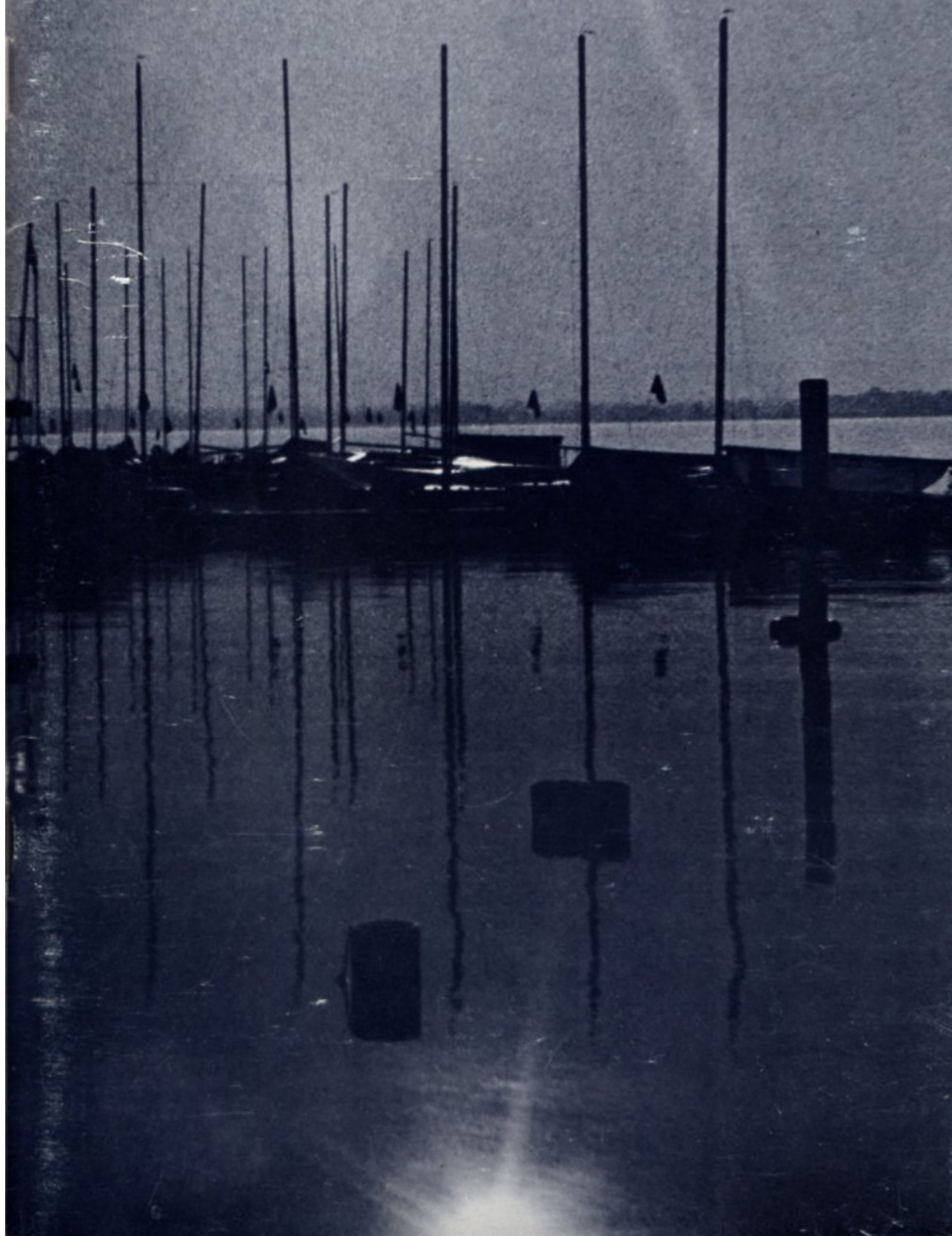


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HIGHLANDER CLASS

INTERNATIONAL ASSOCIATION

1970 YEARBOOK

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Cover: Sunday morning at The Pipers, Lake Norman, N. C., site of the 1970 Nationals. Forestays carry Pipers flags, in annual tradition. Photo by Allen Culpepper.

FORECAST FOR THE '70's

As we think about the present state of the Highlander and the class, and look forward over the ten years ahead of us, it seems clear that what is going to happen in the '70's is: **THE HIGHLANDER CLASS IS GOING TO SHOW PHENOMENAL GROWTH.**

Although our past growth has not been fast compared to some other classes, it has been steady and, better, for the last ten years, it has accelerated. Conditions for major growth are much more favorable now than ten years ago. We are, overall, in such better shape that we'll grow a lot faster than before. **At the very least**, we'll double our size and add 600 new boats by 1980, an exciting increase, which will make a big difference to the class.

Much more likely, however, is an increase of 800 Highlanders, and this is quite a conservative figure, as you'll see. This is our prediction for the 1970's, based on the past record and the present state of the class. However, it's quite possible that there will be 1000 new boats by 1980! It's within our grasp to see Highlander No. 1600 sailing in that year! Sound impossible? Especially in view of the fact that we've only recently passed 600? Perhaps — but consider the state of affairs at the moment and then realize the basis for the numbers.

There is, finally, a solid base on which such growth can be built. The Highlander is arriving at the point where it is **really a great** boat, thanks to the many improvements made since 1960. We now have: 1) fiberglass hull, 2) fiberglass deck, 3) fiberglass centerboard, 4) aluminum mast and 5) self-rescue capability (the details of which will be worked out this year). Couple these with Highlander performance and Highlander comfort which are virtually unsurpassed, especially in a boat of this type, and you have an extremely desirable, salable product.

In addition, we have a second builder now, and one who will stay with us. When enough dealerships become established, it will double the sales effort and the production capability. This is a giant step forward.

We have growing footholds in new areas of the country, where the Highlander is particularly suited, and new activity in some older areas. Along with this, the level of competition is steadily improving, which helps to make the class more attractive.

There are a number of other gains made since 1960 which will make our rapid growth possible. The class organization is strengthening fast, with an increasing number of dedicated people active. We have a paid Executive Secretary-Treasurer, Marj Bauer, who has proved she's capable of the best kind of help a class can get, in communication, record-keeping and generally lubricating the wheels of progress. Thanks to Murray Anderson and others, we now have such a well-thought out Constitution and By-Laws that the smooth operation of the class is insured, indefinitely. The Specifications have been gone over in painstaking detail by Ron Meredith and committees, for clarity and consolidation of changes made over the

years (which will be submitted for approval at the 1970 Annual Meeting). All of these will maintain our one-design control, while allowing desirable improvements in the boat, such as the use of new materials.

In the last ten years, there has been a lot of boat-designing activity: catamarans, auxiliaries, single-handers, keel-boats, smaller centerboarders — but nothing new and significant to cut into the Highlander's market. Our market is overlapped by the Lightning, Thistle and Flying Scot, but compared to each of these, we have several important advantages and a lot to talk about. The market is growing fast, with more people having more extra money to spend and more time to enjoy it, despite the national economy's present difficulties. And it is growing fastest on inland waters where the Highlander is especially outstanding.

The picture is bright and so are our prospects for big growth. Let's look closer at the numbers. The minimum estimate for new Highlanders in the '70's is 600, double our present size. Increase during the '60's was 130% — somewhat more than double the total of the '50's. 600 for a decade is only 60 per year, just a little over our current rate of 50-plus. It'll be disappointing if that's all we average in the next ten years. The 800 boat figure merely assumes that Douglass & McLeod maintains their figure of 45 boats a year and that Durabilt sells 35 a year, and they're not far from that rate now. With all we have going for us it should be easily possible for Douglass & McLeod and Durabilt each to average 50 a year. And that's 100 total, and 1000 new Highlanders in 10 years!

