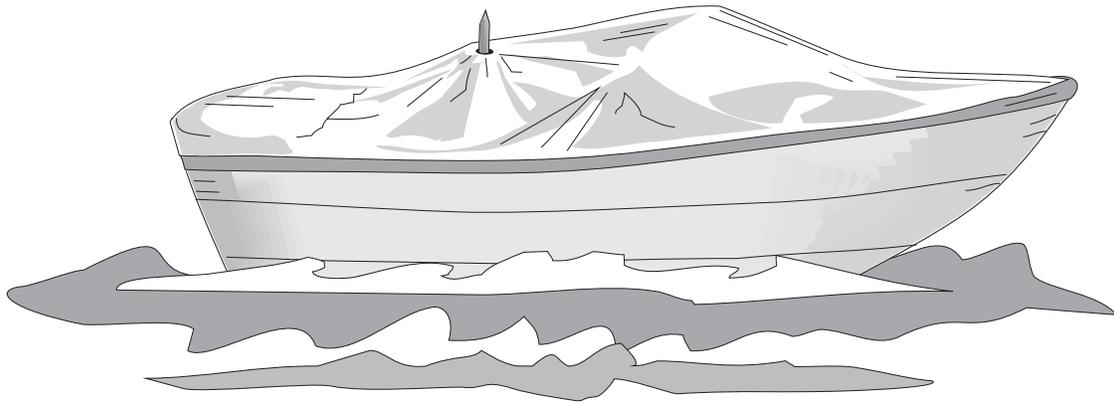


## Boat Covers

There are two basic kinds of boat covers. We generally use the word “mooring cover” when we mean to describe a cover that is left on the boat to provide protection when it is in the water or on a lift (a “tonneau” cover is a partial mooring cover, usually designed to cover an open cockpit only). And those covers that are used to cover the boat in storage or in transit are called “trailer covers.” The distinction is important because the two uses require quite different construction techniques. A mooring cover must be easily removed and stored. A trailer cover must be extremely tough to resist a possible buildup of snow and ice and well protected from the chafing damage that might otherwise occur in the 60 plus mile per hour slipstream behind a towing vehicle.

*Self-Reliance Under Sail*



## Materials

Fabric choice will depend, in part, on the use for which the cover is intended. Mooring covers are usually made of the Dacron or Acrylic cover fabrics like "Top Gun", or Dacron Cover cloth or "Sunbrella." These fabrics hold up very well in the sun and they also "breathe" to keep condensation to a minimum.

These same fabrics are also used for trailer covers, but special care must be taken at likely chafe points, especially with the Sunbrella (acrylic) materials—their only weakness is their tendency to chafe rather quickly. Leather or vinyl patches sewn under the cover can be used to provide this protection wherever the fabric rests on a corner or edge.

Some like to use the vinyl coated polyester fabrics (like “Weblon”) for trailer covers, too, even though they do not

breath. Their resistance to chafe is very good and they are, of course, completely waterproof. The condensation problem can be avoided by building several vents into the cover.

In addition to fabric, you will need thread, fasteners, leather, and line. The thread should be V-69 or V-92. Both will work. The V-69 has the advantage of better sewability and longer runs between bobbin rewinds. The V-92 is somewhat stronger. In either case, it is wise to use a white thread since dyes can make the thread more brittle and more susceptible to ultra-violet degradation. But this is not to say that colored thread cannot be used.

## **FASTENING SYSTEMS**

A number of fastening systems can be used depending upon your application. It is, however, important to decide upon a fastening system even before estimating cloth requirements since that system will determine how much the fabric will overlap the gunwales.

1. For small dinghys with bumpers or rub rails all round the gunwales, it is generally sufficient to fabricate a casing in the cover edge with a drawstring that can be used to gather the cover in under the edge of the gunwale. See Figure 1.
2. An alternative is cloth to surface snap fasteners secured at 18 to 28-inch intervals all round the boat. Lift-the-dot fasteners work well here also except that I find them more likely to break off the boat since they protrude a bit farther than the snap fasteners do.
3. Larger boats, especially those that will be trailered with the cover in place, can make good use of line run from side to side under the boat. See Figure 2.
4. Boats left in the water that have numerous obstacles to a drawstring like stays and shrouds, can make use of weighted bags to hold the cover in place.

## **RIDGE POLES**

Also plan now for any ridge pole installation. Ridge poles increase the effectiveness of the cover by reducing the tendency for rain water to pool. They also increase air circulation under the cover, reducing the likelihood of condensation. See Figure 3.

There are three general categories of cover supporting systems: 1) battens extending from side to side across the boat, 2) a ridgepole running fore and aft, and 3) stakes used vertically like a tent pole to form a peak in the cover. Depending upon the support system used (or even whether one is used) more or less fabric will be required.

It is not possible for me to recommend one fastening system or one type of support system. The choice must always be made in light of a consideration of the requirements of the cover in question. Read over this section and the "Principles of Canvas Work" section before making your decision.

