

©

INSTRUCTIONS FOR CONSTRUCTING THE JORDAN SERIES DROGUE
by Marilyn Lange, "Kuan-Yin", 37' Searunner Trimaran

GENERAL PLAN OF THE JORDAN SERIES DROGUE

The basic purpose of the Jordan series drogue is to distribute the force required to stabilize the weight and momentum of your yacht in heavy weather by using a series of relatively small fabric cones threaded serially along a weighted line which is attached to or near the transom. (See Sketch "A"). This design provides for much easier deployment than a large parachute-type sea anchor as well as reduced wear and tear and stress on the working components of the drogue and on the boat itself. The benefits of using a series of cones occurs when your boat accelerates down the crest of a wave: each individual cone or "droguette" in turn takes up a portion of the strain as it resists forward movement through the water. There is no shock loading of the drogue line but rather a gradual, smooth deceleration which is proportional to the boat's speed.

PLEASE READ AND STUDY ALL INSTRUCTIONS, DIAGRAMS, AND TABLES BEFORE STARTING THIS PROJECT !

You will need the following tools for this project: sewing machine, hot knife for cutting fabric and tape, a piece of heat resistant formica or micarta as a cutting surface, splicing tools and (very fine) needle nosed pliers for pulling the tape through the braided line.

Materials required:

Ripstop dacron or nylon fabric - 1 1/2 oz. weight. See Table "A" for number of yards. (White is probably easiest to work with)
3/4 inch nylon tape - .015" thickness. See Table "A" for length.
Dacron thread - high quality for sailmaking
Braided line - See Table "B" for strength and approx. lengths
Shackles and thimbles to match sizes and strengths of line
End weight See Table "B" for size (suggest anchor chain).
Chafing gear
Anhydrous lanolin & seizing wire for shackles
Appropriate hardware to create two strong points on transom

CREATING THE PATTERN FOR THE "DROGUETTES"

Each droguette is a cone six inches long with an opening of 5 inches in diameter on the wide end and 1 1/2 inches in diameter on the narrow end which has three tapes stitched radially on its surface. Sketch "B" shows what a completed droguette looks like and Sketch "C" provides the basic pattern.

Before the cone is stitched closed three tapes will be stitched to the cone following radius lines between the narrow and wide ends and equally spaced from each other. These tapes attach each cone fore and aft to the drogue line which threads through all the droguettes. See Sketch "D". V-notch guides are indicated on the pattern to assist in placement of the tapes for stitching.

Cut out the pattern and trace it onto a light-weight flat piece of cardboard (a large-size carry-out pizza or cereal box works well). Cut out the cardboard pattern with small notches about 1/4 inches deep to show where the tapes will be placed.

Making two or three patterns can help you make the most efficient layout on your fabric.

LAYING OUT THE PATTERN AND CUTTING THE FABRIC

Use TABLE "A" to determine the number of cones you will need to make a drogue line appropriate for your size/weight boat.

Select a smooth, flat, hard surface wide enough to allow you to lay at least a half yard of the ripstop flat. Trace the pattern including the notch markings with a pen or pencil giving good contrast with the fabric. Rotate the pattern at will in order to maximize the number of cones per yard. (Generally, about 15 cones may be placed on each yard of 39" fabric). Consecutively number each completed tracing so you can keep track of the number of drogues you have traced.

Unroll a portion of the fabric on a heat-resistant surface. Cut out the cones with a hot knife to minimize fraying of the fabric. Follow the smooth curve of the arc lines on both ends of the cone - do **NOT** follow or cut out the notch markings.

Also use the hot knife to cut the lengths of tape which will be stitched onto the cones in order to hold each drogue in position along the braided line. Place marks or bits of masking tape on the cutting surface at a distance of 23 inches apart. Cut three tapes 23 inches long for each drogue.

STITCHING THE TAPES TO THE CONES AND CLOSING THE CONES

Stitch a tape along each of the 3 radii of the cone marked by the V notches so that each extends seven inches beyond the narrow end of the cone and ten inches beyond the wide end of the cone. (Refer to Sketch "B"). Since precision placement is not necessary, a rough length guide placed on the front of the sewing machine is satisfactory. Measure off ten inches on a tape and then position this point at the wider end of the cone at a notch mark. Lay each piece of tape underneath the fabric along its radius, using both notch marks for alignment. Using a large stitch setting anchor each tape with two lines of stitching about 1/8 inch from the tape edges, beginning at the wide end, stitching toward the narrow end, across the narrow end, back toward the wide end. Back stitch both ends of the stitching line.

