Section II
Basics of handling, sailing and maintenance

1 Sails controls and the datum mark system

Most of the controls were illustrated in the rigging instructions but we will now review them here and briefly explain their function. You will have noticed that, associated with most of the control systems, are a group of dots and chevrons.

This is a datum mark system which has been carefully worked out so that, even if you are completely unfamiliar with the boat, you will be able to set it up for any condition and therefore derive maximum pleasure from your boat. If you are a beginner, don't be mesmerized by the dots: Put everything at the two-dot position enjoy your boat and forget about the dots until you are comfortable and confident and want to take the next step forward. When you get really good you may even decide that the dots are not quite in the right place and nothing would please the designers more!

The datum mark system is as follows:

Point of sailing	Wind strength	Control setting
Close-hauled	Very light, 0-4 kts	●
	Moderate, 5-11 kts	●●
	Above 11 kts start moving towards heavy air (20 kts) setting	●●●
Close reach		<
Broad reach		‹

a) Downhauls - main and jib

Both the jib and the mainsail have luff downhauls (which are often referred to as cunningham" lines) and these are illustrated in paragraphs 15 and 44 of the rigging instructions, respectively.

If you are wondering what they are for, they are there so that you can increase the tension on the luff s of these sails. As the wind increases, wrinkles and puckers will appear when the boat is sailed close-hauled. The wrinkles will lie in a direction running from the luff of the sail towards the clew.

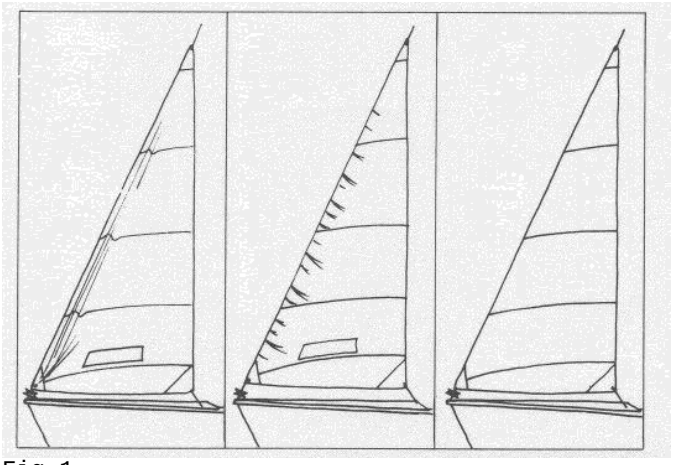


Fig 1
Too much tension Not enough tension Correct tension

These wrinkles Ware caused by the sail stretching as the wind increases and therefore, the stronger the wind the greater the tendency to wrinkle and the more tension you will need

The luff of the jib is hard to get at while sailing so we have used a stiffer (yarn tempered) cloth which does not distort as much as "softer cloths and therefore does not need as much adjustment. It should be adjusted to a tightness that just removes the puckers when sailing upwind, closehauled (Fig.l)

The mainsail on the other hand must be made of a more flexible material because it has to adapt itself to the bending of a very flexible mast, so in this case infinite control is provided within easy reach of the crew. Always use only enough tension to remove the wrinkles.

As the wind lightens, reduce the tension and also, off the wind, further reduce the tension until the wrinkles just appear. This is the optimum setting. The datum dots are read opposite the cringle in the sail. Reaching positions are not shown and are not necessary if you follow the procedure above.

Fig. 2

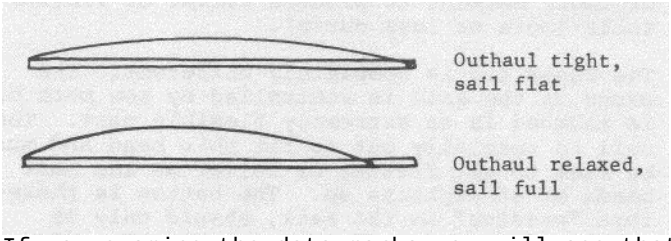
The three boats in Fig.2 are reaching with the wind abeam. Number 139 and "No number" have eased their cunninghams until the wrinkles are just appearing. Number 235 is perhaps too tight - notice the fold at the tack. (Notice also the direction of the wrinkles - running towards the clew.) In the next photograph, Fig.3, these same 3 boats are now broad reaching (almost running) but have not further released the tension on their cunninghams. Vertical tension lines have now appeared similar to those in the overtensioned jib (Fig.l).

