules apply to all Capri 22 Class racing, but do not necessarily apply to non-Class events, such as PHRF racing.

2.2 The builder of Capri 22s shall be Catalina Yachts, or its authorized representatives. No yacht shall be deemed to be a Capri 22 until it has been completed with a hull number either molded into or permanently engraved onto the hull, or unless a variance is granted by the local, regional, or national organizations.

2.3 Capri 22 races will be sailed by the boat owner(s), who is responsible for adhering to the Rules herein and the ISAF Sailing Rules of Racing.

2.4 A Capri 22 yacht shall be measured by a measurer appointed and recognized by the individual Capri 22 fleet involved. A measurer shall not measure a yacht or any related features if the measurer has an interest or a financial involvement with that yacht, unless measurement of the subject yacht is observed by a second Fleet officer. Once measured in accordance with the rules herein, a yacht will not be subject to protest on measurement unless reasonable grounds can be shown to give evidence alterations after measurement. At National and Regional events, a measurer of the C22NA may be elected to measure yachts, if the fleets racing form a 2/3 voting consensus in favor of measurement. If measured by a C22NA measurer, the skipper of each yacht will be provided with a certificate of measurement.

3.0 RACING CLASSES

There are key distinctions between different Capri 22 models, as discussed below. In addition, it is known that Catalina Yachts has modified some features of the boat through time. These minor alterations in design, up until the introduction of the Capri 22 Mark II in 2000, are known only through secondhand information. As of the time of this writing, no other documentation is available and these Rules will assume that the minor historic modifications have not altered the one-design nature of the yacht. The Capri 22 Mark II is reported to have the same waterline as prior Capri 22s, however, it is also known that the Capri 22 Mark II has a different deck, beam, and above waterline structure. It has yet to be determined how that affects its sailing characteristics. At this time, the Capri 22 Mark II will be considered to be a standard one-design Capri 22 until additional information is available.

3.1 There are currently 2 key design distinctions for Capri 22 racing Classes: 1) Standard or Tall Rig sail plan; 2) Fin or wing keel, for a total of four subclasses. Fin and wing keels may race together as one Class. Boats with a Tall Rig can be assessed a six (6) second penalty per statute mile, unless otherwise agreed by a 2/3 vote of skippers racing in a particular regatta.

3.2 In National and Regional regattas there shall optionally be spinnaker and non-spinnaker Classes. If there are insufficient numbers of boats to warrant two Classes, all boats shall race together as one Class. If more than 2/3 of the boats racing are spinnaker or non-spinnaker boats, the remaining 1/3 of the racers shall race rigged as the 2/3 majority, or race separately. In a mixed race, the non-spinnaker boats

can be given a six (6)-second allowance per statute mile. The judgment as to the sufficient numbers of the boats shall be at the sole discretion of the Race Committee. Intent to race in the non-spinnaker Class must be declared at the time of registration, and a yacht so-designated may not fly a spinnaker at a later time without notifying the Race Committee of the change in status before the start of racing.

3.3 Time penalties or allowances assume adequate Race Committee support, or another agreed upon means (by 2/3 vote) of tracking and applying corrections to race results.

4.0 OWNERSHIP

Ownership of a Capri 22 is a key requisite to racing, with exceptions as noted below. This is considered a family and recreational racing yacht, and these Rules are intended to restrict the Capri 22 Class from evolving into a professional racing class.

4.1 The helmsman/skipper of the Capri 22 shall be the owner or an immediate family member unless an emergency requires that the skipper give up the helm to another crew member. The helm may also be shared between qualified persons, as described below. Exceptions may be granted by a 2/3 vote of persons racing in a given event.

4.2 Ownership is established by the presence of the name of the person in question on the certificate of registration of a Capri 22. A Capri 22 may be owned in partnership. Owners, partners, and family members thereof may participate and take the helm in any Capri 22 racing event.

4.3 A chartered Capri 22 may participate in local and regional racing events only if there is an agreement by a 2/3 vote of persons racing in a given event.

4.4 The presence of a professional sailor aboard a Capri 22 during an officially sanctioned National or Regional Regatta is prohibited, and shall bring about the automatic disqualification of the yacht. However, a professional sailor may be present on board a racing Capri 22, if that person is an owner or in an owner-partnership of a Capri 22 (50% ownership or more), or if an exception is granted by a 2/3 vote of persons racing in a given Capri 22 event. A Professional sailor@ is anyone who earns the principal part of their living as a result of designing, building, selling, crewing, instructing or publishing in any facet of sailing or yachting. The interpretation of whether an individual is a Professional sailor@ shall be left to the Race Committee in charge of the regatta. Disqualification shall not require protest, but remain in the judgment and at the discretion of the Race Committee of the regatta.

5.0 CAPRI 22 RACING YACHT SPECIFICATIONS

The general intent of the Capri 22 Class Rules is to preserve the one-design nature of the boat, and allow changes that are cost-effective and accessible to all racing Capri 22s. All racing Capri 22s shall be fundamentally competitive with each other, from a new factory-delivered yacht, to one that has been racing for many years. Each Capri 22 shall be made comfortable and efficient, as determined by each skipper, but no changes are allowed that alter the fundamental sailing characteristics of the yacht.

5.1 The structure and form of the hull, topsides, keel, rudder, mast, boom, and standing rigging shall conform to the specifications provided by Catalina Yachts, or the licensed builder, unless otherwise stated in these Rules. Variances from the standard specifications are allowed on a Fleet basis as granted by a 2/3 vote of the Fleet in question.

In the event that a Fleet grants a fundamental specification variance, design drawings, templates, or other supporting information will be provided to Catalina Yachts and the C22NA, as possible. Altered Capri 22 specifications will be kept in the permanent Fleet records of the Fleet authorizing the change.

5.2 The deck layout for running rigging and related control hardware including halyards, sheets, vang, cunninghams, backstay, blocks, sheaves, purchases etc., may be modified at the discretion of each skipper. However, altered deck layouts must be consistent with the intent and function of the original layout provided by the manufacturer. For instance, a skipper may remount a winch in an alternate location, but may not add additional extra winches beyond those provided as standard equipment on the Capri 22. Similarly, alternate deck layouts may not substantially change the weight or sailing characteristics of the yacht.

5.3 Purchases on sheets, vangs, cunninghams, backstays, or other control devices may be changed or moved to the liking of each crew and skipper. Turning blocks, leads, sheaves, etc. may be added or altered to make control lines more accessible, run at more efficient angles, or simply be more comfortable to a particular skipper and crew.

5.4 Cleats, turning blocks, sheaves, deck organizers, and basic sail controls like twings, cunninghams, etc. may be added to the vessel at the discretion of the skipper, as long these changes do not substantially change the weight or sailing characteristics of the yacht. For instance, halyard cleats and purchases may be mast-mounted, which while different from the manufacturer=s layout, does not change the basic sailing characteristics of the yacht. In contrast, changing the loading characteristics of the standing rigging or altering the mast construction would change the fundamental nature of the boat and such changes are not allowed.

5.5 No changes to rigging, control lines, or other features will be allowed that compromises the fundamental safety of the Capri 22. The factory standards with respect to load capacity and other safety related factors will be maintained. Rigging and other features made of line shall remain line of equal or superior strength, though the diameter may change at the discretion of individual skippers. Unless otherwise stated herein, rigging and other features made of steel, aluminum, or other metals shall remain made of that type of material and at the same gauge, strength, and weight. Lifelines will be steel-braid material per manufacturer=s specifications, unless otherwise agreed to by the individual fleet.

Alterations to the fundamental rigging materials used by the manufacturer may be approved by a 2/3 vote of the Fleet in question. Altered Capri 22 specifications will be kept in the permanent Fleet records of the Fleet authorizing a change. Supporting information will be provided to Catalina Yachts and the C22NA, as possible.

5.6 MAST, BOOM, & SPINNAKER POLE

5.61 The mast shall remain fixed when stepped. No adjustable steps will be allowed. No step may raise the base of the mast more than: inch above the deck level. The mast will be made of aluminum and match the factory specifications of Catalina Yachts or the authorized builder with respect to gauge, height, form and girth.

5.62 The distance between the boom-bracket and upper end of the mast shall not be more than 26 feet for the standard rig, or 28 feet for the tall rig. The distance from the aft surface of the mast to the aft end of the boom shall not be more than 9.75 feet.

5.63 Halyard exits may be placed at any location along the mast, and halyards may be run on either side of the yacht, at the discretion of each skipper and crew.

5.64 The overall length of the spinnaker pole including the end fittings shall not be more than 8.16 feet. The pole shall be constructed of steel or aluminum and be no less than 1.5-inch in diameter. No composite materials may be used to construct a spinnaker pole, with the exception of the pole-end jaws, which may be made of any materials and have any working configuration desired by the skipper and crew.

5.65 A whisker pole, only for use with a non-spinnaker headsail, is allowed and may not exceed 12-ft in length.

5.7 STANDING RIGGING

5.71 The mast standing rigging shall consist of one forestay, one backstay, two upper sidestays, and two lower sidestays.

5.72 The forestay, and upper and lower sidestays (shrouds) will conform to the original manufacturer=s specifications and overall materials. The steel-braid stay material can be upgraded in quality, but the diameter will remain 5/32-inch for the forestay and upper sidestays, and 1/8-inch for the lower sidestays. Stays/shrouds may be covered in protective sheathing.

5.73 The backstay may be made of a synthetic material other than steel braid, as long as the material selected equals or exceeds the breaking strength of the original factory backstay (approximately 2,500 pounds).

5.74 Chain-plates will be unmodified, except for repair or strengthening. While a buildup of the chain-plate bracket is allowed for strengthening, the exit points and geometric characteristics at the deck and up the mast must remain unchanged.

5.75 The forestay may have an adjustable length toggle bracket that may allow for a broader range of lengthening and shortening of the forestay. The forestay bracket must be non-adjustable during racing, but may be adjusted between races at the discretion of the skipper and crew.

5.76 The spreader sweep angle, deflection, and length with respect to rigging and mast separation shall not be modified by alteration of standard fittings. Spreader tips

may be modified as desired, as long as the tip does not affect the geometry of the rig in any way.

5.77 RUNNING RIGGING

5.771 There are no restrictions on running rigging in terms of materials, diameter, number, or placement as long as running rigging is not used in such a way as to change the fundamental sailing characteristics of the Capri 22.

5.772 There are no restrictions to the placement or characteristics of purchases, purchase ratios, placement, or deck layout, as long as purchases do not change the fundamental sailing characteristics of the yacht.

5.773 A rigid boom vang is not allowed.

6.0 SAILS

There will be no changes allowed to the basic sail plan of the Capri 22. Sails may be constructed of any materials selected by the yacht owner. Sails may be cut to any shape preference within the geometric limits provided herein.

6.1 The following sails are allowed: two mainsails, three headsails (155% maximum), and two spinnakers. This allows for fundamental sail replacement in the case of damage or changing conditions during racing. Additional sails may be measured, but only the allotment above may be used for a given race.

6.2 Sail numbers shall be placed on the mainsail and headsail. The sail number shall be the hull number, or an assigned PHRF or U.S. Sailing Association (USSA) number.

6.3 Sails shall be measured in a dry state on a flat surface with just enough tension to remove wrinkles across the line of measurement.

6.4 For national and regional regattas, the sails a competitor intends to use shall be submitted upon request to the Race Committee or the Fleet measurer prior to the start of the first official race. A certificate of measurement or initials on the sail will verify compliance with the rules.

6.5 The sails shall be made to measure to the recommendations of the ISAF, USSA, or other accepted body, unless otherwise authorized by individual fleets by a 2/3 consensus vote.

6.6 The luff of the main shall fit within the allowable distance between the mast head and the boom bracket (Rule 5.62), 26-ft for the standard rig, and 28-ft for the tall rig.

6.7 The foot of the main shall fit between the aft surface of the mast and aft end of the boom, covering a distance no more than 9.75-ft (Rule 5.62). The main may be loose footed, as long as the sail meets these overall foot dimensions.

6.8 The girth measurement shall be taken at the three-quarters and one-half height points on the leech, located when the head is folded to the clew to determine the

one-half point, and when the head is folded to the one-half point to determine the three-quarters point. The maximum widths between the leech and the nearest point on the luff including the luff rope, shall be not more than the following (in feet):

Height of Measurement	Standard Rig	Tall Rig
One-half	6.6	6.7
Three-quarters	3.9	4.0

6.9 The mainsail shall have four battens equally spaced along the leach. Full battens are permitted. Headsails will remain unbattened.

6.10 The maximum luff perpendicular (LP) of a headsail shall not be more than 12.6 feet.

6.11 Leech and foot lines are permitted in any sail.

6.12 A reef is permitted in any sail.

6.13 The spinnaker shall be a three-cornered sail, symmetrical about its center line.

6.14 The length of the spinnaker leeches shall be not more than 25 feet, for the standard rig, or 29 feet, for the tall rig. All girths shall be not more than 14.68 feet.

7.0 ADDITIONAL REQUIREMENTS

Additional requirements for racing Capri 22s account for basic safety and common sense seamanship, and are spelled out only for the purposes of clarification and standardized racing rules.

7.1 Personal floatation devices (PFDs) must be available for all persons on board. At least one throwable PFD is also required.

7.2 When racing offshore or out of the site of land, a ship-to-shore communications device will be carried onboard in a location known to all persons onboard.

7.3 An anchor and line of proper strength and proportions to secure the yacht, as determined by the skipper.

7.4 Operable U.S. Coast Guard (USCG) approved navigation lights. These may be the lights provided as a factory standard, or other approved operable lights.

7.5 A horn.

7.6 Any other applicable USCG-required equipment and compliance with safety regulations.

8.0 ALLOWABLE OPTIONS

8.1 Additional lockers, shelves, or galley items to personalize the interior accommodations.

8.2 Electronic devices to measure speed, distance, bearing, or water depth.

8.3 One mechanical masthead wind indicator, with or without a light.

8.4 Fairing of the rudder and/or keel provided that it complies with the specifications of Catalina Yachts or a licensed builder, or if a variance is provided as specified in Rule 5.1

9.0 PROHIBITIONS WHILE RACING

9.1 Running backstays and similar devices are prohibited.

9.2 Spinnaker chutes through the deck are prohibited.

9.3 The simultaneous use of two headsails, except while making sail changes is prohibited.

9.4 A mast that can rotate is prohibited.

9.5 Adjustment of shroud or backstay turnbuckles or forestay length is prohibited while a race is underway. Adjustments are allowed between races.

9.6 The use of nonessential equipment or metal to concentrate weight amidships is prohibited.

9.7 Removal of interior cushions, locker covers, and ice chest is prohibited.

9.8 No person on board during a race may be positioned so as to extend their torso outside and beyond the vertical extension of the sheer, other than temporarily. This section will not apply to persons engaged in making a sail change, or to those attempting to clear the rudder or keel of kelp or other foreign bodies.

Articles, Tips and Really Good Stuff

Capri 22 Resources

Capri 22 Resources

Capri 22 National Association	http://www.capri22.net
Capri 22 Fleet #1	http://www.aquiver.com/Capri22/Default-C.htm
Catalina Yachts	http://www.catalinayachts.com/main.phtml

Sailmakers

Ullman Sails	http://www.ullmansails.com

Cordage

Samson Rope	http://www.samsonrope.com
New England Ropes	http://www.neropes.com/

Equipment Supply Stores

Annapolis Performance Sailing	http://www.apsltd.com/Default.asp
Sailing Supply	http://www.sailingsupply.com/home.html
Layline Inc.	http://www.layline.com/
West Marine	http://www.westmarine.com/
Boat U.S.	http://www.boatus.com/

Hardware

Garhauer Marine	http://garhauermarine.com/index.cfm
Harken	http://www.harken.com
Lewmar	http://www.lewmar.com
Ronstan	http://www.ronstan.com/index.html

Racing

Capri 22 Tuning

☐ **Ullman Sails Capri 22 Tuning Guide** by Steve Ross, Ullman Sails San Diego

Racing Rules

☐ **The New Rules – When Boats Meet** by Dick Rose
☐ **Same Tack Scenarios at the Start** by Dick Roser
☐ **Q&A: 2001 Rules at Marks and Obstructions** by Dick Rose

Tactics

☐ **Ten Moves That Don't Work in a Big Fleet** by George Szabo
☐ **Get to the Advantaged Side of the Course** by Stuart Walker
☐ **Top of The of The Beat Tactics** by Bob Merrick
☐ **Make the Right Call at the top of the Run** by Moose McClintock
☐ **Finding The X** by Angela Garcia
☐ **Win the Pin With Match-Racing Moves** By Betsy Alison
☐ **Tactics: How to Claw Back** by Scott Ikle

Techniques

☐ **Think Simple Thoughts** by Ed Baird
☐ **How to Point, Foot and Shift Gears** by Greg Fisher
☐ **What Every Driver Should Know** by David Dellenbaugh
☐ **Steering Downwind With Tom Whidden** by David Dellenbaugh
☐ **Optimizing Downwind Speed – VMG** by John Heyes
☐ **Twing Line Tech** by Marty Rieck

Perspectives

☐ **The Details Make the Dream** By John Burnham
☐ **What We Learned In Practice At The Masters** By John Burnham
☐ **Learning To Work Under Pressure** By John Burnham
☐ **All About Mistakes and Opportunities** By John Burnham
☐ **How To Remember Yesterday's Lesson – The Master's Dillema** By John Burnham

Capri 22 Perspectives

☐ **Top 10 Tips from the 1992 Western Regional Championships** by Ken Karnes
☐ **Capri 22 Windward Sail Trim** By Larry Brethorst
☐ **Blade Runner** By Ken Karnes
☐ **Sailing a Capri 22 In PHRF** by Steve Ross
☐ **Setting up and racing a Capri 22** by Ivan Andrade

Capri 22 Tuning

Ullman Sails Capri 22 Tuning Guide

For the past 13 years, Ullman Sails has been developing the fastest Capri 22 sails. The proof is in the results placing first in every Western National Championship held. In addition, Ullman Sails has won the Season High-Point in Peoria, IL the past 5 years. In order to achieve these results, the boat must have the rig properly set up and tuned.

FORESTAY

The first step to setting the rig up properly is to set the forestay turnbuckle to the desired length. After many hours of tuning and testing sails I have found the Capri 22 sails fastest with the turnbuckle extended to the maximum class legal length which leaves enough thread showing on the turnbuckle to allow a ring-ding to be placed in the holes on the ends of the threaded screw post. If your boat is a wing keel version, the mast should have very little rake, some people sail the wing keel with 0" of rake. The best way to measure the amount of rake is to hang a heavy object from the Main halyard at the height of the gooseneck fitting. In order to get an accurate measurement, the best time to do this is when there is little or no wind.

UPPER SHROUDS

After setting the forestay at the desired length the next step is tensioning the upper shrouds. When tensioning the uppers, place a 50' tape measure to the Main Halyard shackle and hoist to the top of the mast. Using the tape measure, measure from the top of the mast to the chainplate on both sides of the boat to insure the mast measures the same on both sides. Then start to tighten the upper shrouds. First tighten one side three or four turns, then tighten the other side three to four turns. It is very important that the mast is exactly even on both sides, so keep checking the tape measure to make sure the measurement is the same on both sides of the boat. Using a Loos Model-A tension gauge set the shroud tension so the gauge reads between 30 and 32. Sighting up the back of the mast you will notice the mast will have 2 of pre-bend when the upper shrouds are at the proper tension. After the upper shrouds have been set, place the ring-ding's back in their proper holes, then wrap with rigging tape to prevent any sail damage or bodily injury. If you think you will experience a heavy air day, and you have the uppers set at 30, take a couple extra turns on the upper shrouds to prevent the mast from bending to leeward as the upper shrouds load up and stretch. If you are tuning a new boat, or a new set of standing rigging, remember, the wire will stretch some, so after a day or two of sailing, you should remeasure you tuning set up.

LOWER SHROUDS

After tightening the upper shrouds the next step is set the tension on the lower shrouds. The first step is to tighten the lower shrouds to take the slack out of them. Then hoist the Main and pull the backstay to the point where you set it in moderate wind. At this point I feel it is best to fine tune lower shrouds while sailing. The primary function of the lower shrouds is to control the amount of bend in the lower part of the mast. If the lower shrouds are too loose a large over-bend wrinkle will develop from the clew to the luff about 4 feet above the boom. The more you bend the mast with the

backstay, the wrinkle becomes more noticeable. If you have this wrinkle tighten the leeward lower shroud. After tightening the leeward shroud, tack and see what the Mainsail looks like. If the Mainsail has too much draft, then the shroud is too tight. When the lower shrouds are set properly the Mainsail should have a consistent sail shape. Then tighten the backstay to where you set it in heavy air. At this point there should be a slight over-bend wrinkle developing from the clew of the sail. After you have set the lower shrouds again replace the ring-ding's and wrap with rigging tape.

BACKSTAY

The Capri 22 has a large Mainsail which has 6 different adjustments consisting of outhaul, cunningham, mainsheet, traveler, backstay, and boomvang. The backstay is a very critical adjustment as for it also affects the headstay sag and the shape of the headsail. When the wind builds the backstay needs to be tighten to flatten the mainsail and reduces the amount of headstay sag which also flattens the headsail. As the wind gets lighter, ease the backstay to make the Mainsail more powerful and induces headstay sag which makes the headsail more powerful also. When adjusting the backstay, the Mainsheet and the Genoa sheet will need to be adjusted at the same time. Place a couple of marks on the backstay for a quick visual reference.

ADDITIONAL RIGGING

The stock Capri 22 is equipped with inexpensive sheets and halyards that tend to stretch under normal sailing loads. The Main, Genoa, and Spinnaker halyards should be replaced with a low stretch line. Spectra is the best due to the strength to weight ratio. Spectra does not stretch or soak up water. In addition Spectra is able to a sharp turn over a sheave or block without damaging the integrity of the line. The one problem with Spectra is the degradation cause by ultra-violet light. As for the Spinnaker sheets, Spectra works very well due to low stretch. The low stretch aspect is very nice when the Spinnaker pole is within a foot of the headstay. A stock piece of line will stretch until the pole hits the headstay. Another item that is nice to have rigged on a Capri 22 is a set of "Twings" for the Spinnaker sheets. These are handy in heavy air in keeping the pole off the headstay under a load. In addition the "Twings" works well as a foreguy, in fact many boats remove the foreguy when using "Twings".

GO-FAST TIPS

Due to the size of the Mainsail on the Capri 22, the traveler becomes a critical adjustment to keep the boat sailing at the proper angle of heel. A technique I have found that is fast is when the boat has too much heel is to depower the boat by dumping the traveler, then pull it right back towards the middle of the boat. By accomplishing his maneuver you will find the boat will depower then accelerate without slipping sideways. Another speed tip is when sailing in light to moderate air with large swells or big chop the Genoa sheet should be eased to a point where the foot of the Genoa is touching the lifelines.

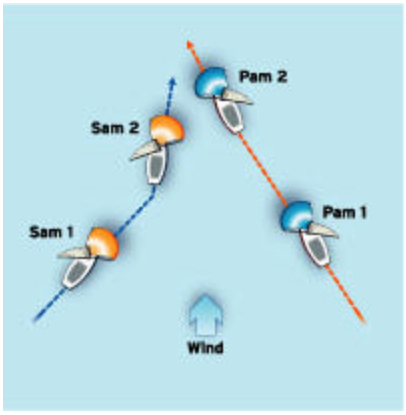
Racing Rules

The New Rules - When Boats Meet

2001-2004 ISAF Revised Racing Rules

By Dick Rose

Every fourth year, ISAF publishes a set of revised racing rules. The Racing Rules for 2001-2004 go into effect April 1. Over the next few months, I will describe how the racing rules for 2001-2004 differ from the rules we sailed under last year. First, I'll cover the changes coming in Part 2 of the rules—those that apply when boats meet. These are the rules that are most crucial to all competitors and judges. After that, I'll systematically review the changes in the other parts of the rulebook.



David Norton

BOTH RULE 16.2 AND RULE 16.1 APPLY BETWEEN SAM AND PAM.

Each Part 2 rule that's been changed is shown in a box with any new wording underlined, and each is followed by a discussion of the reasons for the change and its implications.

Rule 16.2—Changing Course
In addition, when after the starting signal boats are about to cross or are crossing each other on opposite tacks, and the port-tack boat is keeping clear of the starboard-tack boat, the starboard-tack boat shall not change course if as a result the port-tack boat would immediately need to change course to continue keeping clear.

New Rule 16.2 will only apply when boats on opposite tacks are in a crossing situation. In Diagram 1 two boats are about to cross each other, and Rule 16.2 applies in this situation. As Sam, on starboard, and Pam, on port, approach each other, Pam is far enough ahead that she can cross ahead of Sam without Sam taking avoiding action. When Sam bears off and, consequently, Pam immediately needs to take avoiding action, then Sam breaks Rule 16.2. The rule doesn't apply if Stan and Pete are not in a crossing situation. However, when Stan luffs, Rule 16.1, which requires Stan to give Pete room to keep clear, does apply. That rule always applies whenever a right-of-way boat changes course.

Readers will want to know when one boat is "about to cross" another. Just like "about to pass," a phrase used in Rule 18.1 and discussed in ISAF Case 84, when a boat is "about to cross" another will depend on the circumstances—the wind and sea conditions as well as the speeds and handling characteristics of the boats.

Rule 17.1—On the Same Tack; Proper Course
If a boat clear astern becomes overlapped within two of her hull lengths to leeward of a boat on the same tack, she shall not sail above her proper course while they remain overlapped within that distance, unless in doing so she promptly sails astern of the other boat. This rule does not apply if the overlap begins while the windward boat is required by Rule 13 to keep clear.

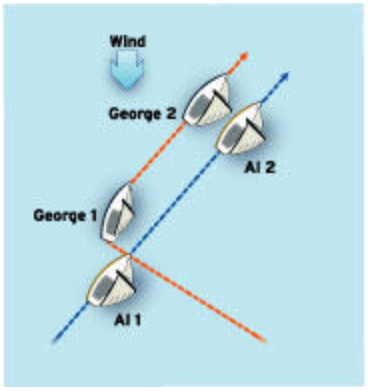
I have underlined two changes in new Rule 17.1. There are some other changes intended to make the rule easier to read, but they don't change the intended meaning in any way. The addition of "promptly" is important when Rule 17.1's restriction applies to a leeward boat on a reach or run that decides to drop behind the windward boat in order to try to roll over the top of her. While overlapped

to leeward, the leeward boat may head higher than her proper course only if she promptly sails astern of the other boat. She can no longer hassle the other boat by luffing her higher for a while before dropping astern.

The last sentence of new Rule 17.1 is completely new. It was added because of the difficulty of deciding whether or not Rule 17.1 applies right after one boat slam-dunks another. In Diagram 2, when George slam-dunks Al, an overlap begins while Rule 13 applies to George (i.e., during the time after George passes head to wind but before he's on a closehauled course). The new last sentence implies that Rule 17.1's proper course limitation doesn't apply to Al in this situation. However, if the overlap begins after George completes his tack, then Rule 17.1 limits Al's course.

Rule 19.1(b)—Room to Tack at an Obstruction

The hailed boat shall ... immediately reply "You tack," in which case, the hailing boat shall tack as soon as possible and the hailed boat shall give room ...



David Norton

BECAUSE THE OVERAP BEGAN WHILE GEORGE WAS TACKING, RULE 17.1 DOES NOT LIMIT AL'S COURSE.

The words "as soon as possible" replace "immediately" in the second line of Rule 19.1(b). To see why this was done, consider the following situation. Nell is closehauled on starboard tack approaching a rocky shore and is unable to tack without colliding with Norman, who's on her windward hip. She nervously hails "Room to tack!" Rule 19 gives Norman two choices. He must either tack or reply "You tack." Under old Rule 19.1(b) if Norman replied "You tack," then Nell was required to tack immediately. That requirement has been made more reasonable. Now, Nell must tack "as soon as possible" after Norman's hail. Under the old rule, Norman could have taken advantage of the strict requirement on Nell to tack immediately and protested her if there was any delay between his hail and her tack.

Rule 20—Starting Errors

A boat sailing towards the pre-start side of the starting line or its extensions after her starting signal to comply with rule 29.1 or rule 30.1 shall keep clear of a boat not doing so until she is completely on the pre-start side.

The words "after her starting signal" were added here so the rule would not apply in the following situation. With the Round-an-End Rule (Rule 30.1) in effect, suppose that Ed crossed the starting line at the pin end 30 seconds before the starting signal and then turned back to round outside the pin-end mark as required by Rule 30.1. Under old Rule 20, he lost all his rights the moment he began to sail back towards the line even though the starting signal had not yet been made. Now, with the added words, Rule 20 will only apply to a boat sailing toward the pre-start side of the line after her starting signal.

Rule 20—Penalty Turns

A boat making a penalty turn shall keep clear of one that is not.

In new Rule 20, "a penalty turn" replaces "penalty turns" because sometimes (for example, if a boat is match racing or if she hits a mark) a boat is only required to make a single penalty turn.

Preamble to Section A

However, some rules in Sections B, C, and D limit the actions of a right-of-way boat. The preamble now reflects the fact that rules in Section D, as well as rules in Sections B and C, limit the actions of a right-of-way boat. Rules 21 and 22, both in Section D, are examples of such rules.

Courtesy of Sailing World Magazine

Racing Rules

Same-Tack Scenarios at the Start

By Dick Rose

Several readers have written me with questions about how the rules apply between two starboard-tack boats on their final approach to the starting line to start. Such questions are relatively easy to analyze because two of the more complex rules do not apply at this time.