Fold the cone in half with the tapes on the inside and align the two seam allowances. Now stitch each cone closed with a single line of stitching about a half inch from the edges, back stitching each end of the stitching line. Turn the cone "inside out" so the tapes are on the outside of the cone. Now the drogues are ready to be threaded onto the line.

PREPARING THE LINES FOR ATTACHING THE DROGUETTES

Use TABLE "B" to determine the tensile strength (diameter) of braided line(s) appropriate for your boat displacement. The length of each line segment will depend upon the number of drogues to be threaded on it. Allow sufficient length from the ends of each braided line in order to splice on the metal thimbles. (Thimbles may be spliced on one end before attaching drogues.) Starting just past the spliced section (or length allocated for the splice), mark off the lines at 20 inch intervals with an indelible marker. These marks will be position guides for the ends of the three tapes which lead from the wider end of each drogue.

Thread the appropriate number of drogues onto each line making sure that the wider end of each drogue will be oriented toward your boat when the drogue is deployed.

ATTACHING THE DROQUETTES TO THE DROGUE LINES

Try this method (or invent your own) for attaching the droquettes to the line. Work a forceps or a very fine needle-nosed pliers (closed) through the line at a mark and grasp one of the tapes leading from the wide end of the droquette. Pull it through the line and make a single overhand knot near the end of the tape so it can't pull through the line. The second and third tapes should be spaced more or less evenly around the line, one slightly above the knot of the first tape and the other slightly below it. After all three tapes are knotted, pull the knots tight against the line.

The three tapes leading from the narrow end of the cone should be passed through the line and knotted in the same manner. To determine the position of the first tape pass, measure back from the succeeding mark on the line about 5 1/2 inches. Refer to Sketch "D". (It's convenient to have a measuring guide this length for this purpose). Repeat this process until you get all the droquettes positioned on the braided lines.

ASSEMBLING AND ATTACHING THE DROGUE

The Jordan Series drogue consists of three basic components: a bridle leading from two strong points (as widely spaced as possible) on the stern of your boat converging at the forward end of the drogue line, a drogue line consisting of two or more segments upon which the cones are attached, and a weight which holds the drogue line below the surface of the water. Review Sketch "A".

Each of the bridle arms should be AT A MINIMUM equal in length to the length of the boat (LOA). The combined strength of these two bridle arms should be in excess of the minimum tensile strength specified in Table "B" since tension on the drogue line oscillates between the two bridle arms.

Interpreting the specifications in the technical bulletin and information provided by Donald Jordan I believe that the diameter of the drogue line may be stepped down incrementally toward the end weight as the drogue line increases in length. The first 50 droquettes (Segment I) should be threaded on braided line of the strength specified in Table B. (About 85 feet of line - excluding splices - are required to thread 50 droquettes.) For each additional 50 droquettes an eighth inch step-down in line diameter may be made.

DEPLOYING THE JORDAN SERIES DROGUE

Once the drogue is attached to the two strong points and positioned so it can run freely, you simply lower the end weight into the water and allow it to run out over the stern. Set up chafing gear as necessary.

