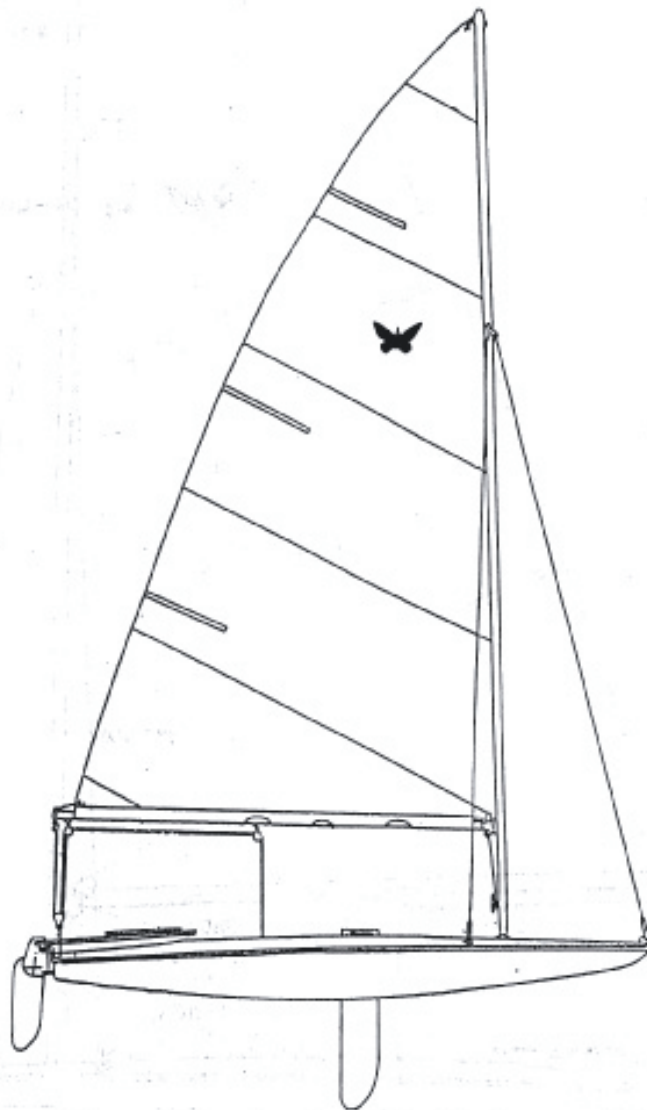


Butterfly Instructions & Maintenance

Manufactured by: Windward Boatworks



Northern Lake Sailboats, LLC

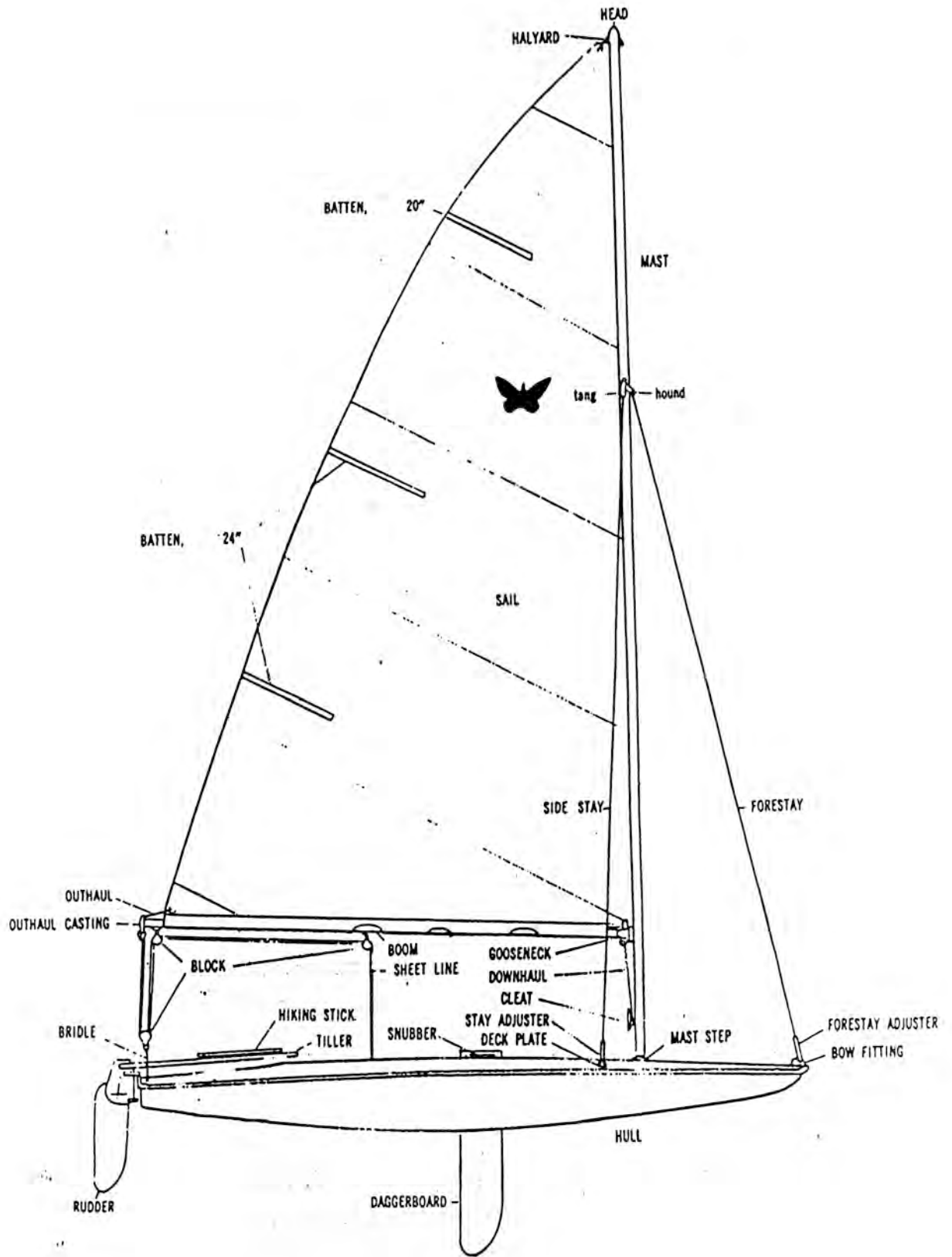
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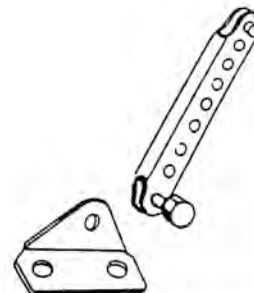
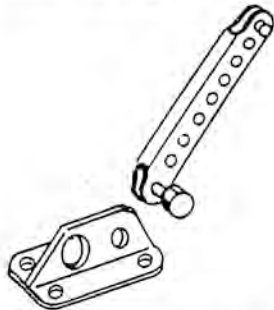
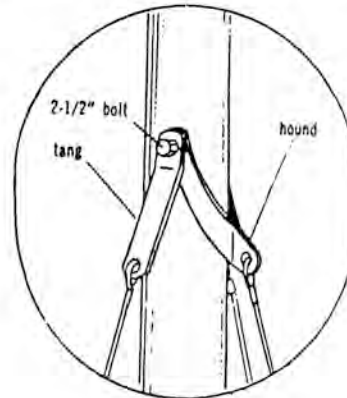
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Everything you need to sail your Butterfly is packed in the hardware box with the exception of the mast, boom, and sail. The only tools needed for the initial assembly are two 7/16 wrenches for installing the stays on the mast. An adjustable wrench or pliers may be substituted for either. It would be wise to run through the assembly once at home, taking some time to familiarize yourself with all of the parts.

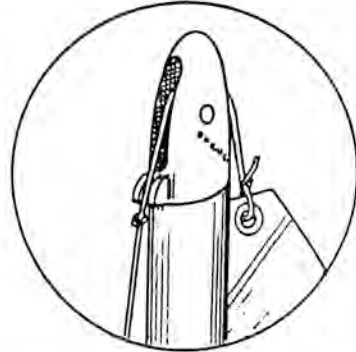
1. ATTACH STAYS TO THE MAST. Place the forestay hound over the mast with the holes in alignment. Bolt the side stay (shroud) tangs on top of the hound with the tang bolt and elastic stop nut. The nut should be snug but not tight. Over tightening could affect the mast rotation and could crush mast if excessive pressure is applied. Once the stays are attached, they should be left on. Simply coil the stays together and tie them to the mast when car topping or trailering.



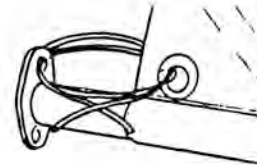
2. Attach the captive pin adjuster to the bow fitting.
3. Attach the captive pin adjusters to the deck plates.
4. STRING THE HALYARD (36 foot, 3/16" dacron line) through the casting and over the sheeve wheel on the masthead. Tie the ends together so that the halyard will not slip out when stepping (setting up) the mast.
5. STEP THE MAST. If one person is stepping the mast by himself, use the following procedure. Place the hull of the Butterfly near the shore in such a way that the boat is level from side to side, but with the bow lower than the stern. Lay the mast the length of the deck with the top of the mast toward the stern. Attach the two side stays to the stay adjusters with the clevis pins and split rings included. You will probably find that the mast will have the proper rake with the side stay clevis pins in the second or third hole from the top of the adjuster. Stand the mast on the round mast step in the center of the deck and be sure that it will stand by itself. Attach the forestay to the forward stay adjuster so that the stays are snug. The stays do not have to have tension as the mast will be properly supported even if the stays are one or two holes loose. Readjust stays so that the mast is vertical when the boat is level. (See Adjustments Section, Next Page) Once the correct mast angle is determined the adjusters may be left on the stays and removed from the boat at the captive pins.

6. INSERT THE BOOM through the sleeve on the bottom edge of the sail. You will find it easiest to fold the gooseneck flat against the tube and slide the forward end through the sleeve. Fasten the captive pin on the gooseneck through the grommet in the corner of the sail.

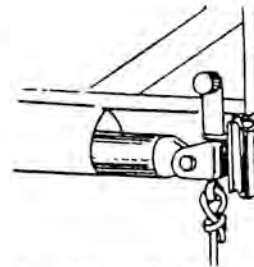
7. HOIST THE SAIL. Position the boat with the bow facing into the wind. Tie a simple over-hand knot in the halyard about 15 inches from the end. Tie the same end of the halyard to the head (top corner) of the sail about 6 inches from the end. Leading the luff edge of the sail (the edge with the sewed in rope) into the mast slot, carefully raise the sail by guiding it into the slot. Insert the gooseneck slide into the same slot and raise sail to the masthead. Guide the halyard through the lock on the forward edge of the masthead. By pulling sail down slightly the knot is locked in the jaws of the lock. (A mark can be made on the halyard so that the exact tying position can be easily determined.) Secure the free end of the halyard to the cleat on the side of the mast. To release the halyard, simply pull the free end forward out of the lock.



8. ATTACH THE OUTHAUL. One of the 3/16" x 40" lines is the outhaul. Tie the aft corner of the sail to the boom as illustrated. Pull tight enough to remove large wrinkles in sail - tighter for higher winds, looser for light air.



9. ATTACH THE DOWNHAUL. The other 3/16" x 40" line is the downhaul. Tie one end to the ring on the gooseneck as illustrated. Pull line down to remove large wrinkles in sail and tie to cleat on aft edge of mast. Use more pressure for high winds and no tension for light air.



10. STRING THE MAINSHEET. Attach the two blocks (pulleys) on the boom parallel to the boom. The shackle clevis pins should run through the holes in the block strap. Attach the block on the bridle with the shackle turned 90° to the block so that the block is also parallel to the boom. The clevis pin should not go through the holes in the block, only through the strap. Tie the end of the mainsheet (36 foot heavy line) onto the boom end casting. Reeve the line down through the bridle block and up through both boom blocks as illustrated.

11. ATTACH RUDDER. Making sure that the tiller goes under the bridle, attach the rudder to the gudgeon on the transom. Be sure that the safety spring on the rudder snaps past the fitting. This is to prevent the rudder from accidentally coming off if the boat should capsize.

12. INSERT DAGGERBOARD. Dip the daggerboard into the water so that it slips through the snubber easily and then insert it through the slot with the rounded edge forward.

ADJUSTMENTS

TWO PIECE MAST

The two-piece mast joint requires no mechanical fasteners. If the joint becomes stuck, grasp the mast close to, and on either side of the joint and shake it as you pull it apart.

MAST RAKE

A good rule of thumb for determining mast rake is to keep the mast perpendicular when the boat is at rest in the water. You would then have no forward or aft rake. When the mast is raked straight or back, the boat will tend to turn into the wind when close hauled on a windward beat. This is a desirable situation, as a boat with no one aboard will turn into the wind and come to a stop. It is known as weather-helm since the boat always steers itself into the wind (to weather) and must be held on course with the tiller. As the mast is raked forward the weather helm will diminish and will become a lee helm at which point the boat tries to turn away from the wind and run off on a reach. For safety's sake, a lee helm is undesirable and should be avoided.

DRAIN PLUG

The drain plug is located in the transom next to the lower gudgeon. Occasionally, when the boat is out of the water, remove the plug and lift the bow to check for condensation that may form in the hull. The plug can be tightened by snapping the lever in and also by screwing the lever clockwise. If the plug is over tightened, it will be difficult to remove as the end of the lever screw will pull through the rubber, expanding it. If this happens, unscrew the lever until it is very loose, and wiggle the plug out.

DAGGERBOARD SNUBBER

The snubber may be adjusted to change the tension against the board. The opening between the rubber should be 9/16". When the daggerboard is dry, it may seem too tight. When the board is wet, it will work much easier. If the snubber still grips too tight, round the sharp edges with a few passes of sandpaper. The snubber may be adjusted by loosening the screws and sliding the rubber in or out.

RUDDER

The rudder blade should pivot freely with the coil spring doing all of the work in holding the blade up or down. To adjust pivot tension, loosen the lock nut, turn the screw, and then retighten the lock nut. The screw is threaded into the casting so the adjustment cannot be made by turning the nut or screw only.

TILLER

The hiking stick and tiller pivot bolts should be kept snug but not overly tight. The tiller is held up off the deck by a nylon button resting on a pin on the rudder. If the tiller pivot should wear enough to allow the tiller to touch the deck, a shim can be placed under the nylon button. Simply pull the button off, insert a washer or any hard material and tap button back into place.

MAST STEP

A light coat of vasoline or non-staining grease spread on the mast step will facilitate the pivoting action and reduce wear. If you are launching off of sandy beaches, it may be well to omit the grease or use a dry lubricant or wax.

CARE OF THE FINISH

The surface finish of your Butterfly is not painted on, but is the first layer of plastic itself with a color pigment added. This layer is about 15 thousands of an inch thick, which is 4 to 5 times as thick as the paint on an automobile. This means that you can put a very deep scratch or gouge in the surface without ever going through the color coat. It also permits scratches to be sanded and polished without going through the color. If a scratch is through the color coat, it can be filled with the same gel coat (pigmented plastic resin) that was used when the boat was built. A gel coat repair kit is available from the factory. To keep the finish in top shape, the boat should occasionally be treated with polish or cleaner and wax.

SAIL CARE

CAUTION - Do not remove hand rails to refinish.

Dacron sailcloth is a hard, dimensionally stable material under normal temperatures and pressure. It will deform at temperatures over 160 degrees and eventually break down and burn at higher temperatures. This means a cut, such as a boom vang slot, can be made with a hot knife or soldering iron and the edge will be fused at the same time. Be careful where you lay your cigarette, it will do the same thing.

Sail cloth is woven out of dacron thread, treated with a resin filler and then calendered through hot rollers to make it flat, hard, and nonporous.

The worst condition to which a sail can be subjected is to let it flap, or luff, while the boat is on shore or tied to a dock. This will knock the filler out of the sail and break down the bond between the threads. **LOWER YOUR SAIL WHEN NOT IN USE.**

It is best not to roll the sail around the boom after a day of sailing. Remove the sail from the boom and allow to dry if wet. Remove the battens (if possible) and fold the sail prior to putting it in the bag.

DRYING - When possible, dry sails out of the sun. While dacron is not nearly as susceptible to the ultraviolet rays of the sun as nylon, it should not be exposed any longer than necessary. The greatest danger is a possible shrinking of the luff rope, which in some sails is nylon or a similar stretchable synthetic. Do not hang sail to dry - lay flat. After sailing in salt water, rinse sail with fresh water to remove salt deposits.

CLEANING - Dacron sails can be cleaned by spreading them over a large clean area, or simply immersed in lukewarm water in a bathtub. Remove battens before cleaning. Use a soft scrub brush and a mild detergent or Ivory soap. Never use a washing machine. Detergents with a neutral ph factor will not tend to set certain types of soil rather than remove them. Always scrub in line with seams. After scrubbing, rinse sail with plenty of warm water to remove all soap before laying flat to dry.

STORAGE - Never put sharp creases in your sail when folding for storage. Fold and roll the sail as loosely as possible in the direction of the battens. Store sails dry to prevent the formation of mildew. When storing for the winter, use an accordion fold with the folds parallel to the foot. Store in a sailbag in a dry, cool place. Be careful, as rats and mice have an appetite for Dacron sails.