Rule 18.1(b) states that all of Rule 18 does not apply "at a starting mark surrounded by navigable water or at its anchor line from the time boats are approaching them to start until they have passed them." Also, because boats do not have a proper course before the starting signal, Rule 17, which requires a boat not to sail above or below her proper course under certain circumstances, doesn't apply. In almost all same-tack starting approach situations, the only applicable rules are Rule 11, if the boats are overlapped; Rule 12, if they are not overlapped; Rule 15, if one boat just acquired right of way through her own actions; and Rule 16.1, if the right-of-way boat changes course.

David Norton

In the situations we will examine, neither boat is tacking. Therefore, Rule 13 doesn't apply. If there's contact, then Rule 14 must be addressed. However, when boats touch there's invariably a rule infringement before the contact because at some point they must get so close to one another that the right-of-way boat "needs to take avoiding action." At that moment, which is always before contact occurs, the other boat fails to keep clear (see the definition Keep Clear).

The Rules That Apply

Rule 11 On the Same Tack, Overlapped: When boats are on the same *tack* and *overlapped*, a *windward* boat shall *keep clear* of a *leeward* boat.

Rule 12 On the Same Tack, Not Overlapped: When boats are on the same *tack* and not *overlapped*, a boat *clear astern* shall *keep clear* of a boat *clear ahead*.

Rule 15 Acquiring Right of Way: When a boat acquires right of way, she shall initially give the other boat *room* to *keep clear*, unless she acquires right of way because of the other boat's actions.

Rule 16.1 Changing Course: When a right-of-way boat changes course, she shall give the other boat *room* to *keep clear*.

Barging Situations

Denys Allain and Angelo Guarino asked questions about the simple situation shown in Diagram 1. The starting line slightly favors the starboard end. Lou and Wendy are overlapped throughout their approach to the committee boat, which is the starboard-end mark. Lou is sailing close-hauled and, if

he holds his course, will pass just to leeward of the committee boat's stern and there will not be room for Wendy to pass between him and the mark.

Denys points out that the committee boat is big enough to qualify as an obstruction and wonders if, for that reason, Wendy can invoke Rule 18.2(a) and request room from Lou to pass the committee boat. The answer is "No." Rule 18 does not apply at any starting mark surrounded by navigable water, whether or not the mark is also an obstruction.

As long as Lou holds his course, the only applicable rule in this situation is Rule 11. It requires Wendy, the windward boat, to keep clear. If Wendy continues to converge with Lou, there will come a time when Lou needs to take avoiding action. At that moment Wendy breaks Rule 11.

Also, at that same time, Rule 14 begins to apply to Lou. It obligates him to avoid contact with Wendy if "reasonably possible" However, whether or not Lou avoids contact in no way changes the fact that Wendy has broken Rule 11, and, if there is contact, Lou can be penalized only if the contact causes damage.

Note that, at position 2, it would be easy for Wendy to luff and pass the committee boat to port and avoid a confrontation with Lou. If she holds her course until position 3, she can no longer escape, but that does not relieve her of her obligation to keep clear of Lou.

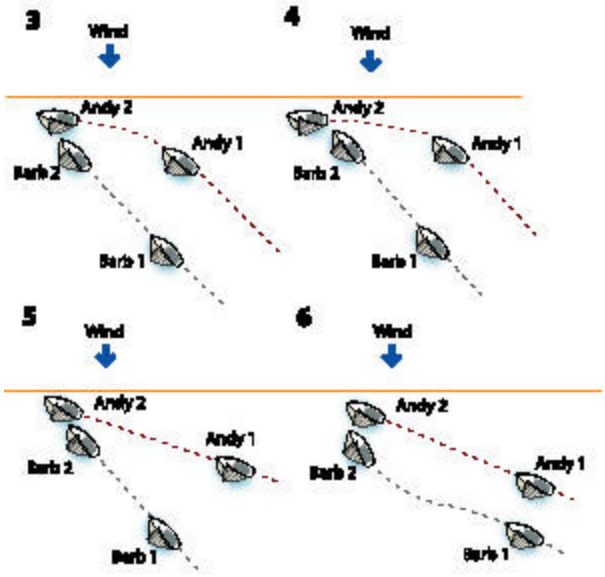
Look at Diagram 2. This differs from the first situation because Lou's approach to the committee boat is on a track slightlyto leeward of his line of approach in Diagram 1. Now the question is, "Is Lou allowed to luff in order to deprive Wendy of room to pass to leeward of the committee boat?"

Lou holds right of way under Rule 11. If Lou changes course, Rule 16.1 requires him to give Wendy "room to keep clear." A luff by Lou at position 2 does not break Rule 16.1 because at that time there's plenty of space for Wendy to keep clear. However, if Lou begins to luff when the boats are in position 3, then he does break that rule because there is no longer space for Wendy to maneuver to keep clear without hitting the committee boat, which is clearly not a seamanlike action.

To summarize—a leeward boat may always hold her course as she approaches a starting mark and, if there is not room for a barging windward boat to pass to leeward of the mark, then that's just tough for the barger. However, a leeward boat may not luff to deprive a barging boat of room unless at the time she luffs there's room for the barger to keep clear.

Mid-line windward-leeward encounters

Jeff Cohen asks about four different situations that often crop up when one of two boats is trying to avoid going over the line before the starting signal. These are shown in Diagrams 3 to 6. In each one Andy converges with Barb as he tries to avoid crossing the line too soon. Jeff asks which rules apply and what the obligations of the two boats are in each of the scenarios.



David Norton

Diagram 3. At position 1 Rule 12 gives Andy right of way as the clear-ahead boat. Andy's bears away and that action creates an overlap. When the overlap begins, Rule 12 no longer applies and Barb acquires right of way under Rule 11 as the leeward boat. Because it is Andy's action that creates the overlap, Rule 15 does not apply. At position 2 Andy breaks Rule 11 by failing to keep clear. Barb holds her course while the boats are overlapped, and so Rule 16.1 never applies to her.

Diagram 4. At all times Rule 12 gives Andy right of way because he is clear ahead. Between position 1 and 2, as Andy bears away, he is required by Rule 16.1 to give Barb room to keep clear. Barb luffs slightly after position 2 and avoids contact. Neither boat breaks a rule. Barb keeps clear as required by Rule 12, and Andy gives her room to do so as required by Rule 16.1.

Diagram 5. The boats are overlapped at all times. Rule 11 gives Barb right of way as the leeward boat. Because Barb holds her course, Rule 16.1 does not apply. At position 2 Andy is breaking Rule 11 because he is not keeping clear.

Diagram 6. As in the last scenario, the boats are overlapped and Barb holds right of way under Rule 11 throughout the incident. As she luffs Rule 16.1 requires Barb to give Andy room to keep clear. Moreover, no rule prevents Barb from luffing Andy across the line. There is obviously plenty of room for Andy to keepclear. He fails to respond promptly when Barb luffs and, as a result, breaks Rule 11 at position 2.

In order to avoid any problem with Rule 14, in each of the situations shown in Diagrams 3, 5 and 6 Barb should try to avoid contact as soon as it becomes clear to her that Andy is not going to keep clear.

Courtesy of Sailing World Magazine

Racing Rules

Q&A: 2001 Rules at Marks and Obstructions

By Dick Rose

This month I'll answer some questions on the 2001 racing rules that have come up in seminars that I've given to several fleets and clubs over the past few months.

David Norton

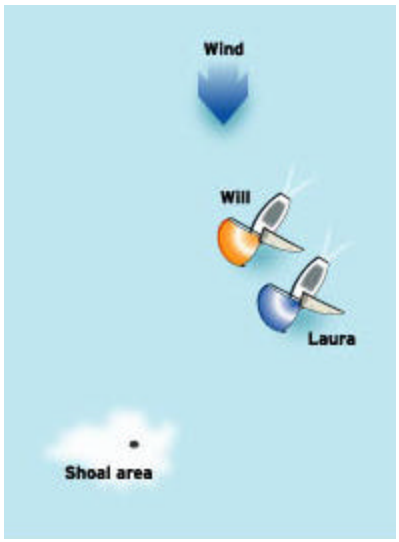
WENDY AND LOU ARE ABOUT TO START. RULE 18 DOESN'T APPLY, BUT LOU CAN'T LUFF WENDY INTO THE COMMITTEE BOAT.

Barging at the committee boat: Lou and Wendy are sailing closehauled on their final approach to the starboard end of the starting line as shown in the first diagram. They are overlapped on starboard tack with Lou to leeward. Several questions have been asked about this simple and common situation.

What rules apply if Lou luffs Wendy? First note that because the boats are approaching the starting line to start, Rule 18 does not apply (Rule 18.1(a)). Wendy is required to keep clear of Lou because she is the windward boat (Rule 11), but if Lou changes course he must give Wendy room to keep clear (Rule 16.1). If Lou luffs Wendy before she overlaps the committee boat, then Wendy will have plenty of room to keep clear. She can luff up and tack into the space behind and to starboard of the committee boat. However, if Lou luffs Wendy at the position shown in the diagram, there is no way that she can keep clear without hitting the committee boat. Lou is required to give her space to keep clear "in a seamanlike way" (Definition Room), and hitting the committee boat is decidedly unseamanlike. Therefore, Lou cannot luff if that would compel Wendy to hit the committee boat.

Suppose that there's a current setting both boats toward the committee boat, that neither of them changes course, and that Wendy is swept into contact with the port corner of the committee boat's transom. What rules apply then? The new definition of a mark tells us that the entire committee boat is a mark, and so when Wendy touches it she breaks Rule 31. Lou holds his course, and so he does not break Rule 16.1. If he must bear off to avoid Wendy after she touches the mark, then Wendy would also break Rule 11. If Wendy breaks only Rule 31 her penalty is just a 360 degree turn. If she breaks Rule 31 and Rule 11, then her penalty is a 720 (Rule 44.4(a)).

Room to pass an obstruction: Will and Laura are overlapped broad reaching on starboard tack toward a shoal area marked by a tall thin pipe that is visible above the water. Both of them know this is a dangerous rocky area, as shown in the second diagram, into which they dare not sail. Before the boats reached the position shown in the second diagram Laura overtook Will close aboard from clear astern, and so she is not permitted to sail higher than her proper course (Rule 17.1). This situation can play out in four ways, and I'll consider the rules that apply in each.



David Norton

AT AN OBSTRUCTION THAT CAN BE PASSED ON EITHER SIDE, FOUR RULES SCENARIOS CAN DEVELOP, DEPENDING ON THE SIDE OF THE SHOAL EACH BOAT CHOOSES TO SAIL.

Suppose both Will and Laura intend to bear off and pass the shoal to starboard. Obviously, the shoal is an obstruction, even though the pipe marking it is not. In this case the shoal is an obstruction that they both are "about to pass" on the same (starboard) side. Therefore, Laura must give Will room to pass the shoal (Rules 18.1 and 18.2(a)).

Suppose both Will and Laura think that the fastest course to the next mark is to pass the shoal to port. Then Rule 18.2(a) applies and requires Will to give Laura room to pass the shoal to port and, because Laura has right of way as the leeward boat, Will must also keep clear. What if Will protests Laura for breaking Rule 17.1 claiming that her luff to pass the shoal took her above her proper course? That protest should be disallowed because when Laura luffed to pass the shoal she was sailing her proper course — i.e., the course she would have sailed in the absence of Will to finish as soon as possible.

Now suppose Will hails for room to pass the shoal to starboard at the same time that Laura hails for room to pass it to port! In this case, the hails show that the boats do not intend to pass the shoal on the same side. However, because Will must keep clear of Laura, if Laura elects to pass the shoal to port, then Will would likely pass it to port as well. Therefore, even though Will would rather pass the shoal to starboard, the boats are about to pass it to port, and so the rules covering the situation are identical to the rules that governed the boats when both intended to pass the shoal to port.

Of course, if Laura decides to leave the shoal to starboard and Will elects to leave it to port, the rules are of no consequence because the boats' courses diverge.

Note to Readers: I appreciate your many e-mails, and I hope you'll continue to send your questions to rules@sailingworld.com. Time prevents me from answering all of them, but they're useful in future columns and proposals to US SAILING to improve the rules. Unfortunately, I can't intercede on your behalf with protest or appeals committees.

Also, even though I am, again, the chair of the US SAILING Racing Rules Committee, the views I express here are solely my own interpretations of the rules. My columns aren't official US SAILING interpretations. The only authoritative interpretations of the rules for U.S. sailors are the published US SAILING appeals and ISAF cases and umpire calls.

Courtesy of Sailing World Magazine

Tactics

TEN MOVES THAT DON'T WORK IN A BIG FLEET

August 29, 2002
By George Szabo

When you go from racing in your local 10-boat fleet to a 50-boat regatta, life on the racecourse changes. In a small fleet, if you make a mistake it's possible to tack away, find clear air, get some leverage, and get back in the game. In a larger fleet, or on a small racecourse, there's less elbowroom and mistakes are amplified—especially at the start and at mark roundings. So before you head out to your next big event, commit to memory the following high-risk tactical moves that always seem as though they'll work, but actually have a low probability of paying off.

Stuart Streuli

BIG FLEETS USUALLY PRODUCE LONG STARBOARD TACK PARADES AND CROWDED ROUNDINGS. WHILE IT'S TEMPTING TO TACK SHORT OF THE LAYLINE AND LUFF OR PINCH UP TO THE MARK, IT RARELY WORKS, SAYS THE AUTHOR.

1. Claiming the caboose. What do you do when you're sailing down the line on starboard tack with 2 minutes to go, unable to jibe through the wall of port tackers returning to find a hole? You'll often see people wait to jibe until they reach the end of the port-tack train. The last starboard-tack boat to jibe is the caboose, and being the caboose is like being the last guy into the supermarket parking lot, unable to find a spot. On the starting line, all the holes will be taken.

If the line of returning port-tack boats is too thick to jibe into, head upwind a boatlength or two and either jibe or tack. Getting back into the port-tack parade sooner will increase your odds of finding a hole on the line.

2. Sailing down the line on port tack and putting your bow to leeward of the boat in front of you. How many times have you had your bow pinned to leeward of a boat in front of you, so close that you're unable to tack into a great hole that opens up? When you're stuck to leeward you have to wait until the weather boat takes the next good hole that comes along, leaving you waiting for table scraps. Instead of getting stuck, slow your boat by easing the sails or by making large S-turns so that your bow is directly behind the weather boat's transom. This will give you the freedom to move as you like and get the hole that you want.

3. Sailing up the middle of the course when the wind is light and the puffs are significant. If the wind is puffy, and the puffs are moving quickly, you can defend from the middle when people from the edges are coming across with pressure. Unfortunately, when the puffs are moving slowly, or in lighter air when the pressure differences are often great (such as Biscayne Bay or Tampa Bay), the edges of the racecourse can be better. When the puffs are moving slowly, and you're on the edge of the fleet, you can be patient and wait for the extra pressure and use that pressure to tack and cross those in the middle of the course. The only option for boats in the middle is to tack in

order to maintain leverage, but they're losing all the time because you'll likely be sailing over the top of them with better speed.

4. Always demanding your starboard rights. You're on starboard, on a lift, or, for some reason, you're determined to get to the left side of the racecourse and a port tacker is coming. How many times have you gotten worked up and felt as though you had to enforce your rights by yelling, "Starboard!" as loud as you could, only to have your rival tack on your lee bow so perfectly that you're forced to tack away? Once you tack, you're on a header, probably sailing to less pressure and away from the best side of the racecourse. In a situation such as this it's usually better to let the port tacker cross. If you want to get left, wave them by. Tell them they owe you one and sail for the good wind or current. It may feel strange to let them off the hook so easily, but when they cross and later tack to weather and behind, you'll feel better about letting them go.

Stuart Streuli

WHEN IT'S LIGHT AND PUFFY, STAY AWAY FROM THE MIDDLE OF THE COURSE. THE WIND IS BETTER ON THE EDGES.

5. Tacking away from the layline for clear air. You're on port tack, sailing towards the starboard-tack layline as you near the weather mark, and someone tacks right on your nose. It's tempting to throw the boat into an immediate clearing tack, but before you fall victim to the knee-jerk reaction of tacking away for clear air, consider whether it's better to live in the bad air or foot off until you reach the starboard layline. If you're really close to layline, the odds are that the wind on the other tack (underneath all the boats on the layline) will not be any better. Tacking away will require you to do three extra tacks. In a bigger boat, or in light and lumpy conditions, three tacks in short order could be deadly.

6. Tacking shy of the starboard layline. Sometimes, as you reach the starboard layline, it looks as though you can tack just shy of the layline and to leeward of a pack of boats, pull off a perfect luff, and actually make the mark. I'm not sure why this always looks so good, but inevitably it turns out badly (except in the rare circumstance when the boat in front of you actually hooks the mark and drags it to leeward four lengths, allowing you to get around.) It's usually much better to go with the conservative duck of boats that are on layline and find a spot where you're slightly overstood. Approaching the mark on starboard tack, slightly above the fray, will allow you to close-reach over boats luffing to get around the mark, and let you watch the entertainment.

7. Jibing right on the team in front of you when they jibe early on the run. This is usually a sound tactic, but before you go attacking, make sure to look over your transom to see if your competitor is suckering you to jibe into the bad air of the fleet behind, which has already jibed. If the boat in front of you is certain that you'll jibe on him, it may lure you into jibing and then immediately jibe back into clean air, only to laugh at you as they sail away.

8. Taking the low road when everyone else is going high. Immediately after rounding the weather mark, you sail your normal course and realize everyone else is sailing hotter angles. You tell yourself that they're sailing away from the mark, and it seems it would be better to go low. So you work low, underneath the dark cloud of disturbed air from the fleet rounding the mark, only to find that the whole fleet is now rolling you. If you jibe, the situation is just as hopeless, and things look grim. Where should you go? If the seas are flat and the waves are not surfable it's usually better to stay high and keep your air clean. Staying high with clean air (outside or on the edge of the weather mark Bermuda Triangle) allows everyone else to make the mistake of sailing in the disturbed air zone

while you sail in clean air and go fast. When the waves are more powerful than the wind, you may find that going low and catching a wave or two may get you low enough to get s eparation from the fleet.

9. Not keeping your nose clean on the reach. If there's a boat close to your bow and a boat behind that's tempting you into a luffing matching, be careful that the boat behind doesn't take you up to a point where your bow becomes hooked to windward of the boat in front of you. When this happens the boat in front of you will probably react by luffing you to the moon.

If the boat behind succeeds in initiating the luff, and getting you and the boat in front of you to take each other out of the race, he may quietly sail below the two of you and pass you to leeward. The best way to control this situation is to luff, but control your speed in order to keep your bow clean and have the ability to turn down.

10. Not thinking about windshadows on the run. How many times have you thought about jibing back to the middle of the racecourse in order to reconnect with the fleet, only to let the fleet behind you jibe first. You jibe late, only to find that you're in the entire fleet's bad air. Your other option was to keep going well past layline so that you could jibe and reach back to the leeward mark in clean air. It's important to know exactly where your opponent's windshadow falls. Practice sailing in someone's bad air to figure this out. Then, the next time you need to jibe into a narrow lane, you'll be able to live there.

Courtesy of Sailing World Magazine

Tactics

GET TO THE ADVANTAGED SIDE OF THE COURSE

April 12, 2002
By Stuart Walker

There Are Three Kinds Of Sailboat races—ones so short that the advantaged side doesn't matter, ones so long that the advantages tend to even out (or other factors are equally or more important), and races of medium length in which getting to the advantaged side is paramount. On medium-length courses, which are typically set near shore, there's usually an advantaged side. **The first boat to reach the advantage usually wins**, because after it does, there's insufficient time remaining for anyone to catch up.

In big fleets sailing long courses, the best strategy is to start in the middle of the line, keep to the middle of the course, expect that any advantage to one side (unless extreme) will be reversed by some advantage to the other, presume that boatspeed will get you into the top 10 at the weather mark, and await the mistakes of your opponents.

In small fleets on short- to medium-length courses, the opposite is true. Here, the best approach is to start at the extremities of the line, head immediately toward the advantaged side, and realize that boatspeed is of little value unless you get to the advantage first.

One side is almost always advantaged, either because of a persistent shift, the onset and subsequent veering of a sea/lake breeze, the dominance of a particular phase of a series of oscillating shifts, by favorable current, stronger wind, or smaller waves. Before the start, the competitor must evaluate the conditions and decide, not whether, but which side is advantaged and then develop a plan to get to that side first.

Essentially, this means that you must start at one of the extremities of the line—to leeward of all other boats heading left when the left side is advantaged, or to windward of all other boats with the ability to be the first to tack to port when the right side is advantaged. However, such perfect starts require precise timing and positioning and all too often a small mistake results in being driven through or over. Alternatives are available.

What matters most is getting to the advantaged side of the course before your opponents, not necessarily getting off the line first. The first step at about one to one and a half minutes before the gun is to sail into a position, either beyond the advantaged end or to the advantaged side of the fleet, from which it can be observed as it organizes for its final approach. From such a position, it will quickly become evident to which end of the line most boats are headed and whether most of them will be early or late. Perhaps everyone will act in accordance with Yogi Berra's presumption that "the place has become so crowded that no one goes there any more" or in light air will be unable to reach the desired end in time. Opportunities to make the perfect end start may then become evident and should be utilized.

There are two special circumstances in which this perusal will reveal such an opportunity: when the opposite end of the line is more upwind and will attract most of the fleet, and in strong current. A tack below the most leeward boat on the line when the right end of the line is more upwind, but the left side is advantaged or a position above the most windward boat on the line when the left end is more upwind, but the right side is advantaged is usually possible. In favorable current, seek the pin end from a position below the layline. In unfavorable current, approach the weather end from a barging position.

If the pin end is upwind and the left side of the course is advantaged, you should arrive at a location a few boat lengths beyond the pin and just below the extension of the line with

about one minute to go. Try to be the last boat to come back on port, because if you're not, you'll be controlled by the one that is. From here, if the air is light and the fleet late, one may bear away on port, cross ahead, and tack in clear air to windward. If the fleet is on time or slightly late, you can cross below the pin with about 20 to 30 seconds remaining, tack under the leading starboard tacker, luff them if necessary (after completing your tack), and bear away to arrive at the pin with the gun. Vary the radius of your circular approach to the first starboard tacker so that at the tack's completion you are bow to bow with them. If the fleet is early, you should bear away at high speed below the first few boats, find a hole, tack into it, and come up tight under the boat to windward.

Sometimes, if the pin end is heavily favored, boats will be tacking to port as soon as the gun fires. Your speed will permit you to slide through the hole that one of them creates and to emerge and tack in clear air to windward of boats hung up at the pin.

If the weather end is upwind and the right side of the course is advantaged, two alternatives to approaching on starboard and arriving at the committee boat on time are available. One is to approach from the port end (just as you would have done if the pin end were favored) but timed so that you arrive close to the weather end 20 to 30 seconds before the gun. From here, you should tack under the most leeward of the starboard tackers that is luffing up to the line. Come in late with speed; arriving early will permit some of the boats to windward to escape and go around you to leeward. After completing your tack, you should luff the most leeward boat, initiating a chain reaction that will affect most of the boats near the layline, and cause them to slow for fear of being shut out at the committee boat. You should then be the only boat in the vicinity that can bear away, get up to speed as the gun fires, and tack across the bows of those boats jammed astern and to windward.

The other, safer alternative is to make a late start, but do so right at the committee boat. At about one minute before the gun, take a position from which the fleet can be observed four to six boatlengths beyond the weather end and just below an extension of the line. If the fleet is late or excessively slowed by a lull or adverse current, you may be able to slide around the committee boat ahead of them. If they're early, but moving quickly, the'll have to bear away down the line, leaving you a hole at the gun. If they're on time, you should delay and bear away so that you come in with speed right on the transom of the most windward boat. From this position, you should be able to prevent that leeward boat from tacking and be the first to tack yourself.

There are two caveats to remember, however: 1. If you come into your final approach late with speed, arrive early, and are forced to slow down, someone with speed will surely drive through, above, or below, and you'll be in their dirty air all the way to the advantage and beyond. 2. Do not persist in your starting plan when another boat—beyond the port end or ready to barge—is attempting the same start. Keep to leeward and in control of them and be willing to go farther down the line or farther astern, if necessary, to avoid a catastrophe.

Courtesy of Sailing World Magazine

Tactics

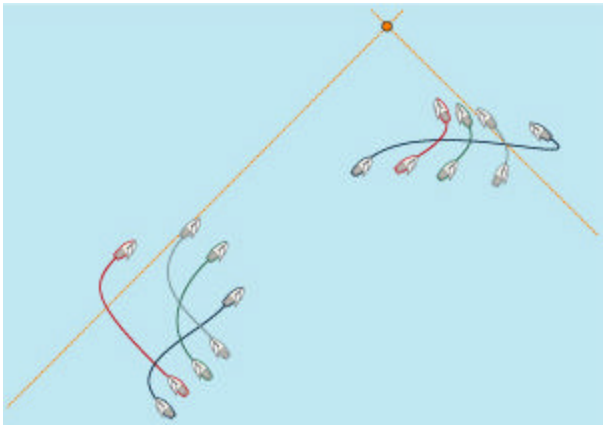
TOP OF THE BEAT TACTICS

November 1, 2001
By Bob Merrick

As you approach the weather mark in a crowd and sail in a progressively smaller cone of water, finding a clear lane becomes more difficult. It's important to know what boats are ahead of you, anticipate their next moves, and react accordingly. Doing so will allow you to sail in clear air for as long as possible while sticking close to your overall leg strategy. Here are tactics for dealing with situations you may encounter at the top of the beat.

Just behind, approaching a long layline

You're just behind a pack of boats as you approach a long port or starboard layline. In this situation, tacking on the layline will result in a lot of time spent sailing in bad air. It may also force you to overstand in an effort to find clear air. Both scenarios will cost you boats. You can avoid this by tacking before the layline. The tricky part, however, is choosing exactly when to tack.



Joseph Comeau

IN BOTH OF THESE SITUATIONS THE FOURTH-PLACE BOAT (DARKEST LINE) CAN MAKE UP GROUND BY TACKING EARLY (LEFT) OR OVERSTANDING SLIGHTLY (RIGHT).

It's likely that you, as well as the boats around you, are sailing towards the layline because it's the correct way to go. Maybe you're waiting for a shift or sailing toward a puff. If so, you may have to tack early to avoid the layline and stay in clear air. To avoid tacking any sooner than you need to, anticipate when the boats in front of you will tack. How early you need to tack depends on how many boats are ahead. You don't want to give up any more than is necessary with regard to the shift or puff. Keep in mind that everyone else will be trying to stay in clear air as well.

International 505 champion Peter Alarie explains this concept by thinking of clear lanes as numbered in order of desirability. The lead boat is going to take lane No. 1. The number one lane may be right on the shift or on the layline. To keep its air clear, the second boat will take lane No. 2, to leeward of No. 1. The third boat will take No. 3 and so it goes down the line for all the boats that are close enough to affect your air. If you're in fourth position, you can't tack in lane No. 3. If you try, you'll end up in bad air.

There's often an opportunity to be the "vulture." If you're in fifth position and you see the fourth boat sail past lane No. 4, then it's yours. The fourth boat will end up overstanding or sailing in bad air. If this is the case, you will most likely pass them on the next crossing even though you sacrificed some of the shift or puff.

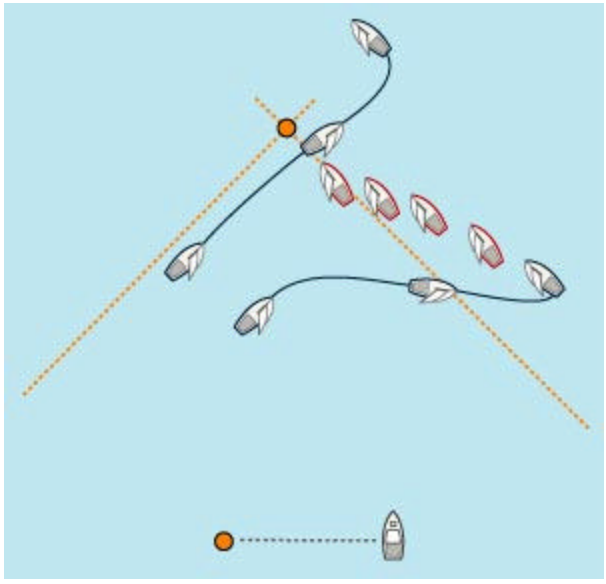
Make sure you consider how much you'll give up strategically and weigh it against the gains you'll make by sailing in clear air. Occasionally it pays to spend some time in bad air in order to get to a good spot on the racecourse.

Just behind, approaching a short starboard layline

Imagine yourself behind a pack of boats, approaching a short layline. This is similar to the previous example except that you're closer to the mark. When approaching the port layline, it's usually best to tack out early any time you're not leading, especially when you're in a pack of boats.

Approaching a short starboard layline is a common scenario. If the group in front of you is tightly packed, consider overstanding. As the lead boats tack on the layline, boats approaching on port will be tempted to leebow rather than duck a long line of starboard tackers. A boat that successfully leebows outside the two-length zone may have to pinch in order to make the mark, forcing the boats to weather to also pinch. The result can be a large group of boats all sailing slowly towards the mark. An extreme case of this can result in a pile up at the weather mark.