RETRIEVAL

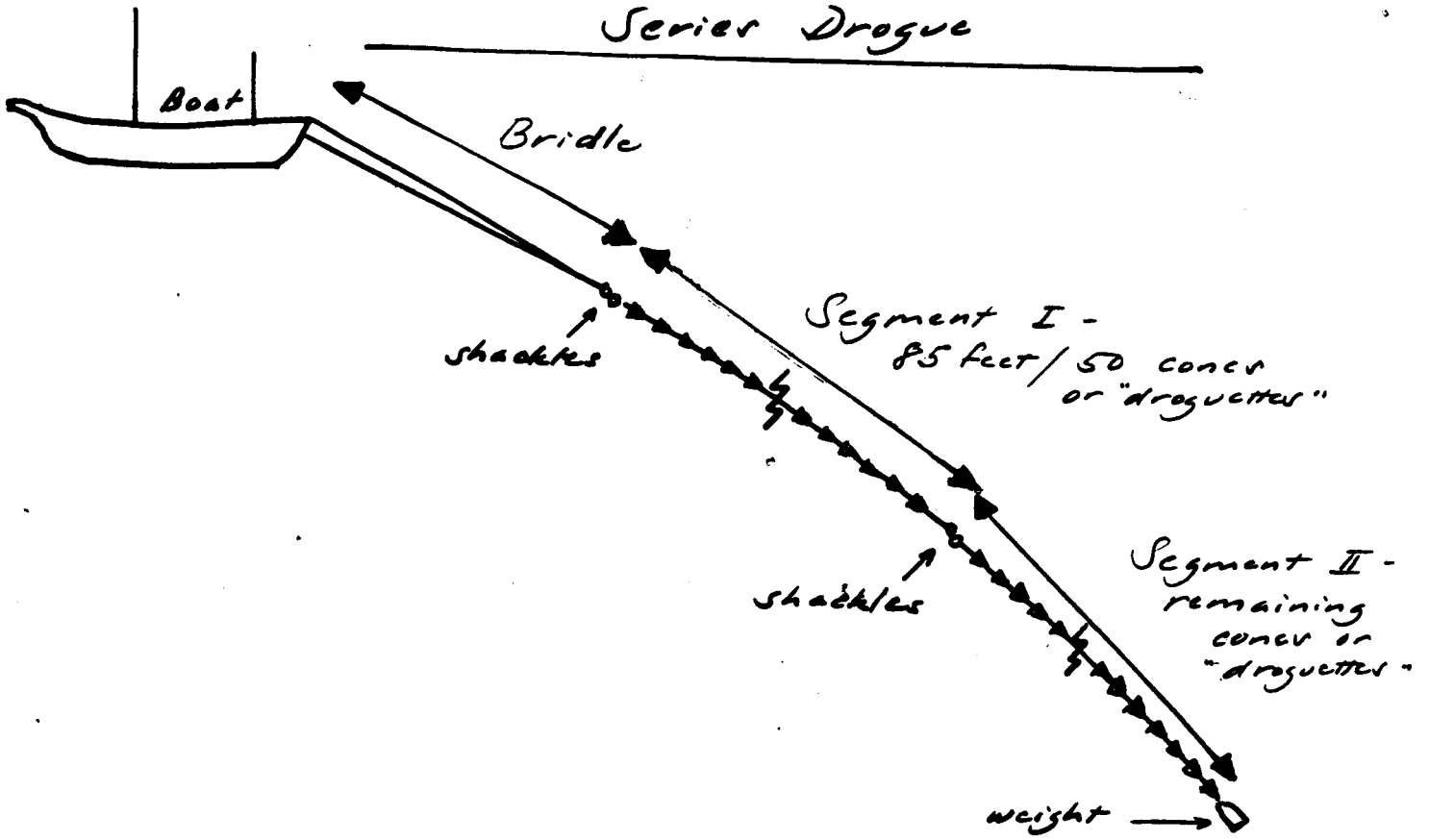
Haul it in hand over hand, (a bit of work), flake it on deck. Inspect for damage. Secure the flake with gaskets and stow. A fresh water rinse when you get the chance will reduce the corrosion of the hardware.