This growth won't come all by itself, of course. We've all got to help it happen. **BUT THIS GROWTH — AND MAYBE MUCH MORE — IS THERE IF WE MAKE THE EFFORTS.** We need:

1. **More promotion effort by the builders.** This should include:
 - A. More advertising,
 - B. Stimulating and helping the dealers,
 - C. Making new dealers, particularly ones who are active Highlander sailors,
 - D. Setting up dealers in new areas,
 - E. Working on new ways to increase the exposure of the Highlander,
 - F. Generally being much more promotion-minded.
2. **More promotion effort by us, the class.** This is an area which we've hardly scratched, and efforts should include:
 - A. A program for publicity that gets some results,
 - B. Helping and stimulating the promotion efforts of the builders and their dealers,
 - C. Advertising the Highlander and the Highlander Class — in addition to the builders' ads,

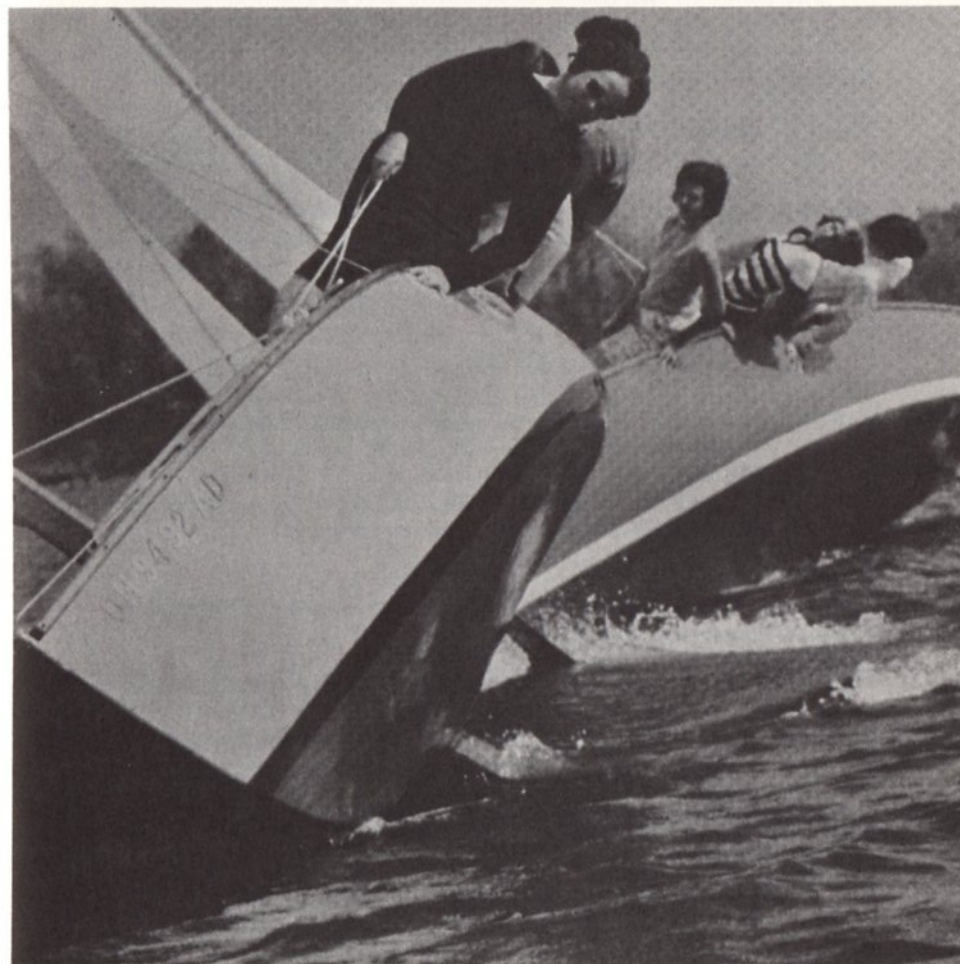
- D. An intensive program to get the Highlander started in new areas.
3. **More help by each Highlander owner.** Each of us can make a real contribution to class growth by:
- A. Sailing on waters where Highlanders haven't yet sailed and showing the boat to people there,
 - B. Trailing to sail with new fleets,
 - C. If you're in a new fleet, inviting nearby Highlanders (and far-away ones, too) to sail with you, which will help your fleet growth,
 - D. If you're transferred to a non-Highlander area, **TAKE YOUR BOAT WITH YOU.** You'll be surprised at how much fun it is to get a fleet going.

Each of these items is an opportunity and each will really help us grow. Your efforts will pay dividends and our class growth will astonish you.

And what will the growth mean? Generally, Highlander sailing will be more fun. The competition will be more intense, which in itself is fun and which will make better sailors of all of us. There will be more Highlanders in nearby out-of-town areas to sail with you and more convenient out-of-town events where you can go. There will be a better market for your boat when you want a new one or have to sell. We will, finally, have helped many more people sail in one of the finest boats ever.

The '70's and Highlander growth are upon us — it's going to be an exciting time for the Highlander Class!

"HIKE!!" Steeles and Westermans fight off a knock-down puff on Cowan Lake.



SPECIFICATIONS

The intent of this section is to clarify and add to what is shown in the official plans. In case of conflict between these specifications and the official plans, these specifications shall govern. It is impossible to foresee every conceivable innovation which may be thought of in the future or mention every suggestion that has been ruled illegal in the past. When in doubt, it must be assumed that anything in connection with the boat, sails or rigging which is not clearly covered by the official plans and specifications or published Measurers rulings is illegal and that a ruling must be obtained from the Chief Measurer before attempting such an innovation. All such decisions shall be made with the best interests of the class in mind, rather than any technical misconstruction of drawing or text.

(1) ONE DESIGN:

There shall be no structural changes in the hull, rudder, centerboard and spars as designed, and no lightening of existing parts. The Association reserves the right to declare ineligible any boat which does not conform to the spirit as well as the letter of all rules and specifications.

The hull and spars must be constructed by a manufacturer approved by Douglass and McLeod and the HCIA.

(2) BOAT'S NUMBER:

Must be cut into the keel plank aft of the centerboard trunk in digits at least two inches high.

(3. HULL:

Minimum weight of the Highlander 830 lbs. including hull, flotation, centerboard, rudder, tiller, mast, boom, main sheet, hardware and rigging. But not including sails, pole, paddles, jackets, anchor and line. If boat weighs less than the minimum amount its weight must be brought up by permanently attaching one half of the increase forward of Station 6 and one half of the increase under the seats aft of station 14. Or the boat may be brought up to minimum weight by altering blocks, cleats and other similar equipment or by covering the exterior of the hull, at least up to the waterline, with fiberglass. Any other method of adding boat weight must be submitted to the Chief Measurer for approval in advance. The reason for this rule, and the guiding principle, that added weight will be distributed over the boat equally.

The hull of a Highlander can be manufactured of a composite material or materials as well as wood and shall include sufficient flotation to support boat and crew when capsized.

(4) SPARS:

(a) Mast: As in official drawings. Shall not weigh less than forty pounds, completely rigged with all halyards, stays, and winches. Minimum diameters of mast to be not less than 4-9/16 inches by 2-13/16 inches at any point between the bottom of the groove and the main halyard sheave.

(b) Boom: As in official drawings.

(c) Spinnaker Pole: Maximum length, including fittings, 84". Only one spinnaker pole to be carried on board. May be used as whisker pole on jib when spinnaker is not set.

(5) STANDING RIGGING:

Shall conform to the official drawing without variation and shall not be expanded or contracted during a race. No change in the places of entry of the side shrouds into the deck, as called for in the official plans shall be made.

(6) RUNNING RIGGING:

Optional, except that:

(a) Boom must be capable of being roller reefed. (A mainsheet block on the boom above centerboard trunk is permitted, provided said block can be removed for reefing. A boom vang fitting on the underside of boom is likewise permitted, provided it can be removed for reefing.)

(b) No locking device aloft for halyards is permitted. Weight of sails must be carried on halyards while sails are set.

(c) Spinnaker Halyard—A separate halyard either inside or outside of the mast must not exceed 19 feet 10½ inches (19 feet 10¼ inches for aluminum mast) above the butt of the mast. Explanation—If internal halyard is used, the center of the sheave pin must not exceed this maximum dimension. The center of attachment of an external halyard must not exceed this maximum dimension and also must lie within the angle formed by the leading edge of the mast and a line which intersects the point of maximum allowable height and the bow at Station O excluding bow hardware.

(7) CENTERBOARDS:

(a) Cocking or jibing centerboards are disallowed.

(b) Shall be of composite construction with a total weight of 83 plus or minus five pounds. Shape shall conform to the official plans, which is an even curve from the leading edge to the trailing edge with the maximum thickness 15/16". Minimum thickness ¼". The diameter of both leading and trailing edges must be not less than one-eighth inch. Method of hoist is optional.

Lead portion of board is permitted as it comes from approved builders mold however, continuing the air foil section of wood into the lead is permissible providing it does not go below minimum weight. Width Y at ½A is 14" max., min. of 13¼". A dimension is 60 plus or minus 1". Roller diameter min. is 2".

Fiberglass coatings of complete board is allowed providing it does not change the profile of the board as drawn in the official plans.

(c) Any reinforcing necessary, such as additional straps regardless of material, must not change the profile as officially shown.

(8) CENTERBOARD TRUNK:

Trunk and slot must be as designed. Centerboard shall be unrestricted in its travel on the trunk, i.e.—no notches permitted in the centerboard trunk so as to lower the board in the water.

(9) RUDDERS:

Kick-up rudders must be pinned in a downward position at all National or sanctioned regattas.

(10) TILLER:

Design optional. Hiking stick permitted.

(11) FITTINGS:

Official hardware, as shown in official plans, is recommended but not required.

(a) Jib leads—placement optional.

(b) A full width mainsheet traveler is permitted at the transom provided the track does not extend athwartship beyond the outside of the hull.

(12) GOOSENECK FITTING:

Must be suitable for roller reefing. If permanent in position the centerline of the gooseneck must be no lower than 24" above the butt of mast (23¼"—aluminum mast). Sliding gooseneck is permitted provided a black band 1½" wide, the top of which must be no lower than 24" above the butt of mast (23¼"—aluminum mast), is permanently applied to the mast. At no time may the centerline of the gooseneck be lower than the top of the band.