## CONSTRUCTION

Boat covers must of necessity be custom fitted. In spite of this, they are all constructed in essentially the same way, and the construction steps are remarkably easy. The five steps to a finished boat cover are carefully described below. Read these instructions carefully before proceeding. The peculiarities of the cover you have in mind may require an alternative method or technique here and there. Nevertheless, these instructions will provide the principles of construction which you will need.

### I. Constructing the Basic Cloth "Blank"

The blank is a rough piece of fabric that will cover the boat with an extra allowance for fitting and finishing. It is usually made up of thwartship panels since rain can be more easily shed when it runs along seams rather than into them. (I assume a cover with its highest point along the center line.) But, especially with small boats, you may want to cut panels that run fore and aft in order to simplify construction and minimize waste. In either case, principles of construction will be similar.

- A. Measure the boat by running a line (string, tape measure, or similar device) from the bow to stern down its center. Make sure that this line goes over all of the support structures which you will use. If there is width at the bow or stern (such as at the stern of the boat in Figure 4 with a stern pulpit), measure down to the deck of the boat. For example, if you are building the cover over a mast used as a ridgepole, your measurement would be along the top of the mast. If a tent pole is being used, run the line up and over the top of the pole (Figure 4).

The number of panels needed will be determined by this

Figure 1

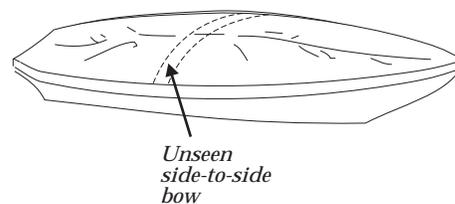


Figure 2

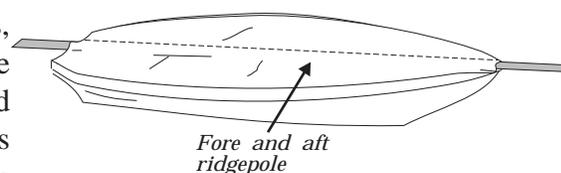
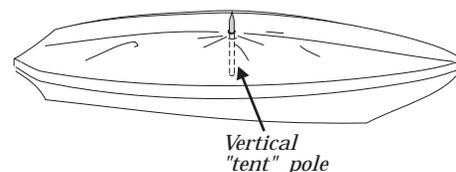
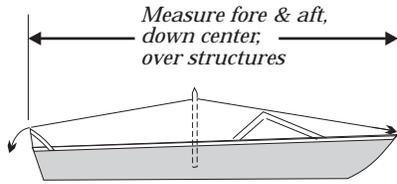


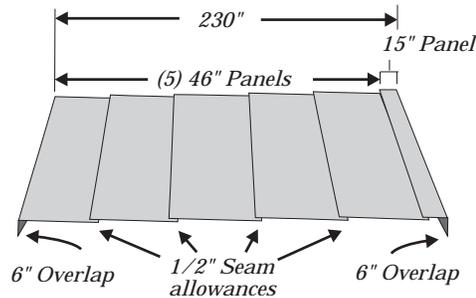
Figure 3



**Figure 4**

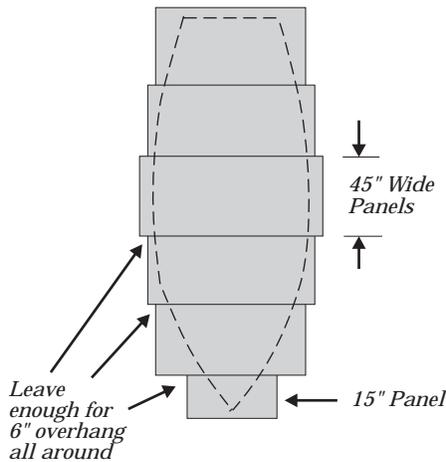


**Figure 5**



**Figure 6**

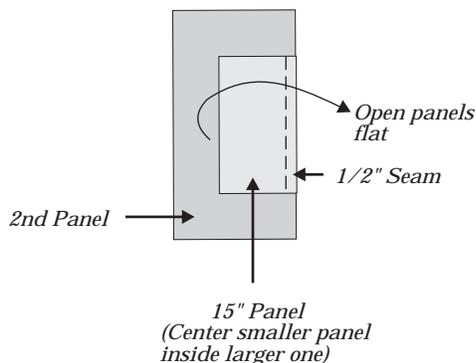
Measure & cut panels only to length needed, plus 6" overhang



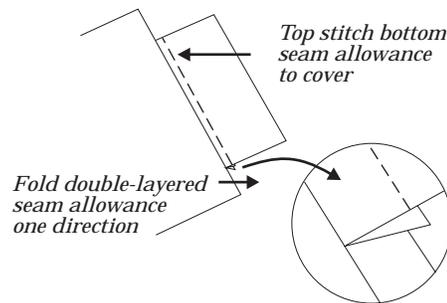
fore and aft measurement plus allowances for seaming of 1/2-inch per panel and overhang at the bow and transom of 6 inches each. If, for example, your fore and aft measurement was 230 inches and your fabric was 46 inches wide, you would add 12 inches to the 230 inch measurement and divide by 45 1/2 inches (the width of your material less 1/2-inch for seaming allowance). For this cover you would need five 46-inch panels and one panel of approximately 15 inches.

- B. Now measure from side to side at each seam starting at the transom to determine the length of each panel (see Figure 5). Each panel should include a 6-inch overhang below the rail on both sides. The ridgepole must be in place when this is done. If a tent pole is being used leave the line used in step A in place to insure that the panels will be long enough. Cut these panels as you go. Repeat this procedure until you have enough panels to cover the boat. See Figure 6.
- C. Sew your panel sections together in their order of measure-

**Figure 7**  
(Front two panels of cover)



**Figure 8**



ment. Use a blind stitch (also called semi-flat felled): place the two panels to be joined one directly over the other (Figure 7). Take care that each panel is centered over its neighbor. Place a row of straight stitches 1/2-inch inside the edges of the panels where they are to be joined. Now open the sewn panels out and spread them flat. Fold over the “seam allowance” (a double layer of cloth 1/2-inch wide protruding beyond the joined pieces) and sew it to the cover with a line of stitches (straight stitches are normal here, but make them as long as possible). The finished seam will have a cross section like that represented in Figure 8.

## II. Adding Shape to the Cloth Blank

Adding shape to the cloth blank can be done in one of two ways. Minor protrusions from otherwise flat surfaces can be provided for with separately fabricated assemblies that can be “let into” the cover. And more extensive shaping and moulding can be accomplished with a “darting” technique. Both are really just different ways of looking at the same thing.

A. For smaller obstacles like lights and flag staffs, fashion boots from scrap cloth to fit the object .

1. First, mark the underside of the cover at each object. Remove the blank from the boat and cut holes to accommodate the object in question. These holes should be either circular or rectangular. Make them large enough to permit easily sliding the cover in place. With a vinyl coated fabric, use scissors for this task. All other synthetic fabrics (polyester and acrylic) should be cut with a “hotknife”, i.e., a soldering gun with a narrow tip or a wood burning tool. This will seal the edge of the material and keep it from raveling.

2. Then cut a rectangle of cloth long enough to go all the way round a line drawn 1/2-inch outside the opening just cut plus one-inch for a seaming allowance (Figure 9).

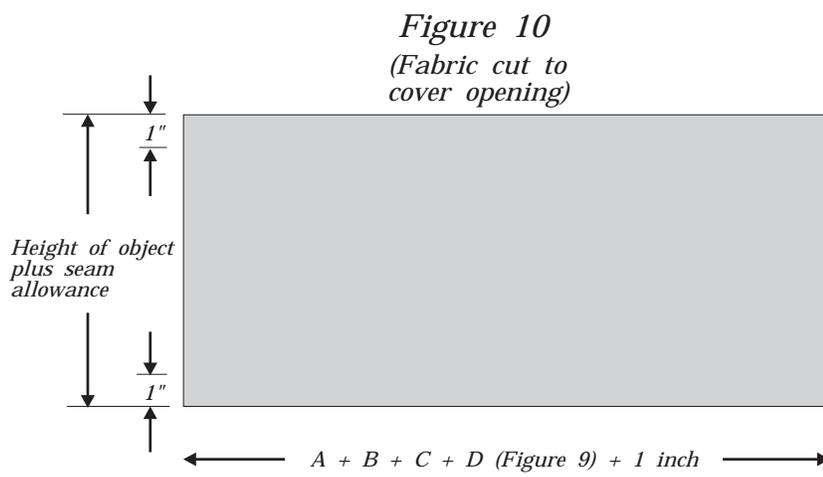
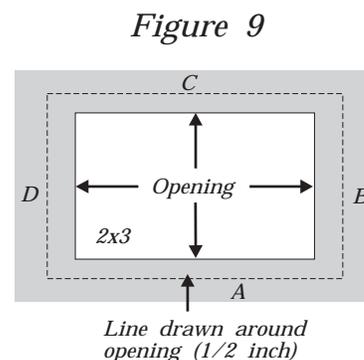
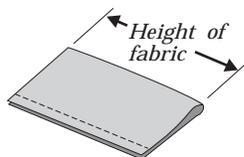


Figure 11

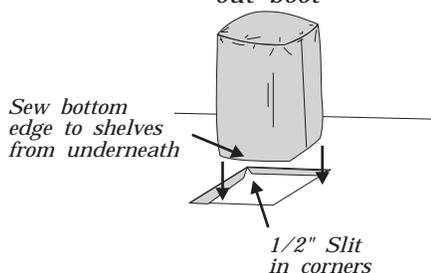


The rectangle should be wide enough to provide for the height of the object plus two inches of seam allowance. See Figure 10.

3. Sew the rectangle shut inside out with a row of straight stitches along its height sides (Figure 11). If the resulting sleeve is less than three inches in diameter or so, you may want to simply close the top of the sleeve with a similar row of stitches. For larger ones, however, it will look better if you cut a piece of material to create a top in the sleeve. Baste this in place carefully with staples or pins and sew all round it with a row of straight stitches. Turn the resulting boot right side out and insert it in the hole cut out for it. Cut 1/2-inch slits in the corners of the cover hole and secure the boot to the resulting shelves of the cloth which are folded down and in (see Figure 12).

