

FABRIC FOILS

The Journal of Sailmaking

The Two-Ply Sail Construction

It has been almost eight years ago that North Sails shook the sailing community with two-ply sails for 12 meter contenders. These sails were sewn together entirely of doubled panels of cloth. The argument was that bias stretch was far easier to control in lighter materials because the thread count could be made much higher. With two layers of relatively light cloth sewn together, the needed strength was obtained with very low bias stretch.

Such sails were obviously expensive and appropriate only for very big boats. As a result, two-ply sails were very seldom made after that initial success. Then Mylar/Kevlar and Mylar/Dacron composites came into vogue and two-ply sails no longer seemed necessary even for big boats.

But the two-ply construction method has resurfaced recently, not for entire sails but rather for the leech edge only. It is now employed in order to make possible savings in weight aloft for dedicated racers. A light fabric, often half the weight of cloth normal for a given sail, will be used for the bulk of the sail and a second layer will be used only along the leech of the sail where stretch must be controlled.

This procedure is especially useful with Mylar composite cloth. The Mylar has sufficient stability to save half or more of the cloth weight that would normally be used in a sail. But it is very difficult to fabricate seams with such Mylar fabric so that they have matching strength. Since seam strength is really important only at the leech edge of most sails, the two-ply construction system is quite appropriate here.

But how is it done? The procedure is surprisingly simple. Cloth panels are cut in the normal fashion. Then, before those panels are basted together, the second ply is sewn to the aft end. A straight stitch is used—the second layer is basted in place flat over the end of the full length panel and a row of straight stitches is run all around its sides about 1/8-inch inside the heat sealed edge

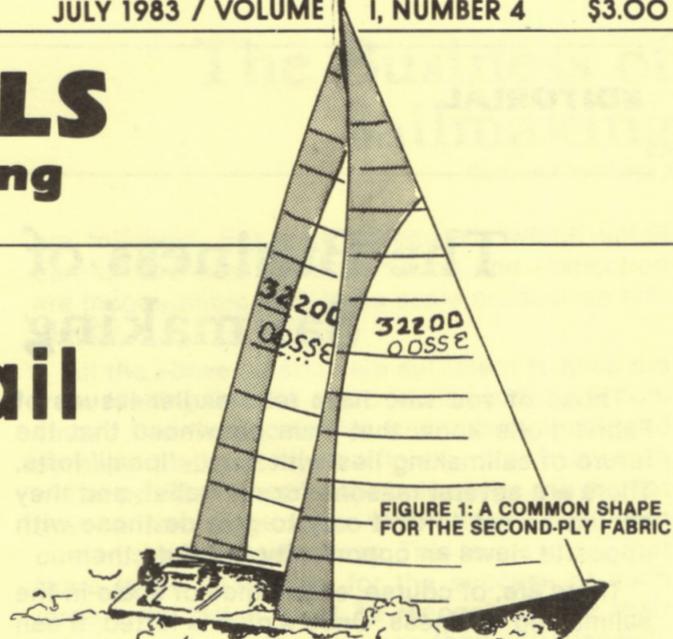


FIGURE 1: A COMMON SHAPE FOR THE SECOND-PLY FABRIC

of the second layer. The use of a straight stitch tends to seal the two panels together and keep air from getting between them and "inflating" the sail.

After each panel has its second layer added in this way, the full length panel assemblies can then be basted together in the normal way and sewn with the normal zigzag stitch. Leech hems should be folded so that the second ply material is

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EDITORIAL

The Business of Sailmaking

Those of you who have read earlier issues of **Fabric Foils** know that I am convinced that the future of sailmaking lies with small "local" lofts. There are several reasons for my belief, and they should be set forth if only to provide those with opposite views an opportunity to refute them.

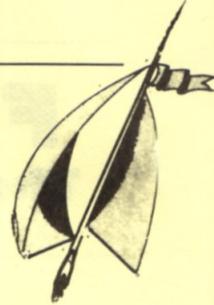
There are, of course, economies of scale in the sailmaking business. Once a plan is lofted, it can be transferred to Mylar pattern sheets. Panels can be cut from these sheets without further lofting. Sewing, too, can be made more efficient if there are people who do only one task hour after hour. Not only do workers increase their efficiency, but machines and work stations can be set up to maximize throughput. Fabric supplies can be more efficiently utilized with greater volume—waste will be cut dramatically.

But there are some unusual limitations on economies of scale in the sailmaking business. Cloth, for example, is not significantly cheaper when purchased in large quantities. The sail market is so small that no single loft can place orders of sufficient size to justify any real savings on fabric direct from the mill. And size does not often make the purchase of more efficient equipment possible. Even very small lofts find the most modern and sophisticated sewing machines and grommet installation equipment well within their reach. Some large lofts are experimenting with computer driven cutting tools that cost a good deal, but the value of these new devices for increased productivity is rather marginal as I indicated in my editorial for the April issue.

The key to significant increases in productivity through volume is standardization, and there is little opportunity for standardization in a sail loft. Production boats are seldom built in quantities of more than one thousand. And, even when there is a broad base of boats for which sails can be built, like the El Toro or the Sabot or the Snipe or the Lightning or the Catalina 22 or the Venture 21, individual skippers often specify a particular cloth weight or finish or draft that requires custom production. It is possible to build "for the shelf" a number of storm foresails of three or four different sizes and distribute them out of stock. But no large loft can devote a significant part of its production to stormsails alone.

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IN FUTURE ISSUES

- Selecting Sailcloth Weight, Type, and Finish
- Battens and Their Use
- The Relationship Between Round and Broadseaming
- The Function of Leech and Foot Lines
- Evaluating Sail Shape
- The Use of Draft Stripes
- Industrial Machines for Sailmaking
- Sail Insignia and Large Scale Designs
- Working with Nylon Spinnaker Cloth
- Sail Interaction—The Use of Telltales
- Batten Pocket Traps

on the outside although this is not absolutely necessary except in the case of sails which are made with primary panels of Mylar.

The width of the leech ply fabric should be about one-sixth of the sail chord. But it should flair at the clew and at the head since stress will be concentrated in these corner areas. Figure 1 shows a common shape for the second ply fabric. Note that the second ply should extend at least as far forward into the sail as the battens. And batten pocket patches should be added to the leech ply side of the sail. This is to minimize the likelihood

Original Equipment Manufacturers (OEM) can sometimes come close to production standardization but, even here, individual orders seldom exceed 100 units or about four or five days of production in a seven-man loft—that is hardly enough time to set up an efficient "line." There are some savings possible, but the OEM business is extremely price sensitive. As a result, almost all of it goes to lofts in Hong Kong where labor rates are low. Sails are treated as "boat parts" rather than fabric by customs and thus admitted practically duty free. Lofts like Vector in the United States which focused on the OEM market have been scarce and now that the new boat market is so restricted they have all been forced to develop custom markets to survive.

What does the custom market mean? For one thing it means a good deal of careful record keeping and communication with customers. Both are expensive or, from the standpoint of production efficiency, wasteful. Every \$500 sale will require three or four customer contacts. Even if this means nothing more than letters or phone calls, it will easily consume two or three hours of supervisory level employee time. If mistakes are made, as they very often will be when communication must take place at long distance, the loft risks either customer dissatisfaction or the loss of its normal profit margin. And this risk further slows the production process—safeguards must be established to insure that customer instructions

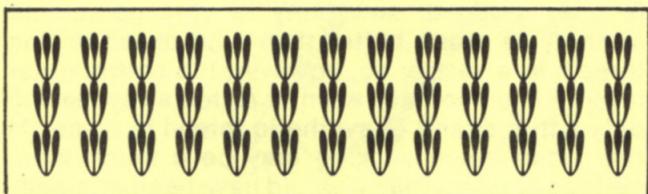
The Business of Sailmaking

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are followed. But such safeguards which entail careful and frequent supervision and inspection are incompatible with large scale production efficiency.

All the above reasons are sufficient to keep me from making Sailrite a production loft. I am convinced that the local lofts, necessarily small and perhaps theoretically inefficient, are in a much better position to serve the bulk of the sail market than a few large lofts which must deal with customers at long distance. This is not to say that there is no possibility for the success of such large lofts, but it must be recognized that their success will not depend upon their "efficiency." It will rather depend upon their creating an image which justifies a pricing strategy somewhat higher in scale than that of the small local lofts. The portion of the market that is image conscious is relatively small and particular so in a slow economy.

Sailmaking may be one of the few professions that continues to reward the isolated craftsman. The capital requirements for startup and reasonable growth are extremely small. It is definitely not the road to vast riches, but it can provide a satisfying and rewarding career for those who want to remain independent and self-reliant. Best of all, it gives us an opportunity to "mess about in small boats." FF



The Two-Ply Sail Construction

Continued from page 1

of chafe damage to the panels that comprise the bulk of the sail. Corner patches should be placed on the "primary" or "first" ply side of the sail so that they form a sandwich assembly at the head and the clew with patches on one side of the sail and the leech ply on the other.

Two-ply sails are obviously intended for racing efficiency. They are likely to be most justified when a very light cloth is used in the sail and when the aspect ratio is relatively high. When used this way, they can be very effective. FF

Choosing a Sailmaking Thread

It is easy to take thread for granted as a sailmaker until you start having trouble with it. There is nothing more frustrating than a thread that is constantly kinking or fraying or melting and breaking. Fortunately, these problems are seldom serious. The reason is that most of us standardize on the use of a single thread that works and ignore any others. This is perfectly okay in sailmaking—a single type of Dacron thread in several different sizes can be used for almost any project. But it is still worth while knowing more about thread and what makes it work.