Roller reefing gear shall be used and available only for roller reefing.

(13) SAILS:

(a) No sails other than mainsail, jib, spinnaker, and storm jib to be used while racing. Only one spinnaker permitted on board. No more than two suits of sails and one spinnaker may be measured in or used in any National or District Championship series. No more than one suit of sails to be added to a boat's inventory in any one year, except that an extra mainsail and jib may be added to inventory in either the first or second year. Any local fleet may further limit the privilege of buying new sails, for example: (1) new jib every year, but new mainsail not more than once every two years; (2) new suit not more than once every two years, etc. The year in which a sail is first used in a race shall determine the inventory year of that sail. In the event of serious damage to a sail, a petition for replacement may be submitted to the Executive Committee, provided said petition has the endorsement of at least one-third of the owners comprising the local fleet.

(b) Any dimension that tends to stretch during the breaking-in period should be cut smaller than the maximum allowed; any dimension that tends to shrink during the breaking-in period should be cut slightly larger than the maximum allowed. No sail shall be used in a Class event without prior measurement and approval by the Class Measurer for that local fleet. Any sail exceeding any maximum measurement may be grounds for both immediate and retroactive disqualification for those races in which that sail was oversize. Any sail may be challenged at any time by another owner, the cost of

measuring, if any, to be borne by the loser of the challenge. Sails are to be measured only when absolutely dry.

The luff and foot of main and jib and the sides and foot of the spinnaker shall be measured under a 5 lb. tension. All other measurements are to be taken with sails smoothed flat with no pressure applied.

Placement and size of windows are optional providing that the total area per sail does not exceed 4 square feet.

(c) Mainsails:

Material: Any woven fabric.

Weight: If cotton, not less than 4.5 ounces per running yard, 28½ inches wide.

If synthetic, not less than 3.5 ounces per running yard, 28½ inches wide.

Distance between seams: Optional

Minimum measurements: None. Roach along foot permitted.

Battens: As shown in official sail plan.

Zippers permitted in foot and luff of mainsails.

When Sails are measured all zippers are to be open.

Maximum measurements of main:

Leech, 27 feet 7 inches

Luff, 24 feet 10½ inches

Foot, 13 feet 8 inches

Mid-luff, 9 feet 2 inches

Method of Measuring: The mid-luff to mid-leech dimension is quite easy to measure under most all circumstances found at regattas. The mid-luff was found by folding the head down to the tack and marking the mid-point. The mid-leech likewise was found by folding the head down to the clew and marking the mid-point. You then open the sail out flat and measure the edges of the sail at the marks. You apply no pressure to the sail, only smooth it out.

(d) Jibs:

Material, weight and distance between seams: Same as for mainsails.

Maximum measurements: As shown in official sail plan.

Luff, 17 feet 10 inches

Jib mid luff 50"

Leech, 15 feet 9 inches

Jib mid foot 16'6"

Foot, 7 feet 8 inches

Minimum measurements: None

Battens: Up to two permitted. Maximum length: 12 inches (Caution: Avoid close proximity to spreaders.)

A minimum number of five (5) snaps or hanks equally spaced along 80 percent of the luff must attach the jib to the forestay.

Zippered luffs are not permitted on jibs.

Jibs which are passed around the forestay and attached back of themselves, either sewn or with a zipper or similar device are disallowed.

Adjustable jib luffs are permitted.

(e) Spinnakers:

Minimum and maximum measurements to apply as on sail plan.

No minimum weight and must be made of woven material.

Distance between seams: Optional.

Dimensions and tolerances: See official sail plan for all dimensions "as designed" and "as measured." Dimension D (the diagonal to be measured only when all interior seams are straight and parallel to each other. All three measurements of triangle A-B-C to be taken simultaneously and without regard for position of rest of sail. All three measurements of triangle X-Y-Z to be taken simultaneously and without regard for position of rest of sail. All nine measurements to be taken without intervening opportunity for the stretching or shrinking of any dimension.

All measurements shall be made after sail is folded along the vertical middle seam and with the luffs conforming with each other.

Two straight line measurements are made from the head of the sail to points where they bisect the middle seam. First dimension (B) is six (6) feet and the second one (Y) is eleven (11) feet. Two additional measurements (A and X) are made from the head along the luff edges, first point is 5 feet and second point is 10 feet respectively.

Distance between the two upper points on opposite edges of sail (C), shall be 5 feet 7 inches, plus or minus 3 inches.

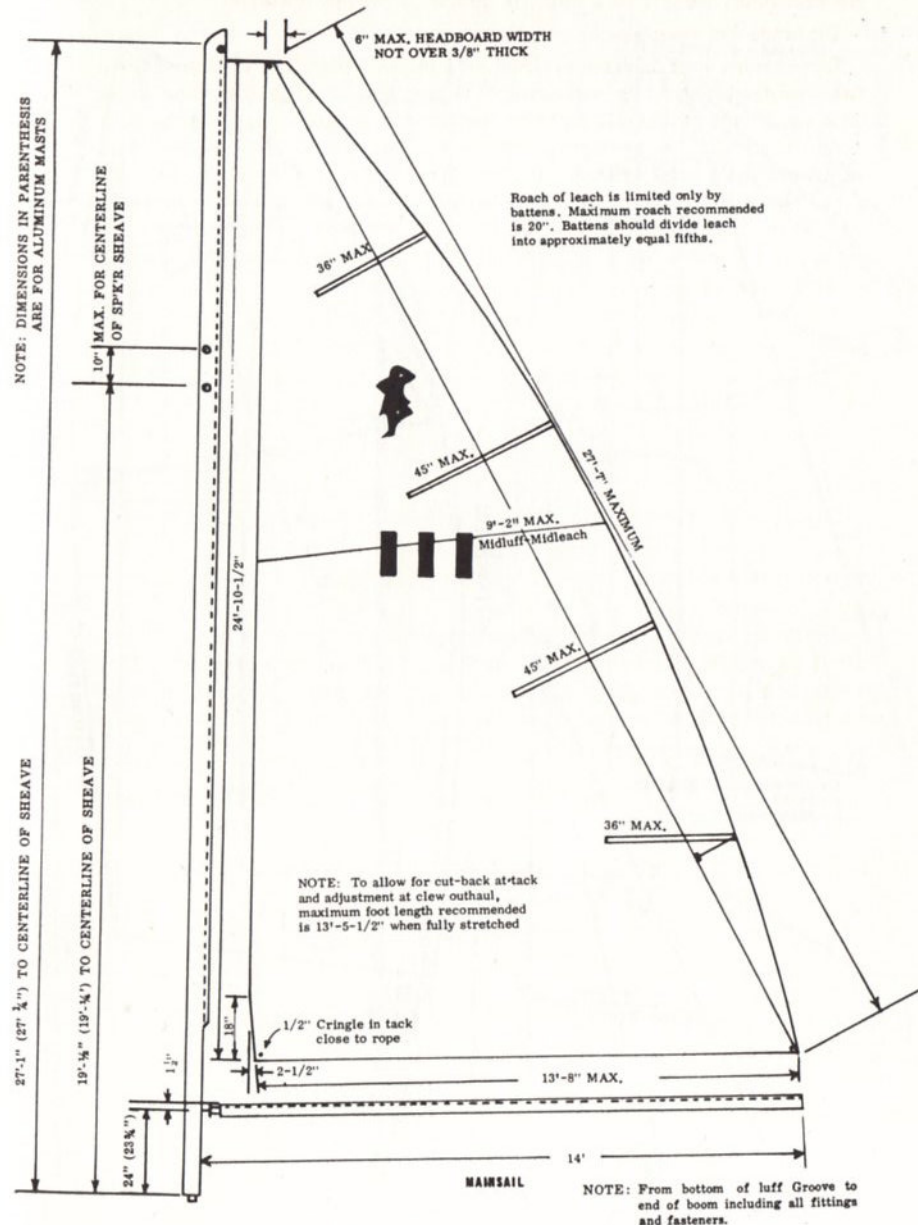
Distance between the two lower points (Z) shall be 8 feet 2 inches, plus or minus 3 inches.

Diagonal distance between head and bottom of middle seam (D) shall be 22 feet, plus or minus 6 inches. Foot measurement (doubled) (F) shall be 7 feet, plus or minus 3 inches. Luff distance (L) shall be 20 feet, plus or minus 6 inches.

(14) HIKING STRAPS

Hiking straps are permitted but they must be below the sheer and inside the cockpit.

(15) Spinnaker Deck holes not permitted.