In these cases, you can make a big gain by coming in above layline at full speed and sailing around the pack while your competitors luff each other at the mark. How much you need to overstand will depend on the boats in front of you. You may need to overstand slightly more than a boat ahead of you trying to do the same thing. There's a point of diminishing returns. If a lot of boats in front of you overstand, you'll have to overstand too much in order to have clear air. In this case, it's better to slightly overstand and sail in bad air. Tacking below the pack should be avoided. If you're close to the mark this is likely to force you to the port layline and ultimately present you with a wall of starboard tack boats on the layline.



Joseph Comeau

IF YOU MUST APPROACH ON OR NEAR THE PORT LAYLINE, DUCK BOATS YOU CANNOT CROSS. IF YOU CAN CROSS, MAKE SURE TO DELAY YOUR TACK UNTIL YOU'RE COMPLETELY CLEAR OF THE CROWD.

Just ahead, on the port layline

Sometimes you can't avoid approaching the mark on the port layline. If you're not crossing boats on the starboard layline, you have to duck them to avoid fouling. If you're crossing, be careful not to break Rules 13 or 18.3. Be sure to completely cross starboard-tack boats before you start your tack. You'll probably round after the boat you crossed, but that's better than doing a 720.

Just ahead, approaching a short starboard layline

If you're ahead approaching a short starboard layline, you're in good shape but not quite out of the woods. It's important to tack right on the layline. By nailing the layline you force your competitors to either leebow—and risk not making the mark—or duck. Since you would much rather have your competitors duck, it's good to give them a little encouragement.

If it looks as if they're going to try a lee bow, bear off a little bit. One of two things will happen. A savvy competitor will realize that you're about to force them to tack below layline, and decide to duck you. A less experienced sailor will

be forced to tack sooner than expected and probably botch the lee bow. In this situation, you should be able to use the extra speed generated by footing to pinch up and make the mark. Be careful not to overdo it. You don't want to foul (breaking Rule 16.2) and you still want to get around the mark without having to tack.

All of these situations call for a good deal of anticipation. Ask yourself, "what would I do if I were in their position?" If they behave as you anticipate, you'll have had plenty of time to plan your move in response. If they do something you don't expect, it means they've probably made a mistake. This means you'll have an opportunity to take the better lane and make a gain before you round the weather mark.

Courtesy of Sailing World Magazine

Tactics

Make the Right Call at the top of the Run

June 27, 2002

By Moose McClintock

Don’t you hate it when you round the weather mark in the top group and immediately lose distance and positions to crews that jibe right away? There you are, dread in your eyes, watching your lead slip away. It's worse when you're the one who jibes away, only to witness the rest of the fleet leaving you in their wake. "Why did we just do that?" you ask. Whenever you find yourself in either of these situations, it's usually because you have only a vague plan about what you want to do, and it doesn't pan out. You must have a strategy for exiting the weather mark, one that's based on your positioning, keeping your air clear, and avoiding traffic.

Stuart Streuli

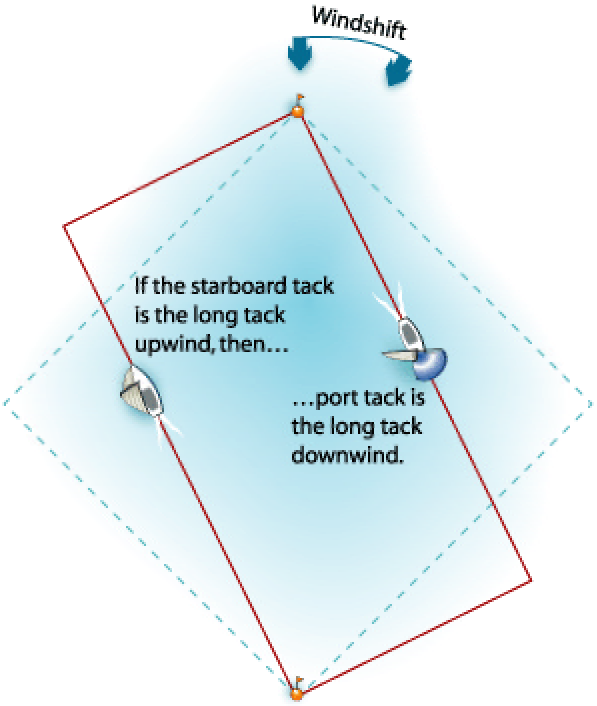
WITH A SOLID PLAN FOR THE RUN, THIS MELGES 24 CAN START TO EXTEND AWAY FROM THE MESSY PACK OF BOATS ON ITS TAIL AS SOON AS IT ROUNDS THE MARK.

One of the first things you should ask yourself is whether the beat is skewed. If the wind speed is constant and you've spent the majority of the weather leg on one tack, your downwind leg will reflect the same disparity of time on either jibe. In other words, if you've spent a lot of time on starboard tack while sailing upwind—because the breeze is shifting to the right, for example—you'll be spending a lot of time on port tack downwind. By jibing to port early in the run, you position yourself on the "long tack" to the leeward mark. This is the headed tack relative to the course geometry—remember that you want to sail the headed tack downwind. Jibing to port right away will position you directly upwind of the leeward mark sooner, allowing you to take advantage of any shifts from a dead upwind position rather than from an edge. I generally point this out to the rest of the crew near the top of the beat and then keep my eyes open for any late shift.

Next, determine if there's more wind on one side of the course. This determination comes from observations that you make during the upwind leg and before the start. The side with more pressure will generally be your top priority if all other factors are constant. It's beneficial to get to more breeze, but the question is, "How do I get there without sacrificing position?" Generally, it's best to be the weather-most boat when there's more breeze on one side of the racecourse. You get to the breeze first and can sail a lower course than boats that either jibe later or sail away from the wind. It's critical to identify whether or not there's more breeze on one side or the other. For example, make sure the pressure you felt on the right while going up the beat wasn't just a random puff or a filling breeze that has since covered the entire course.

Don't forget about current when sailing downwind; it's important because it skews the run. If the current is going perpendicular to a course that's square to the wind it's important to get to the upcurrent side (the side from which the current is flowing) because that will be the longer jibe. Positioning your boat upcurrent also allows you more freedom to play the shifts farther down the leg. If you sail downcurrent initially, you'll spend the rest of the leg trying to get back to the center of the course in order to take advantage of shifts. The lighter the wind, the more important it is to be upcurrent because you're going slower through the water and the vector aiming toward the mark gets skewed in the direction of the current.

Whether due to a windshift, tidal effect, or better wind to one side, make the rest of the crew aware which side is the favored before you round the weather mark so they can be ready to do whatever it takes to get there.



David Norton

Most classes sail windward-leeward courses nowadays, making an escape from the weather mark more difficult. If there's an offset mark, there's usually a zone of dead air under the offset leg. This zone of bad air extends about 10 lengths to leeward of the offset leg and you should cross it only if the benefits of getting to a particular side are huge. To prepare for getting to the other side of the dead zone it's a good idea to sail artificially low (below VMG angles) to get as close to the zone as possible without having to sail in it. After 10 lengths you should be able to jibe to the side you want with minimal loss. Ideally, you'll be poked away from boats that didn't jibe—though they may have moved forward some—plus you'll have the favored side and will have sailed away from boats that jibed into the zone.

If you need to jibe right away, don't forget about the starboard-tack parade and the ghastly amount of bad air behind it. When sailing upwind you can get a small lift off the leech of an upwind boat when crossing behind, and the same happens downwind. Basically, the wind is bent about 10 degrees by the sails of an upwind boat, so when you're sailing to leeward of a line of upwind boats you're actually sailing in a 10-degree lift in disturbed air. This isn't something you'd do on the open water, so it shouldn't be something you would do after rounding a mark unless the side of the course you're sailing to is favored dramatically.

Given this background, consider the following scenario: You're halfway up the beat of a leg that takes you towards the lee side of an island and the breeze suddenly goes left 10 degrees. With the breeze left, it's affected by the island, and it's lighter. The current is flowing from right to left. The majority of the fleet has gone right and there's a stack up of starboard tackers on the layline in more breeze but headed. You come in from the left and round the mark first.

Based on the shift you came into the mark with, you would extend on starboard downwind. This gets you clear of the parade of boats on starboard tack, away from the offset leg's bad air, and it keeps you on the long tack. However, you're now going downcurrent in light air. And you're sailing toward the island away from the best breeze. What would your call be if you were the tactician?

If there are no boats around you and you can sail deeper than normal, this is your best escape. As you sail away from the island your breeze should increase, and you'll slowly be able sail your optimum angle—plus you're on the headed tack. At this point, disregard the current, unless you think the breeze is going to shut down completely, in which case you want to get upcurrent right away. Your most important goal is more wind and getting away from the traffic at the mark. This sets you up on the long tack, and when the wind goes back to its original direction, you can jibe.

If you're in a lot of traffic, concentrate on sailing a slightly lower course than the group around you. Don't be afraid of the pack climbing up, because when they get to the point that they'll affect you, you can jibe away. You should be past the 10-length dead zone and headed toward more breeze. Doing this gives you the option of checking in on the other side of the course, and if it looks bad—try to figure this out in the first two minutes—you can jibe back to maintain contact with the pack. In an ideal world you're farther from the island so you have a little more breeze so you don't lose too much

from the two jibes. When the wind shifts back, you'll be on the inside with starboard advantage if you have to jibe again.

There are all kinds of options based on what the wind is doing and how the fleet is positioned. As in standard downwind sailing, at least try to sail in the most breeze on the headed tack. Figure this out before you get to the weather mark so the crew knows, and stick to your game plan.

Courtesy of Sailing World Magazine

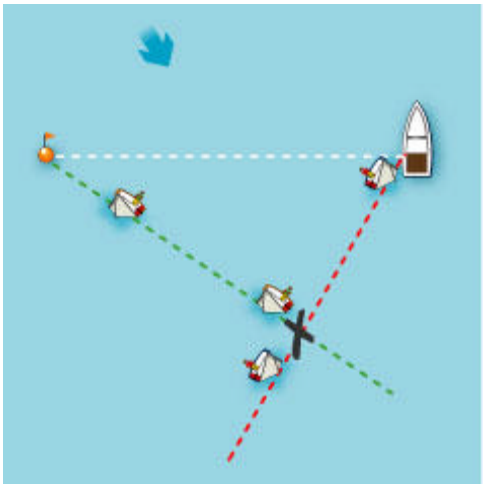
Tactics

FINDING THE X

October 29, 2001

By Angela Garcia

Everyone knows there's a favored end of the starting line and a favored side of the course, but many sailors forget that there's also a favored end of the finish line. Like starting lines, finish lines are rarely square. The sailors who know how to figure out which end is favored will gain two to three boats a race at a big regatta. Over a 10-race regatta, that's 20 to 30 points.



David Norton

FOR FAST FINISHES...FIND THE X

Never fear, today you're going to learn how to find the "X," which will allow you to predict the favored end of the finish line 100 percent of the time!

Look at the diagram below. Like Pete and Susan, you can make your approach oneither the green (starboard) or the red (port) layline. Caution: This does not mean to sail to the corners, but you should be on these laylines in the last 50 yards of the leg. You will hit the X at the point where the red and green lines intersect. At that time, look in front of you at the side of the line you are approaching, and then over your shoulder at the other end of the line. Decide which side looks closer, and head in that direction. Here, Pete didn't pay attention to the X and is heading to the unfavored side of theline. Even though Susan was behind him when they crossed, she'll beat him by several boatlengths.

Courtesy of Sailing World Magazine

Tactics

WIN THE PIN WITH MATCH-RACING MOVES

November 15, 2001

By Betsy Alison

If the pin is favored, many sailors will jockey for the perfect pin start. The ability to leg out on starboard below the fleet or to tack and cross the competition is an advantage worth fighting for. Of course, you may have to battle for it; rarely will a good fleet give you the pin end at the start. The trick to winning the pin is to control the situation and take charge of your own destiny. There are two match-racing moves that can help you win the pin, but you must make one critical decision: Do you lead the pack to the pin, or do you push them?

Stuart Streuli

WINNING THE PIN CAN GIVE YOU A HUGE JUMP ON YOUR COMPETITION.

Leading to the pin

This maneuver is best executed with a port-tack approach to the line. In a typical starting scenario, the flow of boats will move counterclockwise between the race committee boat and the pin. If you want to lead the pack to the pin on starboard, it's best to be the last boat on port and tack closely to leeward of the boat nearest to the pin. A port-tack approach allows you to see any available holes and how others are positioning for the start. Tacking tightly below the boat closest to the pin allows you to control the situation. From this position, you can prevent the boat above from moving towards the pin, and you can herd the pack in a windward position while protecting your hole to leeward. A critical element in making this work is the concept of "time and distance."

In order to accurately position yourself to win the pin, you need to gauge how far away you are from that sweet spot, and exactly how long it will take you to get there. It's important to spend some time in your pre-race preparation gathering this information. Being one or two seconds early can ruin your start, forcing you to jibe around into traffic. To properly execute this start, you must know three things: 1. How long it takes you to sail the length of the line. 2. How long it takes you to get from any stationary object in the water, a lobster pot or anchored spectator boat, back to the pin. 3. How long it takes you to tack and accelerate. The time to sail a given distance will vary with your sailing angle—reaching is faster than running or beating. And don't forget to consider current set.

Once you're in a lee bow "leading" position, your time and distance homework should pay off as you pick the moment to put your bow down towards the buoy, accelerate, and win the pin start. The biggest risk is a rogue boat coming in from astern attempting to snatch your hole while you're herding the pack above. Keep a wary eye astern, and to discourage a rogue boat, put your bow down, ease your boom out, and close the distance with the pin layline. Make it obvious that the rogue will not be able to sail to leeward of you and still fetch the pin. In fighting off the rogue, however, make sure you

don't underestimate the time and distance required to reach the pin. In other words, don't run out of room yourself.

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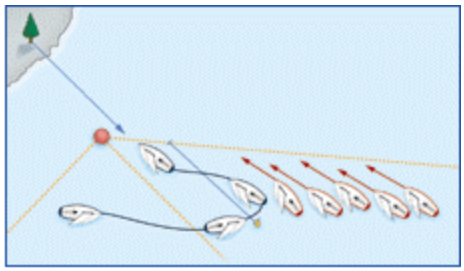

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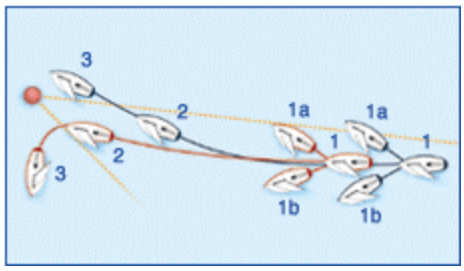

Joe Comeau

1. TO LEAD TO THE PIN, APPROACH ON PORT AND TACK TO LEEWARD OF THE CROWD 2. TO PUSH TO THE PIN, GET ON THE TAIL OF THE LEAD BOAT. YOUR GOAL IS TO OVERLAP TO LEEWARD AND LUFF THEM, OR MAKE THEM EARLY.

The best times to lead back to the pin are: 1. In light air, because tacking angles are wider and you can accelerate more easily with no one under your bow. 2. When you have a large runway available to the pin. 3. If a pack of boats is crowding toward the pin. With everyone overlapped, it's much easier to control the group.

Pushing to the pin

Pushing an opponent is another way to win the pin, but it requires a keener sense of time, distance, and layline position. Before the start, test the layline to get a feel for its position, and then sight through the pin for a marker on land—a shore sight. Check this layline reference several times to ensure that it's accurate—wind shifts will cause it to change.

Pushing is most effective when you're vying with one other boat for the pin. It's more effective in stronger wind because it's easier to accelerate and the ability of the lead boat to slow and stop is reduced. Pushing requires using the match racing technique of tailing another boat closely. The goal is to force the lead boat to use up its runway to the pin, forcing it to luff and slow prematurely. This should allow you to establish a leeward controlling position, or to pressure the lead boat into being early and jibing out.

When pushing the lead boat toward the pin, match their sail trim and angles in order to stay on their transom without gaining a weather overlap. As you push, the lead boat will probably fishtail back and forth, trying to slow its rate of progress toward the pin and attempting to "hook" your bow into a weather overlap. If you become trapped to windward, the lead boat has won. With luffing rights, the lead boat can control the action, slow its approach to the pin, and create a hole to leeward.

As the lead boat tries to hook you, your move is to bear away, cross their transom and overlap them to leeward with speed. If you can establish a substantial overlap to leeward early in this dance, you can then luff and stop the lead boat and control the approach to the pin. If the lead boat bears away before you get a solid overlap, you'll soon fall astern in their dirty air.

Once astern, you have two choices: the first is to aim for the pin and continue sailing fast, forcing the lead boat to match your course to stay ahead. Alternatively, you can luff sharply if you're running out of time or if the lead boat has sailed past the pin layline.

As the pusher, keep in mind that if you establish a leeward position from dear astern, you are required to assume your proper course after the start. If you have erred on time and distance, misjudged the layline to the pin, or trapped your bow to leeward with mere seconds to go, you're in big trouble. At best, you'll have a second row start; at worst, you may not fetch the pin.

Having a great start almost ensures that you'll be in the top pack up the first beat. Confidence in your ability to handle the boat in tight quarters, hold position, generate and protect a hole below your bow, and accelerate at the proper time are vital to winning the pin. One match racing technique that helps

is backing the jib hard to windward to swing the bow down and accelerate without a lot of rudder movement.

There is nothing more satisfying than winning the pin and having all the options open to you. Try these aggressive moves in smaller, less competitive fleets at first. Then try them against a more competitive pack. Slowly, your timing, boat handling, and confidence will improve. The pin will be yours whenever you want it.

Courtesy of Sailing World Magazine

Tactics

TACTICS: HOW TO CLAW BACK

December 15, 2000
By Scott Ikle

The difference between having a mid-fleet regatta and a great regatta is often the ability to come back after a big mistake. As much as you may try to sail flawlessly from the outset, if you're human, you're going to make a mistake at some point, in some race, somewhere in the regatta. Those who make the fewest mistakes win races. Those who can claw their way back from mistakes win regattas.

The most important skill may be attitude. If you can stay positive after a mistake, you'll be better off than a competitor who allows their anger to blind them to the realities of the racecourse. Once you've made the mistake, acknowledge it, and let it go. Begin your comeback by taking a few deep breaths to relax and then start attacking the fleet. It'll be important not to commit any more errors, so stay calm and alert.

After a poor start, your initial reaction may be to immediately tack for clean air. This will work well if the beat is square, giving you the ability to weave through the fleet and look for those all-important clear lanes. Tacking too soon after the start, however, may be dangerous; you may have a pack of boats on your hip that'll be nearly impossible to get through. You may have to crash tack or duck the entire fleet. Avoid these potential pitfalls by being patient and tacking into an open lane.

Sometimes tacking is not the answer. If the first beat is heavily skewed, it may be better to stay put. In a major windshift, you may also want to stay on your original tack. Don't forget your pre-race prep, if you determined before the start that you wanted to be on this tack, stick to your guns. Try footing off to increase your speed, watching for lanes as the boats ahead are forced to tack away. If you have to tack off, but plan to tack back quickly, consider tacking to weather of a starboard-tack boat rather than on their lee bow. You will then have a blocker protecting your lane.

Once things have settled down and you're in a clear lane, start paying close attention to windshifts and the boats ahead. Once you've devised a windshift game plan, concentrate on sailing the beat well and out-sail the mid-fleet pack by sticking to basic tactics. Remember to be ahead and to leeward when leading boats to the next shift, and wave boats across when sailing on a lift. A common mistake that's made by the mid-fleet pack is losing track of the weather mark; often the pack gets to the layline too quickly, stacks up in the corner, and overstands the mark. Often you hear of someone passing 40 boats in a race when coming from behind. They've likely made that big move by passing packs of boats that have all made the same mistake, not by knocking them off one at a time. Capitalize on the pack's mistakes.

The best opportunity to pass the pack is at the weather mark. The pack will tend to stack up on the starboard layline, with all but the leader going slow in bad air. Sail well to leeward of the starboard layline parade. As boats are forced to tack out farther to clear their air, you can expect a hole to open up, which will allow you to sneak around the mark ahead of the pack.

Working a hole to leeward of the port layline isn't the only way to pass boats at the weather mark. As much as we try to avoid overstanding, sometimes it can be advantageous. There could be a windshift at the mark, which slows the fleet as they approach. There could also be adverse current at the mark. Suddenly the fact that you're overstanding means that you're coming into the mark with pace, laying it, and looking smart as you pass the boats that had to tack twice or were pinching.

When clawing back on the first reach it's critical to make up distance on the leaders. This is purely a function of using boatspeed to minimize distance on the leaders before the reach mark. Avoid boat-to-boat battles. Before you close in on the opponent ahead, decide whether to go high over the top, or to dive low, breaking through their wind shadow. Decide early and set yourself up with some space in order to pass them. In some classes, when the first reach is tight, the passing lane is always high. Go high early, avoid luffing matches, and blast over the pack. Only when the reach is broad, or there's adverse current, should you consider sailing low on the first reach. And only go low if the pack is reaching high of the mark. This doesn't mean sailing below the mark, but instead, sailing the fastest course straight to the next mark, delaying any passing maneuvers until you can begin to fight for the inside overlap.

On the second reach leg the dynamics are a little different. The inside overlap position is going to be fought by going high. Avoid the pack that's fighting high and attack from the low road. The low-road move on the second reach is often an effective way to gain boats because you avoid the overlap battle and can sail faster on your own. As you approach the leeward mark, since you've sailed low at first, you'll be able to reach up and pass the boats sailing low and slow into the mark.

The run is always a good leg for catching boats. It's important to know how to round the weather mark. If you're headed when rounding the mark, bear away and set. If you're lifted, consider a jibe set. But there are other important considerations in determining which way to go on the run. It always comes back to what the wind is doing. If you believe that you'll get a favorable shift, it's often a good idea to sail away from the shift first so you can maximize your gain. However, if there's more pressure coming, always sail for the pressure. If you can stay in phase and in pressure, you'll always gain. As you near the leeward mark, always protect the inside position for the rounding. Remember, if you can't get an inside overlap, slow up and round behind the pack, not on the outside. Rounding outside of the pack will put you in dirty air and reduce the number of lanes available to you.

An awareness of how the breeze has shifted as you're rounding the leeward mark can be a key to making a comeback on the last beat. You want to get on the lifted tack right away and stay in phase. If you need to tack at the leeward mark, don't just go around the mark and tack; sail for a few moments, and look for a lane. If you need to stay on the tack, pinch up around the mark, and almost shoot head to wind to get your bow above the centerline of the boat ahead, clear of their dirty air—the worst thing you can do is two quick clearing tacks. If you're coming out of a crowded leeward mark rounding and there are few lanes to be had, your only recourse is to sail in phase, go the right way. The only way you'll pass boats is to sail the shifts better than the next person, so let the others search endlessly for lanes, and let them gamble on the flyers. Just play the fleet, the wind, and make winning percentage moves.

Never give up on the last beat, and always finish at an end. You'll be surprised how easy it is to pass boats near the finish line. Race towards the favored end of the finish line, and don't sail any extra distance. If it's close, shoot the line. You'll be amazed how a properly executed shoot can win a finish.

Clawing back from a mistake means never making another mistake. The strategies and tactics don't change, only your perception of the situation at hand. There'll be dirty air, fewer lanes, and lots of traffic. Turn that into your advantage by waiting for other boats to make mistakes. Sail better than the rest of the fleet, stick to what works, and usually you'll get back in the hunt.

Courtesy of Sailing World Magazine

Techniques

THINK SIMPLE THOUGHTS

June 19, 2002
By Ed Baird

In my frequent role as a coach, I see a lot of talented sailors doing extraordinary things: straight-leg hiking for hours in Lasers, getting out of crowded mark roundings with strong positions and speed, sniffing out windshifts that shouldn't have been there. It's fun to watch how the good guys do it. But it's also fun to see how they blow it!

Everybody has bad days. Even the best can only expect to win occasionally. If they win a lot in one year, you can be sure they went to a lot of events and didn't win a bunch, too. And those who do win regattas rarely win every race. It's nice to know that everyone makes mistakes.

In the debriefs we have at the dock, I'm always interested to hear what sailors were thinking at different times during the race. What's fascinating is how complicated they often make their race. The mental gymnastics they can put themselves through are amazing.

My suggestion is to keep the thinking process simple. There's enough going on that you don't need to add to the potential confusion. Every sailor I've worked with has been able to trace the majority of their disappointing finishes down to either being slow or trying to be too fancy. In being "fancy," they concentrate on the wrong aspects of the race. This leads to missed opportunities or taking large risks without realizing the danger.

Be assured that the winners win by looking at the same variables as you do; they just sift through them better. Take these examples: I sailed a Laser race with 107 boats in 10 knots of breeze. One sailor jumped off to an early lead and was quickly extending in the small shifts and bumpy conditions. He was doing everything right, until he sailed right past the layline for the mark. In fact, at the 1996 SORC, a Mumm 36 did the same thing. And this boat had eight people on board! What were they thinking?

Perhaps the most common brain hiccup happens when we get a great start at the pin, but our strategy is to go right. We'd like to tack, but there's one boat pinning us down, so we try to out-boatspeed them. Meanwhile, the fleet begins to tack away, and by the time we force that one boat to tack, everyone is hopelessly launched to the right and uncatchable. Could it be that this one boat was not worth the fight?

Speaking of fights, we've all battled for the inside at the leeward mark, only to round with the jib half up and the spinnaker half down. Wouldn't it have been better to take the spinnaker down earlier?

These are all examples of misplaced priorities. I like to ask myself these two things: "Am I doing the right thing, right now? Am I taking any risks that aren't necessary?" Don't let frustration or anxiety cause you to take risks that aren't warranted. If the strategy is to go right, get there. If it was correct, it won't matter that you ducked a couple of boats to get there.

When you are suffering from misplaced priorities, my suggestion is to refocus on the basics. So here are some simple rules to live by. I'll bet you'll be surprised at how often these truly basic concepts are forgotten, or replaced by something more, well, complicated.

Rule No. 1 is fundamental: You've got to be fast to look smart! If you play the shifts well, but still drop places, you're slow. I've been in a number of situations when it seemed like we were getting good starts and sailing lifts all day long, but still getting beaten to the mark. There's nothing more frustrating than feeling good about a leg or race, but still doing poorly and not knowing why. When

this happens, it's normal to be frustrated and second-guess your 20 tactical decisions. But often the real culprit is a lack of speed.

You must have good, reliable equipment, and know how to use it. This sounds so simple, but ask yourself, "Do I have the best hull finish on the course? Are my sails from the loft that's winning in our class or fleet? Is my crew ready for every condition? Are all the systems working?"

If your answer is anything other than an absolute "yes," then you're not going fast. Improving in this area means you'll accelerate off the line from difficult positions and not be forced to tack. It means you can round behind another boat at the leeward mark and hang on their hip until things clear out and you can tack freely. Can you do that now?

Don't kid yourself; this is the most basic, and yet the most overlooked, area of racing. You need to ask a lot of questions. How do I set up the boat for light air and heavy? What are the rig tensions that others are using? How are my sail shapes holding up? These are things you can find out with a phone call to your sailmaker, or casual chat at the bar. Then spend the practice time that it takes to be prepared. If you're slow, it's hard to look smart! In every sport, the best equipment makes winning easier, and in sailing it may be more so. If you refuse to put in the prep time or spend the money to have someone else do it, then you must also refuse to get angry when you don't win.

This brings me to my second rule: You can't win every race. Even the most dominant teams don't win all the time. When you look at scores, figure what the winning average might be. In most events with 20 boats, for example, an average of third in each race will easily win a six-race series. If you round the weather mark seventh, don't panic that it's a long way to first. Look at how far it is to third, and try to get there, a little at a time. In other words, let other teams take the risks and make the mistakes!

A common mistake is not keeping track of the wind. You can't tack on a shift if you don't learn the range of the windshifts before the race begins. When the start goes off and you look at your compass, you should know whether you're headed or lifted. It means doing your research. Get out early enough to sail upwind on both tacks.

Too often I see teams get out early, only to use up their time tying on sheets and hoisting sails, or worse, repairing something instead of researching the racecourse. Make it a rule that when your team leaves the dock they're ready to race. Assign preparation jobs for the whole team. Prepare the boat early, so you can think about strategy as you're sailing out to the course.

So now the race has begun, and here comes your first crossing. What is going through your head? Think of this: In every crossing, someone's going the wrong way. This thought is critical as far as strategy goes. You should "check in"—decide if you're headed the right way—by comparing yourself to the fleet every minute or two. If people are running from a burning building, you don't go in to see what it's like. Likewise, if the fleet is mostly going left, should you be going right? The answer can be yes, but you'd better have a strong reason to buck the common thinking. Again, let the other teams take the risks!

Remember this: You need a good reason to tack away from the fleet. So many people let the wrong things dictate their thinking. Have you ever tacked because you were cold and the other tack was in the sun? Or changed tacks when your legs hurt from hiking? Have you tacked because you were angry, frustrated that someone just passed you, or just bored? I have. But I try not to.

The right reasons to tack are that you can make a gain or limit a loss, or position yourself to minimize risk. If you tack for any other reason you could be making an error. Force yourself to do what's right at the time. Don't let laziness or a lack of confidence in your crew work keep you from tacking when the time is right.