There are four common fiber types used to make sewing machine thread: cotton, Mercerized cotton, nylon, and Dacron or polyester ("Dacron" is DuPont's tradename for their polyester fiber). Cotton or Mercerized cotton are soft and consistent in finish. Their "sewability" is excellent. And the fact that cotton swells when it is wet serves to make seams watertight—the thread expands to fill the needle holes when it is wet. Unfortunately, the durability of these threads in a damp outdoor environment is not good. Mercerized cotton will not shrink like plain cotton, but it does rot, mildew, and abrade rather quickly. Indeed, its tensile strength is quite low even initially—only about half that of a similar synthetic thread.

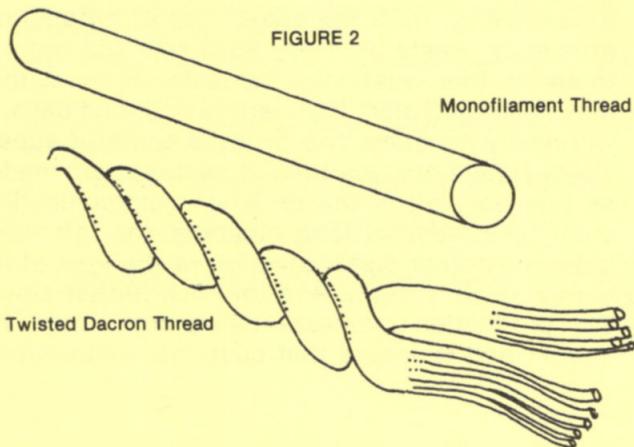
Some threads combine cotton and synthetic fibers in a yarn that has some of the best characteristics of both. This thread will have a cotton outer surface with synthetic threads inside. Seam "wicking" or leaks through the needle holes is thus stopped, sewability is very good, and strength is much better than with an all cotton thread. In a year or so, however, the cotton outer layer is likely to have worn or rotted away leaving only a thin strand of synthetic thread in place. At that point seam wicking may be a much more serious problem than it would have been originally had an all synthetic thread been used.

Most sailmakers therefore choose a synthetic fiber thread. Nylon has some definite advantages. It is available in a clear monofilament that is practically invisible and quite "sewable" (the homogeneous surface is extremely consistent in resistance when pulled through tension devices). Most upholsterers use this type of thread. Unfortunately, it does not hold up at all well in sunlight. As a result, very little of it will be seen in sail lofts.

Sailmakers do use polyester fiber threads. They are extremely strong and durable in outdoor applications. In addition, they are dimensionally quite stable. They will not shrink or stretch enough to create problems. But it is not enough to simply specify a polyester thread.

As is often the case with synthetic fibers, the manufacturing process permits a widely variable thread type. The fibers can be produced with a "spun" or fuzzy surface or with a very smooth surface. The spun fiber is used in the construction of thread for dressmaking because it sews better—the fuzzy surface tends to pull through tension devices in a more consistent way than a hard, smooth, and rather brittle polyester does. But this spun thread is not nearly as strong as the smooth type. As a result, its use is rightly limited to dresses, kites, and the like.

There are two main categories of "smooth" polyester fiber thread: soft finished and bonded finished. Both are twisted threads. A "left-lay" is just about standard now for lock stitch machines so little need be said about that requirement. But bonding is very important. The bonded version is especially treated to protect it from heat build-up and to improve its sewability—a coating is added that makes the thread slide more easily over metal parts. This bonded thread is absolutely essential for a high speed industrial machine, but it is also appropriate for slower home machines because the bonding makes stitch tension more controllable.



Unfortunately, just because the characteristics of synthetic fibers can be so carefully controlled in manufacture, the care taken by the manufacturer can be very important to thread quality. Cheap polyester thread does not have the same sewability as that which is more expensive. This cheap thread is often used as the under thread where the inconsistency of finish and stiffness are not too harmful. But this practice makes sense only in very large lofts where the pennies saved will add up. The rest of us should bite the bullet and pay top dollar for the thread that we use. The extra few dollars will save many dollars more in time and frustration.

Choosing a Sailmaking Thread

Continued from page 4

Only one matter remains for our consideration—thread size. Even if you know what size of thread you want for a given job, you may be confused by the four different ways that size can be stated. There is one nomenclature traditionally used for cotton thread that has been carried over to synthetic thread measurement by some companies. Then there are three measurement systems used for synthetic threads and one of these has been applied in a very loose manner to Mercerized cotton thread. The two tables below should help resolve any confusion here. Table I shows lists of cotton threads and synthetic ones so that they can be related. Note that the numbers following the slash under "Cotton" are not normally stated. So number 24 cotton thread is just slightly heavier than number 69 Dacron or nylon thread. I have included needle sizes in this table, but they are intended only as a very rough guide. Obviously, the weight of the material will play an important part in needle choice as well as the thread used.

Table II compares the measurement systems developed for synthetic thread. "Ticket Number" is the most frequently used system. The others are gradually falling out of use.

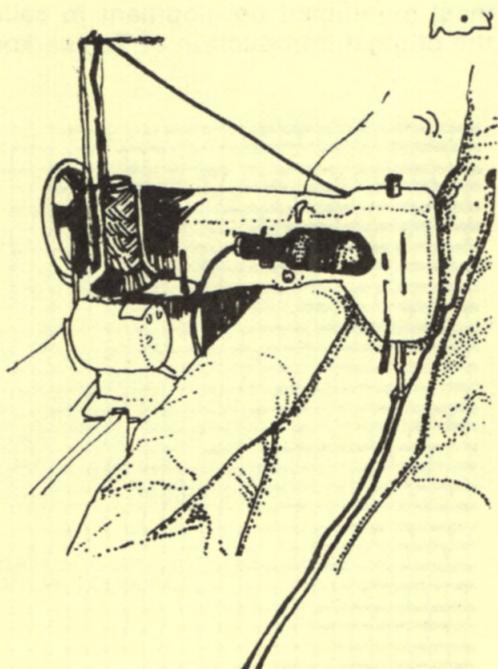
I would normally explain how ticket number is related to the actual size of synthetic thread. The method by which the numbers are derived was once explained to me. But, even if I could reproduce that explanation here, I do not think that it would be of value. The method is very complicated and, at least in part, rather arbitrary. It is enough that sailmakers know which ticket numbers are appropriate for the work they do and how to relate those numbers to the other measurement systems in use. FF

TABLE I: GENERAL THREAD INFORMATION

Twisted Soft Finished Synthetics			Twisted Bonded Finished Synthetics			Monocord Bonded Finished Synthetics		
Ticket Number	Civilian Letter Number	Military Number	Ticket Number	Civilian Letter Number	Military Number	Ticket Number	Civilian Letter Number	Military Letter Number
8	0000	0000	8	0000	0000	8	0000	
15	00	00	15	00	00	15	00	00
23	0	A	23	0	A	23	0	A
33	B		33	C		33	B	
46	C	B	46	D	B	46	D	B
69	E	E	69	F	E	69	F	E
92	F		92			92	FF	F
99		F	99	FF	F	99		
115	FF	FF	115		FF	115	125	FF
138			138			138	150	
207	3 cord	3 cord	207	3 cord	3 cord	207	250	3 cord

TABLE II: NEEDLE SIZE AND THREAD SIZE INFORMATION
FOR BOTH COTTON AND SYNTHETICS

Singer Needle Size	Cotton	Mercerized	Nylon	Dacron	Union Special Needle Size
8	100/2	0000/2	15/23	15/23	027/029
9					
10	90/2	000/2			032
11	80/2			30	
12	70/2	00/2	33		036
13	60/3				
14	50/3	00/3	36	46	040
15					
16	40/3	0/3			
17	36/3	A/3			044
18	30/3	B/3	69	69	049
19	24/3	C/3			
20	20/4				
21	16/4		92	92	054/060
22	12/4		99		
23	10/4				
24	8/4		138	138	067



New mylar/fabric composite

New cloth announcements have become so common in recent years that they can be considered almost commonplace. In spite of all the announcements, the impact upon 95% of the sailing community has been almost unnoticeable. We are still using Dacron and nylon constructions that are essentially similar to cloth in use two years ago. But the racers on the leading edge of technology have been working with exotic cloth composites — usually involving the polyester film called "Mylar." It is only a matter of time until that work bears fruit in a fabric with the durability and suppleness required for everyday sails. I don't want to suggest that such a material is now available, but the latest new product release from Bainbridge goes very far in that direction. For this reason, I want to reproduce that release fully here.