SPINAKER - MEASUREMENT

Diagram illustrating the measurement and construction of a spinnaker sail. Key dimensions and labels include:

- Points: A, B, C, D, E, F
- Dimensions: 5', 10', 20' ± 6', 11', 5' - 7" ± 3", 8' - 2" ± 3", 22' ± 6" - 18", 7' ± 3"
- Legend:
 - L = LUFFS PULLED STRAIGHT
 - F = FOOT
 - D = DIAGONAL

MID-SEAM

Diagram illustrating the measurement and construction of the mid-seam of the sail. Key dimensions and labels include:

- Dimensions: 5', 11', 8' - 2", 22' ± 6", 7' - 0", 5' ALONG EDGE, 10' ALONG EDGE, 20' - 0' ALONG EDGE

MID-FOOT

Diagram illustrating the measurement and construction of the mid-foot of the sail. Key dimensions and labels include:

- Dimensions: 17' - 10" MAX., 50' MAX., 18' - 6" MAX., HEAD TO MID FOOT, MITER, 7' - 8" MAX., 15' - 9" MAX., 60", 54", 7' - 0"
- Label: WIRE LUFF & JIB SNAPS

14



CERTIFIED MEASUREMENTS

1. L - Length overall, Sta. 0 to aft face transom: 20 feet, plus or minus $\frac{1}{2}$ inch.
2. F - Forward end of cockpit opening from Sta. 0.: $84\frac{5}{8}$ inches, plus or minus 2 inches.
3. R - Aft end of cockpit opening from Sta. 0: 17 feet, $11\frac{3}{8}$ inches plus or minus 1 inch.
4. B - Beam at Sta. 10. Taken to outside of hull at sheer: $79\frac{1}{2}$ inches, plus or minus $\frac{1}{2}$ inches.
5. D - Depth of Sta. 10, from sheerline to exterior of hull: 32 inches plus or minus $\frac{3}{4}$ inches.
6. C - Crown of deck at Sta. 6 from sheer to sheer: 3 inches plus or minus $\frac{1}{2}$ inch.
7. Deck widths: outside of hull to outboard edge of coaming.
Sta. 7: $14\frac{1}{2}$ inches, plus or minus $\frac{1}{2}$ inch.
Sta. 12: $10\frac{5}{8}$ inches, plus or minus $\frac{1}{2}$ inch.
Sta. 18: 9 inches, plus or minus $\frac{1}{2}$ inch.
8. Seat location: Aft of Sta. 7: 6 inches, plus or minus 3 inches.
Fwd. of Sta. 18: 19 inches, plus or minus 3 inches
9. S - Height of bow above baseline: $35\frac{1}{2}$ inches, plus or minus 1 inch
10. CB.- Sta. 0 to forward end of centerboard slot: 8 feet, $5\frac{1}{2}$ inches, plus or minus 2 inches.
11. T - Height of transom at C/L excluding deck trim: 20 inches, plus or minus $\frac{1}{2}$ inch.
12. X - Beam of transom at sheerline: 56 inches, plus or minus $\frac{1}{2}$ inch.
13. W - Thickness of rubbing strip out from deck: $\frac{3}{4}$ inch, plus or minus $\frac{1}{4}$ inch.
14. Z - Length of rudder blade from lower edge of transom to extreme bottom of rudder. $28\frac{3}{4}$ inches, plus or minus 1 inch.
15. P - Width of rudder at $\frac{1}{2}$ -Z: 14 inches, plus or minus 1 inch.
16. A - Length of leading edge of centerboard: 60 inches, plus or minus 1 inch.
17. Y - Width of centerboard at $\frac{1}{2}$ -A: $13\frac{5}{8}$ inches, plus or minus $\frac{3}{8}$ inches.
18. Centerboard thickness at $\frac{1}{2}$ -Y: 15/16 inches maximum, $\frac{3}{4}$ " minimum.
19. Centerboard weight: 78 - 88 pounds.
20. Height of main halyard sheave centerline above butt of mast: 27 feet, 1 inch, maximum wood; 27 feet, $\frac{3}{4}$ inches maximum aluminum.

21. Height of spinnaker halyard sheave centerline above butt of mast: 19 feet, $10\frac{1}{2}$ inches, maximum wood; 19 feet, $10\frac{1}{4}$ inches, maximum aluminum.
22. Height of jib halyard sheave centerline above butt of mast: 19 feet, $\frac{1}{2}$ inches maximum wood; 19 feet, $\frac{1}{4}$ inches, maximum aluminum.
23. Height of pivot point gooseneck above butt of mast: 24 inches, minimum wood; $23\frac{3}{4}$ inches, minimum aluminum.
24. Cross sectional dimensions of boom width: $2\frac{1}{2}$ inches, plus or minus $\frac{1}{4}$ inch. Thickness: 3 inches, plus or minus $\frac{1}{4}$ inch. Radius: $\frac{1}{2}$ inch, plus or minus $\frac{1}{4}$ inch.
25. Overall length of boom from bottom of mast luff groove including fittings: 14 feet maximum.
26. M - Sta. 0 to forestay at deck: $3\frac{3}{4}$ inches, plus or minus $\frac{1}{2}$ inch.
27. J - Foretriangle: 69 inches, plus or minus 2 inches.
28. All up hull weight: 830 pounds minimum.

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INSTRUCTIONS FOR MEASURING

The following paragraphs have been prepared as a guideline for measuring a Highlander sailboat. These instructions are not mandatory. There are many ways of obtaining some of the measurements but the method outlined below should enable you to obtain the required information with a minimum amount of effort and time expended. A glossary of terms is included at the end of these instructions.

Materials required:

- 1—Steel tape measure—35' or longer
- 1—Plumb line (5' string with weight attached)
- 2—Straight edges (2x4" or similar)
 - one, 8' long
 - one, 4' long
- 1—Carpenter's Level
- 1—Weight Scale 100-250# max. range
- 1—30' length of $\frac{1}{4}$ line
- 1—Carpenter's square
- 2—6" "C" clamps
- Chalk
- 1—HCIA member in good standing to witness and assist owner with measurement

PREPARATIONS BEFORE STARTING

- A.) Centerboard should be removed from boat.
- B.) Plumb the transom of boat using level. All measurements can be taken on trailer. Therefore, simply move trailer tongue up or down until transom is plumb and secure tongue in this position.
- C.) Place level on centerboard trunk cap parallel to keel. It should be level. If not, adjust trailer to average the plumb of transom and squareness of centerboard trunk.
- D.) Place a straight edge across beam of boat perpendicular to keel at approximately Sta. 10. Place level on straight edge. Level hull and secure in place.

HULL MEASUREMENTS

- 1. L - Length overall Sta. 0 to aft face of transom. ($20' \pm \frac{1}{2}"$)
 - a) Clamp 4' straight edge to transom using "C" clamp and rudder fittings to secure.
 - b) Secure one end of $\frac{1}{4}$ line to straight edge and the other to mast crotch on trailer (if trailer not equipped with crotch, clamp 8' straight edge to trailer tongue making sure it is plumb and secure line to it)
 - c) Level line—make sure it is on center line of boat and does not interfere with deck fittings, mast step, etc.
 - d) Using plumb line, mark vertical projection of bow on the line. For this measurement the bow is defined as the outer edge of the hull at the intersection of the top deck. It does not include bow fitting or the overhang of the deck on boats with fiberglass decking.

- e) With tape measure—obtain overall length measurement—do not remove line.
- f) Record on measurement certificate (M/C) as dimension L (Dim.L)

- 2. F - Forward end of cock-pit opening from Sta. 0 ($84\frac{5}{8}" \pm 2"$)
 - a) Using same set up as above, drop plumb line to locate F and mark on center line.
 - b) Without removing center line, measure from Sta. 0 (marked on center line in 1 above) to mark which corresponds with location F.

DO NOT REMOVE SET UP.

- c) Record on M/C as Dim. F.
- 3. R - Aft end of cockpit opening from Sta. 0 ($17' 11\frac{3}{8}" \pm 1"$)
 - a) Again using same set-up as in step 1 and 2 above, drop plumb line to locate aft end of cockpit opening and mark on the centerline.
 - b) Without removing centerline measure from Sta. 0 to the mark which corresponds with location R. Do not remove set up.
 - c) Record on M/C as Dim. R.
- 4. B - Beam at Sta. 10 Taken to outside of hull at sheer ($79\frac{1}{2}" \pm \frac{1}{2}"$)
 - a) Measure back 10 feet from Sta. 0 reference mark on center line. Mark Sta. 10
 - b) Position a (8') straight edge across the beam at 90° to center line. Locate lead edge by dropping plumb line from Sta. 10 reference mark on center line.
 - c) Using a plumb line or level, mark location of outside of hull on both sides of boat on the straight edge.
 - d) Measure distance between marks—Do not remove set-up.
 - e) Record on M/C as Dim. B
- 5. D - Depth at Sta. 10, from sheerline to bottom of hull ($32" \pm \frac{3}{4}"$)
 - a) Using same setup as in Step 4, drop tape measure through centerboard trunk to outside of hull perpendicular to lead edge of straight edge.
 - b) Measure distance from underside of straight edge to outside of hull.
 - c) Measure vertical distance from sheerline (top of deck at intersection with outside of hull) to the bottom of straight edge of both sides of boat. Add these two measurements together and divide by two.
 - d) Subtract the average dimension obtained in 5c from the measurement made in step 5b.
 - e) Record on M/C as Dim. D.
- 6. C - Crown of deck from sheer to sheer. ($3" \pm \frac{1}{2}"$)
 - a) Measure back 6 feet from Sta. 0 reference mark on center line. Mark Sta. 6
 - b) Position a straight edge on deck across the beam at 90° to