When I first started sailing bigger boats, sometimes we would talk ourselves out of tacking because we didn't want to make the crew work too hard. Wrong! Come up with a strategy and then get on the best tack to follow it. If the rest of the fleet thinks differently than you and chooses the other tack, keep "checking in" to be sure your plan is working. The less confident you are, the more you should be

on the same tack as most of the boats around you. Only if you're confident that the shift will go your way should you split more. That's managing the risk.

Here's another simple strategy rule often taught in junior sailing: You shouldn't have to turn your head to see the mark. Being on the closest tack to the mark doesn't make it the correct tack all the time, but many top sailors put a priority on staying away from the laylines until the end of the leg. Especially when the wind is fairly shifty, a quick way to confirm this basic strategy is to look for the mark. If it's within a few degrees of the bow, you have a strong reason to stay put. If the mark's over your shoulder, however, you have a strong reason to tack. Generally, the closer tack to the mark carries the smaller risk for failure.

And speaking of junior sailors, as adults we need to teach by example that yelling is a sign of being underprepared. Whenever I hear voices raised on the racecourse, I know they come from a boat that won't win consistently. Preparation breeds calmness. Being organized and prepared means things don't catch you off guard. It means you're ready for any situation.

Winning teams spend a lot of time talking about what they'll do if such-and-such happens. Don't fill in the long beats with chatter about last night's party; talk about whether you're on the right tack. Decide what you will do if other boats in the fleet start tacking. Top teams are rarely surprised by a sudden change in circumstance. They've been expecting it. There's no excitement, and especially no yelling, when the change happens.

Your team should make this commitment: no matter what happens, no one yells. If you blow something, talk about it after the race. If you get frustrated and want to scream, save it for when you're in the shower. Take your situation and make more of it than the next competitor. Next thing you know, your team will enjoy itself more, the race will slow down and be more clear, and you'll find that you're thinking ahead. You'll be prepared, and you'll be laughing as you pass the "yeller" on the course. Remember, let the other teams make the mistakes.

Finally, when faced with a frustrating race, I calm myself with this thought: Most of the fun is in the learning. People who enjoy competition the most are learning every day. The more you learn and improve, the better you feel about yourself. By taking the focus off the goal of winning, the pressure of the race goes away and it's easier to make clear decisions. Concentrate on setting goals for the day, and get them accomplished. Don't measure yourself by finishes alone.

Try to keep the crew talking about the potential good and bad of each move before it happens. After each race, be sure to talk about why things went as they did. Remember that everyone is trying hard, but that people will always make errors. When they happen, look for ways to avoid them next time, not punish them this time. Smile when you talk!

I think it's great fun to see sailors start to think this way. Suddenly they are more relaxed. They get their heads out of the boat and onto the racecourse. One tremendous bonus of using each race to learn is that you laugh a lot more, and worry about trophies a lot less—what a great way to get around the course. And remember, the more you learn, the more likely you are to win!

So there you have it. The basics of our sport are where we win and lose most races. Pay attention to them, and you'll have your share of good days. Forget them, and you're sure to be disappointed. Because as complicated as we like to imagine our sport, it's basically a simple game of starting first, protecting your lead, and finishing strong.

Courtesy of Sailing World Magazine

Techniques

HOW TO POINT, FOOT, AND SHIFT GEARS

June 7, 2002
By Greg Fisher

Subtle gear changing is what truly separates those with just adequate boatspeed from those who always seem to be a click quicker and higher. While most of the fleet starts the race with a similar setup, created with the help of a tuning guide or by following standard principles, the fast boats are constantly making additional adjustments. When conditions suddenly change—a puff hits, or powerboat waves arrive—these sailors shift gears smoothly. Before we dive into the subtleties of their sail adjustments, let's take a look at how you might create a basic pre-race setup.

Step 1: Set the depth

Try to memorize the depth that feels about right in 10 knots of breeze. Then set your mast bend and headstay sag to replicate that shape, using it as your starting point in other velocities. Another method is to increase mast bend until you just begin to see slight wrinkles (called inversion wrinkles) running from the clew of the mainsail to the lower quarter of the mast. For the jib, decrease headstay sag until you are just able to make the telltales on both sides of the sail fly easily. Any tighter, and the steering groove will become too narrow.

Step 2: Set the draft position

For most boats, the main draft should be positioned nearly halfway back. Pulling the cunningham tighter pulls the draft forward, while easing it allows the draft to move aft. Use the jib halyard or jib cunningham to position the fullness in the jib. The draft should be slightly farther forward than in the main, usually about 35 percent, or roughly one-third, of the way back.

Step 3: Set the twist

To set the leech tension for the main, sight from under the boom and set the sheet so that the chord of the top batten is parallel to the boom. For the jib leech, set the sheet so that the last 6 inches of the middle of the leech (a mid-leech batten helps here) are parallel to the centerline of the boat. Easing the sheets allows the outboard end of the battens to fall away, increasing twist. Trimming the sheets does the opposite, decreasing twist.

Step 4: Set the angle of attack

If you drop the tiller, the boat should continue to track straight, or slowly head up into the wind. Any more helm than that means excessive rudder drag. If the boat has excessive windward helm, ease the traveler to until the helm is balanced. This four-step process for setting your sails is only a starting point. It's still a great idea to line up with someone you know is fast before the race to see if you are "on the money." If you're faster, great! If you're off the pace, just ask your crew, "Are we lacking speed or pointing ability?"

Solving Pointing Problems

An inability to hold a lane or position close to other boats can really destroy a tactical game plan. Pointing problems are not so much indicated by the angle that the boat seems to be sailing relative to the boats around us, but more by the fact that the boat is actually sliding to leeward.

Trying to pinch to maintain height can be the crux of the problem. The old adage, "foot, then point," says a lot. A boat needs to go fast before the underwater foils can develop enough lift to hold their position in the water. To regain pointing ability, ease the sails out, bear off slightly, and get back up to speed. Once up to top speed, re-trim to your starting point trim and reevaluate your pointing problem. If the problem persists, check your sail trim.

When sail trim is the cause of the problem, it's usually the main, not the jib. The upper leech of the main provides most of your pointing ability. Be sure to trim the main so the upper batten is at least parallel to the boom. If you need more pointing ability, try trimming the main tighter. You can hook the upper batten as much as 15 degrees to weather for short periods. Avoid the temptation to overtrim the jib to help pointing ability. Hooking the jib leech will choke the slot between the main and jib, stalling the entire sailplan. The jib should never have less twist than described in the "basic setup."

Only after you've decided to trim the main harder should you try to pinch the boat. In this mode, the weather telltales on the jib will be stalled. In big puffs, the luff of the jib can break as much as 8 inches back. This "super pinch" mode can only be held for short bursts and in flat water. Once the boat starts to slow down, be sure to ease the sails out, regain your speed, then start the process again.

While it may seem natural to let the boat heel more when trying to point, fight the urge. Keeping the boat flat will help maintain a balanced helm and maximize the efficiency of your underwater foils. Still not pointing? Either your rig is too loose, resulting in too much headstay sag (i.e., the jib is too full) and sometimes too much mast bend, which makes the leech too open, or the luff tension on either sail is too tight (the draft is too far forward).

Solving Footing Problems

What if your pointing is fine, but your straight-line speed is lacking? The simplest fix is easing the sails. More open leeches on both sails will help the boat sail lower and faster in a straight line. Sometimes, however, this results in a pointing problem. If so, first check your helm balance. Weather helm can seriously hinder the boat's ability to go fast. Instead of easing sheets, it's often better to find a way to ease helm. First, try to sail the boat more level. If you can't keep the boat flat, induce more mast bend to flatten the main. The next step is to ease the traveler until the helm is balanced. Finally, tighten the outhaul, tension the cunningham/jib halyard to pull the draft forward and open the leeches of both sails.

Gear Shifting: Puff On!

We've got you going with good speed and good height. Then what happens? The wind velocity changes and it's time to shift gears. First, let's look at some of the automatic trimming change that should happen as soon as a puff hits. 1. Ease the main, and sometimes the jib 2. Steer up to "feather" the boat 3. Re-trim sails.

Since a puff typically lifts you, due to a change in the apparent windspeed, you need to ease sheets and head up as it hits. Be sure to let the boat climb up into the wind and steer toward the upper end of your groove with the jib luff actually breaking. In flat water, all that may be required is a quick ease of the mainsheet. But in chop, it may be necessary to ease the jib as well.

If the puff packs some real velocity, more adjustment may be necessary. If you can't hold the boat down, and there's still too much helm, try the following, one at a time, until the helm is balanced. 1. Ease the traveler 2. Bend the mast (vang tension, backstay tension, etc.) 3. Tension the cunningham on both main and jib.

Gear Shift: Into a Lull

For the same reason that puffs are lifts, lulls usually appear as headers. In a lull, it's important that you bear off as smoothly as possible. Make sure the boat remains flat and resist the temptation to add heel to maintain "feel" in the helm.

Ease the main so the top batten angles outboard from parallel to the boom. Leave the jib trimmed initially until the bow is pulled down to the lower end of your groove with both telltales streaming aft. At that point, the jib should be eased so the leeward telltale doesn't stall.

Here's how to maintain speed in a lull. 1. Ease the main 2. Allow the boat to heel to weather, creating lee helm, to steer the boat down 3. Ease the jib 4. Level the boat 5. Pull the traveler up (if the boom is below centerline).

If the lull is long-lived, you may need to take additional steps to maintain speed. 1. Straighten the mast and induce luff sag in the jib 2.) Ease main and jib cunninghams to maintain correct draft position. The smoother you shift gears the faster you'll be, so practice until it's automatic. Heck, manual transmissions went out years ago!

Courtesy of Sailing World Magazine

Techniques

WHAT EVERY DRIVER SHOULD KNOW

June 4, 2002
By David Dellenbaugh

When you're steering upwind, where do you sit?

I prefer to steer from the weather side in almost any amount of wind, as long as it's comfortable. You'll find that most of the good sailors steer from the windward side because this offers them a better opportunity to see the waves, feel the wind in their face, gauge the pressure on the rudder and get a feeling for the angle (heel) of the boat in relation to the horizon; it also keeps them out of the disturbed air in the slot. Except in the very lightest of winds, where it's important to see the jib when it's just starting to lift, I think every big-boat helmsman ought to work on learning to steer from the windward side. I don't think you'll really improve your ability to feel a boat until you almost always steer from the weather side.

What do you look at when steering?

Too many helmsmen I sail with become mesmerized by the telltales. I'm not saying that you shouldn't use them, but the less you depend on them the better off you'll probably be. I put telltales about a third of the way up the genoa and two feet back from the headstay. I also like telltales on the shrouds. The best skippers use these telltales, but they also use the speedo, the waves, the horizon, the angle of heel, and so on. The person who uses many different factors and is able to compute them while steering has the best chance to become a good helmsman. I try to emphasize getting away from telltales and using them only as a reference.

A big boat is generally hard to feel, at least compared to a one-design. That's why it's good to stand up on the weather side and get as much input as possible when you're steering. You can't rely on just one thing; if you're only looking at the telltales, for example, what happens if the sail trimmer has the jib in too tight? You could be sailing by the telltales beautifully, but slowly and surely, the boat will start going slower and slower. I like to put a boat's instruments as far forward as I can and still be able to read them. This allows me to keep all my steering aids-telltales, waves, angle of heel, instruments, and sails-in my field of vision and eliminates the need to look down. If you have to turn your head and change focus to see the speedo or compass, then you'll have to re-orient yourself every time you look up, and that's slow.

How much do you steer by the instruments on the boat?

You have to sail a big boat more by the numbers than you would a small boat. The technology we have on boats is getting better all the time, and you don't want to ignore the input that instruments can give you while you're sailing upwind, especially on bigger boats, which are relatively insensitive. However, just as you wouldn't sail a boat only by the telltales, you don't want to steer it solely by the instruments. I've seen people try to sail a boat upwind using only the apparent wind angle instrument, and that's ridiculous. If you use any instrument other than as a reference, you're going to get into trouble. You have to find a happy medium where you use the instruments as a guide but don't get mesmerized by them.

Which instruments do you look at?

Let's break it down into two stages-a boat's tune-up period and then the time during races. The best way to learn how to sail a boat fast is to use as many of the instruments as you can. When you first start sailing a boat, see how fast it will go with different sails in varying conditions. If possible, have another boat with relatively the same rating out there with you and try different things. Then start keeping track of boatspeed, angle of heel, wind angle and speed (both true and apparent), velocity made good to windward, etc. If you have a good navigator or someone who is comfortable with

numbers, start making a chart for your boat. At this stage, use all the instruments. When you're racing, however, it's difficult for even the best helmsman look around at a lot of instruments. You have to narrow it down. I think the two most important instruments are boatspeed and windspeed (I prefer using true wind, if possible, since it won't be affected by acceleration or deceleration). If you have made a performance chart or if you have a velocity prediction program, you'll know generally what boatspeed you should be getting at each windspeed. For example, if the skipper sees that the windspeed is 16 true and knows from experience that the best VMG will be made at a boatspeed of 6.8 knots, then he should start looking for 6.8 on the speedo.

How do you know to pinch or foot?

You're continually looking at a tradeoff between going higher and slower or going lower and faster. The course that pays off is the one that will get you to the windward mark the fastest; the one that gives you the best VMG. Your optimal angle will depend on wind strength and sea conditions. In smooth water, for example, it will usually pay off to sail higher. This will give you the best VMG, but it also may mean that your speed through the water is lower than it might be in waves. Some helmsmen are confused when I suggest they try sailing at a slower boatspeed; they can't believe that I want them to go slower. What I'm really saying is, "Let's head a little higher and try a little slower speed, and then see if that doesn't net out to a better VMG to windward." As a rule of thumb, the average sailor steers a boat too fine; that is, it's sailed too high and too slow. Most people are obsessed with pointing well when they go upwind. But what most people don't realize is that pointing is a net effect-it's not just where you point the bow. It involves a boat's speed through the water and how the keel interacts with the sail plan. When the tactician says you're not pointing well, you can't just aim the boat higher because this means you'll go slower and the keel won't lift as well. You get going lower and slower, and it's a cumulative problem.

How is steering upwind at night different than during the day?

If you can learn to sail a boat by feel during the day it will certainly improve your chances to sail a boat well at night. The best sailors feel the wind better at night; that is they are more attentive to where the wind is, either on the back of their neck or on their face, and they can feel the wind changing. You have to depend less on what you can see and more on your "sixth sense." At the basic level, be sure your instruments are lit up. A flashlight on the headsail also can be an important reference since most sailors depend on the jib telltale more at night than during the day. I like to position a high-powered light so it is constantly shining on the telltale. That doesn't mean you're looking at the telltale all the time, but when you do look at it you don't have to wait for someone to shine a light up there. If you have a flashlight that goes on the side telltales from time to time, it's not a bad idea either, and make sure your Windex is lit. As far as position goes, standing to windward still offers the best opportunity to feel what is going on, which is important since you certainly can't see the wind or waves.

What's important for the helmsman to hear from the crew?

You definitely don't want everyone in the crew trying to communicate at once; that isn't good for the helmsman's concentration. I think that there are basically only two or three people who should talk to the helmsman-the tactician, the sail trimmer, and possibly the navigator. During a race, the helmsman will concentrate on steering the boat fast; the tactician will report tactics, the navigator will communicate with the tactician; and the sail trimmer will talk directly to the helmsman about speed. Most of the rest of the crew will speak up only if there is something on the course that should be considered. I like to have this communication go primarily to the tactician so the helmsman stays out of it as much as possible. Big-boat sailing is a team sport as you can't do everything when you're driving-delegate responsibility. If you set up a good hierarchy of communication, then you'll hear what is essential and not waste your time being distracted by non-essential information. You'll also free yourself from having to tell everyone else what to do.

As a helmsman, what should you communicate to the crew?

The obvious things are, "Hey, the boat feels sluggish," or "We feel overpowered," or "I can't quite sail the jib that tight at the right speed." These are all things that have to be felt through the wheel or tiller; anyone else will have a hard time figuring out what's wrong. I know I'm better at feeling why the boat is slow when I'm on the helm-off it I can only guess. One area where a skipper can be helpful

is sail trim. A mainsheet trimmer, for example, looks at the main all day long and can get kind of mesmerized with his own little problems. It's ironic how a skipper can look up and say, "Hmmm, we need a little more twist." The trimmer may be able to make the sail look perfect, but he can't really feel its effect on the boat. Another thing the skipper can feel better than anyone is the angle of heel. A crewmember can read it off the inclinometer, but the helmsman can say, "Hey, I think the boat would go better with a little more heel." What's important is pressure on the helm, or the feel of the boat.

How do you get and keep the boat "in the groove"?

Pressure on the helm is key to feeling the groove. The first thing that I do when I'm sailing a new boat is to mark the wheel or tiller so that I can always tell how many degrees of helm the boat has. With a tiller, this means starting with a protractor at the rudderpost, extending the degree lines forward, and marking them on the deck under the tiller. You want to go as far forward as possible because the small angles we're talking about show up best there. A wheel's a little more simple because once you mark the degree lines on the quadrant, you can put a piece of tape at the top of the wheel when it's centered and another piece on each side of center at a certain rudder angle. Don't measure the angle on the wheel; turn the rudder that amount and then mark the wheel.

What's the optimum amount of weather helm?

I'd say that the optimal is probably three or four degrees; this has proven to be pretty fast on a trim tab, which you can actually crank fairly exactly and leave in one place. Five or six degrees has proven to be a little slow. With big modern rudders, having an angle of greater than four or five degrees is, in simplistic terms, like turning a barn door on the back of the boat. Three to four degrees will give the boat a little extra lift and provide the helmsman with the opportunity to feel when he's in the groove. This is particularly important with a wheel, which often feels like power steering in a car. So I try to make sure there's a mark at around four degrees on the wheel or tiller. If you have only one or two degrees of weather helm, it's probably not enough for there to be a feeling of a groove. Ways to add pressure would be to heel the boat more, move your weight forward, trim the sails more to the centerline, power the sails up, etc. For example, if you're sailing along in medium air and have a hard time finding the groove, it might help to put a few guys on the leeward rail. Chances are that this is not faster through the water, but it would be faster for the helmsman. In other words, the boat will probably go fastest when it's sailed upright. But if you heel the boat five more degrees, the helmsman will be able to feel the boat better and do a better job of steering, which may be more than enough to offset going slightly slower through the water.

Are there any other tricks that make it easier to stay in the groove?

It will usually be easier to keep the boat in the groove if you sail it on the full side, especially if the breeze is shifty or if there are waves. In other words, err on the side of sailing the boat slightly faster than the speed that you know will produce the best VMG. The reason for this is that heavy displacement boats depend on momentum, and once you start going slow the problem accumulates; that is, you keep getting slower and slower. Trying to point high in shifty or wavy conditions is like sailing with a jib that has too fine an entry-the envelope for error is narrow. When conditions are variable it's harder to find the groove again once you've lost it; so if in doubt, sail slightly full.

What techniques do you use for steering upwind in waves?

Steer up the front side and down the backside. The bigger the sea, the more you have to think about how to get through it. When you're going upwind, against the waves, you want to steer through the waves so that you are affected as little as possible by the waves' action. The worst thing you can do is to turn the rudder too much. That's a general rule of thumb. But if you don't turn the rudder at least once in a while, a wave can really hurt you. You need to have good peripheral vision and anticipate what's going to happen. It's like skiing. If you look only at the next mogul, you're invariably not going to be that great a skier; but if you get the total picture and then deal with things as they come, you could be a great skier. When you're steering a sailboat, you want to look five or ten waves ahead and at the same time handle each wave as it gets to you. I ask my crew (or my tactician) to let me know when a big wave is coming just in case I've missed seeing it; I also ask for input on where the flat spots are. Another good rule of thumb is to keep the amount of weather helm to a minimum in waves. Generally, this means using less sail area than you would in flat water. Most people think that they have to put up a lot of sail to power through the waves; but this creates a lot of helm, and the natural

reaction is to try to reduce it by feathering. But every time you feather in waves, you start going slower and slower. You want the amount of sail area that will let you drive off for speed without overpowering the boat and steer the boat through the waves without being overwhelmed by weather helm.

How should you steer a big boat through a tack?

A big boat has a lot of momentum and therefore a lot of shoot. This means that to optimize VMG you want to tack slower than in a one-design so that you gain distance to windward in the middle of the tack. The heavier the boat, the slower you can tack, but you don't want to take too long or it will be hard to accelerate coming out of the tack. A boat generally tacks with the best VMG if you swing into the wind slowly and then spin more quickly to get the sails filled on the new tack as soon as possible. The lighter the wind, the more you should back the jib. When I'm steering a boat through a tack, I like to begin the turn from my position on the windward side and stay there (as it becomes the leeward side) until I see the jib fill to what I think is the right angle. Then I'll jump to windward and watch everything that can help me get the boat back in the groove and up to speed. The windier it is, the sooner I move up to the new weather side. If you do it right, your speed-building curve should level off just as you reach the speed that will give you the best VMG to windward. You definitely want to come out of the tack fuller in light air and finer in heavy air.

Any other tips for steering upwind?

Even though I've said that the helmsman should concentrate only on making the boat go fast and let the rest of the crew worry about everything else, that's not exactly true. Sailing is a team sport, and the skipper needs to function as the quarterback-he should be producing the "theme" for the sailboat race. Too often, the helmsman jumps behind the wheel without knowing who's doing what and steers his way through a race of confusion. You have to organize things before you start racing, or you'll have too much to worry about while steering. Look at all the races that Dennis Conner has won, his organizational and management skills are so good that he's often won a race before he even gets out there. A lot of guys can steer a boat upwind well, but not too many are organized as well as they should be. When the helmsman, the quarterback, gets on the boat in the morning, he should pull everybody together for a few minutes and say, for example, "Okay, you're going to do the mast area, and I want you to coordinate the moves between the bowman and sail trimmer on the spinnaker set." You'll be surprised how easy this can make things during the race. The job of steering a big boat upwind requires a wide range of skills, from doing your homework the night before a race to using your instruments for finding the best VMG. Anticipating what will happen next and always keeping an eye on the broader picture are key. When you're able to do this, driving is a lot of fun.

Courtesy of Sailing World Magazine

Techniques

STEERING DOWNWIND WITH TOM WHIDDEN

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By David Dellenbaugh

Richard Mason/Assa Abloy

SURFING A VOLVO 60 DOWNWIND IN THE SOUTHERN OCEAN REQUIRES FINESSE AND STEADY NERVES.

How is steering downwind different from steering upwind?

It takes more latent ability to steer a boat well on reaches and, especially, on runs. You'll see a greater number of good helmsmen upwind than you will downwind, even though everybody assumes downwind is easy. One big difference between upwind and downwind is that you feel a lot less breeze when you are driving off the wind. For example, if the true wind speed is 14 knots, you might feel 20 knots of apparent wind on a beat, but on a run you may only feel about seven knots apparent. This means that you're sailing in lighter air a majority of the time off the wind, which is why most guys light up their cigarette or eat their sandwich—because it's a relief from the noise an wind of beating. It's tough to steer downwind well in light to medium air, because unlike upwind, the feel of the wind is less apparent and you don't have a constant angle of heel or pressure on the helm to use as a guide. It almost takes a whole new mental attitude to turn the mark and do your best downwind. For this reason, rounding the weather mark is often a good time to change helmsmen. So put lunch away—eat it upwind. The breeze doesn't stop shifting when you hoist the spinnaker, and as a driver, you need your full attention to continue using as many aids as possible—instruments, masthead fly, telltales, waves, other boats, sails, pressure on the helm, etc.

What's the best position for a helmsman when steering downwind?

The most important thing is to be comfortable while you're steering. With a wheel, it's probably best to stand in the middle of the boat. You usually have to turn the rudder more downwind than upwind, especially in waves, and being in the middle will give you the best leverage possible. But this isn't a fixed rule. With a tiller you can use the hiking stick to steer from the windward side, or you can straddle (or stand next to) the tiller in the middle of the boat. As the breeze comes on, you certainly should be in a position where you have as much 1everage as possible so you won't let the boat broach or wander. This often means sitting on the windward side and holding the tiller with both hands. Brace your feet against something solid, too, or you won't last long on an overpowered reach.

Try to steer from a position where you can see as much of the waves a sails as possible. Since the helmsman is often the person farthest aft in the boat, he or she usually has the best over view of the sailplan and won't get mesmerized by the luff of the spinnaker like the trimmer does. Your position is also important for seeing the instruments. These are a little harder to watch downwind than upwind

because the crew, instead of being on the rail, is in the center of the boat and moving all over. It always seems like someone is sitting right in front of the dials.

What instruments do you use?

You want to use the same basic instruments that you do upwind—boatspeed and true wind speed—plus the apparent wind angle. You need to watch the latter because your optimum wind angle downwind is a little harder to feel by the seat of the pants. When you're beating, there's a very narrowly defined apparent wind angle where the boat will feel right. But on a run, your wind can be anywhere from 60 apparent to 180 apparent to make your best velocity made good (VMG)—depending on the wind and waves. For example, in 10 knots of true wind, your best VMG upwind might be obtained somewhere in a groove that's about five degrees wide (from around 26 to 31 degrees apparent). Downwind, however, the envelope that includes your best VMG is much bigger—it might be 25 degrees. So a good helmsman is keeping track of boatspeed, true windspeed, apparent wind direction and VMG (from an instrument, if available, or from a boat performance chart).

What can you do if you don't have the fancy instruments?

You have to keep watching how you're doing against the other boats. They are your best indicator of relative speed, and you should keep experimenting. On a run, for example, jibe more than you think is right (it won't slow you down too much), and how you're netting out with the boats around you. I think it's great to learn how to sail by the seat of the pants and not get too dependent on instruments. At night, one of the best guides you can have is a lighted Windex at the top of your mast. You don't want to steer looking only at the Windex, but you should be able to use it as a reference. I once did a 1,000-mile Mexican race with Dennis Conner and we had a run all the way in a lot of breeze. Dennis didn't care about the Windex and didn't care about the instruments; he shone a flashlight on the telltale on the windward shroud and steered almost completely by that to avoid sailing by the lee. You'll get a pretty stiff neck you keep looking up at that Windex all the time. Another good place to put telltale is on the backstay over your head. Like upwind, having a good "feel for the boat and the wind can be very helpful. The good guys kind of feel the breeze on the back of their necks, which really helps them anticipate what is going to happen. Did you ever notice how short Conner gets his hair cut before big race? He has it trimmed very close in the back, and I hardly ever see him look behind downwind.

Another way to keep track of everything that's going on is to get some help from your crew. Don't try to do everything yourself. Designate one person as the tactician, and ask him or her to keep an eye out for the little puffs and how the other boats are doing, and to keep the communication going with the trimmers. Make sure your tactician reports what's happening behind your back, because you'll lose your concentration if you have to keep looking back over your shoulder to see what's going on.

What's the optimal amount of helm when you're steering downwind?

On the run, getting the right amount of helm is just as important as it is upwind, except that your goal is to balance the helm so that it is neutral. In other words, you should minimize the amount that you have to turn the rudder. Having helm downwind is definitely slow because you just want the boat to go straight. You're not asking it to have lift or to go any closer to the wind, so all you're doing by turning the rudder is creating drag.

Moving crew weight around is one of the best ways to balance the helm. If you have leeward helm, move some or all of the crew to leeward; if you have windward helm, get them up to windward. The helmsman is definitely the key guy in terms of feeling how much helm there is and what needs to happen to balance it. Balancing the helm on a reach is a different story. Even though weather helm is slow, sail area is fast when you're reaching. Therefore, it pays to put up as much sail as you can control, even though this makes the boat heel over and develop helm. While you'd never sail upwind with more than four or five degrees of weather helm, on a reach you may be fastest with upwards of 10 degrees of helm.

Is there a "groove" downwind like there is upwind?

There is definitely a groove where the trimmer feels like he's got some pressure on the spinnaker and the driver feels like the boat is going well. You just have to experiment to find the angle where the

boat feels lively and the sheet is pulling, and try it for a while. Watch how you're netting out against the boats around you. The best drivers can feel a little pressure on the helm once they start cooking; it's kind of a vibration. Again, the speedo is the key instrument, and the helmsman essentially lives and dies by it. Figure out what speed seems to net out well, and then steer the boat up and down to maintain that speed. What most people have the hardest time comprehending is the necessary interrelation between the spinnaker trimmer and the helmsman. Finding the groove requires communication between these two more than anything else. The spinnaker trimmer should be saying things like, "It feels right here, good pressure. Come up a little now because I'm losing pressure, or come down a little because I'm gaining pressure."

Is there anything you can do to make the downwind groove easier to find?

The more open leeched your spinnaker is, the narrower the steering envelope becomes. In other words, the flatter the spinnaker, the tougher it is to fly and the more attention it requires from both the trimmer and the helmsman. It's like having a fine-entry jib when you're sailing upwind—the difference in steering between being light and heavy is not very great. One way to make the spinnaker a little more forgiving is to give it a rounder shape by closing the leeches a little. On a broad reach or run, choke it down by lowering the pole and moving the sheet lead forward. This will give you more of a curl and open the steering groove up a little. Another way to make steering a little easier is to sail on the fast (high) side when you are trying to pick your optimum VMG downwind. It's similar to widening the upwind groove by sailing a little on the full side when you're beating. Most people err on the slow side downwind, and this is a mistake. You will pay for being low much more than you will pay for being high, because once you start to slow down the problem accumulates, and it will take you longer to get back up to full speed.

What can you use as steering guides downwind?