However, since a batten won't wrinkle, the tension lines get thrown back diagonally between battens. The tip-off that the problem is over-tension is that the wrinkles do not run towards the clew but up and out toward the leech. Number 235 is the worst offender and it can be clearly seen that the cunningham eye is still firmly tensioned

Fig. 3

b) Outhaul - main only

This control tensions or relaxes the foot" of the sail and in so doing makes the lower part of the sail flatter or fuller. Generally speaking - the stronger the wind, the flatter the sail and, when reaching, sails should be fuller than when sailing close-hauled.



If you examine the data marks you will see that the three-dot (heavy air position) produces the flattest sail and the broad-reaching setting, the fullest sail. The small crimped sleeve that forms the loop in the outhaul wire is read against the dot system. (In picture 27 of the rigging instructions the outhaul is set at the two-dot position.) When running dead before the wind return to the two-dot position.

c) Sheets - main and jib

The major controls that affect the mainsail and jib are, naturally, the sheets. The jib sheet passes through a fairlead that can only be adjusted in-and-out but not fore and-aft. The plunger should be put opposite the appropriate data mark and in most conditions this will be all the way in at the two dot position, about halfway out at the three dot position when it's really blowing and all the way outboard for all reaching.

In very light to drifting conditions you will note that the position is quite far out and this will be explained later, after you have read Section III. Although fore-and-aft movement is not supplied, we provide the equivalent with a clewboard drilled with several holes (Fig.4). The lower you attach the jib sheets the tighter you make the foot of the sail relative to the leech (equivalent of moving the leads back).

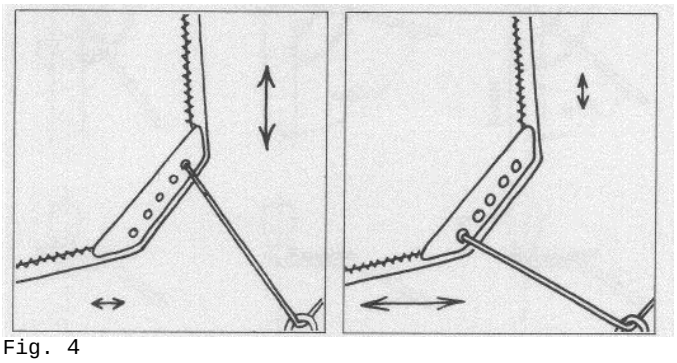


Fig. 4

More tension on leech, less on foot

More tension on foot, less on leech

Start with the leads attached to the second hole from the top (Fig.l3 of Rigging Instructions) and use this setting until you become more familiar with the boat and have had a chance to get into Sections III and IV

The mainsheet controls the tension on the boom while the traveler control can be used to control the in-and-out movement of the boom even after mainsheet tension is applied. It is suggested that the traveler lines be left cleated initially with the traveler car in the center of the track and that both the downward tensioning of the boom and the in-and-out movement both be controlled by the mainsheet alone as in any traditional sailboat.

After you have sailed your boat for a while and read the more advanced sections of this manual, you will slowly find yourself more and more cleating the mainsheet and sailing completely with the traveler However, we believe you will be more comfortable at the start using only the mainsheet.

d) Rotation lever

This is used to rotate the mast from side to side in order to line up the leading edge of the mast with the sail as shown in the diagram. The boat will sail with the lever in any position but the performance and handling are dramatically improved when the lever is properly rotated as per Figs.46, 47 & 48 of the Rigging Instructions.