- center line, locating leading edge by dropping plumb line from Sta. 6 reference mark on center line. If straight edge contacts rub rails or mast step place a block on deck at centerline under straight edge to eliminate interference.
- c) Measure vertical distance from sheer at outside of hull to bottom of straight edge on both sides of boat. Add these two measurements together and divide by two.
 - d) If it was necessary to place a block under straight edge in step 6b, measure thickness of block.
 - e) Subtract the dimension obtained in step 5d from the dimension obtained in 5c and record on M/C as Dim. C. Do not remove centerline set-up.
7. Deck widths at: Sta. 7 (14½" ± ½")
 Sta. 12 (10¾" ± ½")
 Sta. 18 (9" ± ½")
- a) Locate Sta. 7, 12, 18 in the same manner as Sta. 10 and 6 were located in steps 4a and 6a.
 - b) Position a straight edge across the boat at these stations in the same manner as in steps 4b and 6b (NOTE: While straight edge is positioned at Sta. 7 and 18 the dimensions required in step 8 may be taken)
 - c) Using a level or carpenter's square mark the location of the outside of hull and the outboard edge of coaming. On fiberglass decks measurement should be taken from mid-point of radius blend between deck and coaming. Measure both sides of boat. Add the two measurements together and divide by two to obtain the average dimension. Follow this same procedure at all three locations.
 - d) Record deck width dimensions on M/C. Do not remove set-up.
8. Seat locations at: Sta. 7 (6" ± 3")
 Sta. 18 (19" ± 3")
- a) While straight edge is positioned at Sta. 7 and 18 to obtain the deck dimensions to seat locations may also be measured.
 - b) With straight edge located at Sta. 7 drop a plumb line from straight edge to the seat. Measure distance from plumb line to forward most edge of the seat. Repeat procedure on other side of boat. Add the two measurements obtained together and divide by two to obtain average dimension.
 - c) Repeat step 8b at Sta. 18 measuring from the plumb line to aftermost edge of seat.
 - d) Record dimension on M/C. Remove centerline from boat.
9. S - Height of bow above base line. (35½" ± 1")
- a) Tie one end of line which was formerly used as the centerline to mast stanchion
 - b) Drop line thru centerboard trunk.
 - c) Pull line taut and secure to vertical support on trailer tongue.
 - d) Level this line.
 - e) Drop plumb line from bow at intersection of deck and outside of hull (Sta. 0)
 - f) Measure back 6' (Sta. 6) and 2' (Sta. 2) from the intersection of plumb line and base line. Mark locations on base line.
 - g) Base line should be approximately ⅞" below hull at Sta. 6 and 3½" below hull at Sta. 2. If the distances are greater than this check for interference with C/B gasket. If distance is less than these numbers place a shim under line at exit of C/B slot to obtain the reference dimensions.
 - b) Making sure that base line is level and located as described in (g) above mark intersection of plumb line and base line on both lines. Do not remove set-up.
 - i) Measure vertical distance from top of deck (excluding hardware) to base line.
 - j) Record on M/C as Dim. S. Before removing base line proceed to step 10.
10. CB - Station 0 to forward end of centerboard slot (8' 5½" ± 2")
- a) Place carpenter's square or straight edge into bottom of centerboard slot from underneath boat.
 - b) Measure distance from leading edge of straight edge forward to Sta. 0 reference mark on base line.
 - c) Record on M/C as CB dimension.
11. T - Height of transom at CL excluding deck trim (20" ± ½")
- a) Hold a straight edge on the centerline against the bottom of the hull at stern of the boat so that it extends beyond the transom.
 - b) Measure from the top of this straight edge to the top of the deck at the centerline (exclude deck trim)
 - c) Record on M/C as Dim. T
12. X - Beam of transom at sheerline (56" ± ½")
- a) With the end of the measuring tape located at the top of deck at the intersection of the outside of hull at one side of transom measure distance to the same location on the other side of transom.
 - b) Record on M/C as Dim. X
13. W - Thickness of rubbing strips out from deck (¾" ± ½")
- a) Measure thickness (not width) of rubbing strips.
 - b) Record on M/C as Dim. W.
14. Z - Length of rudder blade from lower edge of transom to extreme bottom of rudder. (28¼" ± 1")
- a) Install rudder into stern fitting. Position rudder amidships.
 - b) Using a carpenter's square positioned on the transom mark the horizontal extensions of the lower edge of the transom on the rudder blade.
 - c) Holding the end of the measuring tape on this mark determine the maximum length of rudder blade.

d) Using a straight edge, draw a chalk line along this dimension.

e) Record on M/C as Dim. Z.

15. P - Width of Rudder at $\frac{1}{2}$ Z. (14" \pm 1")

a) Remove rudder from boat.

b) Mark $\frac{1}{2}$ Z on the chalk line drawn in step 14d above.

c) With a carpenter's square construct a perpendicular to line Z at $\frac{1}{2}$ Z

d) Measure width of rudder at $\frac{1}{2}$ Z

e) Record on M/C as Dim. P.

CENTERBOARD REQUIREMENTS

16. A - Length of leading edge of centerboard (C/B) (60" \pm 1")

a) Stand centerboard upright on level surface and plumb leading edge.

b) Place a straight edge on top of C/B so that it extends beyond the lead edge of the board at the "knee" of the C/B.

c) Measure distance from ground level to the intersection of the straight edge and a straight line extension of the leading edge of the C/B.

d) Mark with chalk the position of $\frac{1}{2}$ A.

e) Record dimension obtained in 16A on M/C as Dim. A/

17. Y - Width of Centerboard at $\frac{1}{2}$ A. (13 $\frac{5}{8}$ " \pm $\frac{3}{8}$ ")

a) Lay centerboard on flat surface.

b) With a carpenter's square construct a perpendicular to the lead edge of C/B at position $\frac{1}{2}$ A located in step 16d. With a straight edge draw a chalk line across C/B.

c) Measure width of C/B at $\frac{1}{2}$ A.

d) Record on M/C as Dim. Y.

e) Mark location of $\frac{1}{2}$ Y with chalk.

18. Centerboard thickness $\frac{1}{2}$ Y (15/16" max.)

a) Lay C/B on opposite side from that used in 17a.

b) Locate and mark with chalk location of $\frac{1}{2}$ Y in the same manner as described in step 17.

c) Stand C/B on leading edge and secure in position.

d) Place two straight edges against the sides of the board, making sure that they contact the board at $\frac{1}{2}$ Y only. The two straight edges should be parallel and should extend beyond the trailing edge of the board.

e) Measure distance between the two straight edges (inside edge to inside edge)

f) Record on M/C as centerboard thickness at $\frac{1}{2}$ Y. Indicate whether C/B is wood or fiberglass.

19. Centerboard weight (78 - 88#)

a) Weigh centerboard on scale

b) Record on M/C

Mast Measurements—All measurements to be taken from the butt of the mast at the lead edge.

20. Height of centerline of main halyard (27' 1" Max. Wood)
sheave above butt of mast. (27' $\frac{3}{4}$ " Max. Alum.)

a) Lay mast on ground lead edge upward.

b) Position carpenter's square on mast at center point of main halyard sheave keeping one leg of square parallel to lead edge of mast and the other leg pointing upward representing the extension of the position of the center point of main halyard sheave.

c) Measure distance from butt of mast to center of main halyard sheave.

d) Record on M/C.

21. Height of centerline of spinnaker (19' 10 $\frac{1}{2}$ " Max. Wood)
sheave above butt of mast. (19' 10 $\frac{1}{4}$ " Max. Alum.)

a) Position mast as in step 20a.

b) Position carpenter's square at spinnaker sheave centerline as in 20b.

c) Measure distance above butt of mast.

d) Record on M/C.

22. Height of centerline of jib halyard sheave (19' $\frac{1}{2}$ " Max. wood)
above butt of mast (19' $\frac{1}{4}$ " Max. Alum.)

a) Position carpenter's square as above at centerline of jib halyard sheave.

b) Measure distance above butt of mast.

c) Record on M/C.

23. Height of pivot point of gooseneck above butt (24" Min. wood)
of mast (23 $\frac{3}{4}$ " Min. Alum.)

a) Locate the pivot point of gooseneck in the same manner as the sheaves were located in the previous 3 steps with a carpenter's square. (If mast is equipped with sliding gooseneck it should be positioned at its lower limit.)

b) Measure distance above butt of mast.

c) Record on M/C.

Boom Measurements

24. Cross sectional dimensions of boom: Width (2 $\frac{1}{4}$ " \pm $\frac{1}{4}$ ")
Thickness (3" \pm $\frac{1}{4}$ ")
Radius ($\frac{1}{2}$ " \pm $\frac{1}{4}$ ")

a) To obtain width and thickness dimensions of boom use a "C" clamp as a measuring tool.

b) Position "C" clamp across the flat portion of boom width and tighten until adjustable portion of clamp just touches boom. Remove "C" clamp and measure size of opening. Record on M/C.

c) Repeat step 24a to obtain thickness dimension and record on M/C/

d) To obtain the radius of boom cross section, place boom on flat surface with sail slot upward.

e) Clamp 2 small straight edges to boom adjacent to each other perpendicular to the length of the boom one across sail slot the other at 90° to the sail slot.

CHIEF MEASURER'S RULINGS

- f) Measure the distance from the point of tangency on either straight edge to the intersection of the other straight edge.
- g) Record on M/C.
25. Overall length of boom including fittings. (14' Max.)
- Step mast onto boat and secure forestay.
 - Install boom onto gooseneck.
 - Position boom with sail slot perpendicular to luff slot in mast. Secure in position.
 - Measure distance from the bottom of sail luff groove on mast (on a wood mast from aft edge of mast at gooseneck) to the end of boom. Include all fittings and fasteners.
 - Record on M/C.
26. M - Station 0 to forestay at deck. ($3\frac{3}{4}" \pm \frac{1}{2}"$)
- For the purpose of the dimension the deck is defined as the top of the standard D & M bow plate where forestay exits fitting.
 - With carpenter's square and a level measure horizontal distance from centerline of forestay to Sta. 0.
 - Record on M/C as Dim. M.
27. J - Foretriangle ($69" \pm 2"$)
- Secure one end of a $\frac{1}{4}"$ line to mast and the other end to trailer forward of boat.
 - Level line.
 - With the aid of a plumb line mark string at the point which corresponds to the vertical extension of the point where forestay exits bow plate.
 - Measure distance from leading edge of mast to mark on line.
 - Record on M/C as Dim. J.
28. All up hull weight. (830# Min.)
- The boat shall be weighed with the equipment specified in official specifications.
 - Record on M/C and indicate type of boat. (Wood or fibreglass).

GLOSSARY

Beam—Width of hull at any point.

Butt, of mast—The part of the mast which supports the mast on the mast-step. (Not the tenon, see below).

Crown—The height of the deck above the hull sheer line.

Sheer—The line of the boat sides running fore-and-aft at the deck.

Stanchion—The upright wooden supports of the mast step.

Station—Defines distance aft of bow in 1 foot increments, i.e., Station 2 is two feet aft of bow, measured along centerline of boat.

Tenon—The heel of the mast, made to fit into the mast-step.

- HIKING STRAPS—Hiking straps are permitted but they must be below the sheer and inside the cockpit when in use.
- BOOM—The maximum length of the boom including all fittings and attachments is 14'. This measurement is taken from the bottom of the sail luff groove on the mast to the end of the boom with the boom positioned at a right angle with the mast. (Refer to yearbook drawings).
- MAIN, JIB AND SPINNAKER HALYARD SHEAVE DIAMETERS—maximum diameter of the sheaves is limited to $1\frac{1}{2}"$.
- LOCATION OF HALYARD SHEAVE CENTERLINES — All dimensions are to be taken from the butt of the mast not including tenon.
- MAST STEP—Maximum thickness of mast step is $\frac{3}{4}"$. When an aluminum mast is used an additional butt plate, not to exceed $\frac{1}{4}"$ in thickness may be used.
- NAYRU RULE 54.3 MODIFYING "CLOSE PROXIMITY". It is permissible to allow spinnaker guy to run freely through the pole end fitting.
- CUNNINGHAM HOLE—A hole in the mainsail for the purpose of controlling luff tension only is allowed with the following restrictions: only 1 hole, maximum diameter $\frac{3}{4}"$ located not more than 8" above the foot bolt rope and not more than 4" aft of the luff bolt rope.
- CENTERBOARD PADS—The use of pads or spacers applied equally to both sides of centerboard, above the hull line (housed portion), to prevent the leading edge of the centerboard from falling off to leeward due to the clearance between centerboard and trunk is permitted. These pads will be installed in such a way that they do not violate the specifications which disallows cocking or jibbing devices.
- HULL DEPTH DIMENSIONS—(D) Because of the absence of a keelson in fibreglass hulls the method of obtaining the depth of the hull at Sta. 10 has been changed. The control dimension is now from the sheerline to the outside bottom of hull at Sta. 10. The specified dimension is changed to $32" \pm \frac{3}{4}"$.
- JIB TACK FITTING—A jib tack fitting in-line with forestay is permitted. Position of forestay must comply with measurements J and M.
- POLYMER COATINGS—The use of polymer coatings applied to the hull to increase boat speed (decrease drag at the boundary layer) is prohibited.
- BAILERS—Hull or transom bailers may be used. (Before installing these bailers the builders advice should be sought.)
- BOW FITTING—The type of bow fitting is optional.
- BOW MOLDING—The half round bow molding used on wooden hulls may be removed.
- COCKPIT SPANNERS—The use of any device which spans the cockpit opening (used to mount jib blocks, mid-boom travelers etc.) is prohibited.
- SPEED CHANGE INDICATORS—The use of audible or visual speed-change indicators during a sanctioned regatta is prohibited.

OUTLINE HISTORY OF THE HIGHLANDER CLASS

- 1950, June—Plans published in "Yachting".
- 1951, Fall—Highlander No. 1 launched.
Dec.—Twelve Highlanders sold in 1951.
- 1952, Jan.—Highlander exhibited at New York Boat Show.
—Highlander Class International Association formed at Boat Show Meeting.
- 1953, Jan.—John Caldwell elected first President of the Class.
Summer—First National Championship held at Mentor Harbor Yachting Club, ending in a tie between Herman Wyler of Ville St. Laurent, Quebec, and Stanley Gridley of Mentor Harbor. Sail-off won by Gridley.
- 1954, Jan.—Constitution and By-Laws adopted.
—57 Highlanders had been built.
Sept.—Highlander entered in Yachting One-Of-A-Kind regatta, sailed by Bill Cox, tied for 3rd with International 14, (2nd among one-design centerboarders).
- 1956, June—First issue of class publication (later named "The Highlander"), editor Ray Feibusch of Brooklyn, N. Y.
Aug.—First yearbook authorized.
- 1957, Spring—Jouet Co., Paris, France builds twenty Highlanders.
Aug.—National Championship becomes International Championship.
- 1958 —Composite material for hulls and spars approved.
- 1959 —Fire at Douglass & McLeod destroyed wood molds. Fifteen months of production lost.
- 1960 —First fiberglass Highlander built.
- 1962 —Aluminum mast approved.
Aug.—Annual meeting changed from N. Y. Boat Show to International Championship Regatta. (Mentor Harbor)
- 1964 —Aluminum mast in production.
- 1966, Mar.—Highlander in One-Of-A-Kind at St. Petersburg, sailed by Gene Wood, finished 2nd in conventional centerboarder division, 1st among one-design centerboarders.
- 1967 —Fiberglass centerboard introduced.
- 1968 —Fiberglass deck introduced.
- 1969, Jan.—Durabilt Corp, produced its first Highlander, becoming second regular Highlander builder.
Aug.—New Constitution, By-Laws and Racing Rules adopted
—Aluminum centerboard introduced.

HIGHLANDER, A NEW DOUGLASS PLANING CLASS

THE HIGHLANDER is the latest and largest of the planing type sailboats designed by Gordon K. Douglass and built by Douglass & McLeod, of Painesville, O., a development of this designer's 14-foot dinghies and Thistle Class sloops. The first of the clan will be in commission this season. Like her predecessors, she will be of molded plywood construction with laminated mahogany stem, mahogany keel, bronze fastenings, stainless steel standing rigging and hollow spars and hardware by Douglass & McLeod.

Mr. Douglass writes: "It is relatively simple to design an out-and-out planing hull, but a sailboat planes only a small part of the time. To be successful she must also be a good displacement boat, with ability to windward, seaworthiness and utility."