Figure 12

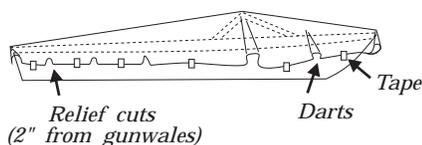
Rightside out boot



- B. Most of the fitting process is accomplished by stretching the fabric over the boat and marking it so that excess cloth can be removed. This process is very similar to the darting technique used in dressmaking.

1. Center the cover over the boat. If there are any fore and aft rolls in the fabric near the gunwales where it hangs down from the cabin or windshield to the stern, cut the material from the outside of the fabric blank to a point about two inches below the gunwales. These small "relief" cuts will generally be sufficient to fit the cover over relatively flat spars. Fashion these relief cuts in the edges of the fabric until the material hangs smoothly—the relief cuts should allow it to sag more naturally all along its width (see Figure 13).

Figure 13

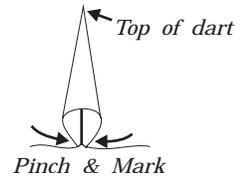


2. Tape the edge of the fabric to the hull every 18 to 24 inches. I like to use duct tape for this. Do not pull the cloth tight, just let it lay across the boat "naturally." There will be excess cloth at the bow, the corners of the stern, and at any other point where the cover makes a sharp break such as at a windshield or pulpit or cabin. A dart should be fashioned at each one of the points where there is excess cloth. Mark with a pencil or chalk the top of each dart where the excess cloth begins. Then smooth the cloth downward, gathering the excess in a

vertical line. Mark the bottom of the fabric where it touches below the gunwale (Figure 14).

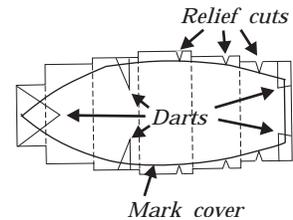
3. When all darts are marked, use a pencil or a chalk to mark everywhere that the cover touches the boat and may be subject to chafe. And then mark the cover around the entire perimeter of the boat at the bottom of the rubrail or just under the gunwale. When the cover blank is removed from the boat and spread out it should look like it does in Figure 15.

Figure 14



4. Mark all round the cover to indicate the line for final trim six inches or so below the gunwales.

Figure 15



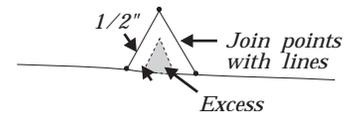
### III. Trimming, Sewing, and Finishing the Boat Cover

The cover can now be trimmed, sewn and finished with a skirt all around.

- A. Before trimming the cover, check the fairness of all the lines that mark the perimeter of the cover. Smooth them where necessary. Then cut all round just 3/4-inch outside of these lines. Use a hotknife here if possible to seal the cloth and keep it from raveling. Then join the points that mark the darts with straight lines and cut out the excess material, leaving 1/2-inch of extra cloth as a seam allowance (Figure 16). The cover should now look like the one in Figure 15.

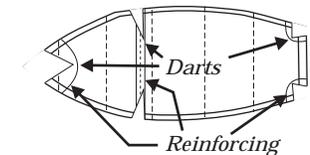
Figure 16

(Unincreased dart)



- B. The cover was marked earlier at all points where it touched the boat. Each of these points should now be reinforced with a layer of vinyl or leather (Figure 17). If this will be a trailering cover make the patches quite large since the cover may shift a good deal. Also reinforce the wedges that form corners — seven or eight-inch strips of fabric here are about right. All reinforcement patches should be basted in place with double sided tape, pins, or staples and sewn all round their inside edges with a straight stitch. The edges that run along darts or along the edge of the cover will be sewn when those edges are finished so they need not be secured at this point.

Figure 17



- C. Then sew the darts (Figure 18). Fold the cloth so that the edges of the wedge cuts and their patches are flush and

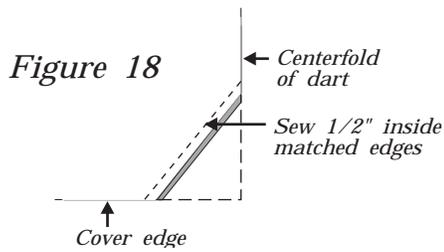
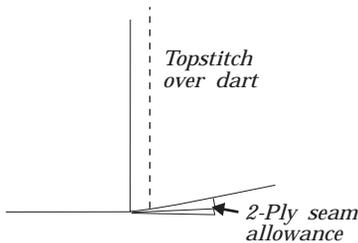


Figure 18

place a row of straight stitches 1/2-inch inside those edges. Then fold the seam allowance over against one or the other side of the dart and secure it with a “topstitch”, a second row of straight stitches (Figure 19). Make sure that all darts are finished so that the seam allowance is on the same side of the fabric as the patches installed above. This will, of course, be the side that is down against the boat and, thus, out of sight. It is a good idea to baste the darts before they are sewn to insure accuracy. A double sided tape, pins, or staples can be used for basting purposes.