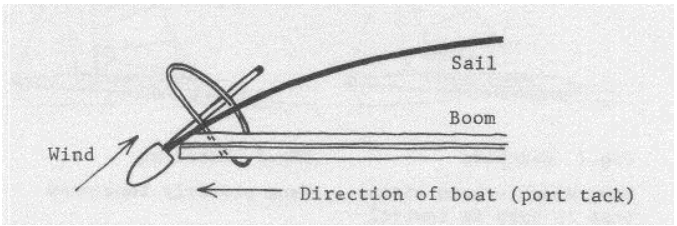


Fig. 5

For close-hauled sailing, a "Normal" rotation is generally used, with the nylon boom stop inside the cage (Fig.6a). For off-wind sailing, "Full" rotation is applied by push

ing the lever and cage to the outside of the stop (Fig.6b), effectively locking the mast and boom in this position.

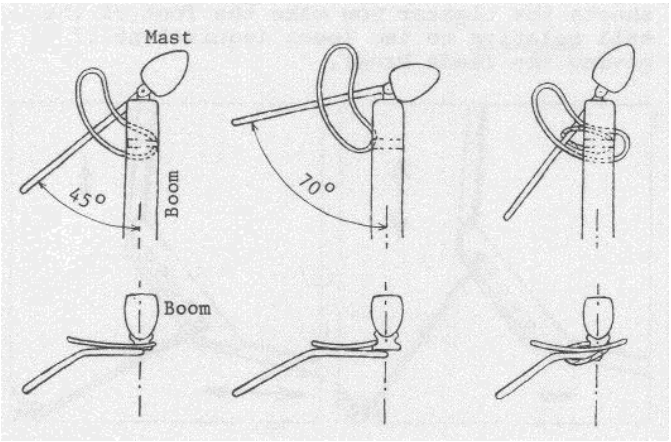


Fig.6a "Normal" rotation, stop inside "ears"

Fig.6b "Full" rotation, stop outside "ears"

Fig.6c Use loop of line for intermediate angle, if desired

Experienced skippers seldom use other than these two angles, but any intermediate (Fig. 6c) angle may be attained by use of an appropriate loop of line between lever and stop.

If you find that the mast is flipping out of rotation, simply lock it in the fully rotated position (see also paragraph 48 of the Rigging Instructions) arid, after more experience and further reading, you will eventually discover why. Note: It will always flip out on a reach or run if not locked.

e) Boom vang

The vang serves two functions on the Tasar. Firstly, it is used to hold down the boom when the mainsheet is released for reaching and running (Figs.7&8) and secondly, it is used to induce bend into the mast for the purpose of flattening the sail, (Fig.9).

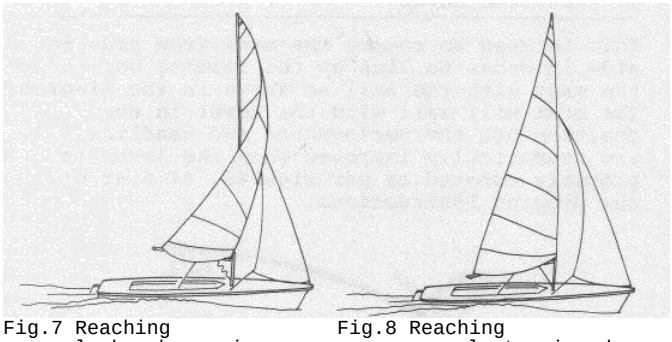


Fig.7 Reaching vang slack - boom rises, boat is hard to control

Fig.8 Reaching vang properly tensioned

Like the other major controls, it is data- marked with the dots on the block lining up

with the dots on the plastic tube. The boat can be sailed without the vang ever being adjusted. Just put it at the two-dot