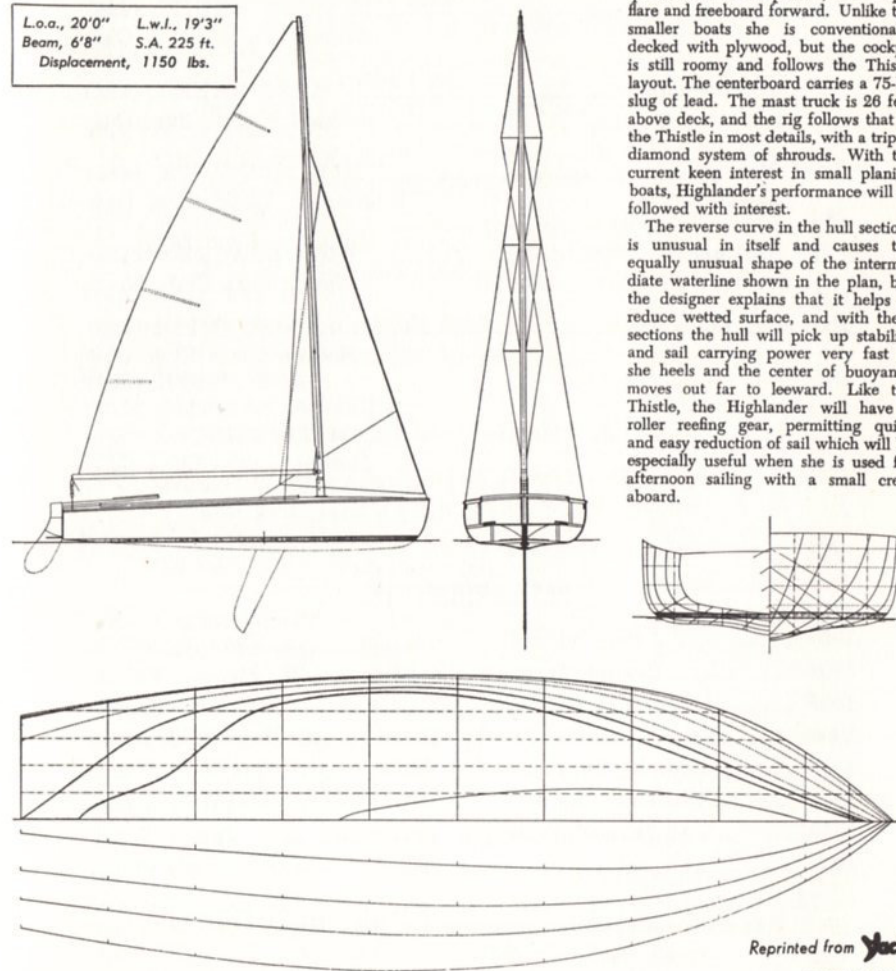
Highlander's bare hull weighs only 550 lbs., she has unusually low displacement-to-length and high sail area-to-wetted surface ratios both of which make for good planing performance. Stability, the designer says, is her outstanding characteristic, not only initial

and ultimate stability but also, due to her lines, the ability to develop dynamic stability under sail. The hollow garboards are designed to reduce displacement at that point and get it out into the bilges, to further enhance stiffness. The slightly convex sheer line helps her carry sail by keeping the rail out of water at a sharp angle of heel. Her sail plan is relatively low in aspect, still another contributing factor in ability to lug sail.

The bow lines follow those of the Thistle, whose dryness and weatherly qualities have been proven, with ample flare and freeboard forward. Unlike the smaller boats she is conventionally decked with plywood, but the cockpit is still roomy and follows the Thistle layout. The centerboard carries a 75-lb. slug of lead. The mast truck is 26 feet above deck, and the rig follows that of the Thistle in most details, with a triple-diamond system of shrouds. With the current keen interest in small planing boats, Highlander's performance will be followed with interest.

The reverse curve in the hull sections is unusual in itself and causes the equally unusual shape of the intermediate waterline shown in the plan, but the designer explains that it helps to reduce wetted surface, and with these sections the hull will pick up stability and sail carrying power very fast as she heels and the center of buoyancy moves out far to leeward. Like the Thistle, the Highlander will have a roller reefing gear, permitting quick and easy reduction of sail which will be especially useful when she is used for afternoon sailing with a small crew aboard.

L.o.a., 20'0" L.w.l., 19'3"
Beam, 6'8" S.A. 225 ft.
Displacement, 1150 lbs.



Reprinted from **Yachting**

JUNE, 1950

1969-70 HIGHLANDER CLASS OFFICERS

President -----	MURRAY ANDERSEN (622)
	Buffalo Yacht Club, N. Y.
Vice-President -----	DICK CHAPIN (576)
	Lake Norman Yacht Club, N. C.
Secretary -----	ORVILLE WOOD (200)
	Edgewater Yacht Club, Ohio
Treasurer -----	DICK BRACKEN (135)
	Nyack Boat Club, N. Y.
Commodore -----	FRED BAUER (494)
	Atwood Yacht Club, Ohio
Secretary-Treasurer -----	MARJ BAUER (494)
	Atwood Yacht Club, Ohio
Chief Measurer -----	RON MEREDITH (444)
	Edgewater Yacht Club, Ohio
"The Highlander" Editor -----	DICK BRACKEN (135)
	Nyack Boat Club, N. Y.
Executive Committee -----	TOM SMITH (420)
	Hoover Yacht Club, Ohio
	BOB HULEK (387)
	Brockport Yacht Club, N. Y.
	HERM GROEZINGER (607)
	Hoover Yacht Club, Ohio

PAST PRESIDENTS

1953 -----	John Caldwell	1961 -----	Carl A. Ludeke
1954 -----	Russell Ferree	1962-3 ----	Dr. Hudson Fowler
1955 -----	Stanley Gridley	1963-4 -----	Richard Farkas
1956 -----	Ralph Lawson, Jr.	1964-5 -----	Donald Southam
1957 -----	M. D. Lockwood	1965-6 -----	Harold Williams
1958 -----	Benjamin Sawyer	1966-7 -----	Frank Quatman
1959 -----	C. Russell Eddy	1967-8 -----	James Smith
1960 -----	Peter Dunkle	1968-9 -----	Fred Bauer

NOTE: Starting in 1962, election was changed to mid year election to coincide with International Championship Series.

PAST CHAMPIONS

1953	Stanley Gridley	33
	Mentor Harbor Yachting Club	
	held at Mentor Harbor Yachting Club	
1954	Ray H. McLeod	58
	Mentor Harbor Yachting Club	
	held at Mentor Harbor Yachting Club	
1955	Benjamin Sawyer	49
	Cowan Lake Yacht Club	
	held at Northport Yacht Club	
1956	Ray H. McLeod	58
	Mentor Harbor Yachting Club	
	held at Duxbury Yacht Club	
1957	O. C. Bailey	120
	Corpus Christi Yacht Club	
	held at Mentor Harbor Yachting Club	
1958	O. C. Bailey	120
	Corpus Christi Yacht Club	
	held at Corpus Christi Yacht Club	
1959	Mark Bratton	136
	Corpus Christi Yacht Club	
	held at Raritan Yacht Club	
1960	Richard Farkas	267
	Raritan Yacht Club	
	held at Put-In-Bay Yacht Club	
1961	Allen Bower	290
	Mentor Harbor Yachting Club	
	held at Duxbury Yacht Club	
1962	Eugene Wood	200
	Edgewater Yacht Club	
	held at Mentor Harbor Yachting Club	
1963	Chris Magnusson	292
	Mentor Harbor Yachting Club	
	held at Corpus Christi Yacht Club	
1964	Chris Magnusson	292
	Mentor Harbor Yachting Club	
	held at Edgewater Yacht Club	
1965	Eugene Wood	200
	Edgewater Yacht Club	
	held at Port Washington Yacht Club	
1966	William Allen	144
	Corpus Christi Yacht Club	
	held at Lake Geneva Yacht Club	
1967	Romeyn Everdell	346
	Duxbury Yacht Club	
	held at Mentor Harbor Yacht Club	
1968	John M. Clark	92
	Duxbury Yacht Club	
	held at Duxbury Yacht Club	
1969	Thomas Smith	420
	Hoover Yacht Club	
	held at Buffalo Yacht Club	

INTERNATIONAL TROPHIES

Perpetual Rotating Trophies

First Place	Silver Plaque
Second Place	Douglass & McLeod - Revere Bowl
Third Place	Boston Sailmakers - Revere Bowl
Fourth Place	Ulmer Sailmakers - Revere Bowl
Fifth Place.....	
	Mentor Harbor Yacht Club Highlander Trophy Brandy Snifter
Corpus Christi Silver Trophy.....	High point club other than the host club. Revere Bowl.

PERMANENT TROPHIES

Keepers

A silver trophy for the first five places.

A silver trophy for the winner of each of the individual five races.

Sail-A-Gair Silver Trophy -

Highest finish for new member in his first Internationals.

Sail Hash Marks -

First place -- 3 chevrons

Second place -- 2 chevrons

Third place -- 1 chevron



Highlander Class Champion
Tom Smith

SAILMAKING AND SAIL-SETTING

By Don Bever

Don Bever, winner of the Star Worlds in '65 and second in Solings at CORK '69, is in charge of Research and Development for North Sails, in San Diego. Don is originally from Cleveland and Vermilion, Ohio, where he sailed on Lake Erie and many of the Midwest's small lakes, building up long experience in Thistles, Lightnings and Comets.

In designing sails for any boat every sailmaker first uses his basic ideas of what sail shape should be. Then he modifies this as he feels necessary for each particular class or type of boat. Factors that he considers are the general sailing characteristics of the boat such as: overall hull shape, beam, weight; the type of rig: including flexibility of mast and boom, staying and whether mast is keel or deck stepped; and the physical arrangement of the boat and fittings as it pertains to sail control: such items as jib fair-lead position, type of mainsheet control, traveler location and control. In addition the average crew weight and wind and water conditions also influence the design although more and more sailmakers are designing "all purpose" sails — one suit of sails which can be adjusted on the boat for proper shape, draft and trim for varying wind and sea conditions. This I feel is quite important for it allows the racing skipper to sail the entire season, either in his own fleet or on the "circuit", with one suit of sails knowing that by properly adjusting and setting them on the boat he can have good speed in all winds and on open rough water as well as inland lake conditions.