I like to use everything possible as a steering reference. If you have a stern light ahead that's on a boat steering same the course you are, nothing's better to keep you going straight. It's the same when you can see a lighthouse or mark that you're headed to. Sometimes you can line up a star in your shroud, but remember that this will only work short periods of time. The angle of waves will also help you a lot at night. Another helpful guide is sail trim. If your sails are trimmed for the course you want to steer and all of a sudden they start luffing, then either you've been headed or you're steering high of course. So I'd say you should look at wind angle, waves, stars, moon, close stern lights, angle of the sails, feel of the wind on your face, angle of heel, horizon, a point on land—a whole bunch of things. You have to remember current leeway and all the things that are going to affect the course you're steering. The best way to steer a straight course for a mark (if you can see it) is to line up the mark with something on land behind and then hold that bearing constant.

Do you have any tricks for steering on an overpowered reach?

Making sure you have good leverage on the wheel or tiller and communicating with the crew are key. Too many helmsmen just sit there with the tiller up under their neck and don't say anything. You have to let the sailtrimmers know how the helm is. Make sure that they ease as much a possible, and don't ever overtrim when you're in overpowering conditions. The spinnaker is particularly easy to over trim because it looks so pretty when it's in tight. You'll find that the better crew tend to lose their spinnaker more often than you might think because it's eased so much. I like to use telltales near the spinnaker leeches to help make sure that the sail is always eased to the maximum. The mainsail trimmer is equally important as the spinnaker trimmer, and he's usually right next to the helmsman, so there should be a lot of talking back and forth. Make sure somebody constantly monitors the vang as well.

It's usually worth going with the spinnaker even if it means you round up every once in a while. This may make it harder to steer than if you had a genoa but it's faster. Don't start depowering the rig until you're at the point where you can't steer the boat straight (because of weather helm) and the rudder begins to stall. The main rule for depowering is to start at the back of the sail plan and proceed forward. The first thing to do, assuming that the spinnaker is eased as much as possible, is to ease the mainsheet and the vang. Other ways to depowering the main, and therefore reducing helm, are bending the mast, pulling in the flattener, or even going to a reef. Secondly, you should take a staysail down, if you're flying it, to reduce heel and therefore lessen weather helm. Finally, you can go to a flatter spinnaker. The helmsman is the only person who can really feel when it is time to make these changes.

When weather helm builds up and the rudder begins to stall (i.e. there's bubble of air around it) before you can depower enough, one technique for reattaching flow on the rudder is to give the helm a few quick pumps. Keep an eye out for waves as well because they can tip the boat over, lifting much of the rudder out of the water. Anticipate big waves by steering a little lower so they won't push you over so much. As usual, steer higher in the relative lulls and lower in the puffs.

How about when you get out of control on a run?

One thing I tell helmsmen when they're steering downwind in severe conditions is that it's very much like skiing. On skis you have to keep you body, and therefore your center of effort over the skis. You can't lean way uphill or way downhill. In sailing, you have to keep your whole sailplan over the hull. Looking at it another way, you have to steer so you keep the hull under the sailplan and prevent the keel from becoming a pendulum. For example, if the boat heels to the right, then steer under it to the right. If the boat heels to the left, steer under it that way. These steering corrections should be fairly small; you don't want to over steer and cause a turn the other way. If you're having a hard time keeping the boat under the sails, perhaps your crew weight is too much to one side. You definitely want to balance the helm in these conditions.

A helmsman can have problems steering downwind because most boats have too much sail in a breeze and can't be as effectively reefed as they can be upwind. Even if you could reef the main you'd end up with too much sail on the spinnaker side. So it's critical to figure out a way to balance the boat with the sails (as it is on any other point of sail) and this requires working extra hard with the sailtrimmers. For example, if the boat wants to round up to windward, ask the person on the guy to square the pole. If the boat wants to go out to leeward, ask for the pole to be eased forward and the sheet trimmed.

How do you avoid and recover from broaches?

A boat is most vulnerable broaching (or jibe broaching) when the rig is loaded up. This usually happens at the bottom of a wave, where the bow digs into the next wave, slowing the boat and the rig tries to keep on going. Ideally the helmsman wants to go dead down the wave and then head up a little in the trough to avoid this. Remember that steering corrections on a run should be as small as possible. The worst thing you can do when you start to round up is overreact. An inexperienced helmsman will typically crank the helm over as the boat starts to luff up, but when the sails fill and flow attaches to the rudder, the boat will have so much momentum going the other direction that it will do a jibe broach. The important thing is to try to get flow on the rudder without making too abrupt a movement. Keep ventilating the rudder (by giving the helm quick tugs) to get rid of a stalled bubble, and work the boat do to the compass course that you were originally on, or maybe a little lower. If feel like the boat is about to round up it's probably better to call for a spinnaker luff and keep the boat going straight than it is to broach. At least that way you won't lose all your moment down the course. If you do broach, the first sail that you trim back in should probably be your spinnaker. Just as you depowered the boat from back to front, you should power up from the front to the back.

What can you do to help the boat surf in waves?

One of the best downwind drivers I've ever sailed with is Mark Soverel. He's unbelievable and it's because he's a surfer [Ed's note: Soverel died in January, 2002]. Steering a big boat down waves is no different than surfing. What you're trying to do build up boatspeed and apparent windspeed by steering across the wave. You then use this speed to make optimum VMG to leeward by turning (maybe 10 to 20 degrees) and going down the face of the wave. When your bow is about to dig into the next wave, head up so that the rig doesn't become overloaded. It's definitely not fast to go in a straight line. My advice is to watch a surfing contest on television, and just study those guys go across waves.

In surfing conditions, the helmsman should look for troughs on the windward side of the boat and also watch the bow wave. If you see the bow wave starting to get bigger, then it's time to head up little. You want to pick the biggest wave to surf on, and this is where looking behind, or having your tactician look behind can really help. Every third wave or so is bigger than the others. Spend most of your time going down the big wave rather than trying to go down the little waves and missing the big ones. You have to discriminate. Steering by the lee can be very fast when you're on a wave. Another

trick that some helmsmen use for catching waves is wriggling the tiller just as a wave starts to lift their stern. I think this breaks up the suction that's created when a boat is moving through the water and stops the boat from being sucked into the wave. It's like breaking up the ground effect on a race car.

What's the fastest way to steer during a jibe?

You lose very little by jibing downwind as long as your crew can execute a jibe properly. So one basic rule of thumb is that the helmsman ought to jibe at a speed that's good for the crew. It's no good to spin a fast jibe if the spinnaker ends up inside the headstay. Ideally, though, if you jibe only for the benefit of the crew, you'll usually be steering through the jibe too slowly. They problem with turning slowly is that you don't have apparent wind building fast enough on the new jibe. As a result, your speed stays in the low range, and it may take a long time to get it back up again. You should almost always turn more sharply than what you think would be right in a jibe.

By and large, you want to come out of the jibe a little higher than the angle that gives your optimum VMG. Your goal is to load the boat up (with apparent wind) on the new jibe as quickly as possible, because when you jibe you are making great VMG for a while (since you're headed straight downwind), but you start losing all your apparent wind. If you don't come up fairly sharply just after the jibe, you'll lose too much momentum your course should be up and then down—that's the ideal jibe. The only exception to this is when you're sailing downwind in a lot of breeze and you don't need to sail higher to get back up to speed.

Where are you looking as you jibe?

I watch the spinnaker the whole time. The reason for this is that the helmsman should call when the pole is tripped. You ought to yell "Trip" when the pole is fully squared (i.e. the boat is headed dead downwind or slightly by the lee), and this is the moment when you want to start turning the boat a little faster. I use the angle of the Windex and the compass during the second half of the turn to help me know what heading I should be on for the new jibe. I try to end up so the Windex is a little farther forward on the new jibe than it was on the old to keep speed up. Another rule of thumb on a run is that if I'm sailing with the Windex about 25 degrees forward of dead aft, then we'll jibe through about 25 degrees. In this case, I'll say, "Let's jibe through 35 degrees, keep good speed and then bear down to our optimum angle." As we come out of the jibe, I'm looking for a rough compass course and Windex angle.

It's safe to say that helmsmanship does not win races by itself, but it can certainly make a big difference. Both upwind and downwind, the best drivers can sense how a boat is going by the feel of the wheel or tiller, and they are quarterbacking the whole team according to this. Practice using all your senses when you're steering, and don't get hung up on any one aid like instruments or telltales. Communicate with your tactician and trimmers, and keep the boat sailing on the fast side.

Courtesy of Sailing World Magazine

Techniques

Optimizing Downwind Speed – VMG

By John Heyes
18:39 19th April 2000

Finding the quickest route downwind for sprit and conventionally rigged boats

With more and more sprit boats and cruiser/racers using asymmetric 'chutes appearing in the handicap fleet, the talk in the bar after the race is often familiar. Either the race officer had set an asymmetric favoured course and the sprit boats were all back in the bar first or if there was a long run against the tide the asymmetric sailors will all be moaning that they never had a chance! Having sailed on several boats of both types in recent races, I too have found myself blaming the course for not winning and somehow managed to ensure that I was racing with a symmetrical kite the weekend there was great breezy reaches and vice versa.

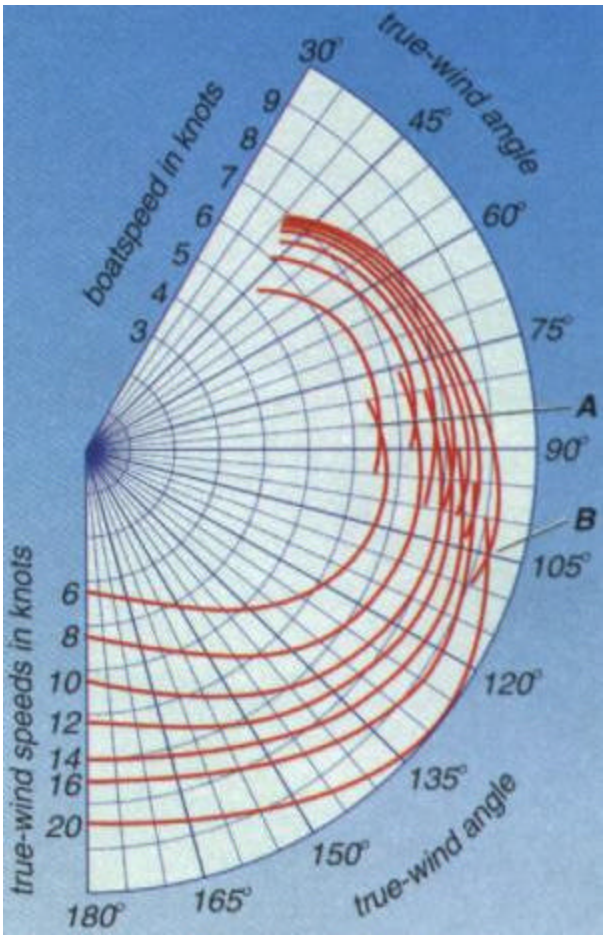
In reality every boat has a set of angles and wind speeds at which its downwind VMG (Velocity Made Good), will be much enhanced and in sprit boats this angle can be very specific, with a pronounced increase in performance. The key to getting down to the bottom mark before the other guys is to know at what angle for the current wind speed your boat is fastest and then to adapt your strategy to spend as much of the leg as possible on that 'fast' angle.

Sprit Boats

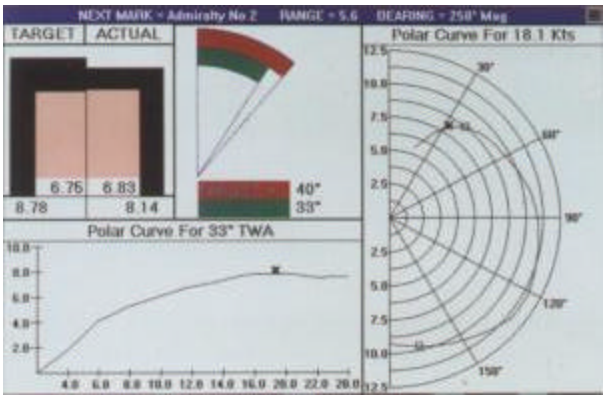
The lighter and faster the boat the greater the differential in speed between the optimum VMG and sailing slightly off angle. The top Melges 24 sailors have figured out that on the windward/leeward course in light airs the trick is to sail deep, running as low as possible with the tack line eased up and a big, 'knuckle' fronted kite projecting as far to windward as possible and with the boat heeled in that direction too. In these conditions you have to overcome the urge to head up to make the boat feel 'pressured up', as sure, the speed will increase but the VMG to the bottom mark may not. In one design fleets such as the J80, Melges 24,or 49'er, the key is to monitor the rest of the fleet to see the angle that pays the best. Watch out for boats getting inside you and sliding past on a deeper track.

Once the breeze and waves build enough for the boat to plane the game changes. Now it becomes a matter of hunting for the gusts that will keep you on the plane and with it the increase in downwind VMG. In order to "stay with the pressure", the helmsman must be willing to listen to the trimmer calling the pressure that they feel through the sheet and to the tactician who should be always watching to weather for the next gust coming down. The trimmer will usually make calls like "pressure feels a bit soft here, come up a little" or "good pressure now, lets soak down a little now". Do not worry if this technique involves sailing an 'S' shaped course, the increase in VMG for a light weight sports boat should more than offset the extra distance sailed, but for a heavier displacement cruiser/racer the differential may not be so great and it will take a stronger breeze to make her get up and go.

The key technique here with all sprit boats but most dramatically with the light weight planning machines such as the Olympic 49'er skiff is to sail high initially to build both the apparent wind speed and angle before heading off. On my first ride downwind on the 49'er I had to be told when we were almost pointing straight downwind as with the huge asymmetric sheet pulling hard and the main boom only just over the quarter it felt like we were on a shy reach as our generated apparent wind was so far forward. The principle is the same for all asymmetric rigged boats. As soon as there is enough wind for the boat to,' create its own wind', head up to build the apparent before coming off on a wave or with a gust. If the boat is capable of planning, the jump in VMG can be dramatic, as shown in this 'ear-lobe' shaped polar diagram of a Whitbread 60', or not quite so marked as in the case of the J-105 which has a smaller sail area to displacement ratio.



The two sets of curves on the J-105 polar diagram show the cross-over true wind angle at which it pays to fly the asymmetric instead of reaching with the jib. Interestingly this point varies from around 87 degrees in 6 knots true to 105 degrees in 20 knots. You can also see how the optimum VMG position shifts progressively downwind as the breeze gets up; from a true wind angle of 103 degrees at 6 knots to one of 130 degrees in 20 knots true. This confirms the fact that when the breeze is strong enough for the boat to plane constantly, the art is to sail as low as possible whilst maintaining planning speed. Remember that gusts travel directly downwind, so the lower you go the longer you will stay with the pressure.

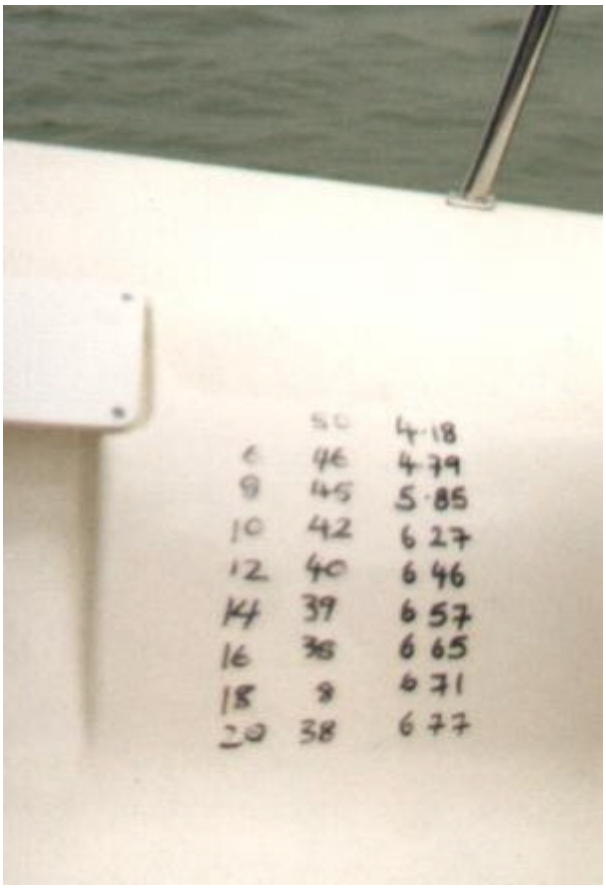


Symmetrical Spinnakers

For boats with conventional, symmetric chutes racing in a mixed fleet, the way to find the best downwind VMG is by using a table of target speeds for each wind strength; data which can be taken from the boats polar diagram. At first glance a polar diagram can appear as a complex picture of concentric circles, but it is really only a simple graph with three rather than two axes. Each curve is a plot of boat speed for a particular wind strength and each point on the curve corresponds to a wind strength value. Only half the diagram is drawn usually as the curves should always be symmetrical. The other half of the diagram would show the same data but on the other gybe. Most manufacturer's will supply a copy of the designers polars for the boat or you can get one calculated for your own boat free with an IMS rating from the rating office. You can get racing software that will compute your own polars and target speeds from recorded measurements of actual boat speeds achieved from the boats sensors.

Target speed is the speed the boat needs to be going to achieve the maximum velocity made good, either upwind or down. The simplest way to use target speed information is to have a chart of target

speeds for every 5 knots of wind stuck up in the back of the cockpit in easy view of the helmsperson and tactician. Once you know the sort of speed the boat should be going in 15 knots it is then just a matter of finding the right groove or wind angle that will provide that target speed. Write the wind angle next to the target speed on the chart to give the helm an idea of where he/she should be headed. Offshore navigators often have this data provided by computer, on rugged marinised PC's so that they can be used on the rail.



If you find you are sailing faster than the target figure suggests first check the matching wind angle from the polars. It is likely that you are just sailing too high, sailing fast but not making the optimum VMG downwind. Heading off a little and dropping a few tenths of a knot will actually get you to the bottom mark quicker. Similarly, if you are struggling to make the target speed, head up to build speed and then check the wind angle to see that you are sailing high enough.

Instruments that can help

As your downwind performance improves and we look for more ways of going faster, the attention shifts to the quality of the information being used. How reliable are the target speeds, is the builders polar diagram accurate for your particular boat and sails, is the speedo, wind angle and wind speed, calibrated accurately?

Many of the latest instrument systems can provide a bewildering array of useful computed functions such as true wind angle, VMG, COG (course over ground), SOG (speed over ground), calculated from data only sampled from sensors once or so a second. You may think that a constant instrument display of VMG would be the ideal answer to finding the fastest angles downwind. Used intelligently, it can provide a useful aid as long as the user is aware of its limitations and the errors which can creep in from the way in which the function is computed. The fastest instrument systems sample data from the various sensors; boat speed, compass, wind angle, every four seconds and others can be less frequent. The effects of heel angle on a fluxgate compass can cause error of up to 4 degrees for every 10 degrees of heel. The wind cups at the top of the mast require around 0.2 knots of breeze before they begin to rotate which should be allowed for in the calibration as should an allowance for up-wash of air flow up the rig, artificially accelerating the flow experienced at the masthead.

If you are using a VMG read-out in a sprit boat to find the fastest reaching angle, it is vital that the instruments operate fast, otherwise the information you are trying to steer to will be from the previous gust or wind shift. In the same way that the speed of computer operation is measured by its Baud rate, the fastest instrument system operates at 28,800, others at 9,600 and the NMEA system at just 4,800. So if you are looking to invest in a VMG instrument for a sprit boat check out carefully the specifications and how fast and often it will update before you start to trust the information it provides. In the reality of the race course, the average VMG instrument is unlikely to be fast enough to supply you with the quality of data you require. Conventionally rigged boats are better off in my opinion using target speeds and have an eagle-eyed tactician calling the shifts and choosing when to gybe. Never forget that windshifts do not stop downwind. If you gybe the boat on each major windshift you actually sail a shorter, straighter course to the mark.

For sprit boat sailors racing in a handicap fleet, without the benefit of similar asymmetric boats around them to judge the fastest angles, I guess a VMG display would be a useful starting point to learn the best angles to sail, but after a while you will learn to feel what angle the boat likes for each wind strength. It seems to me that the best helms in the Melges 24 class are mainly ex-dinghy sailors who retain a 'seat-of-the-pants' feel for keeping the boat on the plane and for playing the gusts and waves offwind. There is a further point to be aware of when using VMG displays for offshore or round the cans racing; that VMG displayed gives you a velocity made good downwind value and may not necessarily take you directly towards the leeward mark. Zig-zagging downwind with the asymmetric up it can be all too easy to fly past the mark half a mile away if you are just chasing the optimum gybe angles in a shifting breeze. More useful is a VMG display linked into a GPS (Global Positioning System), which can give you an actual VMG to the mark and helps to guide you into the mark. This is where on board tactical software systems or just an on-screen GPS plot can be a great help, providing a visual picture of your track into the mark and even giving such information as time and distance to go to the layline. We found our way to a mark in thick fog in the middle of the English Channel in the Rolex Commodores' Cup offshore race just using a tiny Magellen hand held GPS, which could be easily used on the smallest of sprit boats.

For many of the new sprit boat classes, the downwind legs provides many more opportunities for changing places than upwind and is a whole bunch more exciting!

Courtesy of Yachts and Yachting Online

Techniques

TWING LINE TECH

Improve Spinnaker Handling

By Marty Rieck

Small offshore boats used to be outfitted like miniature maxi boats. When I first started sailing MORC boats in the early 70s, the big-boat syndrome was very evident and one of its worst manifestations was that everyone carried reaching struts. A breezy reach-to-reach jibe found the foredeck crew fighting with the strut in a nautical version of Wrestle-Mania.

Fortunately, most of today's boats look to high-performance dinghies for their inspiration and reaching struts are obsolete except on very large or very narrow boats. They have been replaced by twing lines (also known as tweakers) and spinnaker handling is much easier. Twing lines are barberhaulers for the spinnaker sheets - blocks that ride on the sheet and are attached to a line that allows them to be adjusted, pulling the spinnaker sheet down.

The most common application for twing lines is on smaller offshore boats that jibe the spinnaker pole end-for-end. The twing lines allow the windward sheet to become an effective afterguy by leading it to the windward rail near the point of maximum beam. When the boat is jibed, the new weather sheet is "tweaked" to the rail to become the guy, while the new leeward sheet is released, and runs directly to the turning block at the transom. Tweaking the guy to the rail helps to keep the spinnaker pole under control by pulling down against it, and improves leverage for drawing the pole aft when it is near the headstay on a tight reach. Most modern boats are beamy enough that leading the guy to the point of max beam opens the angle sufficiently to make it possible to move the pole aft with reasonable ease.

The twing line on the leeward side can be used to change the lead angle of the spinnaker sheet, much like an adjustable genoa sheet car changes the genoa lead angle. Many modern boats have small foretriangles and the best sheet lead position is quite far forward of the transom, except when the boat is reaching. Twing lines allow the turning blocks to be positioned far enough aft for effective reaching, while the lead can be "positioned" forward to stabilize the leech of the spinnaker when running. The leeward twing can also serve to hold the sheet down to clear the boom and prevent chafe, which can be important on a heavy-air reach when the spinnaker sheet may otherwise prevent the boom from being released in a gust. It's also useful for "choking" down the sheet to help prevent the spinnaker from oscillating in very heavy running conditions. Using the leeward twing for adjusting the spinnaker sheet lead alone is so effective that many offshore boats over 30' (9 m) are equipped with twing lines on the sheets even though they have separate afterguys.
Many production boats don't come rigged with twing lines, but designing an effective system for your boat is easy. There are four elements to consider: the block that rides on the spinnaker sheet, a block or lead mounted on the rail, a properly positioned cleat or stopper, and the control line.

The block that floats on the spinnaker sheet should be strong enough to roll freely under load, but as light as possible because its weight is parasitic and will pull down the sheet in lighter air when it isn't needed. When the guy is under its highest load (when the pole is against the headstay), the twing is only deflecting the sheet 20 or 30 degrees, so the actual load on the block is comparatively small. When the pole is aft and the sheet deflection is most severe, the load on the guy is lowest. This means you can choose a floating block with about a third of the working load of the spinnaker sheet block and large enough to comfortably accommodate the line diameter of the sheet. Smaller boats can use Carbo Ti-Lites.

It may seem that a snatch block, which could be removed in light air, would be the ideal floating block, but snatch blocks are generally too heavy for the job. Small, high-load blocks with opening sides have been designed for just this purpose on larger boats, but most smaller boats will find that Carbo Ti-Lites work just fine.

The rail-mounted block or fairlead should be slightly stronger than the floating block - half the strength of the spinnaker sheet turning block is a good rule. I should be mounted near the widest part of the boat. Boats with lifelines need a fair lead past the stanchions. Generally, the best lead is found by placing the block just ahead of the stanchion nearest to the point of max beam.

Placement of the twing line cleat will impact the system's effectiveness. Small offshore boats like J/24s, which have a flush deck where access to the cleat is unhindered, frequently place a plastic bull's eye fairlead on the rail with a cam cleat mounted close behind. Racer/cruisers with cabin houses and narrow side decks generally find it better to lead the twing line to a cleat in an accessible position, usually at the front of the cockpit. Larger offshore boats may need a rope clutch for securing the twing, and should position it so the twing can be winched when necessary.

Proper positioning of the cleats make the twing lines more useful, especially during end-for-end jibes or smaller boats when the new guy has to be tweaked and the old guy released at the same times. In many conditions, the crew can use the twing to bring the new guy within reach of the foredeck man during the jibe.
The adjuster line should be as small as possible to minimize weight on the spinnaker sheet. Low stretch, high-strength lines are ideal for this application. Choose the smallest size you can comfortably handle and splice the line to the block to allow it to be drawn down close to the deck. Boats under 28' (8.7 m) should find 1/4" (6 mm) line large enough and boats under 35' (10.9 m) should be able to use 5/16" (8 mm) line.

If you're sailing without twings, give yourself a taste of how effective they can be by jury-rigging a simple set for your next practice session. If your crew is normal - that is, if they like systems that make their life easier while they make the boat faster - you'll rig a permanent set for the next race.

Courtesy of Sailing World Magazine

Perspective

THE DETAILS MAKE THE DREAM

By John Burnham

Not long after we stepped the rig on our 30-foot Shields, I started worrying that the 4,500-pound boat might capsize on its trailer. That's how hard it was blowing across the Seawanhaka Corinthian YC parking lot on the north shore of Long Island. It was September 11, 2002, a day of brilliant sunshine and strong northwest breeze similar to the day when the Twin Towers fell. Except this year the gusts were well over 40 knots, and Long Island Sound was wall-to-wall whitecaps.

There was no way we'd be sailing a practice race for the Shields Nationals, so most of our crew worked mechanically through sail measuring, rig tuning, and lesser chores that kept us busy; but Peter wasn't satisfied. Borrowing some Scotch Brite technology from a fellow competitor, he spent two hours working his way around the hull until the underwater surfaces were gleaming, burnished beyond any finish we'd ever achieved. We all gathered around, buoyed by the promise of speed reflected in that shine.

Three days and five races later, we wallowed on a windless sound under a sooty sky. The Stamford-Denmark Race fleet drifted nearby, also in postponement mode, and 30 miles to the west, a colossal fleet of 1,200 Sail For America crews motor-sailed through New York Harbor.

On our boat, we were 3 points ahead and nervous as hell until Matt and Pete started testing each other on the mathematics of which end of the line was favored. The laughs they generated didn't help me get a good start when the southwester finally filled, but maybe they kept us loose enough to bail out quickly and find a lane, and then sail two of our best downwind legs en route to a second-place finish.

Looking back on it, somebody on the team was always figuring out what to do next. Through dumb persistence, by sweating small details as if they were large, we learned to sail fast enough, smart enough, and with enough combined confidence and paranoia to win the championship. Reed and I—along with Pete, Matt, Rachel, and others—did dozens of things throughout the season like Pete's bottom job. A few, such as adjusting our mast rake, probably made a measurable difference, but without instruments or two-boat testing, we were rarely sure. What we did learn, though, is that such persistence always contributes in terms of team psychology.

You don't have to take my word for the benefits of positive psychological factors. Olympic trials runner-up Dean Brenner, who writes this issue's story "Dream the Dream," explains that half the battle is simply defining your own vision. "Raise your sights," he says, "and really decide what you want to achieve." Or read how Laser World Masters champ Ed Adams describes pulling himself back together when his regatta was on the ropes. Not that these experts could help us deal with the trouble we faced after the Nationals: When we got home, our local competitors forgot to acknowledge our superiority and seemed to take special delight in beating us.

That wrinkle aside, even if you don't plan to quit your job and spend your last nickel reaching for Olympic glory, the idea of having a goal, putting a team together, and working steadily to improve still applies. Why not shoot for the top half, the top five, the fleet title, or even the nationals? Go for it, and have some fun. Just don't forget to burnish the bottom.

Courtesy of Sailing World Magazine

Perspective

WHAT WE LEARNED IN PRACTICE AT THE MASTERS

By John Burnham

You can learn a lot in practice, which is something I did as a crewmember for Dave Irish at the St. Francis YC International Masters regatta recently. The regatta was raced in J/105s, a very popular class nationwide, but not a boat I've raced on before. We were also sailing with a team that had never sailed together before, although Bill Babel, the mainsheet trimmer, and Dave McVicker, bowman, qualified as regulars on Irish's Mumm 30 team. Vickie Sodaro, who had raced with Dave a couple of times, practiced with us in place of her friend Linda Lockwood, who would be joining us on race day. I drew an assignment as jib and spinnaker trimmer, and practice time was obviously going to be important if I were going to fit in and perform well.