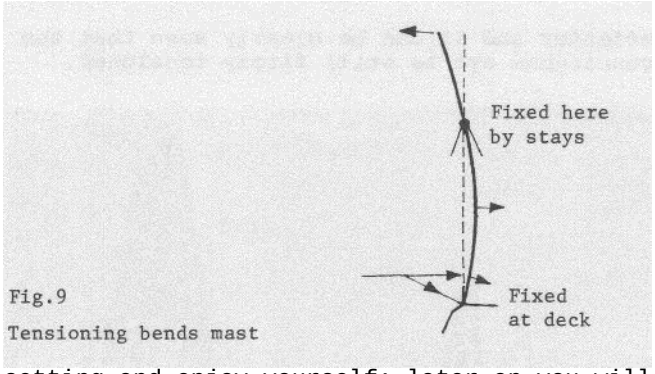


Fig.9

Tensioning bends mast

setting and enjoy yourself; later on you will find yourself experimenting while sailing upwind.

No matter what setting you use upwind, <u>always and in all conditions use the two-dot setting for</u> reaching and running Any other setting will put unnecessary strain on the rig and will not gain you any more speed or better perperformance. We will go into **more detailed use of the** vang in subsequent sections.

f) Battens

A final word about your fully battened mainsail. We can guarantee that, before you have sailed your Tasar very long, you will be told by the experienced sailor that the batten tension is the key to the performance of the sail. <u>This is just not true</u> Most people who have experience with full-length battens are from the catamaran classes and are sailing with very stiff masts that bend very little (relative to a Tasar) and they use the tension on the ends of their battens to produce fuller or flatter sails (more or less curve)

The Tasar rig is completely different. The curve in the sail is controlled by how much bend is induced in an extremely flexible mast. The sail is specially cut to fit this bend and must be free to get flatter or fuller as the mast bends or straightens up. The batten is therefore "passive" in the sail, should only be tensioned enough to remove the wrinkles (Fig.35, Rigging Instructions), and its stiffness has

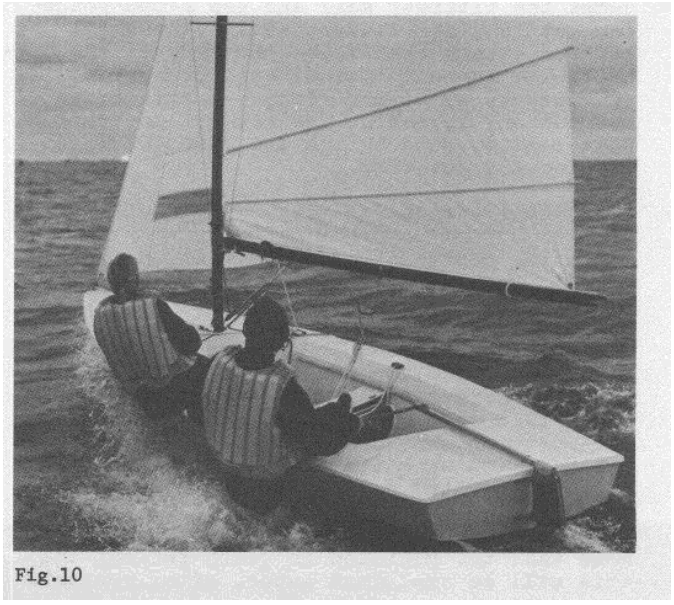


Fig.10

been selected by the designer to complement the sail shape in all conditions. If they were any stiffer it would be difficult to make the sail 'full" enough in some conditions and, if they were more flexible, it would not be possible to get the sail "flat" enough in other conditions.

Therefore, if you put additional tension on the battens, you will induce a shape into the sail that it was not designed to take! What you have is a superbly matched spar, sail and batten combination which, when coupled with the control system, allows you to achieve any shape you desire with one set of sails. The photograph of Fig.lO shows a bottom batten with not enough tension to remove the wrinkles.

g) Stay slides

For upwind sailing the stay slides should be kept fully back. However, when reaching in all light and moderate winds, the leeward stay may be slid forward: this enables the mast to rotate more easily, and eliminates distortion of the mainsail across the tight leeward stay. Don't slide it too far or the forestay may go too slack for proper control of the jib. Boat 235 in Fig.2 could benefit from sliding the leeward stay forward as the stay is clearly distorting the sail. When running square or tacking downwind in light and moderate airs, both stays may be slid all the way forward. This allows the mast to rake forward slightly, it allows the mast to rotate more easily and it allows the forestay and jib to belly forward away from the mainsail to "catch more air."