Thereon each sailmaker makes his decision as to the overall sail design including the amount of curve in the seams, in the luff and foot of the sails and in the choice of cloth for the sails. I won't go into design details and theories here; there have been many good articles written in various magazines and class publications in the last few years which give a wealth of information on sail design. I also feel that many sailors concern themselves too much with the theories and design principles used by various sailmakers — possibly what they could better do to obtain top racing results is to purchase sails from one of the leading sailmakers making winning sails for their class and devote more effort to learning how to set and adjust these sails properly to get the best possible performance in their racing conditions. I will go into this in more detail below but first would like to touch on one point of sailmaking the importance of which I don't think many sailors fully realize — that is, the choice of material to be used in the sails.

For dacron used in mains and jibs both the stretch characteristics and the life of the material are quite important. The stretch of the material at 90 degrees to the seams, the fill as we call it, affects the leach of the sail. The stretch at 45 degrees, or bias, affects the middle of the sail and the luff, and the combination of both interact to affect not only the shape of the sail, i.e., amount of draft, location, set of leach, but also how "automatic" the sails are to properly

adjusting themselves to small changes in wind speed or direction as well as how they react to physical changes made by the skipper or crew — outhaul and luff tension adjustment, trimming or easing the sheets, vang, bending the mast etc. The life of the material, "fatigue life" as we call it, indicates how long the material will retain the original or close to the original stretch properties. This is, of course, important to every skipper because he wants sails which will continue to perform well in many, many races, "be as good in September as they were in May". First, not all materials of the same weight, even from the same manufacturer, have the same stretch characteristics — and mains and jibs require materials with different stretch properties and sails for different sizes and type of boats often require different stretch properties for the same sails — for example, 4.5 oz. dacron which makes the fastest Highlander mains has different properties than that used for the best Star mains or Windmill mains — the same holds true for jibs. Secondly, material life also varies not only in different cloth made by one supplier but from different suppliers. I would like to point out, however, that in recent years material life has been greatly improved by all cloth manufacturers and each year a larger percentage of materials available have increasing fatigue life. In nylon spinnaker cloth we are also concerned with the stretch and life of the materials, plus porosity and tear strength, and they all affect the design, speed and life of spinnakers. In summary then, the choice of cloth has a great deal to do with the shape and performance of all sails, and their life, and keeping records of the best materials and continuous quality control testing insure accurate reproduction of fast sails which is of great importance to every racing skipper.

Once you've received those new "super bombs" from your chosen sailmaker what do you do with them to make you go fast?

On mainsails today most sailmakers are putting shape along the foot of the sail either through use of a shelf, lots of curve in the tack seam or other methods. This construction allows you to adjust the fullness of the sail and to some extent draft location in the lower portion by adjusting the position of the clew with the outhaul. Just how effectively this changes the sail depends somewhat on the method of construction used. Releasing the outhaul and allowing the clew to come forward makes the sail fuller and lets the leach area stand firm. On the luff of the main, sails with the Cunningham ring should be very close to maximum luff length with little tension. Stretching the luff with the Cunningham pulls the draft forward and also removes wrinkles caused as the cloth stretches in more wind and also as the mast bends. In sailing to windward in light airs the clew should be in 1½ or 2 inches and very little luff tension used. As the wind increases the clew should be pulled out and luff tension gradually applied to keep the draft from moving too far aft. In winds above 10 or so, the outhaul should be pulled all the way out; continue to stretch the luff some in more wind. Be careful not to overstretch, however, and it usually is better to be stretched not quite enough rather than to have too much luff tension — and remember, never

stretch the luff or foot so tight that a tension wrinkle appears parallel to the boom or mast which the wind will not blow out. Running and reaching the Cunningham should be released entirely and the outhaul slacked off enough to make the leach stand firm when vanged. In light-medium winds the clew can come in 4 or 5 inches, in heavier winds when you may already be overpowered there's no use to make the sail any fuller so let the clew in only a couple of inches to make the leach stand. I would also point out that outhaul and Cunningham adjustments should lead into the cockpit area where the skipper or crew can easily reach them; the more convenient they are the better you will be able to use and adjust them to your advantage.

In light airs be sure not to trim the mainsheet too hard — better to keep the boom in close to the centerline of the boat and ease the sheet a little to allow the sail too "breathe" a little. As the wind increases trim a little harder and ease the traveler out to balance the helm and keep the boat on her feet. In light winds the maximum draft should be a little ahead of the center of the sail and as the wind increases it should move back some until it is a little aft of center in 5 to 18 mph and up. Except possibly in drifting to very light conditions when supporting leach roach is a problem, the leach should progressively twist off to leeward from the bottom to top. In winds from about 5 mph and up if the leach hooks to windward at the center and top try not trimming quite as hard or try to get a little more fore and aft or side bend in the mast. A tight leach in the lower portion can be relieved by tightening the outhaul. In light airs up to about 8 or 10 the sail should not "lift" along the luff at all or very little — this will depend somewhat on whether you are driving off in choppy water to gain speed or pointing high on smooth water. Around 10 mph the sail may start to lift or "sleep" along the luff area — the mast may start to bend some to reduce this — the best sails seem to lift evenly along the luff from tack to head at optimum trim. Somewhere between 15 and 18 mph the sail will carry a more pronounced backwind, this again depending on how you are pointing in the sea conditions and also on how well you are able to hold the boat down. If you feel the sail is backwinding too much—don't try to eliminate it entirely in this much breeze—fore and aft mast bend will flatten the sail and side bend will move the draft back some. If the mast is too stiff to bend enough fore and aft then slacking the diamonds will promote side bend. Remember, any mast bend should be a fair curve without straight or "S" sections.

With jibs, luff tension is similar to that required on the main—less in light air, more as the breeze picks up and release the tension on a reach. The tack fittings on the deck should allow the foot of the sail to come as close to the deck as possible to get all the benefits of a "deck-sweeper". The more low-clewed jibs require the leads more inboard — about the 9 or 10 degree line off center seems about optimum for the Highlander. Regardless of further changes in the cut of jibs I don't feel leads further inboard will prove better on the Highlander — they possibly could in light winds, 4 to 8, and

smooth water, but I doubt it. When the winds are about 8 to 10 mph the lead should be started to be pulled outboard, again depending on both sea conditions and how you can hold the boat down. In other words, when you are driving off the leads should be more outboard, pointing high more inboard. In light air the maximum draft of the jib should be about one third of the way back from the luff, in the center in medium winds and a little aft of center in heavier winds. The leach will appear to "look inboard" in the lower portion but should twist outboard and to leeward as you look up to the top and should be rather parallel to the lee side of the main luff — so the slot opening is roughly the same width for the full length of the jib leach. The fore and aft position of the leads should be somewhat ahead of the former "bisect the clew angle" position common for higher clewed jibs. The foot and leach should trim up together as the sheet is pulled in, if the foot appears too tight with a bad wrinkle from tack to foot try moving the lead forward some — if the leach appears too hard and tight try moving the lead aft and remember, with the clew closer to the deck, an inch or so fore and aft movement of the lead is a lot, comparable to 4 or 5 inches on a high clewed jib.

In the two races which I saw at the Nationals last year I was surprised that so many boats did not carry spinnakers on the reaching legs. It would seem on a boat as powerful as the Highlander, and particularly those boats sailing with a crew of 4, that the combination reaching - running spinnakers so popular today could be carried to advantage on reaches when the apparent wind is even abeam in winds up to about 18 or 20 mph. I think it would be a good idea to try it and I'm sure improved reaching performance will result, using the proper spinnaker.

When reaching, the outboard end of the pole should be carried high. This will help the chute lift and also flatten it so you can reach easily and not be overpowered. The sheet should not be choked but eased as much as possible and played constantly so the luff of the spinnaker has just a slight curl most of the time. Broad reaching and running the pole should be carried close to parallel to the water to get the spinnaker as wide as possible and present the greatest area. The pole again should be carried as high as it can be and still keep the chute full; in light winds the pole has to be lower. If the luffs start to curve in and the chute collapses, lowering the pole will usually make it fill again, then if the wind picks up, lift the pole again slowly. In most classes the rule is "when in doubt try the chute" and I'm sure it will apply to the Highlander.

I hope the above will help you all better understand good sail trim and adjustment. I encourage you to experiment using these suggestions as guidelines to determine the best fine adjustments for your sails, your boat and different conditions in which you race. Keep track of how your sails and boat go best and keep abreast of what other top skippers are doing — and when you apply it properly to your own sailing you are bound to increase your performance and enjoyment of racing. Good sailing and good luck!



Tom Smith, in 420 "Rhythm" led 63 Highlanders to victory in the 1969 Internationals at Buffalo, N.Y.

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