MILDEW - Mildew is caused by storing soiled sails wet. While it does not affect the strength of dacron, it is unsightly and should be removed early to prevent spreading through the dirt and moisture left in the sail - a good reason for keeping the sail clean. To remove mildew, brush the area with a stiff brush to remove as much as possible. Place infected area in a solution of 1% bleach and cold water for about two hours. Wash thoroughly and rinse with fresh water. Repeat if necessary.

STAINS - Oil and grease stains may be removed with trichloroethylene or naphtha. To remove rust stains, soak stained area in a solution of 2% hydrochloric acid and warm water. Always finish by washing and rinsing with fresh water.

REPAIR - Periodically inspect your sail for broken threads, batten pocket wear, sleeve wear, and chafing around the headboard in tack areas. If excessive wear is evident, contact a local sailmaker for repair. A temporary repair can be made with spinnaker repair tape or white rigging tape.

WINTER STORAGE

The most important thing to remember when storing a boat in subfreezing temperatures is that water expands when it freezes, and a sizable quantity of water inside the boat could damage the structural members if left to freeze. To properly prepare your boat:

1. Remove the drain plug from the transom and place it in your sail bag. Tip the hull by lifting the bow and at the same time roll the hull on one side to drain any water that might be trapped between the ribs in front of the footwell. Keeping the bow elevated, roll the hull back so that the transom is parallel to the ground. Any water accumulated will run out the drain hole.
2. Position the hull and/or cover to prevent ice buildup in the footwell. Storing the boat upside down is fine. In any case, support the hull off the ground or concrete, if only a few inches, to prevent ground or concrete acids from etching the finish on your boat. The supports should be placed under the back end of the footwell and anywhere from the front edge of the centerboard slot forward to the mast step. The same applies to boats that are hung from the garage ceiling. If the boat is left on a trailer the tie downs should be loosened so as not to exert undue pressure on the bottom for a long period of time.
3. Be sure drain holes are open in the mast base and all water is drained. If you store the mast outdoors, be sure to place the luff rope slot downward. This will prevent accumulation of water, snow, and ice which can and has ruined more than one mast.

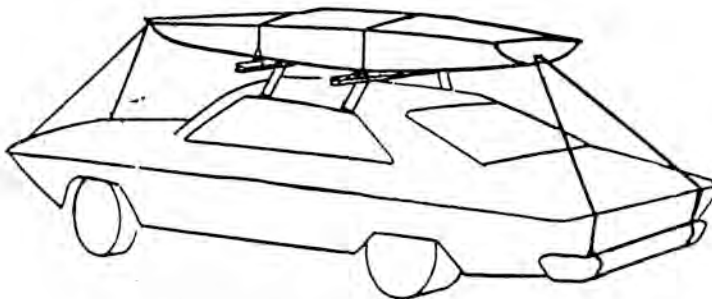
CAR TOP AND TRAILER TIEING

As the sketch shows, the boat is tied with rope or carrier straps to the car top carrier. Do not depend on these straps alone or on the carrier clamps holding against the force of the wind on the boat.

The important ties are ropes from the bow and rudder fittings to the four corners of the car bumpers. This should be new rope at least 1/4" in diameter. (No five year old clothesline please.) The important thing is that these ropes are strong and securely tied. It is a good idea to tie a knot at the boat fittings so the boat does not shift along the rope.

When trailering your boat, be sure the rope to the bow stop or trailer tongue is sound. It is a good practice to also run a line from the rudder fitting to the rear of the trailer frame to insure the boat from sliding off and being dragged if the strap should loosen or break. (This has happened.)