POLYKNITS

Howe & Bainbridge is pleased to introduce a comprehensive line of new Mylar sail materials. Unique in its design and appearance, Howe & Bainbridge's new polyknit line represents the most significant development in sailcloth since the original introduction of Temperkote. The line

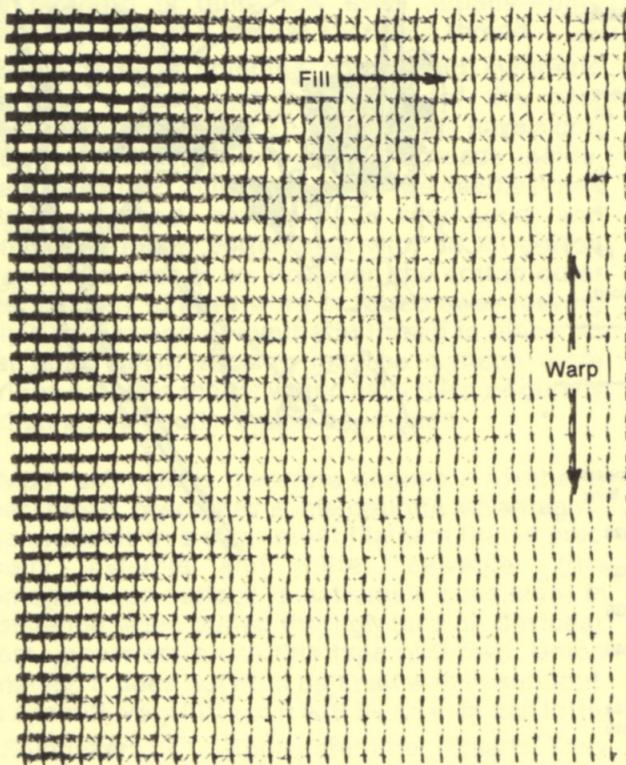


FIGURE 4: BAINBRIDGE POLYKNIT

of Bainbridge polyknits consists of four precisely engineered products:

Weights	Constructions
2.8 oz.	16P440 1 mil Mylar
3.5 oz.	10P1000 1½ mil Mylar
5.1 oz.	16P1000 2 mil Mylar
6.1 oz.	20P1000 3 mil Mylar

In the four years since the introduction of Temperkote in the fall of 1979, a tremendous amount of technology has been developed and enormous lessons learned in the areas of production, construction and design of Mylar composite sailcloth. A great deal of this development can be attributed to the outstanding feedback that Howe & Bainbridge has received from its customers. It is as a result of these four years of experience, comments, criticism and ideas of the Howe & Bainbridge customers that the new polyknit Mylar sailcloth line originated.

The most notable characteristic of the polyknit materials is that they are highly oriented. Unlike woven sailcloth and traditional Temperkote, a visual inspection reveals the unbalanced nature of these materials. The polyknit line's unbalanced stretch ratio provides an extremely strong, low stretch fill, offering the strongest polyester/Mylar material available. This enables the polyknit Mylars to support the leeches of big boat genoas, frequently without the need of two-ply construction techniques.

The outstanding strength and low stretch of the polyknit materials is accomplished by efficient use of all yarns. A detailed examination of a polyknit sample reveals fill yarns which lie absolutely straight and parallel to one another and are flat on the Mylar film — there is no crimp or bending of these fill yarns within the composite. This "zero crimp" aspect of the polyknit composite materials is their unique and outstanding feature and is responsible for their sensational performance and durability. With materials such as woven sailcloth, woven fabric laminated to Mylar film or a woven scrim laminated to a Mylar film, the yarns all have crimp where they wind under one warp yarn and over the next. When load is applied to a crimped composite, the yarns tend to straighten out. The immediate result is stretch in the material which ultimately results in leech elongation. A yarn that is absolutely straight will not have such "mechanical" or "geometric" stretch, and there will be no elongation due to crimp. The only stretch will be from the fiber itself. This is the case with the polyknit composites, and the result is complete efficiency from all polyester yarns involved. This is the only sailcloth in the world that is able to make such a claim.

cloth from Bainbridge

Vertical panels, or warp oriented fabrics, also obtain their efficiency by the virtue of low crimp. Since polyknits have zero crimp, they eliminate any need to go to a vertical panel construction.

Another way to look at the amazing efficiency of the polyknits is to look at their strength or stretch to weight ratios. They far outperform any other non-Kevlar material when examined from this point of view. To say this in another fashion, the polyknits have the maximum stretch resistance at the minimum possible weight.

To illustrate the improved performance of the polyknit materials, two graphs have been attached. One compares relative fills of Temperkote materials to polyknit materials. The other compares fills of BSDS fabrics to those of the polyknits.

Not only have the stretch characteristics of Mylar sailcloth been improved with the introduction of the polyknits, but durability has also been improved with this new type of composite. Because of the large deniers in both directions, the polyknits have tremendous tear strength. As a result of the outstanding adhesion obtained by our unique laminating system, the yarns are, in effect, flexibly cemented to the film, and in the rugged testing performed to date, there have been no reported instances of delamination.

It should be realized that with a new generation of technology and materials, some changes must be made in the construction technique. Just as with the Temperkote, we advise using Temperkote seamstik between the seams. As well, we recommend using wider seams than might normally be used in a traditional Temperkote sail. The wider seam distributes the load, and as a result, better seam strength is obtained. Every sailmaker solves construction problems and engineers sails differently.

Some areas, however, must be examined more carefully when constructing sails out of polyknit materials. Patching and seaming are the primary areas that must be attended to in the construction process. While in fact seaming and patching polyknit sails may be more time consuming than seaming and patching on a traditional Dacron sail or Temperkote sail, considerable time can be saved in the elimination of two-ply construction. The use of separate tapes rather than a folded hem on both leech and foot is also a recommended construction procedure.

FF

Mylar™, Dacron™, Kevlar™ are trade names for DuPont.

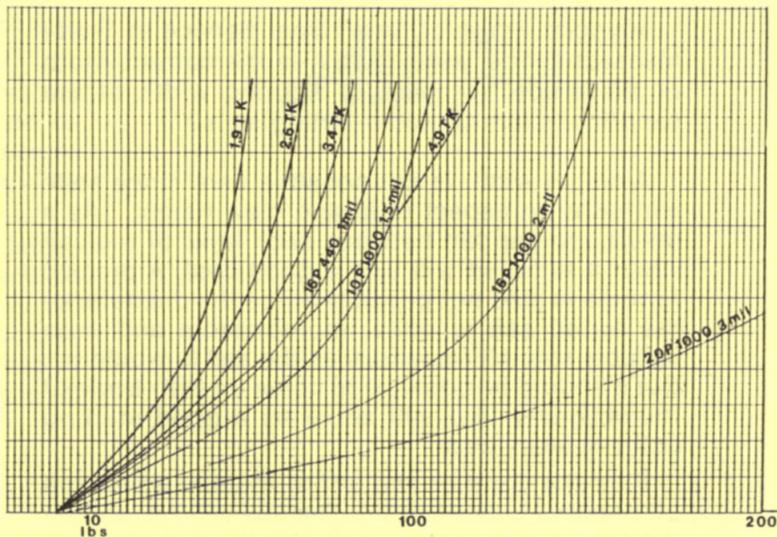


FIGURE 5: FILL STRETCH COMPARISON: TEMPERKOTE MYLAR FABRIC VS. POLYKNIT.

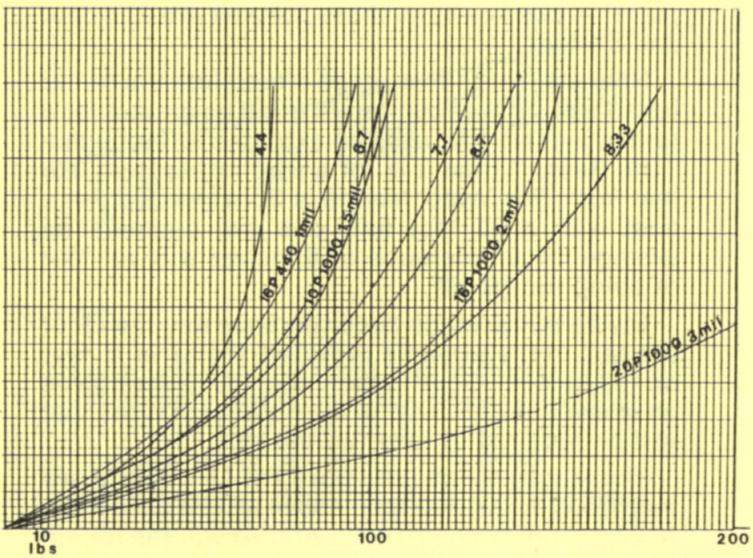


FIGURE 6: FILL STRETCH COMPARISON: BAINBRIDGE STABILIZED DACRON SAILCLOTH VS. POLYKNIT.

Malcolm Smith of Small Boat Service in Truro, Massachusetts, asks: "What is the correct width or the proper formula for figuring width of the sacrificial cloth on roller-furling sails?"

A single width is not possible here since sails will differ in aspect ratio and clew height. As a result, the gap left between each layer of the sail when it is rolled will vary a good deal. A precise formula is also not possible since the diameter of the furled sail is quite unpredictable and even variable since it increases as the sail is wound up. But it should be possible to come up with a rule of thumb guide that will serve as a good starting point in every case.

Find the point on the luff of the sail where the LP line would intersect it. The sail will roll so that the foot is below this point and the luff above it. Measure the luff length above and below this point. In our example, these lengths are 21.6 feet and 8.4 feet.

Now estimate the average circumference of the furled sail. This circumference will be greater for a furling system that uses an extruded luff tube like "The Reefer" than it is for a wire luff system like that from Blue Water Marine or Schaefer. But, for a boat with a 30 foot luff, one can estimate an average circumference of 8 inches without fear of being too far off.

Divide this average circumference into the LP of the sail. In the example provided, the LP is 15 feet or 180 inches. Eight inches into 180 inches gives an answer of 22.5. That is the number of turns that will be required to fully furl the sail.