Always keep both stays right back in all strong winds and all gusty winds as letting them forward results in severe compression on the mast and probably breakage If in doubt, keep them back!

2 Setting up for sailing

a) Hiking straps

Your Tasar is designed to be sailed by men and women of normal stature without the use of a trapeze. This does not mean, however, that your body weight is not needed. In fact, just the opposite is true. Without the trapeze, your weight becomes very important (your combined weight is twice that of the boat!) and the boat is therefore designed to provide the maximum in comfort (and therefore efficiency) while hiking.

Although hiking is not essential for sailing, it is good fun and good exercise and, as you will learn in the weeks ahead, the best way to enjoy your boat in a breeze. Unlike boats with keels, planing dinghies are sailed as upright as possible at all times and, if they are heeling over, it is a sign that either you and your crew are not hiked out or you are not sailing your boat as well as you might! More about that later.

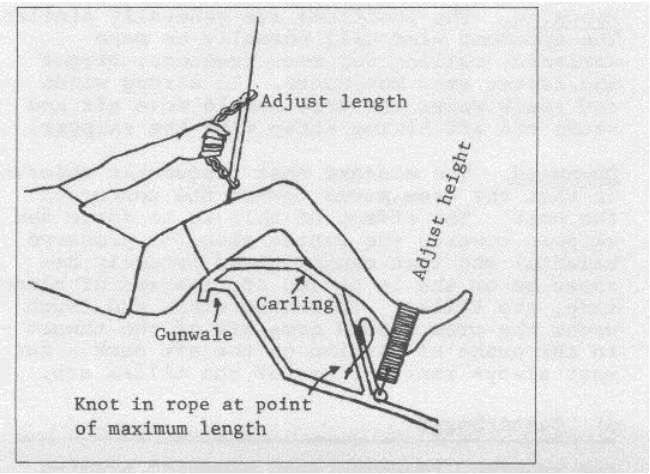


fig 11

The most comfortable hiking attitude is that which has the knee midway between carling and gunwale, so that the calf lies against the carling and the thigh lies on the gunwale (Fig. 11)

The hiking straps are individually adjustable from under the thwart and should be adjusted to the most comfortable length for this posture. The crew should also adjust the length of the hiking handles (by taking extra turns around the stays), until he or she can hike comfortably with body horizontal whilst supported with a straight arm holding the handle.

If you wish to test the strap length and there is not enough wind, one member of the crew can go to leeward while the other hikes out to windward and checks the length. Be sure and put a knot in the line at the point where the strap is as long as you would ever want it to be. This way, if the line is accidentally uncleated you won't go for a swim! You will find, as you sail the boat more and more, that you will have your traps much tighter upwind but will probably loosen them offwind to hike with a straighter leg, thus keeping the buttocks out of the water and making fore-and-aft movement in the boat much easier.

b) Hull trim

At hull speeds of less than one knot the hull should be heeled to leeward and trimmed "bow down" to reduce wetted area and enable gravity to help shape the jib. As hull speed increases, the boat should be brought upright and sailed absolutely upright at all speeds greater than about two knots. At hull speeds up to five knots, the bow should be immersed about one inch to one and a half inches, depending on crew weight - adjust crew position fore and aft until the bottom of the transom just skims the water. See Fig.l2. In about 10-12 knots of wind, this Tasar is being sailed flat with the bow correctly trimmed