Figure 19  
(Right-side out)



D. The edges of the cover will be finished with a narrow “skirt”. Cut 8-inch strips of fabric across the width of the material to form this skirt. Cut enough to go all the way round the cover and sew them together end to end using a semi-flat feld stitch (Figure 20). This long strip of cloth should be hemmed along one of its short 8-inch edges by folding over a 1/4-inch width of material and running a straight stitch down its center. Then fold the long strip lengthwise down its center over a length of 3/16-inch or 1/4-inch synthetic line that is at least three feet longer than the skirt so that the strip forms a sleeve for a draw-string. Place

Figure 20  
(Hem end of Skirt)

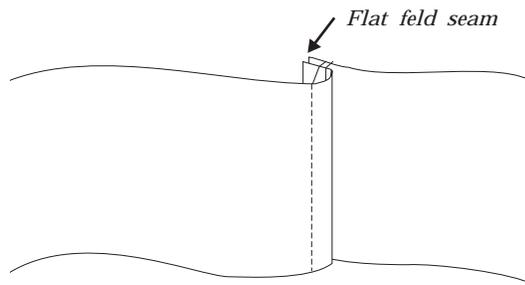
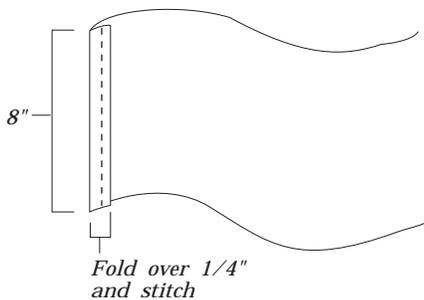


Figure 21

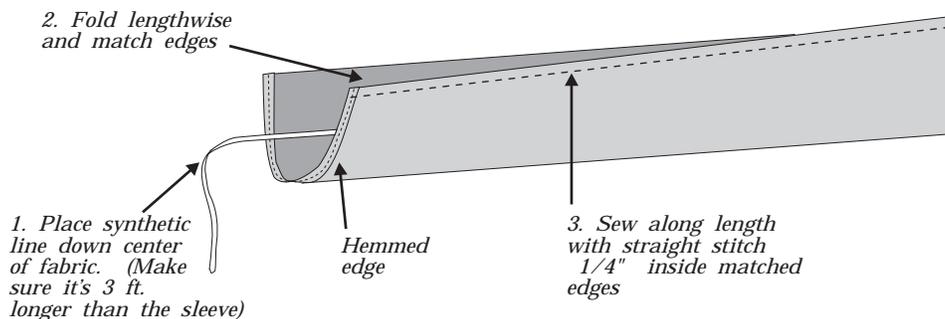
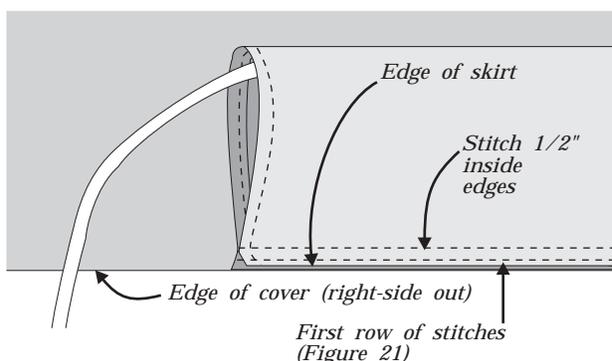


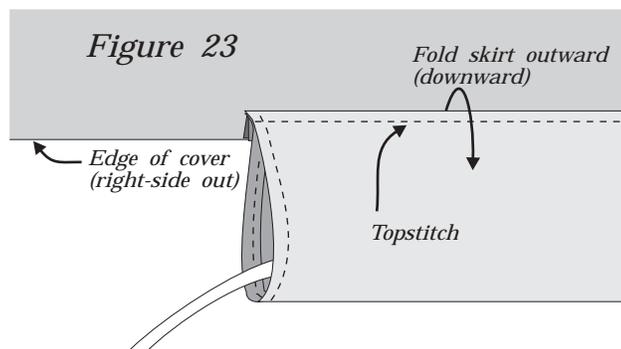
Figure 22



a row of straight stitches 1/4-inch inside the cut edges to close the sleeve along its length (Figure 21).