The length of the luff above the LP line that we measured in the first step above will be divided into 22.5 roughly equal parts. And so will the length of the luff below that LP line. Thus, each wrap of the leech of the sail will leave about .96 feet of the sail exposed. And each wrap of the foot will leave about .37 feet exposed.

Obviously, the width of the sacrificial cloth should equal the width of the exposed sail plus 3 or 4 inches to provide an allowance for hemming and safety margins.

It is a good idea to make the cloth strips along the foot the same width as those along the leech even though they seldom need to be that wide. If the minimum width is used on both edges, the sail will tend to look "top heavy."

FIGURE 7: FIGURING WIDTH OF THE SACRIFICIAL CLOTH ON ROLLER-FURLING SAILS

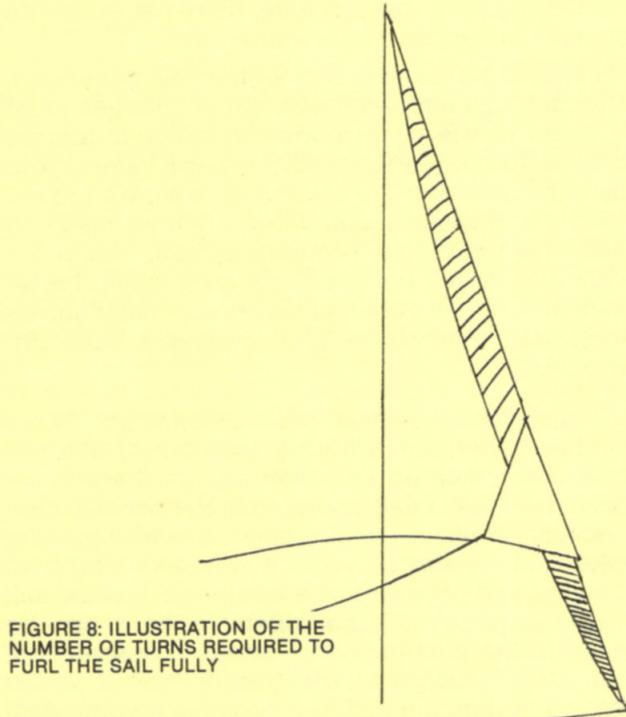
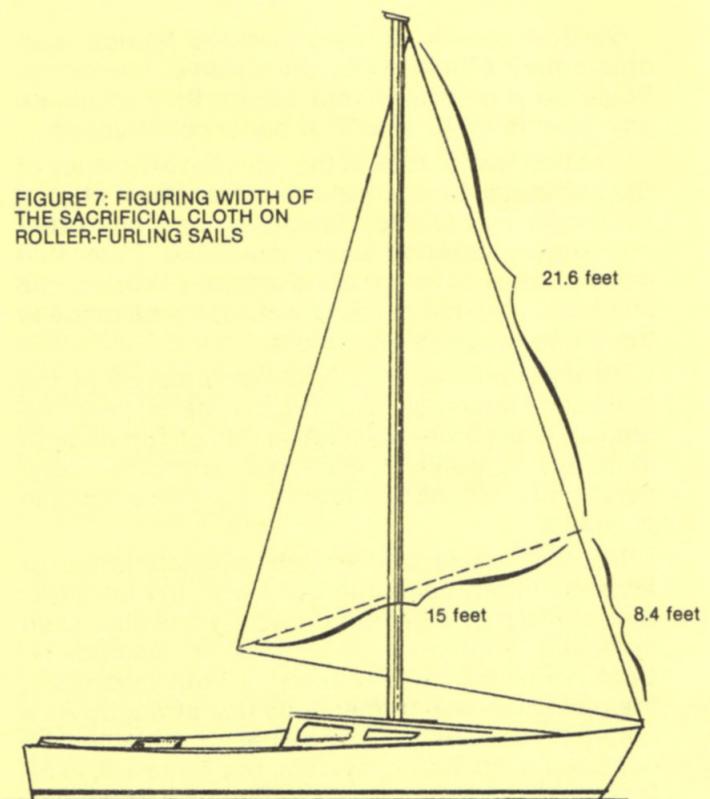


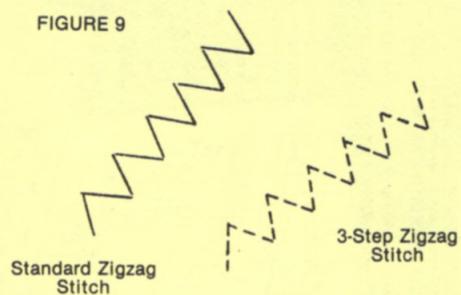
FIGURE 8: ILLUSTRATION OF THE NUMBER OF TURNS REQUIRED TO FURL THE SAIL FULLY

Lynn Dugan of Palm City, Florida, asks "Why should I use a light weight thread in spinnakers? Wouldn't a heavier thread work just as well and resist chafe better?"

A V-46 or V-69 thread would certainly serve the function of holding seams in place. It would be stronger and more durable than lighter weight thread. And the extra weight that it adds would be barely noticeable.

But there is one serious problem. The larger thread requires a larger needle and more tension to properly "set" the stitch. As a result, it is difficult to sew light weight nylon without puckers when a heavier thread is used. Even V-30 thread, if it is brittle or stiff, can cause puckering problems in these light weight materials.

FIGURE 9



Some sailmakers have turned to three-step or four-step stitch machines to reduce their pucker problems. This stitch is, in essence, a straight stitch that turns 90 degrees every three or four penetrations. It makes possible the use of a heavier thread than the true zigzag stitch. And it reduces the tendency for spinnaker stitches to snag. There are just two disadvantages: production speed is slowed and recutting is difficult (ripping seams out is a real chore!).

**zigzag/zigzag/zigzag
zagzag/zagzag/zagzag
zigzag/zigzag/zigzag**

?????????

Ask Jim

Letters to the Editor

Dear Jim,

The word got out that there was someone in the "neighborhood" that could work on sails and that it is not always necessary to go to the "big City boys" to have some sail repair work done.

I have had several inquiries about building new sails for people but have put them off because of time constraints. My original plan was to build my own sails to use for club races this season but it now will have to wait another year. I am really anxious to set to work on building my sails.

Very truly yours,
Ray Leonard



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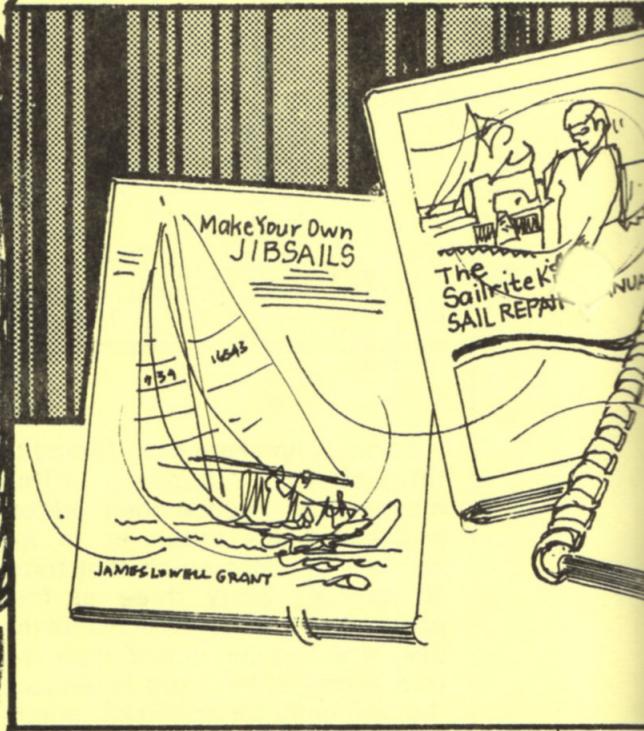
The Sail Repair Manual

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It was just 13 years ago that we first published books that have guided so many people. They have been improved in minor ways in three or four editions since their introduction, but had not been a major revision.

During this past year we have been very busy. The result is a completely new **Canvas Worker's Manual**, a new **Spinnakers: Their Design and Construction Manual**, a new **Sail Repair Manual**, and a new **Jibsail Manual**. These books now feature far more drawings and explicit text. In some instances instructions have been modified to reflect advances in the practical use of the subject. This is especially the case with our **Jibsail Manual**, which was almost entirely rewritten.