J/105S ARE LOANED TO INTERNATIONAL MASTERS REGATTA. SAILORS DRY THEIR SPINNAKERS BEFORE SAILING AT ST. FRANCIS YC.

What I didn't think about in advance was that two afternoons of practice would give me a chance to try some different trim techniques and decide which I liked. Mainly, we experimented with three ways to trim the jib: first on the leeward-side primaries, then on the windward-side cabintop winches, and finally on the windward-side primaries. If we'd gone straight into racing, no doubt we'd have settled on the traditional approach: Tom, the mainsheet guy, would've had to go to the low side to release every time, and I'd have ended up on the low side grinding out of each tack. Instead, we began cross-sheeting, which meant Tom could hand me the handle and then release the sheet without moving. I'd drop to leeward as the tack began, pop the handle in, then tail quickly and hit the rail for the final trim.

The other thing we had time to do was mark every control line from the tack and sprit lines to the jib and spinnaker sheets. On our first trip upwind on Thursday, we sailed a few miles, right out through the Golden Gate, marking all of our settings. I put two pieces of yellow tape on my sheets, about 5 inches apart, with another strip of tape as a reference mark on the cockpit edge, just inboard of the winch. As the day went on, I began to realize that as I was grinding, I'd see my first mark come toward the winch and know the jib was 95% trimmed so I could hit the rail and get the rest from there. Cool!

Vickie (who was about to race in—and win—US SAILING's Adams Cup) marked the sheets for the asymmetric spinnaker near the turning block, so I could have a quick visual check of whether I was at or near the maximum ease position for running downwind. This was a much less precise mark than on the jib sheets, and I found that coming out of jibes, it had its limits; if I blindly eased it to the mark, I would likely start to collapse the chute. The key lesson, in other words, is that the sail trimmer still has to look at the sail sometimes.

Learning to jibe the chute was fun. Both sheets were on cabin-top winches, usually with only one or two wraps even though we had 18 to 20 knots of wind. Vickie would have pre-loaded the new sheet on its cabin-top winch, so to prep for a jibe, I'd just move in off the rail, take the slack out of the windward sheet, and on command, cast off the loaded sheet. Dave M. would pull the new sheet around the headstay from the weather deck at the shrouds (for some reason this is called "tractoring") and I'd tail like crazy. As the clew came inside the chute and aft, he'd pull down hard on the leech to fill it and as soon as the majority of it filled, I'd ease several feet of sheet. Sometimes this would be completed well before the main came over, which was no problem. The key things I learned practicing this were making sure there was no friction to slow the old sheet from going out and making sure I kept up with or even got ahead of Dave on the new trim.

Basic trim on a run with the asymmetric isn't altogether different than with a symmetric chute, but I was glad to have some time to get used to the different warning signs of a collapse and practice my dialogue with Dave on the helm. With a traditional kite, on a run with plenty of wind you can pull the pole aft to the shrouds and trim the sheet accordingly, and then the question is only whether the helmsman is steering too deep and the spinnaker is either getting soft because the wind's getting lighter or it's getting soft because the main is starting to blanket it. On an asymmetric, you have to heel farther to windward and ease the sheet to project the luff of the sail to windward of the sprit, and if you run too deep the leeward half of the sail begins to get nervous or soft, especially in the upper half. It simply takes a while to get used to what this looks like and what to say to the helmsman ("Heat it up" seemed to work just fine). After six or seven runs, I began to get a visual memory of how the sail looks when it's soft (we're too low) or powered up (we're reaching up too much), so that hopefully I can fit my observations for best speed in with Tom's tactical calls for where we should be positioned within the fleet.

Making mistakes is less stressful on a practice day. The worst thing that can happen is that your teammates will have a good laugh; then again, you can have a laugh too. One time on a tack, as I took the handle from Bill, I forgot to put my thumb on the locking mechanism, which meant I fumbled getting it into the winch and was way late on the trim. (If you're the jib trimmer and you hear the jib luff for more than about 1.5 seconds, you're too slow.) Another time I got mixed up and picked up the wrong part of the sheet, something that's possible when you're cross sheeting but is easy to avoid if you remember that a sheet comes off the winch's right side. My favorite mistake was after our first spinnaker set, without thinking, I leaned forward and tripped the rope clutch holding the jib halyard. Then I realized that J/105s are equipped with roller furling jibs, so you don't drop the jib when sailing downwind—you roll it up!

The other good thing about mistakes is that you may find out it wasn't a mistake after all. On spinnaker sets, my job was to take out and stow the jib winch handle, pull the sprit all the way out as we reached the weather mark, and then begin to trim the chute as it went up. On one of our sets I couldn't get the sprit to go out for several seconds and thought I must be getting weak. After we got squared away and talked it over, Dave realized that the tack line, which connects the spinnaker to the end of the pole, had to be led straight forward through the gap in the middle of the bow pulpit and not over the side of the pulpit as it had been that time.

Certainly the best thing about practice is getting to know your teammates, learning to work together, and also developing a camaraderie. Every crew has its inside jokes as well as its ways of supporting each other. You learn who will give you energy and who will keep you calm; that is, who's wired (Dave M.) and who's mellow (Bill). You hit the dock and put the boat away carefully. You have a beer and a nice dinner together, and you can relax, knowing that you've got your mechanics more or less in place, and more important, your skipper can relax knowing the same thing. You're going to get the boat around the course at reasonable speed tomorrow, so you can begin to focus on the competitive aspects of the game.

Courtesy of Sailing World Magazine

Perspective

LEARNING TO WORK UNDER PRESSURE

By John Burnham

The racing began on Friday, and after all of our practice, we still botched two or three maneuvers and sailed a poor first race. On reflection, it all boiled down to another "P" word—pressure. It's one thing to practice hard and work out all of the kinks; it's another to remember to do it all exactly the same way when you approach the weather mark on port tack, duck another boat, and then slam into a tack. That was the situation at one rounding, when Bill had to ease the mainsheet big time for the duck. I pulled the winch handle for him and something told me he wasn't going to leave his mainsheet in time to release the jib. But I essentially closed my eyes and left the rail anyway to trim the new jib, hoping I was wrong—sure enough, he was busy retrimming his main while Dave tacked the boat. We didn't tip over or hit the mark, but it wasn't fast to round the weather mark with the jib backed and then, once released, flogging.

On the first run we headed down the wrong side of the run, inshore, in a pack of boats, but then cut our losses and made a good gain with a jibe away from the City Front. On the second lap, after a good quick jibe to the outside, we arrived at the leeward gate with a pack of boats snapping at our heels. Once again, pressure reared its ugly head in the form of a debate between the skipper, tactician, bowman, and spinnaker trimmer (me) on the rounding plan. And once we decided which way to round, we rushed our spinnaker takedown, letting another boat overlap us on the inside. Another effect of the takedown style was that a jib sheet got sucked down the forward hatch under the chute and even though Dave M. on the bow shouted, "We can't tack," the brain trust in the cockpit didn't notice the problem and rolled into a tack. I reached to trim the new jib sheet—and it was gone! Dave had pulled it forward to sort out the rat's nest. Then, to compound the problem, I went forward to retrieve and re-lead it rather than simply advising the skipper to tack back, which we eventually had to do anyway. We dropped 4 boats in the melee and had a quiet last beat, finishing 10th, two from last.

DAVE MCVICKER AND LINDA LOCKWOOD, MEMBERS OF DAVE IRISH'S TEAM, ON WHICH THE AUTHOR SAILED, HAM IT UP FOR THE CAMERA.

We were determined to avoid that fate in the second race, and our Dave-and-Dave combo nailed the start, not far from the leeward end. Looking over his shoulder, Bill realized we could tack and cross the fleet, heading offshore for the better ebb current. One quick tack later and we were in the lead and extending in the right direction. The pressure from then on was simply to do our jobs with precision and manage the course so we didn't overstand the weather mark in the ebb. Our boatspeed was good, although we never felt we could point very well, and we held it together for a satisfying win. This time the pressure was on others. One boat close behind us dropped their spinnaker in the water on the second set. Another lost a man overboard when the jib filled and swept him off the foredeck during a spinnaker takedown (he was quickly recovered, fortunately.)

For the day, Bruce Munro, a Bay area big-boat sailor and past St. Francis YC commodore, was the only one to put together two top finishes, so he led the regatta with 4 points. John Jennings, the defending champ from St. Petersburg, Fla., scored a 6-2. We ended the day virtually tied for third with six other boats at 11 points.

Courtesy of Sailing World Magazine

Perspective

ALL ABOUT MISTAKES AND OPPORTUNITIES

By John Burnham

Everybody makes mistakes in regattas, but learning to seize the opportunities you have can make up for a number of lesser miscues. As part of Dave Irish's J/105 team, I helped make a couple of early mistakes on Day Two of the Masters Regatta, but fortunately we overcame them with a good moves later.

Courtesy St. Francis YC (www.stfyc.org)

WITH LOWELL NORTH TO LEEWARD, THE MASTERS REGATTA FLEET GETS UNDERWAY IN A MILD SAN FRANCISCO BAY BREEZE.

We sailed the first race at the end of the flood tide, so the best course was up the City Front on starboard tack where the ebb tide had already begun. **Mistake No. 1** came after a good start when I saw a ribbon of current sweeping offshore past the breakwater east of the yacht club and didn't suggest a tack. As a result we sailed out of the best current and immediately lost several places.

Mistake No. 2 almost arrived at the weather mark. St. Francis YC signals courses with starboard mark roundings in a flood tide because the fleet wants to go up the left side of the beats and down the right side of the runs. Of course they don't take into consideration the fact that most race-boat equipment is arranged with port roundings in mind. As we got ready to round the first mark I realized that my cabin-top spin sheet winch was being used by Linda for the spinnaker halyard. I looked to the leeward side cabintop winch and realized I couldn't use that either, because it still had the jib halyard on it. So I improvised and loaded the sheet on the primary until the others could help me sort things out. Bullet dodged.

However, as the chute filled after our mid-fleet rounding, I must've been a bit discombobulated because I made the brilliant suggestion that we jibe. Bill said, "OK," and Dave jibed the boat, after which I immediately realized we were heading away from the best of the remaining flood. I turned and asked, "Why did we do that?"

Now we were really struggling and to compound matters, in the lighter airs of this race, we couldn't always sail as deep an angle as we wanted with the spinnaker we'd drawn. It would start to collapse along the luff as it became too depowered, so we fussed with the sail, tightening the halyard and tack line more.

Seizing the Moment No. 1: After letting most of the boats pass us as they sailed toward the right hand leeward gate mark, we crossed all of their transoms and went to the lefthand gate mark to avoid traffic. To our delight, as the breeze subsided, eight or nine of them parked in the ebb tide near the mark. We popped around our mark and suddenly found ourselves in fourth place.

Seizing the Moment No. 2: The easiest way to lose distance on these beat was to overstand the weather mark as the ebb tide began flowing stronger and stronger upwind. As the ebb built for our the second beat, we tacked to leeward and ahead of the second and third-place boats, and surprised ourselves by laying the mark and passing one of them.

John Burnham

MASTERS' SKIPPER DAVE IRISH SEWS A JIB-BATTEN POCKET CLOSED AFTER END-FOR-ENDING A ROLLER-BATTEN THAT WAS COLLAPSING AT THE AFT END.

Seizing the Moment No. 3: Remarkably, the boat in front of us jibed right away, just as we had at the previous weather mark. We put the pedal to the medal and sailed all the way out into the Bay on port jibe into the lesser current, then came in neck and neck with regatta organizer Don Trask to the leeward mark. We held our overlap and stayed ahead of him on the final beat to finish second behind Keith Musto, the British Olympic medalist better known in this country for making great foul weather gear and racing a Melges 24 at Key West.

Mistake No. 3 came shortly after the start of the second race. Since the ebb had now fully kicked in, we knew it would pay to tack right after the start, but we fell victim to the old problem of getting a little too good a start. We had great speed but couldn't shed two boats on our weather side. By the time we tacked, those who had started late and tacked right immediately, such as Bruce Kirby, were launched into the lead.

Mistakes No. 4 & 5: We followed the leaders down the City Front to get current relief, and moved up to fourth place, but forgot to jibe out early enough to set up for the lefthand side of the gate, from where we'd again be sent quickly out into the strongest ebb tide. Our right side rounding and a quick tack didn't hurt us too much, but regatta leader (John Jennings) had jumped to a 100-yard lead. We rounded the top mark in about fourth, this time with a big twist in the chute on our set, which cost us one place. Still, that wasn't the real mistake. The real mistake was back on the City Front where we repeated Mistake No. 4 by taking a costly extra jibe along the shore and locked ourselves out of the left hand gate again. This time, with the fleet pressing in behind, it cost us much more, and we dropped to eighth on the beat, just passing one boat at the finish for a seventh.

Today's lesson was that as our crewwork—and everybody else's—improves, and with the wind slightly lighter on a crowded racecourse, strategy and tactics become paramount.

Courtesy of Sailing World Magazine

Perspective

HOW TO REMEMBER YESTERDAY'S LESSON—THE MASTERS' DILEMMA?

By John Burnham

With one race to sail on Sunday we were 5 points behind John Jennings and 3 behind Keith Musto. Lurking 2 behind us was Bruce Munro. Regrettably, we were on the flat part of our learning curve for this regatta. Dave was sailing the boat very fast, but tactically Bill and I weren't putting it together. Dave jumped out to a great start near the leeward end and came up the City Front gaining on the boats to windward because we were sailing in the stronger part of the new ebb tide, which first gets moving there. At one point we could've tacked and crossed all but one boat. Too bad we didn't, because just as we'd done the day before, we sailed out of the best current by the Golden Gate YC and fell from the front to the back in the blink of an eye. (See Mistake No. 1 in last week's story.) This prompted several reflections on my part.

Reflection No. 1: We challenged after that, but could never fight our way through to the front, which was probably a result of the overall boatspeed improvement in the Masters fleet. Our extra practice may have given us a headstart in our speed and handling on Day One, but by this time most of the boats were even.

Reflection No. 2: We finished the race in seventh, and with Munro winning the race, the consistent Jennings staying out of trouble, and Musto finishing close behind us, we dropped to fourth for the regatta. Where we failed was in developing an ability to execute the best tactics and strategy, which is decisive in any fleet with even speed. As sailors get older and more experienced, with age comes wisdom, but the master's ultimate dilemma is this: it becomes progressively harder to remember yesterday's lessons

Reflection No. 3: Does it matter? Well, it doesn't feel good to let down your skipper when, with a few smarter calls, you know you could've been in the hunt. After all the effort and expense, you hate to do less than your best; but on the other hand, you have to consider the fact that maybe this was our best given who we were as individuals and how we gelled as a crew. With time, you can relax and feel just fine about finishing fourth in any regatta, especially in a regatta such as this considering that there were many outstanding sailors placing behind us.

Reflection No. 4: Does it matter? Of course not. We joined together as a crew to play a game. We did our jobs pretty well, we shared a lot of laughs, the wind was strong, the courses fair. We got to know a fantastic place to sail, and we got to know a fine group of individuals. Most were mellow, the mainsheet trimmer and tactician sitting behind me, for example; some were wired (well, one was wired), that is, the pro ski racer on the bow. I had the pleasure of sitting beside the harpist amidships who pulled all the strings in the pit and would wear her bruises proudly for a week. It was a great education to race on three different J/105s for the week with three different owners—Tom Struttman, Eden Kim, and Jaren Leet. And it was especially a privilege to sail with the man we all began calling, "The Master"—an unassuming Mumm 30 racer and boatyard owner from Harbor Springs, Mich. I'd known Dave Irish from 14 years of US SAILING meetings, three of which he served the sport as president, and I found his easy-going yet lucid manner transferred naturally to a racing boat. In fact, that may be where he developed and refined a style that will draw other racers to sail with him for as long as he keep assembling crews. Hopefully I'll get to join him again.

Courtesy of Sailing World Magazine

Capri 22 Perspective

10 Tips From The 1992 Western Nationals

By Ken Karnes, Fleet #1

After sailing in a light and lumpy Western National Championship this summer, I had some thoughts on some of the critical elements to our team's success. Since victory is often the result of prior planning and preparation, I thought I'd share some of our tips with you.

1. Learn from the Past

After our victory at the 1991 Western National Championship in Coronado, California, I made notes on everything that needed to be adjusted, repaired, replaced or improved on the boat for 1992. After reviewing photos of the racing, for example, it was determined by our sailmaker that the mainsail shape could be improved to create a more powerful all-purpose main. After a four-month testing program with Ullman sails this spring, a new design was created which ultimately swept the first three places at the 1992 Nationals.

2. Learn from Others

As good old Ben Franklin said, *"A fool learns from his own mistakes, a wise man from the mistakes of others."* So what did we learn from others that helped us win in '92? A week before our Nationals, the Santana 20s had their championship in San Diego. Seems the guy who won their first two races got disqualified for not having all the class-required equipment. Needless to say, we checked all our equipment to ensure we met our class rules prior to our first race. As it turned out, our spreaders supplied by the factory were approximately three inches too short. Instead of sailing on (like New Zealand did with their bowsprit,) I immediately got a new set of class legal spreaders courtesy of Frank Butler. As a result, unlike New Zealand, we turned our energies toward winning the regatta, not fighting the legality of our equipment.

Knowing our ocean race course would contain a lot of kelp and seaweed, we talked to a local Star Boat sailor to determine the best methods to remove weeds. Drawing from the J24 class, my crew Chuck Sinks led our spinnaker sheets from the aft sheeting blocks forward to two turning blocks located on the port and starboard stanchions adjacent to the secondary winches. This seemed to keep the skipper from getting tangled up in the spinnaker sheets during jibes and helped us keep our weight forward in the light sloppy conditions.

The design concept for our new mainsail was borrowed from Solings sailing in their world championship. Borrowing from his own experience crewing in an F-27 trimaran, my other crew Bill Hardesty, was able to jibe the spinnaker effortlessly.

3. Sail with the Best

Work and family responsibilities preclude me from racing more than a few times a year. As a result, I rely on my very experienced and talented crew, Bill Hardesty and Chuck Sinks, on an annual basis to get me around the Nationals' race course. If you don't have time to practice and develop a crew from the bottom up, your best shot for success is to find some experienced people you like and count on them to get you around the course. Ask them to sail with you as far in advance as you can. Prepare your boat and sails to the best of your ability, and then get out of the way and let your crew do their thing. Treat them nice, be a good host, and chances are they will sail with you if not often, then at least when it really counts.

4. Eliminate Uncertainty

Anything you can do to make your boat's control lines and other adjustments easier to manage will make your racing more error-free and enable you to spend your time sailing the conditions, course, and competition, rather than trying to get the genoa halyard tension "just right." Remember that control lines with constant tension like halyards should be the no-stretch variety so you can "set it and

forget it." Consider color coding your lines (we use red for main, blue for jib and genoa, and green for spinnaker systems) to make your crew's job easier. Use a laundry marker to mark appropriate halyard settings, backstay tension, etc. so that your crew can consistently produce fast settings in varying conditions, mark roundings, and other sail change situations.

5. Just Steer the Boat

Success on the race course is more likely when every member of the crew knows what their job is and does it. The helmsman should set the example by steering the boat around the course in the most efficient manner. When the helmsman is in control of the boat, it gives the crew the confidence to focus on their jobs without constantly looking back at the skipper to see why the boat is heeling too much, is off the wind, etc… Every time the crew is distracted by a skipper's erratic steering, you can bet the spinnaker will collapse! Fast helmsmen delegate all line pulling, weed clearing, race tactics and navigation to the crew. Just steer the boat, ask your crew a lot of questions, and make steering decisions based their answers.

6. Eliminate Breakdowns

Remember the five "Ps" (prior planning prevents poor performance.) Well, it's true. Keep a list of what needs to be repaired, maintained, or improved and then "just do it." If a competitor breaks down, find out what broke and why. The programmed replacement of parts prone to failure before they break will eliminate breakdowns on the race course and ultimately saves you money. It's cheaper to replace standing rigging every five years for example, than to "risk it" and end up replacing a broken mast and repair torn sails as a result of a upper shroud failure after eight years of use. Learn from your competitors, listen to what your local Capri dealer recommends, and follow the manufacturer's recommendations in the Capri 22 Owners Manual. Our programmed replacement of major parts after five years includes: standing rigging, running rigging, genoa and spinnaker halyard entrance and exit sheave boxes in the mast, rudder pintles and gudgeons, all cotter pins and ring-a-dings. Remember, you can replace it before it breaks or after it breaks, but you're going to replace it.

7. Huddle up in the lumps

The Pacific Ocean conditions at this year's Western Nationals were light and lumpy. The 5 -10mph wind conditions, coupled with a three-to-four foot moderate swell and heavy chop left over from the previous week of stronger winds was a challenge to deal with. The key to speed in these conditions is keeping your boat weight as light as possible for good acceleration off the line, through tacks and jibes and mark roundings, and keeping all remaining weight in the boat out of the ends to prevent the hobby horse action in waves which will stop you dead. Prior to the races, I removed all extra equipment on board not required by the class rules or Coast Guard. From family mode to race mode for us eliminates approximately 150 unnecessary pounds. Having done this, all remaining equipment such as the anchor, life jackets, extra sails, lunches and so on were located in the center of the boat, down low in each locker by the ice chest. We also sailed with three rather than four to keep the boat light. In light to moderate conditions, the skipper and crew always sit close together between the traveler and the secondary winches on the cabin top. Centering your crew weight will significantly reduce pitching movement. Two additional benefits include all crew weight being located at the maximum beam of the boat for more sail carrying power and moving the skipper forward for a better view of the jib luff, water ahead, and other competition.

8. If In Doubt, Let It Out

In light underpowered conditions, sailing in chop or waves, the boat will pitch, which tends to stall out the sails. In an effort to widen the "sailing groove" and keep airflow attached to the sails, we have found it best to ease the sheets more than usual and keep the a lot of twist in the main and genoa leeches. Our best speed and height to weather was with the genoa foot laying against the lifelines and with the genoa sheet lead in the middle of the track to really twist the leech up high. We also used moderate backstay tension to sag the genoa luff. We kept the main leech twisted as much as possible using moderate backstay tension, outhaul and traveler up approximately six inches. The key was to keep the telltale on the leech at the top batten flowing back. While sail testing in these conditions, we were consistently faster using these settings and pinching to weather, versus sheeting harder and footing off.

Going fast "symptoms" in these conditions include a genoa which luffs at the top first rather than evenly, only minor genoa backwinding on the main, and a dancing telltale on the main leech at the top batten.

9. No Excuse To Lose

Dennis Conner wrote the book on this one. Tell me what your excuse is and I'll tell you why you don't do better. Make a list of your usual excuses for not doing better, and then determine what you can do about it this winter. I've already made my list, developed and action plan to address some problem areas, and am confident I can improve my performance next year. How are you doing?

10. Enjoy The Process And Live With The Result

If you sail competitively for long, you have to learn to enjoy the preparation for and process of racing. Given you make a reasonable effort, the race results are secondary. Remember someone out there is always faster on any given day!

Ken Karnes is a member of MBYC Capri 22 Fleet #1 and was Capri 22 National Champion in 1992, and Regional Champion in xxx.

Capri 22 Perspective

Capri 22 Windward Sail Trim

By Larry Brethorst, Capri 22 #450

The key to success in the Capri 22 is to be able to change gears in changing weather conditions.

The Capri 22 is a very easily driven boat that quickly responds to sail trim and rig adjustments. The sailing that we do in the Midwest is, for the most part, on inland lakes with associated flat water. The sail inventory we used in the Eastern Nationals was made by Morrelli Sails, Ventura, California. It consisted of a light air 155% 1.3 oz. Kevlar genoa; a heavy air 155% 2.7 oz. Mylar genoa; a mainsail of 3.7 oz. Mylar; a tri-radial spinnaker of .4 oz. Mylar; and ¾oz. Nylon tri-radial spinnaker.

Mast Rake
One of our main objectives in tuning the mast is to achieve proper helm. The amount of mast rake is determined by the amount of helm the boat has. In light air the mast should be raked slightly to give the helm a positive feel. With the wing keel boat I am sailing, the mast is in a nearly straight up and down position. You will have to experiment with mast rake to achieve the proper helm for your individual boat and sails. Remember the proper rake should give a slight amount of weather helm in light air and should be without excessive amounts of weather helm in heavy air.

Pre-Bend
The amount of pre-bend again depends upon your boat and sails. On my boat I am inducing about two and half inches of pre-bend in light air. With the backstay completely released, this will give you maximum headstay sag. The primary way to adjust the amount of fullness in your headstay is by increasing or decreasing headstay sag (using the backstay or mainsheet.) Make your headsail fuller in lighter air and flatter in heavier air. The headstay sag will make the genoa fuller for light air. The pre-bend also flattens the entry of the main. If there are excessive amounts of backwind in the main in the light air, there probably is not enough pre-bend. The pre-bend is accomplished by tightening the upper shrouds and in turn compressing the mast to get the pre-bend. A good sign that the uppers are tight enough is that the leeward upper is not noticeable loose when the boat is heeled over. The lower shrouds will have very little tension for this light air setting. As the wind begins to pick up, the lower shrouds are tightened to prevent the mast from overbending as you pull on the backstay.

If the lower shrouds are not tightened enough in heavier air and you pull hard on the backstay, the overbending of the mast flattens the mainsail too much without tightening the forestay. The lower shrouds are preset at the dock depending on the wind. If you do not want to continually adjust your shrouds, use one of the middle settings.

Capri 22 Shroud Tensions
Pre-Bend of 2.5 inches

Wind (MPH)	0-7	8-15	15+
Shroud tension, upper	42* 420 lbs.	44* 520 lbs.	45* 600 lbs.
Shroud tension, lower	15* 120 lbs.	26* 220 lbs.	32* 300 lbs.

*Measurements made by Loos Model A Tension Gauge

Genoa Trim

A very important adjustment is the genoa halyard. Don't over tighten the halyard. It is better to keep the genoa luff too loose than too tight. By keeping the genoa luff loose, the entry of the sail remains flat, which allows for high, fast sailing.

The next adjustment we look at is the fairleads. As you head up into the wind, the genoa telltales should break evenly. It is better to have the lead too far back than too far forward. The foot of the genoa should be close to touching the shrouds at the bottom before the sail gets too close to the spreader. The amount of sheet tension is critical on the Capri 22. Place a set of reference marks on the spreader so that the crew member trimming the genoa has a reference point.

The adjustment of the backstay is very important. Loosening the backstay powers up the genoa, allow you to foot faster; tightening the backstay improves your pointing ability as well as depowering the boat. It is very important in light air to induce a lot of headstay sag, which in turn powers up the genoa. As the wind picks up, you will start to pull on the backstay to remove the fullness of the genoa. Try to maintain the draft in the genoa about 40 to 45% from the luff.

Main Sail Trim

Again with the mainsail, don't over tension the halyard. Speed wrinkles coming from the luff of the main can be very fast. The draft of the sail should be about 50% from the luff. As the mast is bent, the draft will start to move aft. Use the cunningham to move the draft back to the center. As you tension the cunningham, the draft moves forward and the leech opens up.

The outhaul controls the fullness of the lower third of the sail. In very light air the outhaul is loosened to open the shelf of the mainsail. As the wind picks up, pull on the outhaul until at about 10mph, it is pulled out to the band.

Trim the mainsheet hard enough to make the top batten parallel to the boom. In light air, the top batten should twist off slightly.

Heavy Air Techniques

In heavy air, use the backstay to flatten the main. Pull the backstay until overbend wrinkles just begin to appear. Remember to readjust your mainsheet after pulling hard on the backstay. As the backstay is pulled hard, the draft will move aft, so readjust the cunningham to move the draft back to the 50% position. If your main has a flattening reef, use this adjustment to further flatten the sail.

The boom vang is not used upwind until about 15 knots of wind is reached. The vang is tightened until at about 20 knots, it is very tight. The vang tension helps bend the mast down low, which flattens the lower part of the main. It also allows you to play the mainsheet in a strong puff without losing leech tension.

Traveler

When beating to weather, the main traveler likes to be adjusted to weather one to six inches when sailing with the 155% genoa. Keep the boom centered in light to medium air. In heavy air the boom should be slightly to leeward.

Larry Brethorst is a two-time Capri 22 Eastern Champion.

Capri 22 Perspective

Blade Runner

By Ken Karnes, Fleet #1

Ever wonder why your Capri 22 has jib sheet tracks on top of the cabin? Having trouble seeing where you're going when the 155% genoa is flying? Do your passengers frequently get hit in the face by flying elbows when the crew is sheeting in the 110% or 155% genoa using the primary winches? Does your mate often complain about the endless effort involved in hauling in yards of jib sheet when short tacking down narrow channels? Does your spouse often ask why you must heel the boat over so much when beating to weather when he/she wants a flat platform to make lunch? Tired of rolling or folding your big headsail?