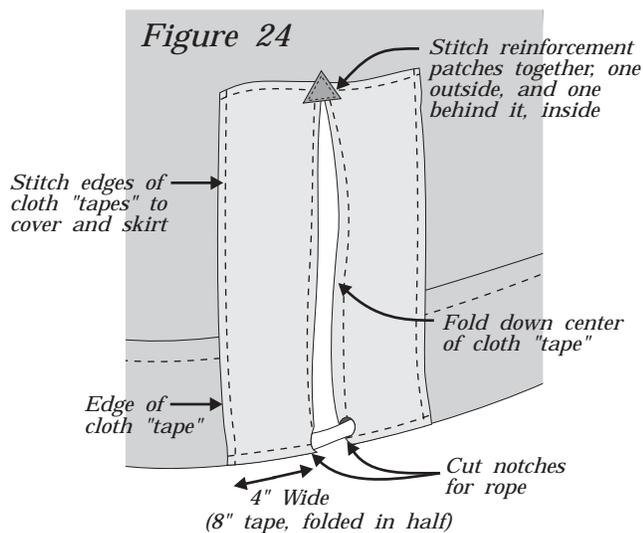
- E. Draw-strings are usually tied at the center of the transom so that the cover can be fitted around a tiller or a backstay or an outboard or a ladder. So this is a good place to begin attaching the skirt. Start with the end that was hemmed in the paragraph above. Simply lay the skirt on top of the outside of the cover so that the cut edges of the skirt line up with the hemmed edge of the cover itself. It will be "upside down". Run a row of straight stitches 1/2-inch inside these edges (Figure 22). The skirt will be finished by folding the narrow width of cloth outward and placing a second row of straight stitches, a "topstitch," in the seam allowance to tack it in place against the cover. Figure 23 shows a skirt in place.

Figure 23



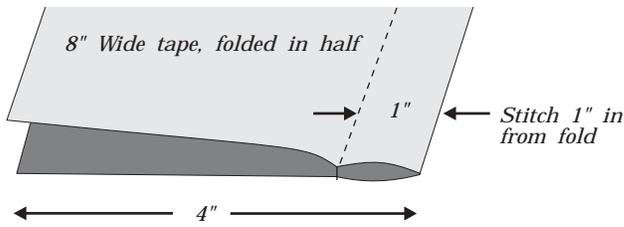
- F. Most sailboats will require two or more additional breaks in the skirt in the way of shrouds and stays or stancheons and pulpits. Indeed, it may be necessary to actually cut a slit in the cover at each such location. If so, use an 8-inch piece of cloth similar to the skirt to "tape" the raw edges of the slit. At the apex of the slit, cut two triangles of cloth 1-inch on a side and sew one of these as reinforcement on each side of the cover (see Figure 24).

Figure 24



- G. Some large covers will be easier to handle if they are in two pieces. And, if you are covering a sailboat with its mast in place, two covers — one forward of the mast and one aft of the mast make

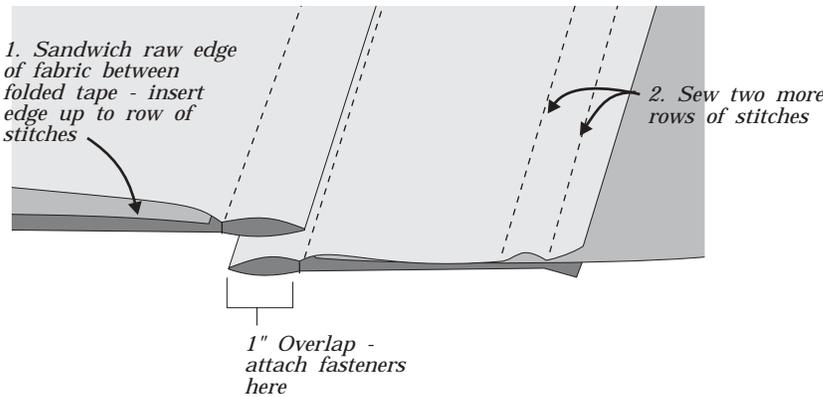
Figure 25



sense even if the cover is not very large. Or you may want to simply make a long slit from the bow to the mast in smaller covers. In each case, simply cut the cloth as required and use an 8-inch strip of cloth to tape the raw edges (Figure 25). But here we want the tapes to provide about 1-inch of extra cloth so that there will be overlap into

which snap fasteners, common sense fasteners, or Velcro can be placed to secure the covers together. I like to fold the tape in half down its center and place a single row of straight stitches one-inch from the folded side. Sandwich the raw edge of the fabric with these sewn tapes. Insert the fabric right up to the row of stitches. Then sew the flaps in place with two rows of stitches. See Figure 26.

Figure 26



H. There are several ways that flaps like the ones described just above can be secured.

1. Twist-lock or "common-sense" fasteners are installed with a small pen knife. Press the fastener stud or socket onto the cloth where it is to be placed so that its prongs leave slight indentations. Make a small slit in the cloth with the point of your knife over these indentations. It is a good idea to heat the knife blade before making the slit (if the fabric is synthetic) so that it will be well sealed. Insert the prongs of the stud or socket through these slits and place an appropriate backing plate inside. Then bend the prongs over onto the backing plate with a pair of pliers.
2. Lift-the-dot fasteners are installed in the same fashion as common sense fasteners.
3. The common sense or lift-the-dot fasteners will keep the cover secure while the boat is at the dock, but if the cover is to be used while trailering, it is a good idea to install grommets or rings along the flaps through which a line can be used to lace the cover together. Spacing will depend upon the strength required — anywhere from nine to eighteen-inch centers is normal. There are

three types of grommets that can be used. In ascending order of quality and strength they are: (1) common washer grommets, (2) teeth grommets, and (3) rolled rim spur grommets. We like to use rolled rim spur grommets for all of our covers. The #2 size (about a 3/8-inch hole) is appropriate for most cover work. If brass rings are used, they should be sewn to the outside of the flap with a loop of cloth folded to three thicknesses or with a length of webbing. Sew the loop of material to the flap with several passes through the machine so that it is quite secure (Figure 27).