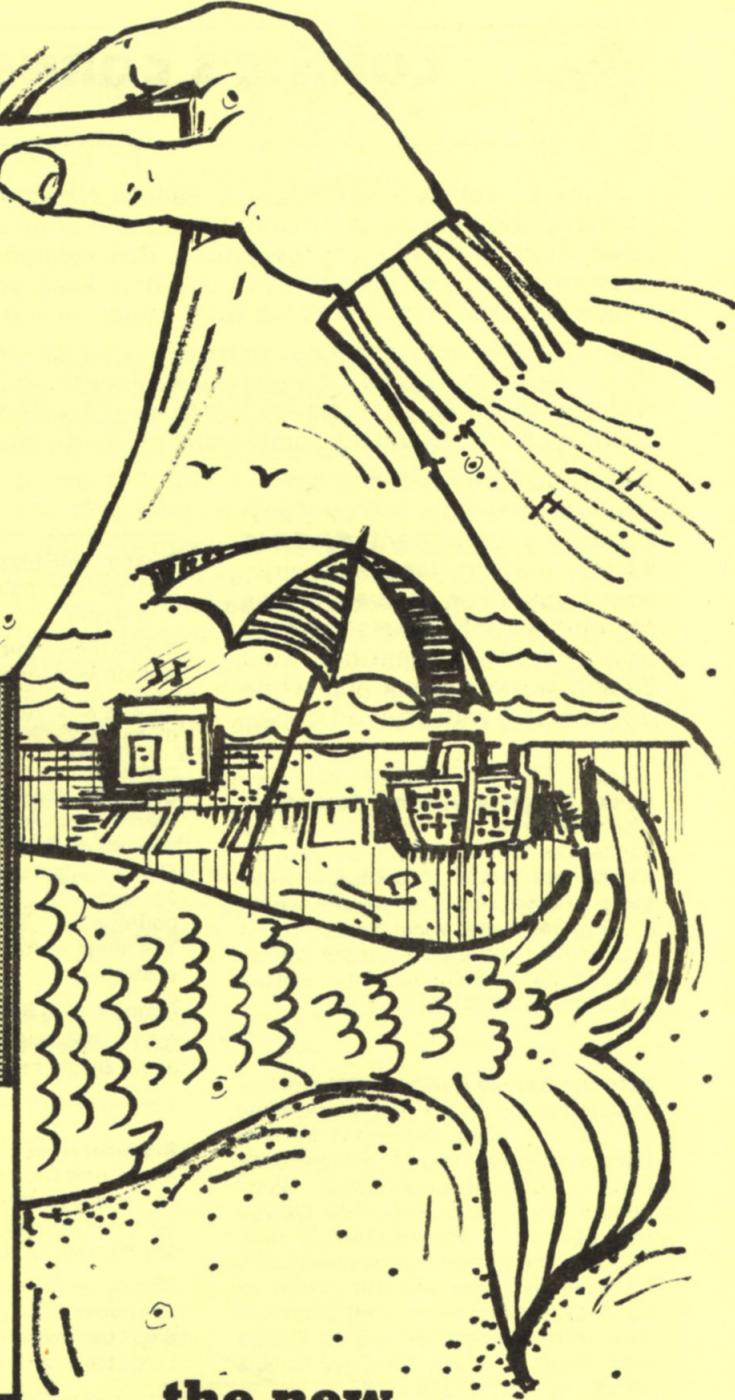
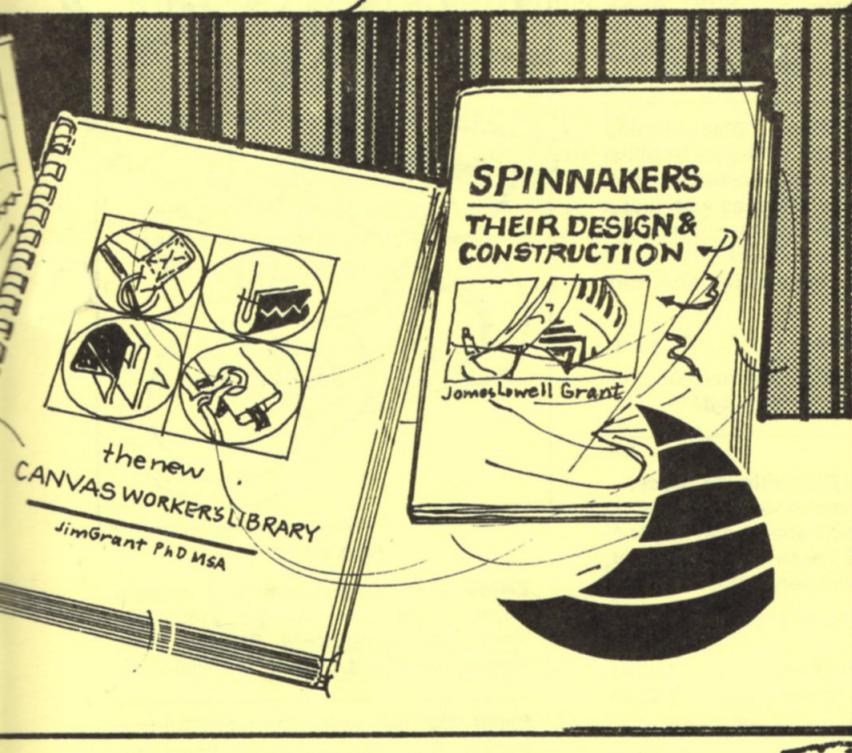
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Without doubt, these books are the definitive source of sailmaking expertise. They are used by professional and amateur alike. They are helpful not just for those who build sails, but also for those who want to understand how they should be used and modified.

Each book is written not just for entertainment (although they are entertaining) but for the sake of clarifying and explaining an old and treasured art form. The intent is to make it possible for everyone to understand and even participate in sailmaking as it is practiced today.

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CONNIE'S CORNER



Some of you will remember a Sailrite Newsletter where Connie gathered together all the discontinued and shop-worn items and offered them for sale at very **low** prices. This section of the Fabric Foils is an outgrowth of that. We will use it to keep you informed of the miscellaneous items which we want to get off our shelves.

It is also a good way for you to do the same. Classified ads are **FREE** for current subscribers. The ads are subject to editorial selection and space availability. They are limited to one-of-a-kind opportunities and small lot sales. Standard commercial products are **NOT** eligible.

Free ads are limited to a maximum of 50 words. The only payment is your current **FABRIC FOILS** mailing label to verify your subscriber status. Photos of items for sale are also printed free — space permitting. Just submit a clear black and white photo along with your ad copy.

Nylon Backpack Netting Seconds in Charcoal. Great for "drying" bags and hammocks. Strong but not suitable for trampolines since nylon sags when damp. Flaws primarily in the color. \$2.49/yd. (44 inches wide). Sent postpaid in quantities of five yard or more. Sailrite Kits, Route 1, Columbia City, Indiana 46725. Phone (219) 244-6715.

Adhesive-Backed Numbers. Old stock in assorted colors, sizes (red, black, blue, 10" 12" 15" high). Outmoded by new Dacron insignia material but perfectly usable. Some numbers vinyl, some ripstop nylon, some even new Dacron fabric but in off shades. Give us color and size and number preferences; we'll fill order as necessary with stock on hand. \$2.00/12 numbers, sent prepaid if 12 or more numbers are ordered. Sailrite Kits, Route 1, Columbia City, Indiana 46725. Phone (219) 244-6715.

Stablekote III Seconds. Often called 3/4-oz. ripstop nylon spinnaker cloth. Lots on hand. Surprisingly good condition. Rolls often less than five yards; some flaws in color. Give color preferences but don't hold us to them since we cannot order in colors when supply is exhausted. 40 inches wide. \$2.45/yd., sent postpaid in quantities of five yards or more. Sailrite Kits, Route 1, Columbia City, Indiana 46725. Phone (219) 244-6715.

Plastic Thimbles, Discontinued Stock. Suitable for light-duty applications in rope eyes.

1/4-inch rope thimbles \$.45 ea.
5/16-inch rope thimbles65 ea.

Sailrite Kits, Route 1, Columbia City, Indiana 46725. Phone (219) 244-6715.

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Olympic Slug Slides \$.45 ea.
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Brummel Hooks, Discontinued Stock. Brand new brummel hooks. There is no better way to secure sheets and halyards on small boats! These hooks are fast, strong, secure, and very light.

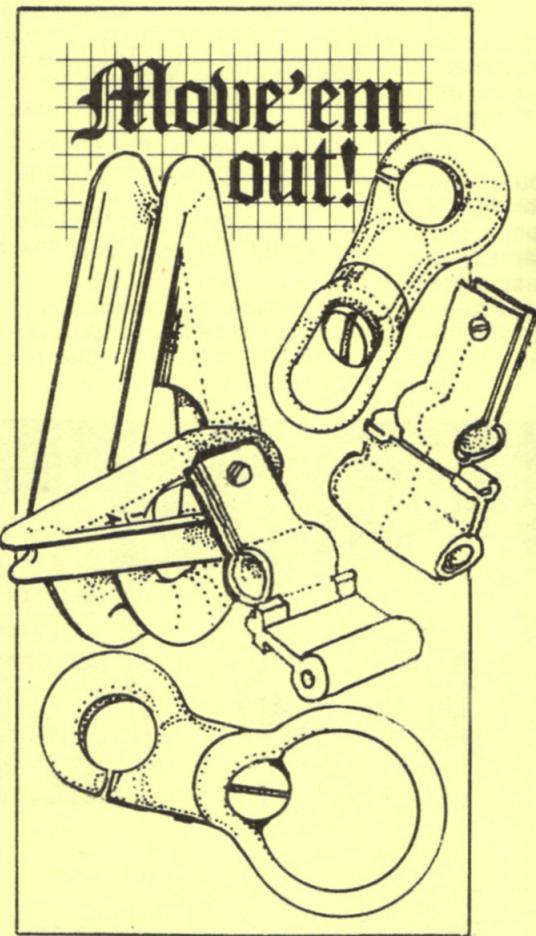
Size 00 — working strength of 500 lbs.
Eye hooks \$2.00 ea.
Small bail swivel hooks 5.00 ea.
Large bail swivel hooks 7.00 ea.

Size 0 — working strength of 1000 lbs.
Eye hooks \$3.00 ea.
Small bail swivel hooks 6.70 ea.
Large bail swivel hooks 7.50 ea.