If you answered yes to any of these questions, you might consider blade running. A blade is a 100% high aspect jib which sheets on the cabin top. The sheets are run to the secondary winches on the cabin top. Since the 100% blade's clew is only about 10" from the jib sheet fairlead, short tacking is easy, as from tack to tack you only sheet about two feet of jib sheet. With so little sheet to handle, a well-timed tack, even is a breeze, can be accomplished without using a winch handle. The cabin top sheeting gets the jib trimming crew out of the paying passengers way, since he/she can stand or sit in the hatch area. The blade significantly increases visibility forward for increased safety and passenger enjoyment. Couple sailing is also much more fun since the boat heels less and there is less need to luff the main to keep the boat level without your usual 600 pounds of racing crew on the rail. Even better, a 100% blade costs 50% less than a 155% genoa. By using the blade for cruising activities, your genoa can be saved for race days and will last significantly longer. Capri 22 sailors with the 110% overlapping jib might consider having their sailmaker convert this sail into a 100% blade. The decreased sail area is insignificant compared to the convenience of easier tacking with shorter jib sheet runs, and chest high secondary winches. Since the Capri 22 main is quite large (about the same size as a Catalina 25 main,) my wife and I have found the blade to be almost as fast as the genoa in light air/flat water. When sailing with just the two of us, the blade is much faster and higher pointing in winds over 10 knots to weather. On light air reaches the genoa is better. When broad reaching and running the blade can be made to wing using the spinnaker pole or we just use the spinnaker.

To conclude, if you ever wish your Capri 22 has a self-tacking jib, or was easier to handle when sailing as a couple, consider the option of the 100% blade. It can make your sailing experience easier and more enjoyable.

Capri 22 Perspective

Sailing A Capri 22 in PHRF

By Steve Ross, Fleet #1

With the Capri 22 being a relatively new production boat, many people purchase a boat in hopes of a fleet developing in the future. Until the fleet develops, the new owner gets the desire to go racing. So their alternative is to race in a handicap system. Generally, there are three handicap systems available for this size boat, they are Portsmouth, Performance Handicap Racing Fleet (PHRF) and Midget Ocean Racing Conference (MORC.) The most common handicap system around the country is PHRF.

The current PHRF handicap in Southern California is 210, but the rating may vary around the country. In order to obtain a rating, you must fill out an application and mail it to your local PHRF Board. The application can be picked up at your local Capri dealer or sailmaker. After the Board receives your application, they will assign you a rating.

The class rules in regards to the sails comply with PHRF rules, so you will not have to purchase any additional sails to be competitive. If you make any deviations, such as an oversized spinnaker or genoa larger the 155%, you must inform the local PHRF Board. Depending on what changes are made, a penalty will be added to the rating. Since the Capri 22 sails well in light air, I feel there is not a need to add any oversized sails to the sail inventory. By making fewer mistakes than your competition on the race course you will make up more than three-six seconds per mile.

As for safety equipment, there is some additional equipment that you are required to have on board. There are four different categories depending on the type and distance of the race.

Charlie Starr from Coronado Yacht Club has been racing his Capri 22 in various PHRF events with great success. Charlie has found the Capri to be competitive in all conditions on all points of sail. This is very obvious by his results in the Charity Bay Race where Charlie was the smallest boat in his class, and finishing first with the second boat barely in sight at the finish. Charlie is also leading his class in the Coronado Yacht Club High Point Series. In addition, Charlie placed second overall, missing first place overall by seven seconds. His class consisted of an Andrews 39, Morgan 45, Olson 40 and many other boats.

Steve Ross is a partner is Ullman Sails, San Diego, and a member of the MBYC Capri 22 Fleet #1.

Capri 22 Perspective

Setting up and racing a Capri 22

By Ivan Andrade – Capri 22 *Tempus Fugit*, (*time flies)*

Even though I wanted to optimize the setup for race, I still wanted to be able to single hand the boat reasonably easily and also use the boat for lessons for ASA keelboat certification. The changes cannot be listed in order of importance because each change requires adaptation in another area. Even so, I can still identify the new main from Ullman Sails and proper weight distribution as the two changes that had the most profound effect. The boat is a 1995 Capri 22, fin keel tall rig, hull # 768 which I purchased in May 2002.

A new Dacron mainsail from Steve Ross with Ullman Sails (U.S.) to replace what appeared to be the original main. I made many of the other modifications prior to receiving the main but it had a most profound effect on all aspects of upwind performance. Prior to spending the $1250 for the Ullman, I purchased a slightly used J 24 main for $200. It has the same P & E as the tall rig Capri but has a fuller cut to the luff. I use the J 24 as my daily beater sail and keep the U.S. rolled up and bagged.

The forestay is set at max length for light to medium conditions and shortened as pressure builds with turnbuckle. This increases rake of mast dramatically and if the boat hasn't been set up like this before it will take some getting used to because the boom will be about 3" to 4" lower at the clew end. I run with 12" to 14" of sag in the forestay in light conditions and play the backstay primarily to adjust the shape of the headsail. The maxed forestay length increases pointing ability in light conditions. As pressure builds the backstay does help to flatten the main and open the leech by inducing more bend in the mast in the upper half but I feel the primary purpose of the backstay is to tension the forestay. When the pressure builds to 15 knots I use the vang to induce prebend in the lower portion of the mast and depower the lower 1/3 of the mainsail.

Unfortunately, most if not all roller furling systems depend on a tight forestay to operate properly and I removed my Harken Profurl II double track system to get better rig tuning. I agree with Steve Ross of U.S. that the Capri 22 and all non planing small keelboats operate best with hanked on headsails. Another reason to not use roller furling is weight aloft. The pitching of the boat in waves and chop was dramatically reduced when I removed the furling system.

The backstay tensioner purchase has been increased to from 3:1 to 12:1 and is run to both sides of cockpit combing cleated in front of traveler angled forward at 45 degrees. This placement allows trimmer or helmsman to apply backstay as needed.

Main halyard still runs through factory installed mast base sheave to port and through factory installed double cheek block on cabin top. It then goes through a cam cleat on a 1" riser about 8" aft of the cheek block placed between the inboard jib track and the hatch rail. The tail of the main halyard is stowed under itself next to the mast and velcroed in place. It is a compromise position. If I only raced the boat I would have the mainsheet exit the mast about 84" up and wrapped on a horn cleat about 18" above the cabin top. Since I use the boat for instruction and daysailing I still want the main halyard lead to the cockpit and cabin top winches if needed. The original placement was real close to the port cabin top winch which was an absolutely horrible place. The tail of the main sheet got caught up in everything including itself and a few jammed sheets on tacks is all it took for me to move it.

The primary rig tensioning I use for setting up the initial mainsail shape depending on conditions is upper and lower shrouds. I follow the U.S. guide for rig tension that is found on their website, www.ullmansails.com, but keep my uppers a little tighter in light air and a little softer in heavy air and my lowers a lot looser in light air and a lot tighter in heavy air. I use the lowers to control the column of the mast. I theorize and observe improved performance in light air up 7 knots. The top of the main should not flex away but the mid portion of the mast column should flex away mimicking forestay sag but still maintaining prebend of 1". This keeps the main powered up even in slight lulls. If the race

holds more pressure I adjust the relative tensions of uppers and lowers to induce 1.5" to 2" of prebend then test sail closed hauled. I get the prebend of the mast to rotate into the wind. Crew or I sight the mast underway to make sure the rig tune is having the desired effect. In light to medium conditions I run a relatively flat main with as little twist as possible. To attain this I keep some small 3" long horizontal luff wrinkles by not hauling too hard on the main halyard. I use the cunningham sparingly to control the position of the draft of the main. I keep the outhaul pulled fairly flat. The only time I let the outhaul out is when I'm power reaching. I keep the outhaul flat even down wind. I use mainsheet and traveler equally to control mainsail twist. When tacking I open leech slightly to induce flow by easing the mainsheet slightly on a centered traveler. As the boat starts to power up on the new tack, I trim the mainsheet tight and start drawing the traveler up. I don't have any preset positions for the mainsheet or traveler, I just look at shape and flow off the leech of the main, (tell tales breaking 50% of the time) and the feel of the tiller.

I try to induce a few degrees of weather helm. A totally neutral helm means there is no angle of attack in your underwater foils and your not getting any lift to weather from them. Induced drag increases at less than .001% while induced lift increases by 2% with angle of attack of 3 degrees for a symmetrical foil such as a keel or rudder. At low angles of attack a symmetrical foil such as a keel yields the best lift to drag ratio but it is not utilized on a keelboat without a small amount of weather helm. This weather helm is generated by dynamic center of effort being slightly aft of the dynamic center of lateral resistance.

Vang purchase has been increased to 8:1 by adding a doubler block. Mainsheet purchase has been increased from 3:1 to 4:1 with an inverted cam cleat for ease of release when helmsman is on the rail. I pull up to release the mainsheet. The traveler purchase has been increased from 2:1 to 3:1 with its cleat on the cockpit combing angled forward matching the backstay tensioner. Tiller extension is long enough so that helmsman can sit hard against the lifelines 6" in front of the traveler. Outhaul cleat is the original placement of a clam cleat on the boom. Topping lift is not utilized and the in-boom portion is just tucked into the boom with the masthead portion removed. In boom cunningham has been abandoned and reinstalled as a simple 2:1 tied off at goose neck turned through a small block attached to a hook and cleated through a clam cleat just below the boom in the mast luff track. Changes in purchase are to allow subtle and incremental adjustments of control lines while boat is being sailed hard. Backstay and traveler are lead forward of traveler to keep weight out of the stern and put controls close at hand when boat is being sailed hard.

The headsail trim requires good communications and crew work. I am using a dacron 5oz. 150% genoa that was installed on the roller furling system but has had hanks installed. It's not a great sail but honestly there is so much power in the main that I use the headsail just to keep the boat balanced, pointing and powered up. I do plan on getting a 155% from Steve Ross at U.S. next spring but cash is an issue. I look for a fairly even break in luff tell tales and adjust halyard, backstay and jib car placement to attain desired shape and break. I will direct the crew to continually adjust car placement, halyard tension and backstay tension on one windward leg if conditions are extremely variable. In light and fluky conditions the jib sheet is never cleated and the sheet is continually played for optimum shape and flow. This obviously takes constant communication between helmsman, tactician and trimmer but is worth the effort. I keep 1/2" scallops between the hanks in light conditions and remove them as pressure builds with the jib halyard. I will be installing a jib cunningham this winter to aid in trimming the jib. Using just the jib halyard has undesirable effects on the shape of the upper portion of the headsail, closing off the leach and requiring too much dinking around with the jib cars to get the shape right. I will be installing a downhaul that will run through the port side fairleads (formerly for the roller furling) to get the headsail down to the deck when singlehandling.

The jib halyard exits the mast through the starboard mast base sheave then around the factory installed doubled cheek block with a cam cleat on a 1" riser then through a carbo block with a standup spring. This setup allows the bowman or any crewmember to hoist the headsail and keeps the tail end of the halyard away from the cabin top winch. Having the cleat blocked up makes it easy to get a hand under the halyard and trip it for rapid drops of the headsail. I really like this setup. I got the idea from Jamie Downing on the Capri 22 website.

Weight and its distribution is extremely important to up wind performance of the Capri 22. For regattas of any concern, I stow the outboard in the vee berth and replace the standard lard ass battery with a motorcycle battery. The standard battery location in the first generation boats was just behind the cooler/step which isn't too bad. At least it's down low and near the middle of the boat and doesn't exacerbate pitching in waves and chop. The new "improved" location is in a locker at the stern of the boat. Imagine a 130lb ape hanging off the stern of the boat pumping up and down as your trying to claw your way to the weather mark. That's what it's like having the motor and battery in the stern. The boot stripe is a pretty good indicator of fore/aft trim. It's easier to sense lateral trim of the boat than fore/aft so you may have to have someone look at or photo your boat underway from both sides to see how your boat is trimmed. Up wind in 5 knots all crew is on the low side with helmsman low as well. Bowman is right behind the shrouds. Trimmer is sitting abeam of companionway and helmsman is in front of the traveler by at least 6". If there is any more crew, stow them below to reduce windage and potential for pitching. I have found in light conditions the boat performs best at 12 to 15 degrees of heel to leeward. Less wetted surface area/parasitic drag, the hull form acts as a foil lifting you to weather, the flow of air is diagonal across the sail increasing lift and the weight of the sails keeps them in a foil shape enhancing lift in the slightest breeze. Light air sailing requires tremendous concentration and patience, attributes my crew and I have yet to fully develop. As pressure builds each crew member goes to the high side starting with the helmsman, followed by the trimmer then the bowman and then any additional crew.

I aggressively roll tack the boat in light conditions utilizing the hull form to carve the turn with coordinated and minimal tiller movement to get the boat through head to wind quickly but smoothly and use crew weight to set the boat quickly on the new angle of heel quickly. I keep the jib backed 10 degrees past head to wind to get the bow around and the trimmer then rapidly sheets standing above the block pulling up. A good tack for the trimmer gets the headsail around inside the lifelines without having to skirt. As pressure builds this technique becomes more and more important. At 10 knots of breeze the trimmers last pull on the sheet should be from the high side to the windward cabin top winch that is blocked up to prevent overrides with two wraps and into a cleat on the side of the cabin. As the boat powers up the last 2 or 3 inches of trimming is done with a winch handle. I have two winch handle holders installed on the washboard rails and a lightweight handle in each one. This location allows the trimmer to grab the winch handle from the high side. With the cleat on the side of the cabin top, the bowman or other crew can tail and cleat while trimmer winches. The use of cabin top winches and cross sheeting keeps the weight centered fore/aft prevents the helmsman from getting involved in anything but driving the boat and trimming the main.

I replaced the standard jib blocks with 2" Ronstan equipped with stand up springs. The standard units create a tremendous amount of drag especially when attempting to cross sheet. I would like to try out Harken Ratchmatic (http://www.harkenstore.com/uniface.urd/SCCYSPW1) or Lopez blocks (http://www.layline.com/shop/product_information-1.asp?number=J24LBL) but once again $$ is a limiting factor. Maybe there is a J 24 sailor out there that is disgusted with his Lopez blocks and will sell cheap.

Every change and technique so far is aimed towards upwind performance and has yielded approximately 14 patched holes but has not overly compromised the day sailing and single handing characteristics of the boat.

Downwind performance enhancement has resulted in 18 patched holes on my boat with no effect on day sailing or single handing capability. I have stripped off every fitting that lead spinnaker control lines to the cockpit. I flew the chute with my wife at the helm and only myself as crew before I made any changes to see if the lines lead aft setup was worth keeping. It's possible but not real efficient. In defense of the lead aft concept I would say if the boat was cruised or daysailed in an area where you could stay on one jibe for several hours with steady pressure then its worth keeping. Since the boat is never sailed in Make Believe Land with steady pressure from one compass heading 24/7, lead aft does not work real well. I have crewed or helmed J 22 & 24, Merit 25, Wavelength 24, T 10, Catalina 22, Capri 22 and 25 and Hunter 26.5 over the past few years and not one of the competitive boats had halyard, topping lift, foreguy lead to the cockpit.

As a system my boat is most similar to the J boats. It can be run very well with three people but a forth may help with pre-feed, topping lift and foreguy. The chute is launched from a suspended bag in the companionway out the port side over the closely trimmed port jib sheet and under the boom. After the bowman has 'made' the pole to the starboard guy and mast and set the topping lift and foreguy on the wide and fast approach to the mark, the trimmer leaves the jib sheet cleated on port, trims and cleats the starboard twinger and gets in the pit to feed the chute out as the helmsman pulls on the starboard guy and the bowman helps with the pre-feed. As the mark is approached the helmsman calls for the hoist and the bowman gets the halyard up quickly. The trimmer immediately begins trimming the chute to get it filled and pulling coordinating with the helmsman for direction to keep pressure in the chute. The bowman reaches down and trips the jib halyard and moves quietly but quickly to get the headsail down and stowed with bungee and Velcro in the pulpit. As soon as the foredeck is clear then the bowman gets behind the mast and uses weight to trim boat. Bowman looks aft for pressure as well as indicating time, bearing and distance to competitors. Trimmer doesn't look aft and helmsman doesn't look aft. Their jobs are to fly the chute and keep the boat moving fast with the input from the bowman. This is a stereotypical set used by many boats. To make it work efficiently requires practice and gear in the right places.

My boat is set up with the spin halyard exiting the mast on starboard 94" above the cabin top with its cam cleat 14" below. Since marks are left to port in the vast majority of fleet racing then it makes perfect sense for the bowman to be on the starboard side of the boat when hoisting the chute. This configuration allows a wide height range of foredeck crew to jump the spin halyard quickly. The topping lift, foreguy and jib halyard are right on the deck nearby so no footsteps are needed by the bowman to reach them for adjustment. Adjustments to pole height, halyard height and foreguy tension are called to the bowman by trimmer or helmsman. No one moves around a bunch to get their jobs done. Any motion other than forward just slows the boat down except when jibing. I roll jibe the boat aggressively with little or no input from the rudder. Any angle to the rudder more than 7 degrees just causes drag and downwind is where this boat really gets up and kicks it. I sail fairly hot angles to keep the boat moving but constantly adjust based on input for tactical considerations as well as pressure felt by trimmer and witnessed by bowman.

The gear placement is as follows: twinger fairleads are installed at base of lifeline stanchions adjacent to companionway bulkhead with cleats on same bulkhead facing in. I do not like this set up. It forces me to use the foreguy all the time to prevent the spin pole from lifting. I will be placing the twinger fairleads 12" to 16" aft of the mast on the toerail with cleats on the side of the cabin so bowman or crew can adjust and not bother the trimmer. Topping lift runs through a block attached to the mast base and turns to starboard through a fairlead at 45 degree angle to aft. The cam cleat for the topping lift is on a 1" riser 1" in front of the fully opened cabin top. The foreguy is lead to a block on the same bale as the block for the topping lift at the base of the mast. Its routing and cleating are the same as the topping lift. I have removed the standup block assembly at fairleads that used to make up the factory race package foreguy assembly.

I am not extremely concerned about stretch of less than 1% when fully loaded. Most of the line installed is so overkill in the department of load for size that stretch becomes less of any issue than lines other requirements. I like lines that don't throw knots. I like lines that come in wild colors making it easy for the crew to figure out which is which quickly and accurately. I like lines that feel good in hand. I probably even have some nylon line mixed in there somewhere but it has not slowed the boat down as much as mixing up the spin halyard for the topping lift as an example.

I had hoped to get digital photos out with this but it's 18 degrees outside right now with a chilling effect on many photo finger. The boat is covered in ice right now so its going to have to wait. I hope this is helpful but is probably rehash for the experienced racers out there.

Rigging and Cordage

Cordage

- ☐ **Line Demystified** By Phil Garland and Scott Ferguson, Hall Spars
- ☐ **Capri 22 Rigging** By Rey Newman
- ☐ **Getting a line on cordage** by Jeremy McGeary
- ☐ **Getting the most out of High-tech line** by Jeremy McGeary

Study HALL

Line Demystified

Lessons from the America's Cup: An Overview of Cordage and Standing Rigging

By Phil Garland and Scott Ferguson

State-of-the-Art

As in every other America's Cup to date, some interesting and significant technical advances were made in standing and running rigging, both in materials and in their use. Though these advances were mostly incremental improvements on existing materials, they nonetheless have been improved tremendously through the many hours of rigorous testing and use in the demanding AC environment. With boats, sails, and spars reaching unprecedented stiffness, these demands on the rigging were harder than ever, and the trickle-down effect on applications to the Grand Prix market should be seen soon as the AC personnel filter back into non-AC programs.

Similar to any other component part on the boat, the criteria used by each syndicate in its selection of materials was based not only performance, but also on reliability and, in some cases, cost. Only one new and exotic fiber (PBO) was considered in a variety of applications, with most riggers opting for fiber types with which they had some confidence and familiarity. On the materials side, most of the new variations in cordage focused on improvements in cover materials and braid styles of core and cover, while some new and interesting applications of these varied according to each teams' needs.

It is also important to remember that for both standing and running rigging, the terminus of the line segment - whether it's a shackle, a winch, an eye splice, or a toggle - will be equally as important as the line itself. Most of the failures that occurred were not in the line segment, but at either of its ends.

High Tenacity Fibers Common in Current High Tech Lines

It's useful to first review the relevant characteristics of each of the fiber types used in cordage:

- **Vectran**, a polyester-polyarylate, or liquid crystal polymer product of celanese acetate, is a good all around fiber with high break strength, low creep, good abrasion resistance, high melting point and low moisture retention. Standard color is gold.

- **Kevlar**, a para-aramid fiber by DuPont, is a high-strength yellow material with low creep, moderate abrasion resistance, and some moisture retention. While Kevlar does not melt, its UV resistance is moderate.

- **Technora**, a para-aramid fiber from Teijin Ltd., is a gold fiber that is also available in a black finish to help UV resistance, has high break tenacity, low creep, and good abrasion resistance. Technora does not melt.

- **Spectra**, an ultra-high molecular weight polyethylene (UHMWP) by Allied Signal, is a white fiber often treated with various finishes to color and bind it together. It is high-strength and has excellent

abrasion resistance. Spectra has zero moisture regain, a low melting point, and moderate creep properties.

• **Dyneema**, a UHMWP fiber from DSM High Performance Fibers, has similar properties to Spectra and is generally available in European rope.

• **Zylon** or **PBO** (poly-phenylene-2, 6-benzobisoxazole) is a rigid-rod lyotropic liquid crystal polymer developed by Toyobo Co. Ltd. This gold fiber has excellent tensile strength and high modulus, very low creep properties and does not melt. It has moderate abrasion resistance and low moisture regain. The fiber's UV resistance is listed as moderate, however it apparently degrades in available light and prior to manufacture into rope must be stored in the dark.

It's relevant to note that many of the rope manufacturers perform additional processes to the fibers before or during line construction to enhance durability, moisture regain, break strength, and elongation. For example, Yale Cordage in the U.S. has developed many coatings that enhance abrasion and UV resistance, while Maffioli Cordage of Italy has developed a treatment for Dyneema 75 that improves tenacity and elongation properties.

Although Spectra and Dyneema often get a bad rap for "creep" or elongation under constant load, the amount of creep is moderate, and at normal working loads (15-25% of break strength) it is probably not an issue. Its excellent durability and strength are values that allow for successful use for about 80% of the running rigging needs on a top-level race boat. Vectran or Technora would be the best choice for higher-loaded halyards when the best stiffness is required.

Line Construction and Material Usage

As noted above, many of a line's performance properties will depend greatly on its construction and use in particular applications. Examples from the America's Cup include the following:

• **V-100 (New England Ropes) and Crystalyne (Yale Cordage)** - A double-braid line with Dacron-polyester cover over a Vectran core. A high strength line used for sheets, guys, halyards, and control lines. Vectran is a good choice with many good qualities, but has some abrasion issues that requires attention to a replacement or resplicing schedule to prevent flex-failure.

• **Yale Tail (Yale Cordage)** - A specialty double-braid line with Dacron/polyester and Kevlar cover over a Vectran core. A very durable and high-strength line used for runner whips, jib sheets and spinnaker sheets. The cover is a unique construction weave that has excellent abrasion resistance and was very suitable to the high loads on the Cup boats. This line was used by America One and Young America among others, and tried out by Prada and Team New Zealand. A similarly constructed product appeared on Team New Zealand for the Cup, and may have been made by their rope supplier, Southern Ropes. (Tom Yale of Yale Cordage was flattered, but admitted he did not make the look-alike product.)

• **Pobon (Yale Cordage) or ZZ (Maffioli)** - A specialty double-braid line of Zylon (PBO) core with polyester cover. The lowest stretch and most expensive line with the highest break strength of any of the commercial products. It has poor abrasion over sheaves and needs to be replaced/shortened often to prevent sudden failure. Young America used Pobon for afterguys.

• **T-900 (New England Ropes) and DZ (Maffioli)** are composite ropes blending Spectra or Dyneema with Technora or Zylon in the core and a polyester cover. Durability of this line is enhanced by blending the abrasive, low creep fibers with the UHMWP fiber.

• **DSK 75 Race (Maffioli), Maxibraid Plus (Yale), Spect-Set II (New England Ropes), among others,** are double braid, Spectra/Dyneema cored, polyester covered lines that are often tapered to give the lightest choice for halyards and sheets. The excellent strength and abrasion resistance of Spectra/Dyneema makes it one of the best values of the high tech ropes. The treated Dyneema 75

Ultra by Maffioli has higher break strengths than Vectran with improved creep over the standard Spectra. Prada relied on the enhanced Dyneema for most of their running rigging and had perhaps the most unique product in the competition, utilizing a PBO-covered Dyneema 75 for the highly-abused runner whips, jib and spin sheets. The PBO, although not contributing to the overall low stretch of the line, was the most lasting of the covers around the winches under high loads.

• **Single Braids:** There are many versions by various builders of Spectra, Dyneema or Vectran single braid (no cover) lines that are used to replace wire as rig or hardware controls or used as strops or lashings to attach blocks and hardware instead of metal bails and shackles. The advantage is lighter weight, less wear, and better articulation. These lines are typically not handled directly as they have poor grip. The benefits of the Spectra and Vectran lashings, strops etc. have been realized by BOC/Around Alone, Whitbread, and IMS boats for some years now, but Young America was probably the first to use Dyneema to connect the Headstay (-60 rod) to the mast. Using a purpose-built eye on the rod, 6mm Dyneema was used to essentially lash the headstay to the spar, allowing the best articulation and replacing an abrasive metal-to-metal connection. There were a minimum number of passes required and care in assuring that all the parts shared the load equally. Take note that this is NOT currently allowed under IMS.

• **Swiftcord (Maffioli)** is a single braid Dyneema 75 with an additional synthetic material added to improve handling. This is used primarily as control lines when the requirement is for a line that runs through blocks well, is strong, light, non-kinking and needs to be adjusted by hand. The water regain is virtually zero, but can be improved by soaking in McLube Sailcote. This product is currently used as sheets and control lines on Olympic classes and larger keelboats.

Note that with most AC boats using halyard locks for the jibs and mains, the need for super-low-stretch in the halyards was not as important, since the tail material had just sufficient strength in the event of a lock failure. The narrow AC boats with their big asymmetrical spinnakers required very low-stretch afterguys, and PBO was the best choice to keep the pole stable. PBO was also best for rig control lines, such as checkstay pullers, to both minimize weight and stretch. For many less-endowed syndicates, Spectra or Dyneema was the best alternative for durability and value.

Standing Rigging

The standing rigging for the latest generation of AC boats was not significantly different than that used in previous competitions. There were, however, some new types of fittings to attach the rods to the mast, and some optimized spreader-end tip cups. In number, there were actually less rather than more of these fittings, since the simpler rig systems had fewer spreaders and thus fewer rods. The Kiwi's X-diagonal system, for example, may have reduced the diagonal loads and some mast compression.

One significant advance was the use of PBO for running backstays, which resulted in much less stretch for a given size compared to Kevlar. The traditional Kevlar terminals did not work well with the PBO fibers, so a special process of winding the fibers continuously around reinforced thimble terminals was used to produce the flexible stays. This also required new attachment methods with the thimbles connecting to a "bollard" on the mast.

Although many other performance boats outside the AC arena have used the soft Kevlar stays, it is not likely that PBO will have wide acceptance due to its questionable reliability. There is, however, currently a new type of Zylon being tested that is supposed to have improved abrasion resistance, so it will be interesting to see what the results are as its put through the development process. We may see it prove more reliable for use in standing rigging rather than as cordage which is turning corners and going over sheaves.

Capri 22 Rigging

Factory specs and suggested replacements for serious racing

By Rey Newman, Fleet #1

The cordage provided that comes with the Capri 22 is adequate for basic sailing. However, for racing purposes, the standard cordage is oversized, stretchy, heavy and water absorbent. You plan on doing any serious racing, it is highly recommended that you upgrade your rigging with better quality lines.

Below is a one set of recommended replacement lines, based on Samson Rope products.

Description	Length	Original	Replacement
Halyards			
Main	64'	5/16" Low Stretch	1/4" Validator SK tapered[1,2]
Jib/Genoa	57'	5/16" Low Stretch	1/4" Validator SK tapered[1,2]
Spinnaker	60'	1/4" Low Stretch	1/4" Validator SK tapered[1,2]
Sheets			
Main	45'	3/8" Dacron	3/16" Lightning Rope w/ 5/16" Trophy cover[3]
Jib	40'	3/8" Dacron	3/16" Lightning Rope w/ 5/16" Trophy cover[3]
Genoa	55'	3/8" Dacron	3/16" Lightning Rope w/ 5/16" Trophy cover[3]
Spinnaker	50' (x2)	5/16" Dacron	3/16" Lightning Rope (covered or uncovered)
Control Lines			
Backstay Adjuster	28'	3/8" Dacron	1/8" Tech-12**
Main Cunningham	10'	1/4" Dacron	1/8" Spec-12
Main Outhaul	4'	1/4" Dacron	1/8" Spec-12 tapered, w/ 3/16" cover[3]
Main Traveler Control	8' (x2)	1/4" Dacron	3/16" Warpspeed
Boom Vang	28'	5/16" Dacron	3/16" Vectran or Tech-12
Reefing Line	17'	1/4" Dacron	1/8" Spec-12 tapered, w/ 3/16" cover[3]
Pole Topping Lift	40’	5/16” Low Stretch	3/16” Lightning Rope
Foreguy	25’	5/16” Dacron	3/16” Lightning Rope
Backstay Adjustable	26’ 6”	5/32” Wire	1/8” Tech-12
Backstay Purchase	7’ 8”	5/32” Wire	1/8” Tech-12
Backstay Safety Pennant	3’ 9”	1/8” Wire	1/8” Tech-12 or Spec-12

Notes:

1. You can use Validator SK, Validator II, Litespeed, or Warpspeed. All of these lines are taperable and the cores are color coated to match the flecks (striping) of the cover.