FOR ADDITIONAL INFORMATION

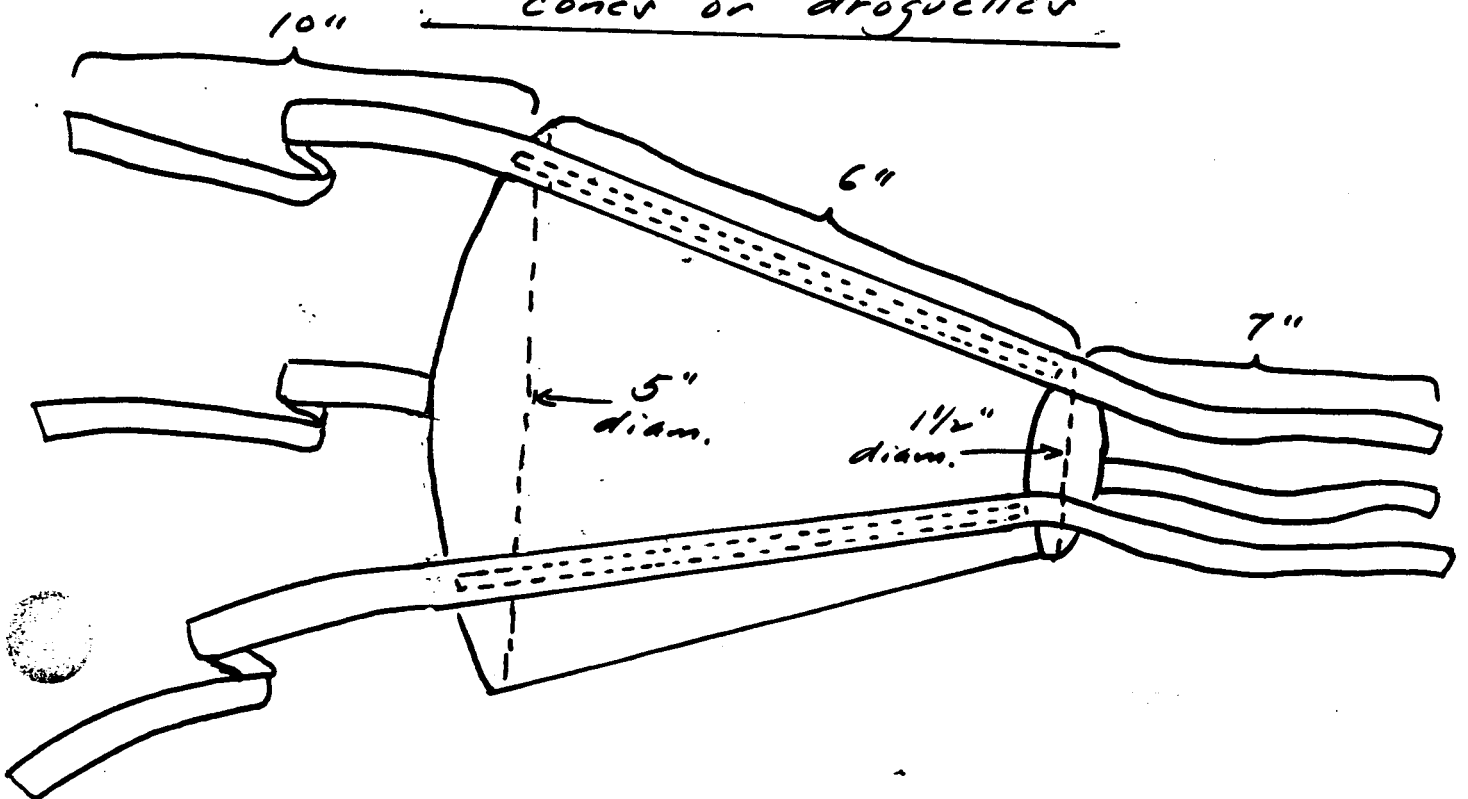
Detailed information on the design, development and experimental testing of the Jordan series drogue is available in a technical publication: Investigation of the Use of Drogues to Improve the Safety of Sailing Yachts - AD/A188 598/LL, published in May 1987 (Order from National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161 at a cost of \$22).

If you wish to communicate with me, please write Marilyn Lange, Suite 509, Box 7729, Longwood, FL 32791-7729.

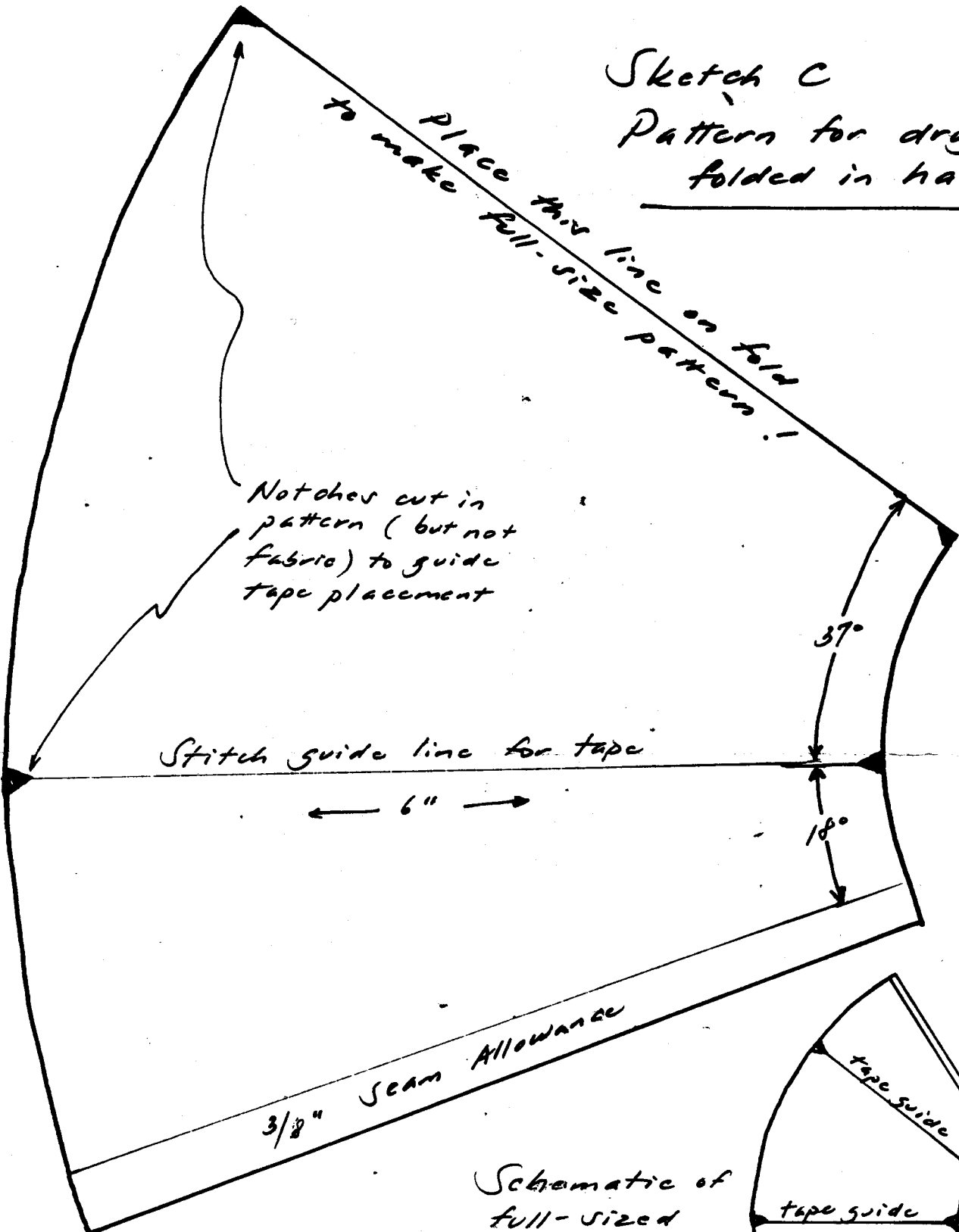
Sketch A - Overall Pattern of Jordan Series Drogue



Sketch B - Schematic of individual
cones or drogues



Sketch C
Pattern for droguette
folded in half



Notches cut in pattern (but not fabric) to guide tape placement

Stitch guide line for tape

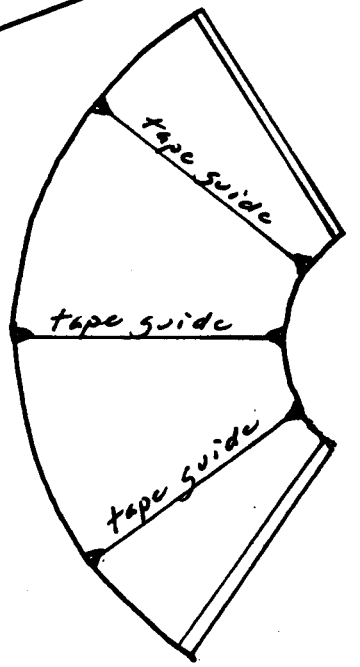
6"

37°

18°

3/8" Seam Allowance

Schematic of full-sized droguette pattern



Sketch D - Droguette Configuration on Line

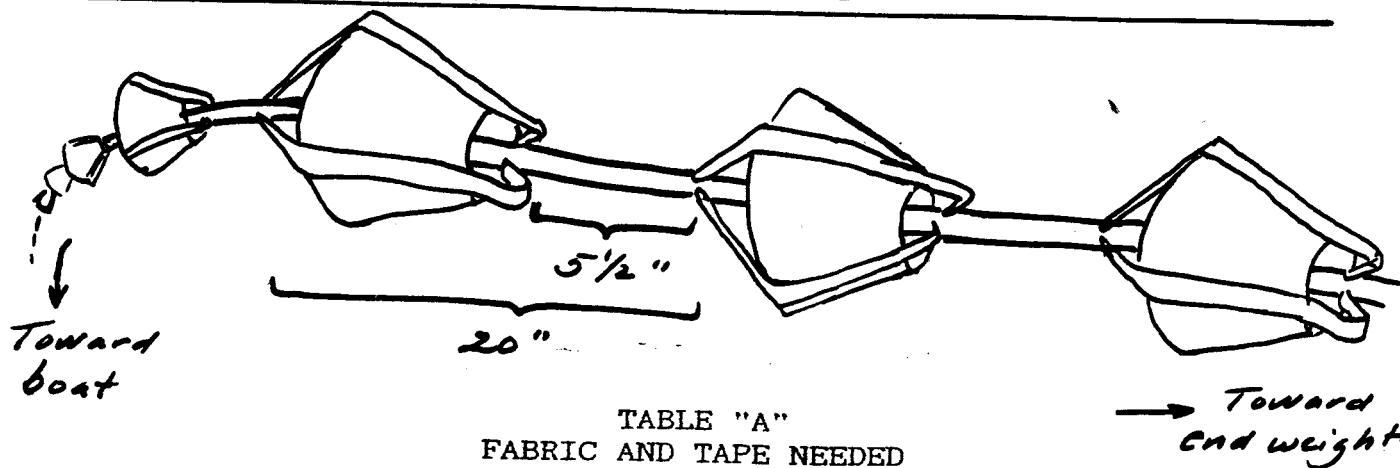


TABLE "A"
FABRIC AND TAPE NEEDED

Boat displacement in pounds	Number of droguettes	Minimum yards of ripstop (39" wide)	Approx. yards of 3/4" tape
To - 10,000	100	6.7	192
10 - 26,000	125	8.3	240
26 - 31,000	140	9.3	269
31 - 38,000	160	10.7	307
38 - 52,000	175	11.7	336
Over 52,000	200	13.3	384

TABLE "B"
BRAIDED LINE AND END WEIGHT

Boat Displacement in pounds	Minimum tensile strength of bridle & segment I (with sug. line diams.)	Length of segment I (50 cones)	Length of add. segmts. at end	Weight
To - 10,000	12,000 (3/4)	85	85	25
10 - 15,000	14,400 (3/4)	85	128	25
15 - 26,000	21,600 (7/8)	85	128	25
26 - 31,000	24,000 (1)	85	153	35
31 - 38,000	30,000 (1 1/8)	85	187	35
38 - 52,000	36,000 (1 1/4)	85	213	35
Over 52,000	42,000 (1 1/2)	85	255	35

NOTES: Tensile strength may also be defined as breaking strength by some manufacturers. Lengths of line indicated in this table are those required for the appropriate number of threaded droguettes specified in Table "A". Please add sufficient additional length for splices.

Make sure all attachment points and hardware are as strong as the drogue line.

DISCLAIMER

The information contained in this article has been obtained directly and by extrapolation from the technical publication and confirmed in consultation with Donald Jordan. You should be aware that this is a new design and is still "experimental".

We have tested ours in the conditions described, but as with any piece of gear, especially one to which you will entrust the safety of your ship and your lives, examine the design closely. Decide if it's suitable for your boat, then build it carefully. There are no guarantees, expressed or implied.