Sailrite Kits, Route 1, Columbia City, Indiana 46725. Phone (219) 244-6715.

EZ Splice Kits. Tools and instructions for splicing 5/16-inch braid-on-braid or 1/4-inch hollow braid line. Discontinued item. \$1.45 each, sent postpaid. Sailrite Kits, Route 1, Columbia City, Indiana 46725. Phone (219) 244-6715.

The deadline for ads is the 15th of November, February, May, and August. The issues will appear two months after these closing dates, in January, April, July, and October.



FOR SALE

Enkes #18 2-speed winch, aluminum drum, brand new. Asking \$130. Ray Anderson, Island View Rt., Box 543, Ranier, MN 56668. Phone (218) 286-5819.

Small Canvas Loft. Contact: Bridget Packer, Ship Shape Canvas, Sausalito, California 94965. Phone (415) 331-2497

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Used In Good Condition: (a) long arm zigzag; (b) Long arm heavy straight stitch; (c) Nautilus press with accessories. Call collect (617) 999-3535. Olie Craft, Inc., P. O. #H-3081, New Bedford, MA 02741

Write to Connie Grant, Whitley County Publishing, Inc., Route 1, Columbia City, Indiana 46725.



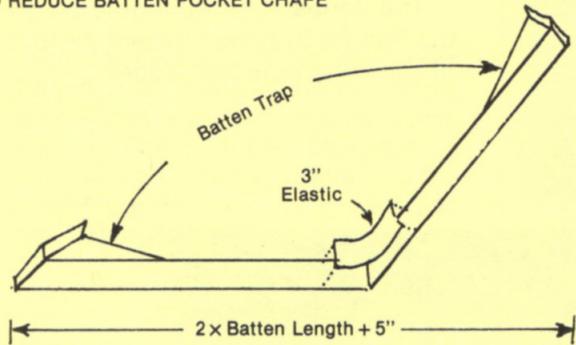
John Hjorth of Mare Co. Sails in Marina del Rey, California, makes the following suggestion concerning batten pockets. These pockets are a constant source of chafe. And it is just as often the sail that is chafed at the pocket. This often invites serious damage if the chafe is not quickly repaired. In order to both reduce the required frequency of repair and limit damage to the pocket itself, John builds his pockets as completely separate units with a layer of fabric under the batten to protect the sail.

A strip of tape roughly one inch wider than the batten to be used and twice its length plus five extra inches is cut. This tape is folded in its center and a three-inch strip of elastic is sewn in the folded end so that a pocket $\frac{1}{2}$ -inch shorter than the batten will be created when the two ends are hemmed $\frac{1}{2}$ -inch. This means that the ends of the elastic should be secured.

Then sew both long sides of the batten pocket together. This can be done at the same time the pocket is attached to the sail if you are careful not to let it slip. Or you may prefer to take things one step at a time. If so, you will sew the pocket together and then secure it to the sail.

Note that nothing has been said here about the batten "trap" at the leech end of the sail. There are a number of traps in use — we normally use a simple triangular entrance chute that is added to the basic pocket above.

FIGURE 10: BATTEN TRAPS AND 3" ELASTIC STRIP INSTALLED TO REDUCE BATTEN POCKET CHAFE



TIPS

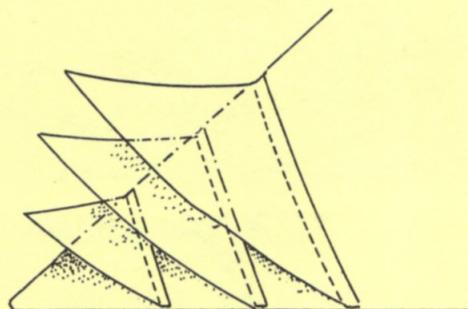
worth passing on...

John Hughes of Marion, Massachusetts, suggests that corner patches be sewn in place one at a time so that the load from the corner is transferred through the different layers to different points in the sail. Indeed, this procedure will distribute the stress over a much greater area of the sail.

Such corner patches were standard practice in the days when sails were made of cotton or flax. Corner assemblies were a constant source of trouble and utmost care had to be taken to maximize strength there. Lately sailmakers have begun to take shortcuts in building patch assemblies since the new Dacron and nylon materials provide ample safety margins in strength. One such shortcut is to sew through all the layers of a patch at one time—the patch assembly can thus be finished in one operation.

But the traditional method that John describes is best and a careful workman will build a stronger sail if he uses it.

FIGURE 11: CORNER PATCHES SEWN IN PLACE TO DISTRIBUTE STRESS



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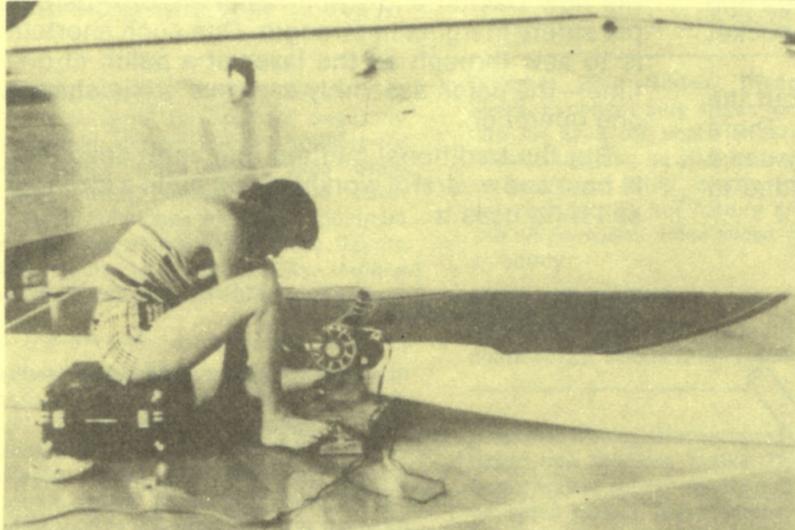
on the waterfront



Mike Oliveau, the first Sailrite Kit customer back in 1969, has made many sails — all for his own use. He has developed quite a reputation for innovative sail design among Cal 20 sailors. That reputation should be even more widespread now. He has just won, for the fourth time, the prestigious Marina del Ray Cal 20 Championships. Only Barry Cassano has equaled this feat, and Barry, too, has made many of his own sails.

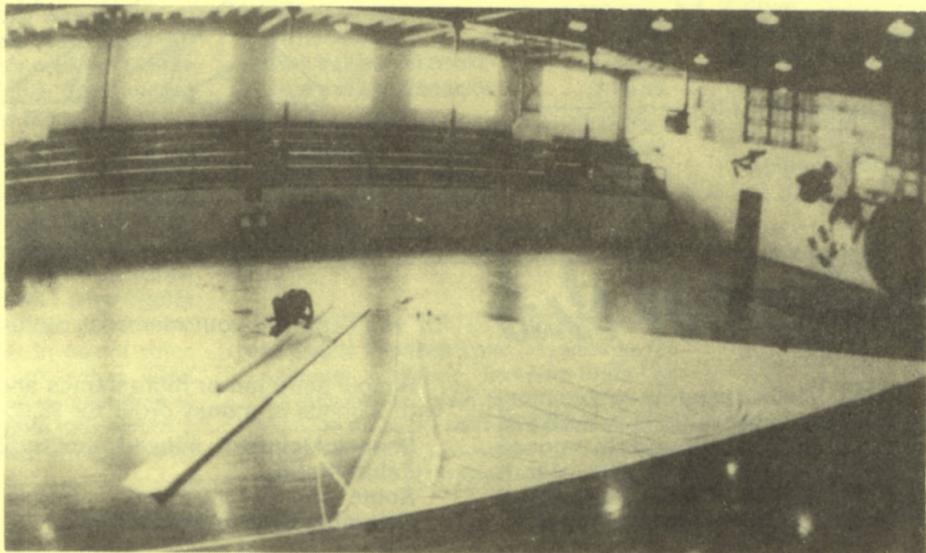
The victory was not without some "heavyweight" competition. Doug McLean, twice junior singlehanded champion of Japan and recently winner of the Southern California Cal 20 championships, was second. Bob Pistey, well-known "tiller jockey" and professional sailmaker was also in the running. Sails from almost every one of the prominent Southern California lofts were in use.

I have learned a good deal from Mike. He has a fertile imagination and the patience to test ideas exhaustively. We can hope that he will be able to win another four championships!



Chuck and Diane Jones send us these pictures. They built their boat and then the sails and all other fabric accessories. Note how appropriate a gymnasium can be for the construction of really large sails.

The Jones venture should be on the Pacific by now. I expect photos of the sails in action soon!