4. Velcro can be sewn to the fabric to provide a quick and adjustable closure system. Sew all round the edges of the Velcro tapes with straight stitches.
5. Zippers can also be used for closures. The #10 Delrin zipper is the most popular for boat cover work. To install a zipper, first break it into two parts. Lay each part on top of the cover flap with the teeth away from the opening to be closed and the cloth zipper tape edge flush with the edge of the flap. Sew both zipper tapes in place with a row of straight stitches along the teeth. See Figure 28. Then fold the zippers under so that the teeth face each other. Fold the material back far enough so that there is a flap of cloth provided to partially cover the zipper. Sew the fold in place with straight stitches (Figure 29). Note that zipper installation makes full use of the 1-inch flap overlap provided in Step G above.

Figure 27

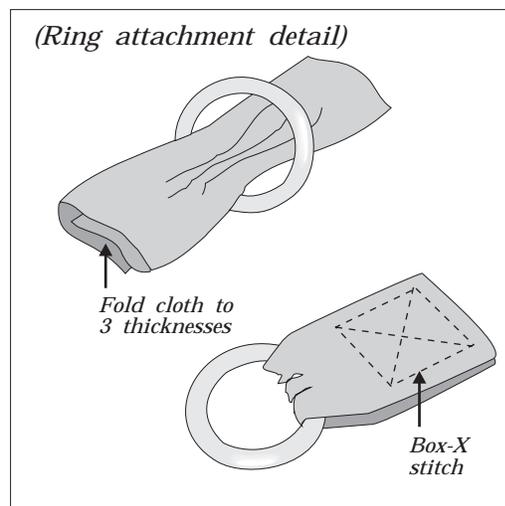


Figure 28

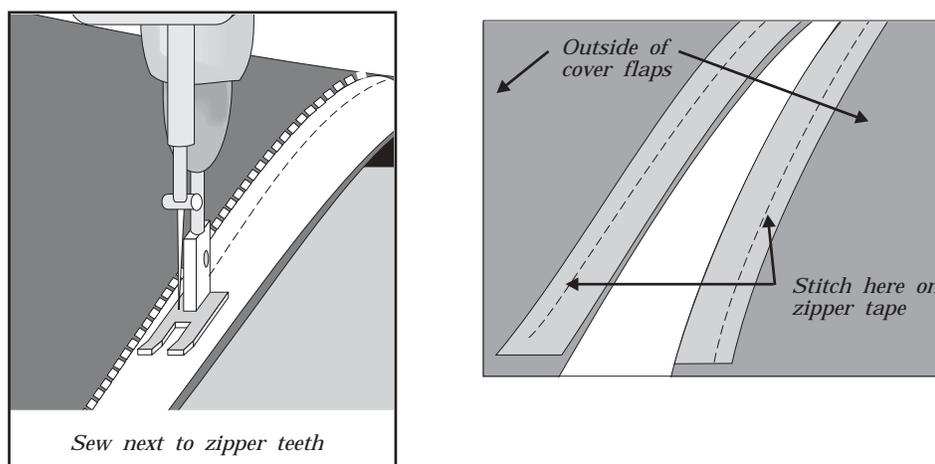


Figure 29

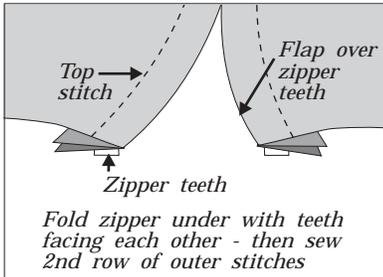


Figure 30

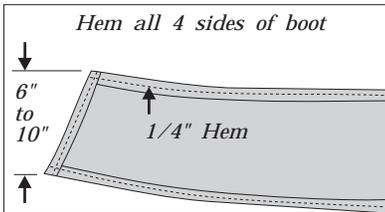
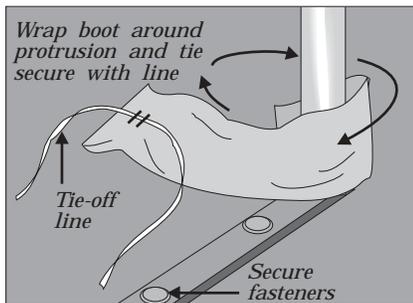
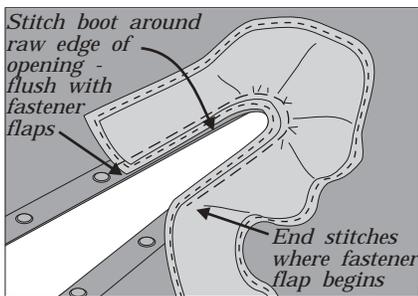