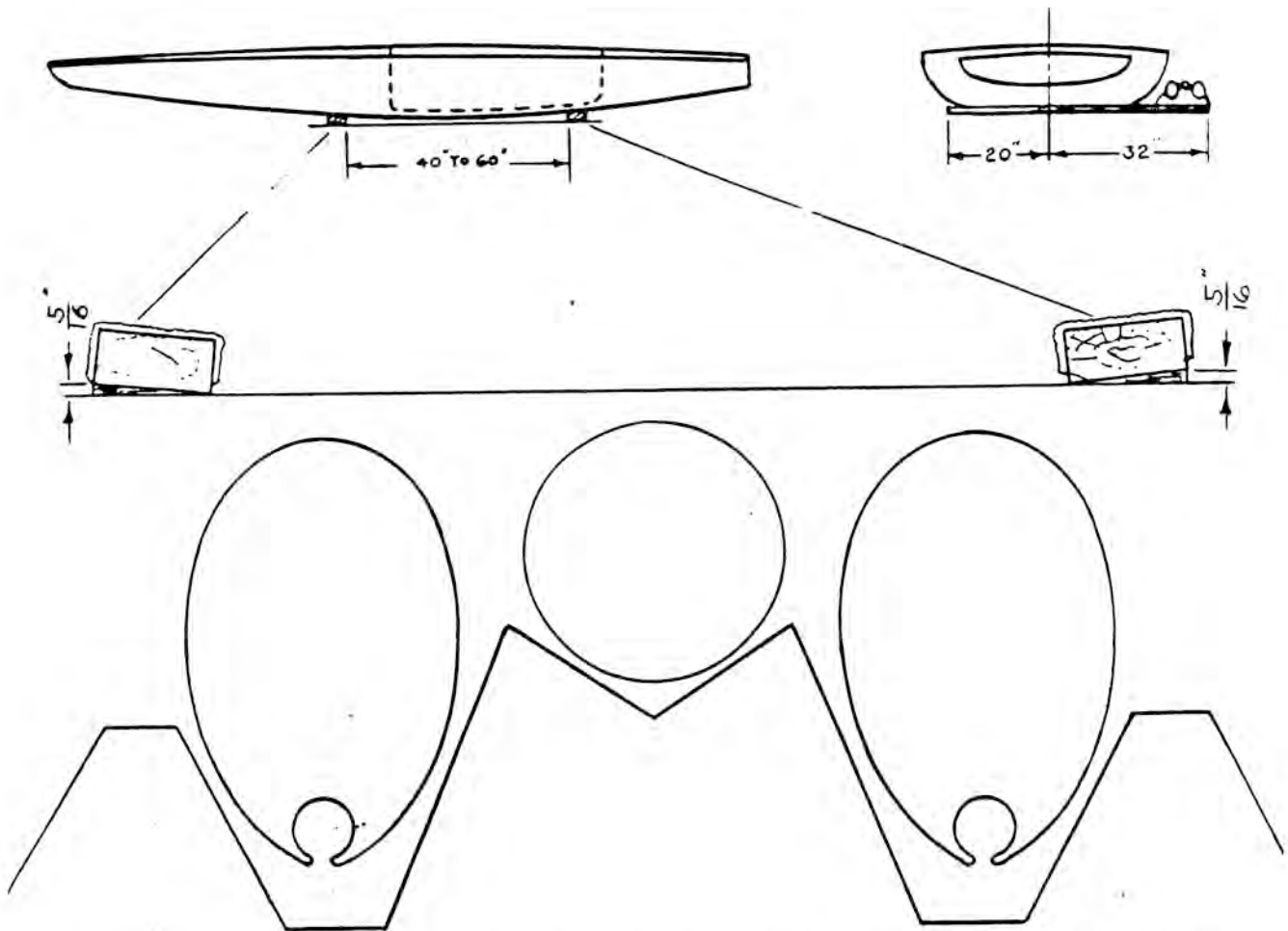
As long as your ropes are sound your boat can safely be car topped or trailered at any legal speed.



HULL SUPPORT FOR STORAGE, CAR-TOP CARRIERS, OR TRAILER

The Butterfly may be stored on the beach or flat surface with no damage. If left on the beach with the mast stepped, the boat should be tied down to prevent being blown over in a storm, causing possible mast damage.

When the boat is subjected to the pounding and vibration of a trailer or car-top carriers, it should be supported as shown in the diagram. Typical bunks are 2 x 4's carpeted and wedged 5/16" to conform to the contour of the hull. The bunks may be placed from 40" to 60" apart. It is important that the rear support be no farther aft than the footwell so that the weight is on the strongest portion of the hull where the footwell receives and distributes the load. The diagram also shows the minimum bunk length for trailer or car-top carriers, allowing sufficient clearance for a two-piece mast and boom next to the hull. The Butterfly may also be suspended by rope or strap slings. The slings should be placed in the same places shown for the bunks.



Pattern for strong, compact, two-piece mast and boom cradle, allowing clearance for rubber padding such as inner-tube material. Cut cradle out of 2" wood. The mast and booms may be tied down with rope, shock cord, or inner-tube strips.