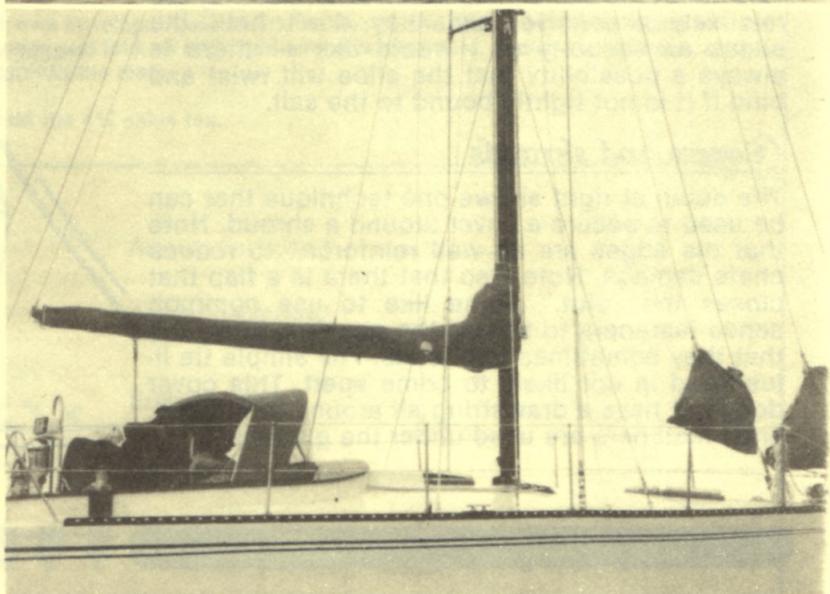
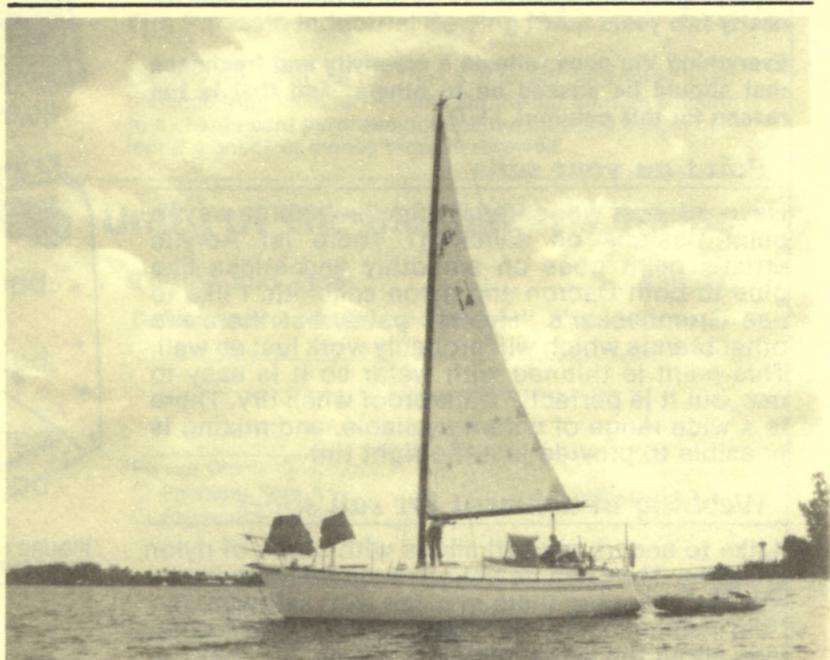




Dick McFalls of Seal Harbor, Maine, sends this photo of a 300 square foot mainsail for the "Golden Anchor." Dick finished this sail as well as the power boat enclosure shown here as part of his work for Unit III of the Sailmaker's Series. He is well on his way toward a Master Sailmaker's Certificate.

Lynne Dugan of Palm City, Florida, sends us these photos of her mainsail, sail covers, and dodger. Lynne has also made a yankee, 125% and 170% headsails, and an awning. She has earned her Master Sailmaker's Certificate in the Sailwright Academy. The quality of her work is just excellent!

Judy Tepley's loft in Superior, Wisconsin, **Wind Catcher Sails**, was given some excellent coverage in **The Evening Telegram**, a local Wisconsin newspaper. As the paper points out, Judy came to sailmaking after four years as a seaman on the ore boats that ply Lake Superior and Lake Michigan. She started the first Unit of the Sailmaker's Series while serving as steward on the boats. Upon the completion of that work, she became a resident student for six weeks. In those six weeks, she built six sails, some of them very large. The work was quite intense: there were many 16-hour days spent over a sewing machine. But all the work has paid dividends: Judy now has a quite successful loft. She is able to exercise her natural ability as an artisan. And customers are keeping her busy!



VIC'S LOFT

This is the first of a continuing series of columns by Vic Kaminsky. Vic is an engineer with the Tennessee Valley Authority who also owns a machine shop and a new sail loft. Vic is the one responsible for the two-speed drive on our Sailwright Sailmaker sewing machine. He modified his own, then he sent me one. It made such a difference in machine performance that we immediately made it a standard feature of the machine. Vic has been supplying the two-speed drive for all of our machines for nearly two years now.

Everything Vic does reflects a creativity and freshness that should be passed on to others. And that is the reason for this column! J.L.G.

Paint on your sails

Have you ever wondered if there isn't some way to paint designs on sailcloth? There is! Acrylic artist's paint goes on smoothly and sticks like glue to both Dacron and nylon sailcloth. I like to use Grumbacher's "Hyplar" paint, but there are other brands which will probably work just as well. This paint is thinned with water so it is easy to use, but it is perfectly waterproof when dry. There is a wide range of colors available, and mixing is possible to provide just the right tint.

Webbing attachment for sail slides

I like to secure my sail slides with strips of nylon webbing. They can be put on much faster than by whipping them in place with sailtwine the "old fashion" way. Shackles can be used to provide about the same installation time, but they are relatively expensive, and they don't hold the slides as securely as I would like — there is always a possibility that the slide will twist and bind if it is not tightly bound to the sail.

Covers and shrouds

The detail at right shows one technique that can be used to secure a cover around a shroud. Note that the edges are all well reinforced to reduce chafe damage. Note also that there is a flap that closes the "slot." Some like to use common sense fasteners to secure the opening, but I find that they sometimes pull loose. The simple tie illustrated is not likely to come apart. This cover does not have a drawstring all around it. Instead, snap fasteners are used under the gunnels.

FIGURE 12: COLOR RANGE AVAILABLE USING ACRYLIC ARTIST'S PAINTS ON SAILCLOTH

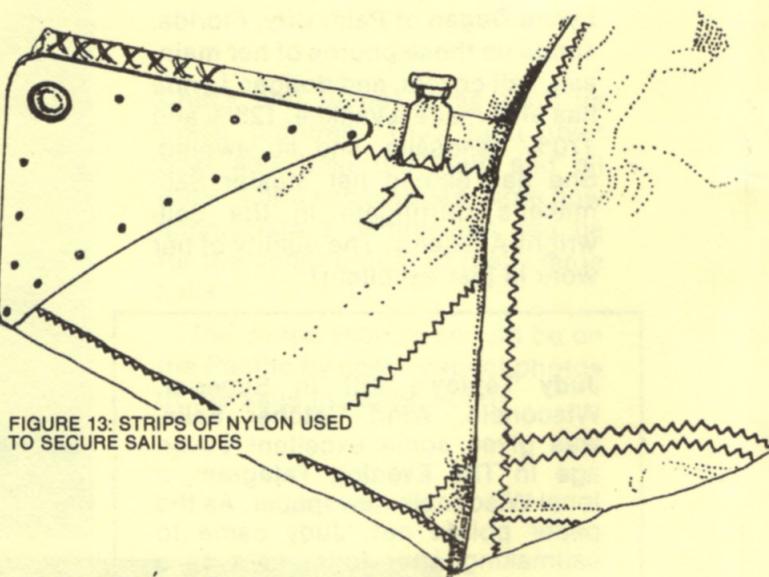


FIGURE 13: STRIPS OF NYLON USED TO SECURE SAIL SLIDES

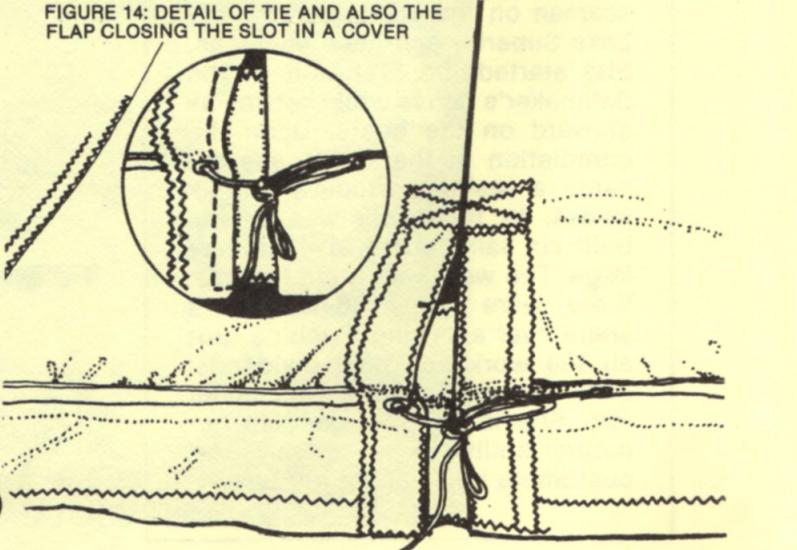
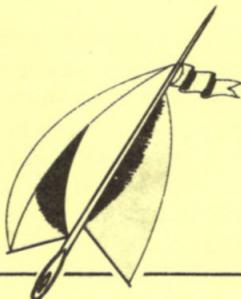


FIGURE 14: DETAIL OF TIE AND ALSO THE FLAP CLOSING THE SLOT IN A COVER

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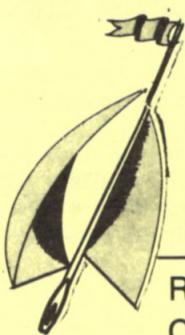
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TAPE THIS EDGE DOWN

The Hildamatic Drifter

An ad on page 224A of the March 1982 *Sail* asks, "What the heck is a Hildamatic Drifter?" The copy goes on to explain that it is a 170% or a 180% drifter with drawstrings on the foot and leech. These drawstrings, the ad proclaims, allow "multiple variations in shape."