Figure 31

(Right sides of fabric are together)



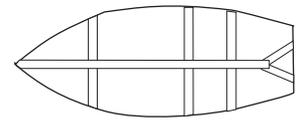
6. If there are any objects which protrude through the cover like a mast, a "wrap around boot" should be made up to seal the opening (Figure 30). Such boots are generally from six to ten inches high and are long enough to wrap from 1 1/2 to 2 times around the protrusion. Cut the boot and sew 1/4-inch hems on all four sides. Then sew the boot to the opening in the cover. See Figure 31. Lay the outside surface of the boot on top of the cover against its outside surface. Run a row of straight stitches 1/4-inch inside the two edges. Keep these edges flush as you move all round the cover opening. This will require careful positioning since the straight side of the boot must be made to go round the very "unstraight" opening, but it can be done and it will look good when you are done.

7. The drawstring in the skirt of the cover may provide all that is needed to keep the cover in place. But you may also want to install snap fasteners every two to three feet along or under the rub rail. Screw the male snap parts in place, then lay the cover over the boat and mark the exact location for the female part of the snap. These female snaps consist of a button and a socket. They can be quickly installed by first drilling a hole in the material with a 1/8-inch drill bit and then using an inexpensive tool to cradle the button and flair the rivet over the inside of the socket.

8. Additional security will be required if the cover is to be used while towing the boat. In this case, I like to use a length of 1-inch nylon webbing down the center of the cover from bow to stern and two or three lengths across the cover from port to starboard (Figure 32). Secure these "tapes" to the top of the cover with two rows of straight stitches. Carefully baste the webbing in place with staples or pins before sewing. Double sided tape does not stick well to the course webbing. At the ends of the webbing install a 7/8-inch brass ring in a loop of the webbing. Keep the ends short enough so that the ring is on top of the cover and does not hang down below it where it might scratch the surface of the hull (Figure 33).

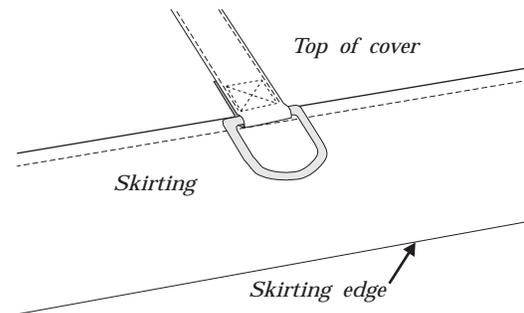
- For some covers used over boats left in the water, where it is desirable to avoid any fastenings in the toe rails or along the side of the boat, you will want to fashion sand bags along the edges of the cover and let their weight hold it in place (Figure 34). These bags should be roughly 12 inches by five inches finished. Make them from strips of fabric 25 inches by 6 inches. Fold the strips down their center (across their narrow dimension). Insert two strips of webbing or hemmed fabric as shown. Then sew the two long edges with a straight stitch just a half-inch inside the fabric edges. Turn the bag inside out, fill it with clean sand and sew the open end shut with a straight stitch after folding the raw edges inside (Figure 35). The two exposed strips should be used to secure the bags to the skirt of the cover at roughly 30-inch intervals.

Figure 32



(Placement of webbing strips)

Figure 33



Test your cover for final fit. Take the time to make minor adjustments — they will greatly prolong the life of the cover and improve its appearance at the same time. If there are any places where the cover is not well secured, add fasteners or tie lines as necessary.

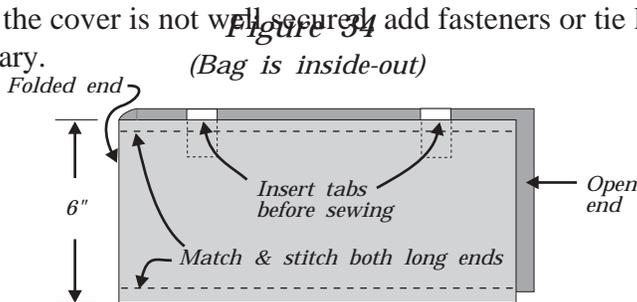
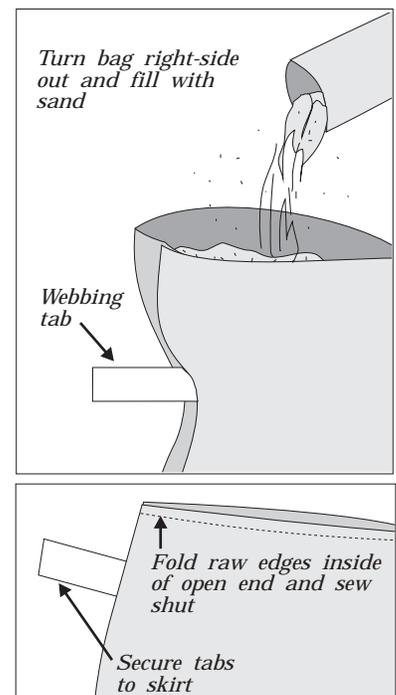


Figure 35



Self-Reliance Under Sail

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