Samson Ropes Validator SK

2. A tapered line is a line whose cover has been stripped for some length of the line, leaving the core bare for that part of the line. The remaining cover is then tucked into core and whipped, producing the "taper". A tapered line allows you to reduce weight where it is not necessary (i.e.: the portion of the halyard inside the mast when the sail is fully hoisted) while the remaining cover provides good handling. For the Capri 22 halyards for instance, hoist the sail, mark the halyard at the mast exit sheave, and strip from the mark to the top of the halyard.

3. Using a high-tech line for some of the control lines means that you can downsize the line quite significantly. But smaller diameter lines can be difficult to handle and may not clutch well. One approach is to taper a line (see 2 above) and another approach is to cover a line with an inexpensive cover. For instance, for the mainsheet, you can use 3/16" Lightning Rope (a blend of Vectran and Dineema SK75) which is very strong, very light and non-water absorbing. But handling that line is not easy so covering it with the cover from 5/16" Trophy keeps the line light, strong and makes it very nice to handle (the Trophy line has a very nice spun polyester cover that is soft and provides a good hand.)

Getting a Line on Cordage

Whether you're seeking the top of the line or watching the bottom one, there's a wealth of choices if you know your ropes

July 1, 2002

By Jeremy McGeary

Bernard Moitessier and Henry Wakelam were among the first cruising sailors to use rope made of synthetic fibers. In 1957, they scavenged serviceable yarns from nylon hawsers discarded by Cape Town whaling ships and twisted them into three-strand line to use as halyards and sheets. Although nylon was a vast improvement over the manila hemp to which they were accustomed, they would've been better off with one of today's high-strength, low-stretch fibers, which are vastly more suited to running rigging.

Nearly half a century down the line, the revolution in cordage technology continues to bring fiber products with greater strength and less stretch. None has durability to equal that of polyester under exposure to seawater and sunlight, but all have found a place, whether standing alone or blended with others, in the complex world of sailboat rigging.

Rope Attributes

Four principal characteristics define a rope's quality and purpose: durability, hand, strength, and stretch. Rope manufacturers can adjust their sophisticated processes to blend these traits in almost any desired combination so that a line can better fulfill a particular function aboard a cruising or racing boat.

Durability: Durability rates highly with cruising sailors. None of the other properties will be of much use if the line quickly deteriorates and becomes untrustworthy. The primary causes of deterioration are chafe and UV-ray degradation, and while chafe damage is usually visible, a simple inspection can't reveal damage caused at the molecular level by the UV components of sunlight.

Hand: Hand is the subjective characteristic of rope that relates to how it feels in the hand and how it handles. Hand is more or less important depending on the intended function of the rope. Sheets, because they're handled constantly and need to run freely and flake smoothly, need to have a softer hand than halyards, which, in the cruising world, anyway, are often set and forgotten.

Strength: Next, a line needs to be strong enough to handle the loads, both static and dynamic (shock), that it will encounter in normal operation. The great advances in synthetic fibers have led to the creation of ropes with strengths many times greater than those of the natural fibers—hemp, sisal, and linen—employed before about 1950.

As rope diameters continue to shrink with no loss in strength, smaller sizes are able to handle the same tasks. Big boats reap great benefits because the high-strength lines are not only much lighter than their forebears but also have smaller diameters, which adapt more successfully to sheaves and winch drums.

On smaller boats, halyards and sheets of appropriate strength can be too small for comfortable handling. Manufacturers counter this differently in double-braid line than they do in single-braid. To give double-braid line a comfortable hand, they wrap a lightweight, bulky cover around a high-strength, load-carrying core. When making single-braid ropes, they blend the high-modulus (high-strength/low-elasticity) fiber with a bulkier, low-modulus one to make them thicker.

Stretch: In moderation, stretch can be desirable, but at times it's not wanted. For halyards, especially, stretch is counterproductive. If a halyard stretches in a gust, the sail will become fuller and generate more heeling moment. This is why stainless-steel wire and those infernal reel halyard

winches, with their erratic friction brakes, were once common and can still be found on older boats that haven't been rerigged. Jib sheets and mainsheets, on the other hand, need to stretch to absorb the impact of gusts and occasional unintentional jibes. Rope manufacturers can tailor the degree of stretch with their selection of fibers and the manner in which they lay or braid them.

Jeremy McGeary

After stripping the cover off the working part of a halyard to save weight aloft, Chien Noir proprietor Cédric Chauvaud prepares to secure the remaining cover.

All these characteristics—in combinations appropriate for almost any use—are available in polyester, which should satisfy the needs of any cruiser looking for long life at low cash outlay. On many cruising boats, high-performance, low-stretch double-braids serve well as halyards, preventers, and spinnaker guys, and a single-braid, because of its suppleness, will make excellent sheets and roller-furling lines. Either construction is useful for control lines like vangs and outhauls.

Upping the Modulus

Other synthetic fibers used in marine rope making include ultra-high-molecular-weight polyethylene or UHMPE (Spectra, Dyneema), para-aramid (Kevlar, Twaron, Technora), polyester-polyarylate (Vectran), and, for the truly exotic, PBO, which stands for poly-paraphenylene-2 6-benzobisoxazole (Zylon). These all exhibit much higher tensile strength and lower stretch than polyester and, in varying degrees, lower resistance to UV degradation. Thus, they're most useful in cruising boats when combined with other materials that protect them from exposure to sunlight.

PBO: PBO has the highest tensile strength and elasticity modulus. It's used for standing rigging on high-tech boats like the Open class singlehanders and for halyards on one-designs and other high-performance racers. But it needs to be protected both from UV and chafe. For standing rigging, this is often done with a shrink-on black-plastic cover. Even when so armored against abuse, it's far lighter than stainless-steel rod rigging. Cost and upkeep, though, effectively eliminate PBO from the cruiser's range of choices.

UHMPE: Manufactured from the next strongest fiber, UHMPE ropes have characteristics that make them more applicable to cruising-boat requirements than those made with the other synthetic fibers. According to the Cordage Institute, UHMPE has "excellent" abrasion resistance, a function of a low interfiber coefficient of friction. It therefore adapts to running over sheaves more readily than do aramids and PBO.

When coated during manufacture, it has reasonable resistance to UV degradation, but for long-term exposure, it's best when protected with a polyester cover.

Halyards are often made from double-braid lines with braided Spectra or Dyneema cores. The polyester cover is stripped off the standing part of the halyard, back though the area usually held in the line stopper, and left on for hand where the line is handled. Unprotected UHMPE braids are useful for lines that spend much of their lives in lockers, like the sheet for the asymmetrical spinnaker or drifter. Their light weight is a bonus in light air and makes them easy to carry. Spectra is widely used for mooring warps aboard large yachts and commercial vessels because the smaller diameters its tenacity permits are easier to manhandle than wire rope or polyester and nylon cordage of similar strength.

Para-aramids: These are less functional aboard cruising boats because they generally have only moderate abrasion resistance, which leads to faster breakdown when used over sheaves. Technora, the exception in this group, has higher "dynamic durability," as the Samson literature puts it, and handles turning around sheaves better than its sisters, Kevlar and Twaron.

On some bigger, high-performance cruising boats, para-aramids are used for the standing parts of running backstays. As with PBO and Vectran, they're usually sheathed in black plastic.

Polyester-polyarylate: We will refer to polyester-polyarylate as Vectran since that's the only brand used in marine rope. Vectran's strength is similar to that of the aramids but with much better abrasion resistance, so it lasts longer when run through blocks. Vectran shares with PBO the Cordage Institute's "very low" rating for creep, meaning it doesn't elongate gradually when held under tension for long periods of time.

Chien Noir (Black Dog), the gang of French riggers used by many Open 60 skippers, makes extensive use of Vectran strands for lashings. When combined with a polyester cover, Vectran can fulfill most jobs on high-tech racing boats, and it also can be useful on cruisers.

For example, New England Ropes' Sta-Set X Plus combines a unidirectional (not twisted or braided) Vectran core, bulked up with multifilament polypropylene, inside a braided polyester cover. The low-stretch and low-creep characteristics of the Vectran make this a good halyard material. The cover both protects the core and gives the finished rope a nice hand.

Loose Ends

Looking back over the past three decades, remarkable advances have been made in rope and fiber technology. However, in the new-millennium world of cordage, there's no panacea, no do-everything line that cruising sailors can trust to last forever.

Though now furnished with far better tools than ever before, the prudent mariner must still pay close attention to the old enemies of rope—age and chafe—while adapting new skills and applications to get the best out of the current crop of fibers.

And while the cruising sailor can still get by with polyester for his daily thread, a little seasoning with higher-modulus fiber will help keep his sails and rig in better shape for sea.

In next month's Hands on Sailor section, Jeremy McGeary, a CW associate editor, will discuss techniques for employing high-tech ropes.

Courtesy of Cruising World Magazine

GETTING THE MOST OUT OF HIGH-TECH LINE

Part II: When you use braided ropes made of synthetic fibers, the old ways of doing things don't always apply

August 1, 2002
By Jeremy McGeary

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With a length of Vectran, a Chien Noir rigger lashes a block for a code zero headsail to the end of a Vendée Globe Open 60's bowsprit.

Many of the arts of the seaman are rooted in tradition, and when new materials replace those that have been around for a while, the rules for using them can be quite different from the time-honored conventions. When stainless-steel shackles came along, for instance, we learned to seize the pins with wire once we'd tightened them because, unlike rough-finished galvanized steel, stainless-steel tends to unthread when subjected to vibration.

Similarly, we're gradually learning ways to make the best use of such "high-tenacity" (high-strength) synthetic fibers that are used in modern cordage. Discussed in "Getting a Line on Cordage" (July 2002), these include the ultra-high-molecular-weight polyethylene or UHMPE fibers used in Spectra and Dyneema; the para-aramid fibers used in Kevlar, Twaron, and Technora; the polyester-polyarylate found in Vectran; and PBO, which stands for poly-paraphenylene-2 6-benzobisoxazole and is used in Zylon.

Rope clutches: Clutches hold rope by friction. Their operating mechanisms may vary slightly, but they grip rope essentially in the same way a hand does, only with more force. However, they only grip the outside of the rope. This is fine when they're used on single-braid lines because they're gripping the whole rope. Problems can arise with double-braids, especially if the cover and core have different stretch and friction characteristics.

An extreme example of this dichotomy is a halyard made of line that has a PBO core wrapped with a protective polyester cover. Under load, the core will slip through the clutch inside the cover, so the cover has to be sewn to the core in the area in which the clutch is likely to hold it.

Spectra or Dyneema braided-core halyards often are stripped of their covers over the length that isn't handled, and the stripped part functions well in a clutch of appropriate size because it's effectively now a single-braid and the UHMPE fiber is highly resistant to wear. The cruiser, perhaps less concerned with saving weight aloft than with protecting the halyard from sunlight, might leave the covers on Spectra-cored halyards of New England Ropes' Spect-Set II, for example. However, stitching the covers to the cores at the clutch points would be a good precaution against slip and wear.

Knots: Avoid using knots to terminate high-modulus lines. Any knot or bend that comes under load lowers the breaking strength of any line in which it's tied. In high-tech lines, the reduction can be dramatic. Knots can also slip out of slippery Spectra. All manufacturers and riggers recommend splicing—say, to halyard shackles or sail clews—as being far more reliable. The type of splice used depends on the lay of the line. Most rope manufacturers offer splicing kits and manuals, and the

winter-bound sailor might consider periodically practicing with them. Otherwise, it's best to have splices professionally made.

Cutting and finishing: Use any blade, including your beloved rigging knife, for nylon and polyester. For high-techs, especially the aramids, use a cheap knife—kitchen, fishing, or Ginsu—and sharpen it when you need to, which will be often. Don't ruin the blade of a good knife by using it to cut such abrasion-resistant cordage.

Simply burning synthetic line is a lubberly way to finish the ends, and it just plain won't work with nonmelting aramids. Use a sailmaker's whipping. Some riggers will cut a core short, whip it where it's buried, then melt the polyester cover together to enclose it, which is seamanlike.

Coiling: Three-strand rope has a unidirectional lay, usually right-handed, so it has to be coiled in one direction, the direction of the lay. Braided rope is balanced, and it's effectively made up of both right- and left-handed lays. Coil it, therefore, in figure eights to prevent it from hockling or kinking. Unwind lines from winches; don't just lift the tail and let the turns spin up and off, or you'll get hockles. To remove hockles, trail the line behind the boat. The worst thing you can do with braided line, whether sheet tails, halyard tails, or mooring lines, is wind it up into circular mats or Flemish coils.

Sheaves: The diameter of a sheave should be at least eight times that of the line. For a line with Kevlar or Twaron in its makeup, 10 times the diameter is better. Because rope flattens as it passes over a sheave, the groove in a sheave should be at least 10-percent wider than the line's diameter. When replacing a wire halyard with rope, change the wire sheave for a rope sheave of the appropriate size.

The tail of a running backstay has been lashed to the stainless-steel rod of a new-age laminate chainplate to eliminate a metal-to-metal connection.

Lashings: At one time, practically every rigging connection on a sailing vessel was a lashing. Advances in metalworking technology led to lashings being replaced by castings, forgings, and weldments, with shackles joining them together. Today, however, there's a reverse trend. Modern synthetic fibers have woven a new life for lashings, and leading-edge rigging specialists—like Phil Garland of Hall Spars & Rigging in Bristol, Rhode Island—are showing the way.

"It makes sense," Garland says, "to use lashed, tied, or spliced attachments to eliminate metal-to-metal contact and, thus, prevent wear of gear and hardware and to provide good alignment."

The French rigging group Chien Noir, which has been applying the technique to Vendée Globe boats and other advanced designs for several years, uses a lot of Vectran. Garland prefers Spectra or Dyneema in this application for greater resistance to UV damage and general abuse, which is perhaps more of an issue on cruising boats than on racers, whose riggings get reworked every few months.

Among the benefits of the lashing technique is the elimination of noisy, clanking shackles. Another is that the spares cabinet carries a couple of different sizes of Spectra strands or cords instead of a large assortment of heavy, expensive metal hardware.

A lashing made with low-stretch Spectra is more difficult to effect safely than one crafted with nylon rope. Strands need to be laid with even tension. In nylon or polyester, tighter strands stretch until looser ones come under load and share the stress, which isn't the case with no-stretch exotics. The technique employed by the Chien Noir group is to pass several loops between the parts to be lashed, massage them to get them evenly tensioned, then bind them tightly together.

It's not an accident that Chien Noir was among the first riggers to marry traditional techniques to the most up-to-date materials. For many years, this rigging gang has been involved in the long-running French revival of historic sailing craft, and its work can be seen on many restored and replica vessels, including the 130-foot topsail schooner La Recouvrance, flagship of the city of Brest.

Such interaction reminds us that when it comes to sailing, we get the best out of what's new by drawing from the best of what's old.

Jeremy McGeary is a Cruising World associate editor.

Boat Maintenance

Maintenance

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- ☐ **Mounting Hardware the way the Pros Don't** By Mike Lee, Harken

Yearly Maintenance Tips

By Larry Baker, Fleet #1

1. Keel Bolts
Should be tightened to 30 ft. pounds annually. Be careful not to over-tighten, which may crack the fiberglass. Note: The washers are molded to the curve of the hull. Should you decide to replace these, mix up a batch of epoxy filler and set them in lightly. After the filler sets up, then torque them to 30 ft. pounds.

2. Shroud Covers
Upper shrouds (5/32) take 8 lengths. Lower shrouds (1/8) take 5 lengths. Backstay (5/32) takes 6 lengths. Shroud covers are great to keep your rigging clean and relatively rust-free. A small jet nozzle on the end of a hose is a quick way to clean off the dirt and grime prior to sailing.

3. Winches
Clean off old lubricant with mineral spirits and put a light coat of winch grease on friction parts and bearings at the start of each season. Be sure to use winch grease as it will not wash out. Check the pawls and spring clips for wear. These can be replaced with a kit--You can get these at The Boat Shop-- if necessary. Note: If you apply too much grease your winches will not run smoothly.

4. Rigging
Install bees wax at the top of your micro-press connectors with new rigging. This will prevent moisture from entering and rusting the rigging from the inside. DO NOT use spray lubricants or oils on the rigging.

Clean Rigging: Use medium bronze steel wool--Never use steel wool--and Rust Buster. Wear gloves and goggles! Be careful not to get any on your decks, aluminum rails, and fittings. You can wet decks down first and have a hose handy when working with Rust Buster.

5. Fiberglass Stains
Rust Buster works great to remove yellow stains. It will not remove the wax. Simply sponge on, let stand for a couple of minutes, and rinse off with soap and water. If left on too long, however, it can discolor the textured deck, which is usually flesh or gray colored.

6. Fittings & stainless
Do not use spray lubricants or oils on the stainless. Simply flush with clean water. Use Bright Boy Polish to clean. Sail Coat is a great product for applying to fittings. Stainless Steel Bow Pulpit and Stanchions can also be cleaned with Bright Boy. Use a tooth brush to get into tight corners. A light coat of Sea Power liquid wax/cleaner works great as a protectant. I only have to do this once every season.

7. Trailer
The majority of your boat's weight (at least two thirds) should be on the keel. You simply lift your boat to remove weight off the trailer. Lower the pads. Bring your boat down to where it is standing square on the trailer--it should not tilt. Bring each pad up to where it is touching the hull and tighten the set screws. Lower your boat to its full weight. Note: Your pads need to swivel. Sight along the hull and look for any impression from a pad. Also check the top of your keel to make certain it is not depressing or flattening the hull.

8. Hull Wax
Use only marine grade waxes (paste or liquid). They are designed for a marine environment and hold up much better. I particularly like teflon liquid wax. Caution: Never apply wax to the non-skid areas of your deck.

9. Structural Weak Points

1) The plastic deck skylight in front of the forward hatch. Replace with stronger Lexan plastic.

2) Nylon spinnaker and jib halyard blocks break down under UV exposure: Replace with aluminum blocks for 1/4 inch halyards. Also replace the blocks at the base of the mast.

3) Deck top turning blocks: These take a tremendous amount of pressure. Inspect often. You can get exact replacements through Garhaurer Marine (909) 985-9993. 1082 West 9th, Upland, CA 91786. Also, you can get your outboard motor bracket rebuilt. They are very reasonable and quick.

Maintenance Notes, Mast and Standing Rigging

By Brion Toss, Master Rigger

The trouble with modern, low-maintenance rigs is that there isn't a lot you can do to maintain them, even if you want to. Stainless steel really does stain less, bronze does stain, but in a lovely way, and otherwise defies the ravages of time, and aluminum, especially when anodized, is basically forever. But all of these materials benefit from various forms of maintenance, so sailors can still do something to get more life - and higher margins of safety - out of their rigs.

First, quality is vital; you can't maintain a Yugo into a Volvo. So if longevity matters to you, think in terms of return on investment. In the world of marine merchandise, we often pay ridiculous amounts of money for stuff that doesn't look very different from hardware store stuff. But more often than not, the price reflects, at least in part, the cost of building something that won't go to pieces at sea. If you are at all in doubt about the cost/benefit of something, start by making a close, skeptical comparison with a cheaper option. Is the level of finish the same? Smoother surfaces corrode more slowly than rough ones. Are the tolerances the same? If a manufacturer is using substandard materials, they are less likely to be fussy with machining. Does either piece look like something designed by someone with a Bright Idea, or someone with a Bright Idea who has been to sea? This one calls for judgement on your part, and if you haven't yet experienced things that might help inform that judgement, I'll have some suggestions in a moment. Meanwhile, get in the habit of seeing gear in the context of the ocean. For example, take Dyform wire, which has polygonal yarns, to maximize "meat", and thus strength. Early forms of it were notorious line chafers, because the polygons had relatively sharp edges. You could always spot a Dyform boat by the collection of lint stuck to the shrouds. Nowadays, Dyform has rounded corners, and is a very attractive standing rigging alternative, but I suspect that the original product was born somewhere in the engineering department, at the hands of people who weren't giving a lot of thought to what would happen when a rope or sail ran over their brainstorm.

Okay, so you would have missed that one too, eh? Well, as a friend of mine once put it, "Tradition is so you don't have to make 200 years of mistakes." Although most of the boats we work on in this shop are about as untraditional-looking as can be, I have never regretted all the time I put into learning the niceties and rationale of traditional rigs. Partly this is because we still get to splice and serve quite often, but also because t\raditional rigging, by definition, encourages taking the long view, in the context of heavy use at sea Dealing with traditional rigs is a little like dealing with an old, deeply experienced sailor, and one of the characteristics of old, experienced sailors is that they hate doing unneccessary maintenance. So they figure out what causes things to wear out, and then come up with the easiest possible ways to prevent and treat wear.

The point here is that maintenance is far from being a matter only of regular attention; it has a design phase that makes the regular attention meaningful. If you overhaul the cuspknuckles every fifth fortnight, good for you. But if better design or better overhauling techniques would mean that you only have to do the job once a year, then you've been wasting time and materials.

So before setting up a maintenance program, get to know the system you'll be maintaining. Get to know the characteristics of the materials, the magnitude and nature of the loads, and how the environment speeds or retards deterioration. In the case of standing rigging, this means becoming familiar with righting moment, tune, climate, wire rope, alloys, terminals, and various forms of corrosion. There are a lot of people out there who know little or nothing about any of these things, and who nevertheless manage to do tolerable maintenance, but you can just bet that they could do it better with a little education and thought. I'm reminded of the fellow in Florida who had those little plastic covers on his shrouds, and knew that in his climate that corrosion could happen under there, especially at the bottom, where things are saltiest and wettest. So every time he went down to the boat he would slide the covers up, rinse off the wires with fresh water, and let them get some air. The wire under the covers was in good shape near the bottom, but one day the mast fell down because the wire had corroded away at the very top of the covers, the one place where water just sat all the

time. He had been looking assiduously for chloride and stress corrosion, but wasn't up to speed on crevice corrosion.

With all that said, here are a few things that would be good to have in any maintenance program for a modern, stainless-wire-and-aluminum-mast rig:

1. The abovementioned fresh water

Salt is hard on metal, and it tends to accumulate given a chance, so rinse it away whenever you have the opportunity. Pay particular attention to things down near deck level, an be sure to get at sheltered places. These include mainsheet blocks - bearings and swivels - as well as furler bearings, all wire ropes, mast step, and tracks. If you have a full boat cover, be sure to rinse everything before putting it on, unless you're conducting a corrosion experiment on the effects of trapped, moist, salty air.

2. Isolate dissimilar metals

I did a rig survey on an 80's boat the other day, and was delighted - no, astonished - to find that every one of the fasteners I checked had been bedded to prevent galvanic corrosion. This simple act will prevent the ugliest, most pernicious, frustrating, labor-intensive phenomenon in rigging. We spend ridiculous amounts of time removing corroded fasteners, and it is so preventable.

So, go to you mast, right now. Take a close look at any of the stainless fasteners on it, screws or rivets. See any white powder around the head of the fastener? How about bubbling of the adjacent paint? If it is a screw, try removing it , and examine the threads. Any powder there? If it is a new boat, there might not be any corrosion. Yet. But there should be a noticeable amount of some form of paste or goo on each fastener, to isolate it from the aluminum (or carbon fiber0 that it goes into. Our favorite product for the purpose is Tef-Gel, but almost anything - silicone, Loctite, chewing gum - will make a difference.

If you couldn't get the screw out, it is probably corroded into place, and you might want to look at the Spartalk entries from May 5, 1999.

Be sure to check the fasteners on a range of fittings, as some might have been put in at different times and/or by different people. If you let this problem go, it can lead to so much aluminum corroding that there's only powder left to hold the fastener.

3. Tune

Aside from performance and comfort benefits, rig tuning provides safety and rig longevity. This is because loose wire will get shock-loaded, which accellerates fatigue, and because tight wire will load cycle closer to its elastic limit, which also accelerates fatigue. It has to be just right. Fortunately, tuning is not a heavily mumbo-jumbo procedure. Unfortunately, there are a lot of alleged riggers out there who believe that tuning is a matter of tightening turnbuckles down as far as possible, or some other, equally irrational belief. Get our tuning video.

4. Lubricate

Most of the winches aboard cruising vessels are crippled, to some degree, by either lack of lubrication, excessive lubrication, or by grease that has been on the gears for so long that it has hardened to the consistency of Playdough. Remember, winches are supposed to be labor-saving devices. But they are also fairly complex machines, so they require regular maintenance. This means strippping them down and regreasing them at least once a year, a job which is not nearly as onerous as it might seem, and which will reward you immensely. I once cleaned up some primaries that had gotten down to about a 1:1 purchase. The next time the boat went sailing, one of the owners almost went overboard when the winch presented an order of magnitude less resistance. They were happy about it, though.

In general, the less you lubricate other items, the better. This is because, unlike winches, things like blocks and turnbuckles will readily collect dust and grit, especially if you slather some grease or oil on them. So think dry-coat for these items, or nothing at all.

5. Inspect

Most rigs are constructed to human scale, with components readily monitored and replaced. But ya gotta look. Every trip aloft needs to be a survey trip, as the upper parts of the rig are the ones you see the least. And don't neglect the stuff on deck just because you see it all the time; it is precisely because you see it all the time that it is easy to miss things. We were aboard several boats recently that had so much corrosion around the mainsheet traveler fasteners that there wasn't much functional metal left; it's the kind of thing that leads to travelers coming out of the deck. But those fasteners were literally right in front of the place where the crew spends almost all of its time on deck. The heart of maintenance is being in the habit of noticing things.

MOUNTING HARDWARE THE WAY THE PROS DON'T!

Nervous drilling holes in your boat?

Mike Lee – Harken Tech Service

What is the one thing most often heard when it's time to install new deck hardware? No, it's not "I have a root canal I should do first". How about, "I'm always really nervous when it comes to drilling holes in my boat."

If your boat is new, or almost new, you can take that nervous feeling in the pit of your stomach and multiply it by a factor of five! The one thing to remember though is if you are feeling weak in the knees about drilling holes in your unblemished deck, that nervous feeling in your gut is good! Just think how cautious you're going to be before you drill. You'll check every hole location five or six times to make sure it's in exactly the right place. I can guarantee that because it is your boat, your true love, your baby, your secret desire, you will check many more times before each hole is drilled than if you had your hardware installed by a professional.

The first thing you do is pretty obvious: find the right location to mount the new hardware. Sounds simple, but here are a few thing to remember to keep it truly simple. Even though the new cleat might look in the perfect position when the boat was docked, it could be a nightmare to get to when the boat is sailing heeled over hard. With this in mind, place the piece of hardware in a position you think works best at all angles of heel. Next, check the hardware by running a piece of line through it to ensure that the "lead of the line is fair". Translation: "make sure the line is not chaffing or rubbing on anything and that it isn't entering the hardware at a funny angle" (see why it's easier just to say "line is fair?").

For example, if the line is entering your new block at an odd angle, both the line and the block won't last long. It will also be very hard to pull. So, line entry/exit angle is very important! It will probably take several tries to get it right.

After using up your precious patience to find just the right spot for your new block, here are a few more things to consider before calling it good. Since most hardware requires thru-bolting to the underside (say of the cabin top), it must be accessible. Also, the underside has to be clear of other installed items such as a light. You sure don't want to drill into things like that! The last thing is to check and see if the fitting is ergonomically correct. Ergo-What? Hey! ergonomically correct isn't anything like politically correct because you won't insult any group of people if you get a cleat in the wrong place (OK. Maybe you will if they trip over it). What this term means is you should place your hardware so you can access it easily and comfortably. In other words, are you going to lose all the skin off your knuckles when you use that cam cleat, or is your mainsail trimmer going to get a winch handle in his spin if someone trims the headsail? These are only a few of the things that can happen if you don't think through block placement carefully.

OK. The time has come to drill through that factory perfect deck. You've checked and rechecked your parts and you're ready. DON'T HESITATE! JUST DRILL! This shouldn't have to be said, but try to drill your hole as straight as possible. It will make your hardware easier to install, look better, and you won't seem like a hack.

After you drill the hole, you need to figure out if the deck is cored or not. The best way to check this out is to take a close look at the "chips" (drill hole stuff). You should be able to tell the difference between pure glass and some type of core. If it looks like a balsa core, make the extra effort to seal the wood with a little bit of epoxy. Balsa wood absorbs water like a sponge. Once there is water in there, the core will most definitely rot and the deck becomes very soft and weak. Having to re-core the deck is a huge price to pay for the luxury of cutting a corner.

Actually mounting the hardware isn't too hard, but you need to do it right. To mount any piece of hardware on any fiberglass surface it is always necessary to use a backing plate on the underside. The

object, of course, is to keep things from ripping out of the deck. The best thing to use is an aluminum plate, but sometimes they can be hard to come by. Depending on what you're mounting, sometimes thick fender washers will do the trick on smaller items. But if it is something highly- loaded like a winch, then a backing plate is a must. However, if it is a small cleat, the washers will work fine.

Don't forget to properly caulk all the mounting holes or when it rains, life in the cabin will be like experiencing a Chinese water torture first hand. To prevent leaks, it generally works best to coat the screw with the caulk because it fills the hole better. If you just squirt caulk into the hole, the screw almost always pushes it out the other side in a blob.

The pros may be able to mount the hardware more quickly and efficiently, but think how much satisfaction you will get knowing you've done it yourself. Also, you will be just that much closer with your boat in a Zen like way. Besides, when that new block rips violently off the boat, there will be nobody else to blame.