"Just give these strings a good tug," it goes on, "and you've got a big baggy sail to catch the breeze" downwind or in light air. And, "to weather, loosen the strings for a flat, powerful, lightweight genoa."

Hild Sails has been using this ad for many years. It is interesting to note that the "adjustable" sail that sometimes illustrates the copy is always shown in its "flat" mode. I have never been able to use drawstrings to substantially change the shape of a sail and neither has Hild Sails. When drawstrings are tightened, all they do is curl the very edge of the sail. The resulting hooked edge may be enough to make the sail "baggy" in some people's view, but it is not likely to contribute to boat performance in light air—even dead downwind where the shape of the foil is not critical.

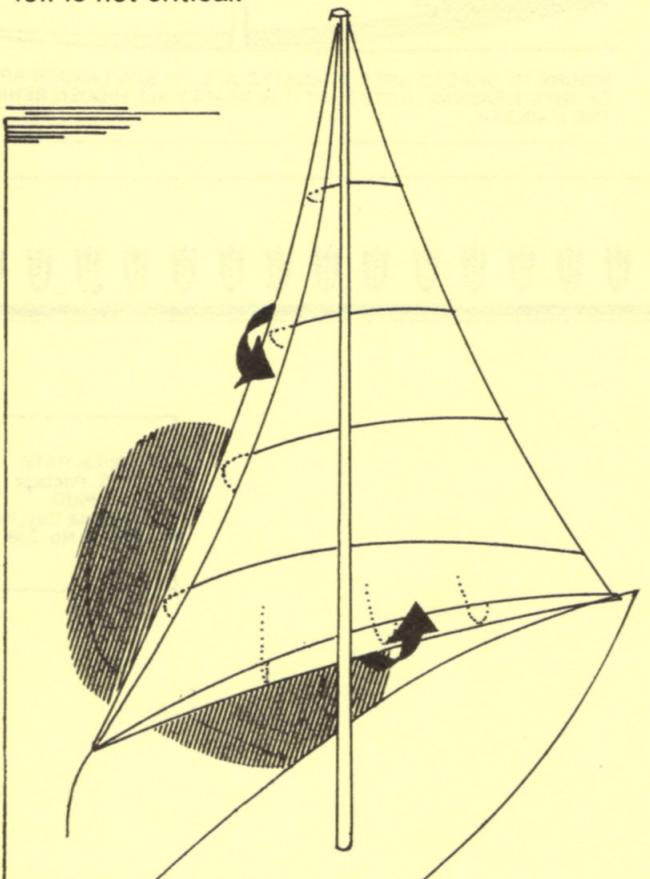


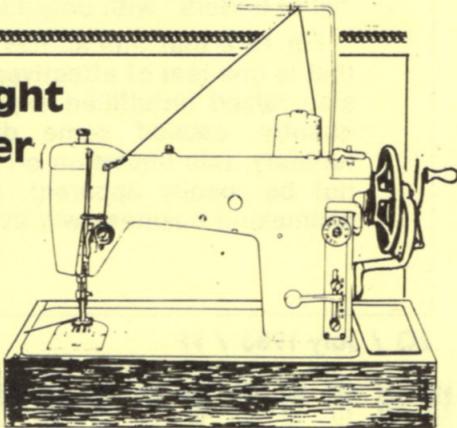
FIGURE 15: CURLING EFFECT OF DRAWSTRINGS ALONG LEECH AND FOOT

Drawstrings are not without function in light air headsails. They can keep sail edges that are designed to optimize performance in light air from flapping as the wind increases. For example, the leech of a #1 genoa would often have a leech hollow equal to about 1% of the length of the leech in order to keep the trailing edge of the sail taut in winds up to about 6 or 7 knots. Drifters often have no hollow at all since they are designed for very light air. But there are times when skippers will find it desirable to keep the drifter up even when the wind increases to the point where such a leech begins to flap so violently that it will shake the entire sail. A leech drawstring makes the sail useful in this kind of wind. It is, however, true that it does so only at the cost of a rather sharply cupped trailing edge—not an optimal shape, but a compromise more than justified by the extra area that is available in very light air.

Continued on next page

The Sailwright Moneymaker

At last, the sewing machine for you! Until now sailmaking and sail repair have been carried out either with small, lightweight, and often underpowered sewing machines designed for home use or with heavy and ridiculously specialized machines intended for volume commercial work.



Now...the **Sailwright Moneymaker** fits perfectly the requirements of sailor and of small loft. A "professional" machine intended originally for tailors but modified to meet the special needs of sailmaking and sail repair.

Complete with hand crank, powerful portable 110-volt motor and solid white oak carrying case, the **Sailwright Moneymaker** can be taken anywhere and used with confidence.

----- The Best Because -----

- Under arm space 33% wider, 20% higher
- Special locking needle bar gives better straight stitches
- Special wide feed dog and presser foot included with each machine—gives more consistent feeding even with slippery sailcloth
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The **Sailwright Moneymaker** \$995⁰⁰

Delivery (via UPS in two boxes) will run from \$10 to \$40 depending upon your distance from Indiana. We will add the appropriate amount to a charge card purchase or send the machine freight collect if a check or money order is received.

In the same way, a foot drawstring can control a very large foot roach as the wind increases. But it would certainly be a mistake to think that the extra cloth in that roach will ever move up into the body of the sail to create extra fullness. It will instead simply form sharp crease along the bottom of the sail.

One other element of this ad deserves comment. It suggests that a drifter should be "approximately 20% to 30% larger than your #1 genoa. It's usually a 170% to 180% headsail, or more." I am not convinced that this is wise. Even if there is no rating penalty incurred for the larger sail, the extra area will be hidden behind the mainsail where it does little more (in light air) than weigh the sail down and cause it to hang limp rather than filling to take on its intended foil shape. On a run it is seldom possible to wing out large sails effectively unless an oversized whisker pole is used—and these are difficult to store and set. I seldom design drifters with more than a 150% overlap. And for very light air, I design sails that I call "wind finders" with only 130% to 140% overlaps.

I'm sure that this ad has sold many sails. And that is one test of effectiveness. But it has surely also raised unfulfilled expectations and, consequently, caused some dissatisfaction. Unfortunately, this limitation on its effectiveness may not be readily apparent, but all of us in the sailmaking business will eventually feel it. FF

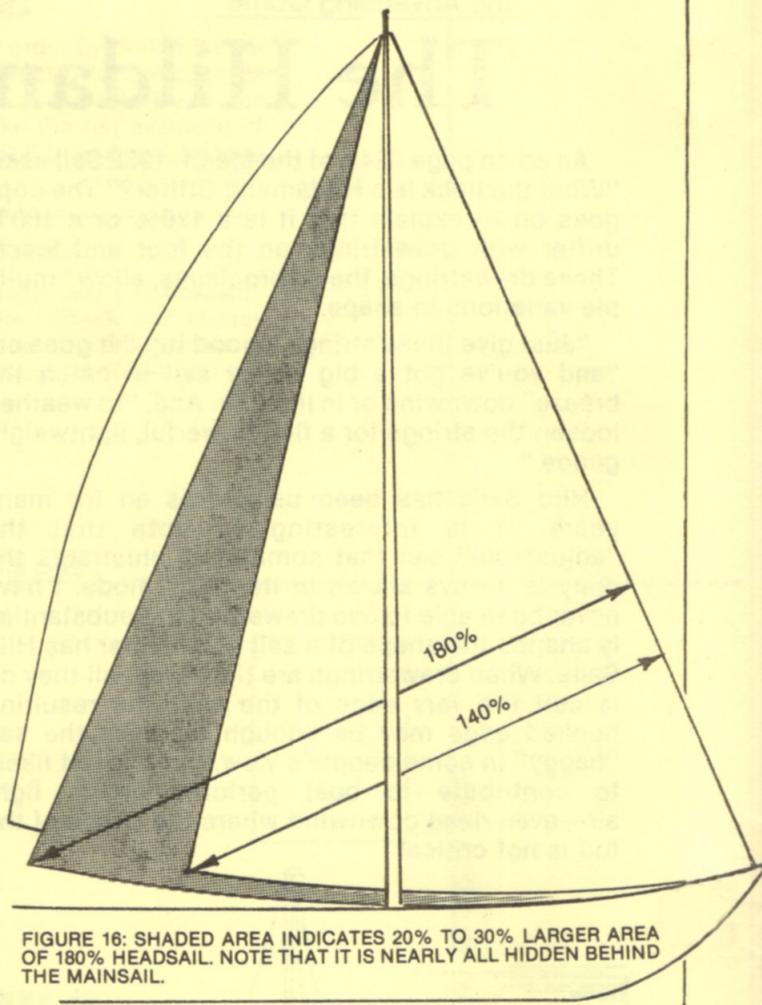


FIGURE 16: SHADED AREA INDICATES 20% TO 30% LARGER AREA OF 180% HEADSAIL. NOTE THAT IT IS NEARLY ALL HIDDEN BEHIND THE MAINSAIL.

20 / July 1983 / FF



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