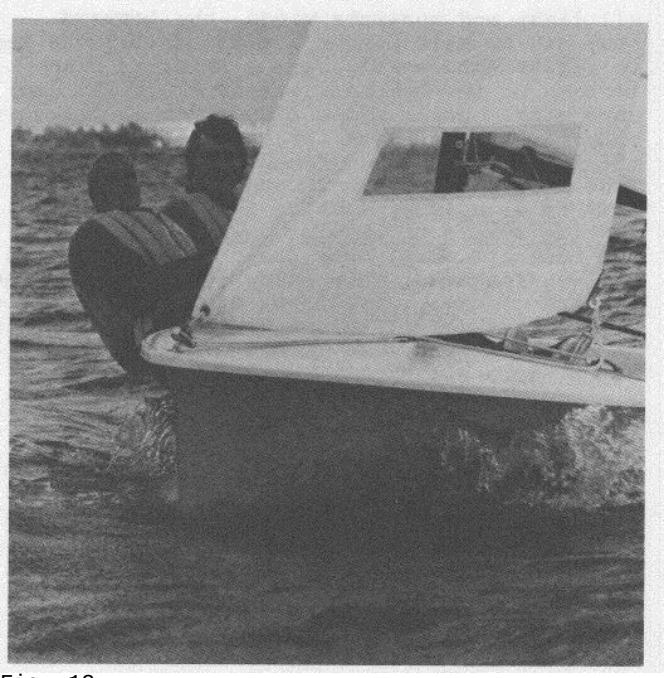


Fig. 12
At this trim the wake is quiet and shows a fine-grain turbulence. If the crew sit too far aft or if the boat is allowed to heel, it will sail more slowly, the wake becomes noisy, and the wake develops a coarse grain. It is thus easy to see, hear and feel these three indications when the boat is not in perfect trim.

As wind strength increases, the boat moves onto the plane. The bow rises slightly as the boat accelerates, and in flat water the boat planes fastest with the bow low, almost touching the water. In rough water it is proper to raise the bow a little more by moving aft; this deflects spray and increases stability but does not increase speed. See Fig.l3. Bow slightly raised, spray deflected under the crew, sailing fast and flat

Fig 13
The Tasar sails fastest when it is guided smoothly like a high speed auto or aircraft, and any coarse or rapid tiller movements will slow the boat.

c) Crew positions

The design of the Tasar deck, cockpit and thwart is based on the principle that the skipper, who has both hands in use, should change position only infrequently, while the crew, who usually has one free hand, should move bodily whenever necessary to balance the fluctuating wind.

Fig.14 shows the positions typically adopted by a skipper and crew in increasingly strong winds and on different points of sailing.

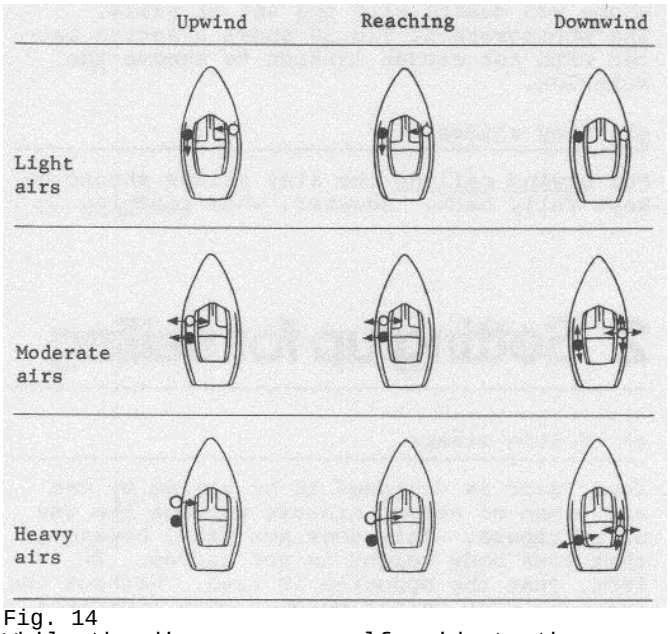


Fig. 14
While the diagrams are self-evident, the following notes may be useful. