ON-BOOM MAINSAIL COVERS

(This is a preliminary posting -- a "beta" version of these instructions. Drawings and photos will come later. Please let us know if you have any suggestions for improvements or clarifications.)

On-boom mainsail covers make the deployment and recovery of mainsails quite easy. The cover fabric is attached to the boom and left there while sailing. The cover is integrated with a lazy jack system so that when the sail is lowered it falls neatly between the halves of the cover which can be quickly zipped closed. The system works best with mainsails that have slugs or slides since they encourage a neat "flaking" of the sail as it is lowered, but it can also be used with sails that have boltropes run up a slot in the mast.

Let's review in general terms how the on-boom mainsail cover design works. The cover is in two halves that are secured along each side of the boom at their lower edges with "Flex-A-Rail" track. A boltrope is sewn along the bottom of each half and that rope is slide into the rail from the aft end of the boom to the gooseneck end. Similar short sections of track are attached to the mast to secure the leading edge of the cover halves -- boltropes are sewn there also. Lazyjack lines are strung from a point about half way up the mast to three or four webbing straps sewn within a couple inches of the top edge of the cover halves. These lines serve the dual purpose of topping lift and furling assist guides. Along the two top edges of the cover we install a long #10 Delrin zipper (sometimes two lengths of zipper are used instead of one full length one) with a fabric flap to serve as rain cap and sun shield. This flap will be sealed with a length of Velcro.

The key to a successful on-boom mainsail cover is careful measurement. The cover must be large enough to provide for the sail and it must also provide for the chance misdistribution of fabric if the drop is not "just right" but it should also be as small as possible if it is not to get in the way while sailing. So we will spend some time on measurement directions in what follows.

Divide the boom into four roughly equal segments and put a piece of masking tape at each segment joint. This should result in three strips of tape on the boom. Now drop the sail and furl it loosely on top of the boom. Use short lengths of webbing or line to hold it in place on the top of the boom. Measure the height of the sail "stack" at each tape mark and also at the gooseneck. Record these heights -- they will be used below.

We will pattern the cover right on the fabric. Spread it out on the floor and place marks along one edge of the fabric the length of the boom plus six inches. At one end place a mark up from this edge onto the fabric the height of the stack measured above at the gooseneck plus six inches. Proceed one-quarter of the original length down the edge and measure up the height of the first tape on the boom plus six inches. Follow the same process for the next two tape marks. At the end of the line along the bottom of the cover piece, place a mark six inches up. Then imagine a line connecting these marks. If that line is not fair, make it so by increasing the size of the cover height at one or more of the marked points.

Cut this cover "blank" from the roll of cloth. Scissors can be used for this task since all edges will eventually be folded under to prevent raveling. Turn the resulting wedge of cloth end-for-end and upside down to use as a pattern for the second side. Thus turned, it should fit nicely onto the remaining cloth segment so there will be very little waste. Place the two wedges on top of one another and mark them with a "SOUT" and a "POUT" to indicate starboard outside and port outside respectively. These marks can be made with chalk or with a pencil along an edge.

Attach prefabricated boltrope (often called awning rope) to the lower edge and to the leading edge of each wedge of cloth. The boltrope along the lower edge will not run the entire length of the cover. Start it 12 inches aft of the leading edge and end it six inches short of the aft edge in each case. Secure this boltrope in place in steps. First baste it in place -- either with double sided tape or with staples (or both). It should be placed flush along the bottom edge of the cover so that the rope is up and on the outside of the cover wedge. Sew this assembly together with a single row of straight or zigzag stitches. Make your stitch length as long as possible if using a straight stitch. For zigzag stitching, make the stitch about 3/16-inch wide and 3/16-inch long. Then fold the cover edge under so that only the bulge of the boltrope protrudes beyond the cover cloth. Again, basting tape and/or staples can be helpful. Run this fold all the way to the ends of the edge in question. Stitch this work in place just as above.

Use a similar procedure to secure the boltrope at the leading edge of the cover. But run it all the way from the bottom to the top of the cover wedge along this edge.

Now turn to the installation of the Flex-A-Rail to the sides of the boom and to the mast just above the gooseneck. The rail comes in 45-inch lengths. It can be easily cut with a hacksaw. Secure an appropriate number of rail segments along the sides of the boom starting about three inches from the aft end of the boom on each side. Install by drilling holes for oval head stainless steel screws. Use a drill bit and drill holes every 4 to 12 inches through the center of the track. Be sure a screw is close to each end of each rail segment and that the segments are properly aligned. Run the rail up to a point about 8 inches short of the gooseneck end of the boom. Also install the rail along the sides of the mast from an inch or so above the gooseneck to a point about 2 inches short of the height of the cover wedges at their leading edge.

Attaching the Flex-A-Rail (rail) to the boom and mast can be tricky depending upon what the boom and mast are made of. Wood is easy but aluminum takes some extra effort. A customer in Florida recently built one of these covers and offered Sailrite some suggestions. Most aluminum spars have a 0.1" wall thickness. The small screws sold by Sailrite to attach the Flex-A-Rail have very delicate heads. The screw is quite unique in that it has a #6 screw body and a #4 head. The reasoning behind the smaller head is to keep the extruded opening of the Flex-A-Rail largely unobstructed by the screw head to allow the rope to slide easily. These screws work great for use in wood and fiberglass but are less than desirable when attaching the rails to an aluminum spar. Instead use #4 x 5/8" phillips head stainless steel screws. Without modification to the Flex-A-Rail the heads of the screws will get stuck at the mouth opening of the rail contributing to broken screws and stripped holes. Consequently, it is wise to plan ahead and countersink openings at intervals along the top of the rail where each screw will be positioned. A countersink drill bit in a drill press or dremel tool works well to cut into the plastic rail. Make the openings no larger than necessary allowing the screw heads to pass easily. The holes in the actual bottom surface of the rail should now be drilled with a 7/64" bit. Line the rail up on the spar and carefully mark the positions of the holes in the rail on the spar. At these marks drill holes into the boom and mast with a #37 drill bit. At each hole carefully run a screw into the hole to "pre-tap" the holes. This will all but eliminate the possibility of breaking a screw when actually attaching the Flex-A-Rail. Finally use a small amount of "blue" loctite for each screw and secure the Flex-A-Rail to the spar.

At this point it is a good idea to test fit your cover pieces if possible. Run the boltrope into the rails on both sides of the boom. And then insert the rope into the rail on the mast. First we want to mark the point on the aft end of the cover halves where it should be finished. To do this, make sure there is a three or four inch bulge of cloth at the gooseneck so the boom can swing from side to side without stressing the cover. Then mark the cover halves three inches or so behind the clew of the sail. Indeed, place a line on one of the cover halves that curves up and over the collapsed sail. This line will serve as a guide in trimming excess cloth from the cover halves. It should be gradually rounded near the aft end of the boom so the zipper closure can be run right down to the boom. Continue this trim line all the way to the leading edge of the cover half if there is more cloth than needed to cover the sail (allowing two or three inches for a hem and a "fudge factor"). While doing all this make sure that there is enough cover cloth to wrap the sail nicely when it is dropped on the boom. It is actually rather late to rectify a shortage at this point, but it can be done if necessary by adding a strip of cloth to the top of each cover wedge.

Next establish the total length of zipper required. Measure from just above the boom (place a mark here to show where the zipper installation should begin) at the aft end of the cover half top edge to a point just behind the mast on the line put down above. Place a mark at this forward ending point for the zipper so it can be used in the zipper shortening process below.

Remove the cover halves and cut the marked one. Duplicate that cut edge on the other cover half. This cut edge will be hemmed and a zipper (in one or more segments) will be installed at the same time. Place the zipper so it starts to close from the aft end of the cover just above the boom (this is the "easy" end of the cover to close and it is helpful to get that part of the sail under control first). If more than one length of zipper is to be used, allow for a two or three inch gap between the end of the first and the beginning of the second so there will be room to insert the starter bar into its socket. Note, it is best to use one zipper length. Sailrite now offers finished (jacket style) RiRi zippers in lengths plenty long for any boom.

To install the zippers, undo them completely. Lay each one of the two halves along the outside top edge of each cover half so that the teeth point away from the edge (Figure). Sew them in place with a row of straight stitches within a quarter inch of the teeth (Figure). Then fold these "zippered" edges under so that they will mate properly. Make this fold large enough to cover the zipper teeth and protect them from the sun. Sew a second row of straight stitches along the inner edge of this newly formed hem (Figure). Continue the hem used for zipper installation to the ends of the cover edge at the aft and forward ends. This will provide a finished or "hemmed" edge for all sides of the cover.

The zipper tapes can be shortened to just the length needed by cutting off their tops (the end that closes last). Some provision must be made to keep the zipper sliders from coming off the cut end. Several techniques are available to accomplish this task. A specially formed metal "U" shaped stop can be pressed on the tape after the last tooth (these "zipper stops" are available from Sailrite) Or the last two or three teeth there can be whipped with twine or covered with a leather patch (see Figures). Or two or three teeth can be cut from a scrap of zipper tape and inserted between the final few teeth on each tape -- then a soldering iron or gun can be used to weld those teeth together to create a new stop.

Some prefer to place a batten along the top edge of each half of the cover--it helps keep the flap of cloth in place while sailing. We like to use 5/8 inch fiberglass battens. They are stiff enough to accomplish their task and yet very light and almost unbreakable. To install them cut long lengths of 2 inch wide "tape" from scrap cover material. Use a hotknife when cutting so the edges will not ravel. Baste this tape in place along the upper edge of each cover half. Sew the tape in place with hems at the ends. Insert the batten and sew the ends shut. These final stitches can be ripped out if the battens ever need to be removed.

The cover itself is now complete. There remains the task of installing a lazyjack system and tying it into the cover. If the boom is less than 12 feet long, it is generally sufficient to have a lazyjack "harness" made up of just two lines on each side of the boom. It is is 17 feet or less in length, the harness will usually have three lines on each side of the boom.

For booms 12 feet and under, divide the boom length into three roughly equal segments. At points corresponding to the two resulting points of division along the cover halves, webbing loops will be created to which the legs of the jackline can be attached.

For booms 17 feet and under, divide the boom length into four roughly equal segments. At points corresponding to the three resulting points of division along the cover halves, webbing loops will be created to which the legs of the jackline can be attached.

At each attachment point along the boom secure a webbing loop to the covers about two inches below their top edges. These loops are just 4-inch lengths of 1-inch wide nylon webbing folded in half and sewn in place with a "box-x" stitch about 1-inch square. The box-x stitch is a square of straight stitches with two diagonal stitches through its center -- it is OK to sew in reverse and to make several passes on a side to speed the work. The jacklines are simply tied to these loops.

To rig the lazyjack system secure a check block to each side of the mast from 12 to 15 feet above the deck (this height is not critical). Install a jam cleat at a handy point near the gooseneck so this line can be tied off. The line should be long enough to go up to the check block on the mast and down to a point about 8 feet above the boom. There will be a bullet block on that end of the line above the boom and a second line will "cascade" from it directly to the cover halves in the case of a boom under 12 feet. For longer booms, a second line will be cascaded from the forward tail of the first cascade (through a bullet block attached there) and the resulting three tails will be tied to the cover halves using the webbing loops and a simple knot of preference.

The cleat on at the gooseneck can be used to adjust the lazyjacks. They can be left somewhat slack while underway. The main can be dropped neatly between them into the cover halves which can then be zipped over the sail. At that point the jacks can be tightened as desired to raise the main out of the way as needed.

LIST OF MATERIALS FOR A 10 FOOT BOOM:

60” Sunbrella - 5 yds
V-69 Thread (#20203) - 1 tube
Flex-A-Rail (#042) - 8 pieces
10 ft #10 Zipper Finished (#28321) - 1
1-inch Nylon Webbing (#22303) - 1 ft
Dacron Awning Rope (#495) - 28 ft
70 feet of 1/4-inch Single Braid Dacron (#21101)
2 bullet blocks (#224)
2 cheek blocks (#0233)
2 jam cleat (#737)
20 feet 5/8” pultruded batten (#27115)
Misc Hardware and Fasteners

LIST OF MATERIALS FOR A 16 FOOT BOOM:

60” Sunbrella - 7 yds
V-69 Thread (#20203) - 1 tube
Flex-A-Rail (#042) - 11 pieces
#10 Zipper Finished (#542) - 1
1-inch Nylon Webbing (#22303) - 2 ft
Dacron Awning Rope (#495) - 40 ft
100 feet of 1/4-inch Single Braid Dacron (#21101)
4 bullet blocks (#224)
2 cheek blocks (#0233)
2 jam cleat (#737)
32 feet 5/8” pultruded batten (#27115)
Misc Hardware and Fasteners

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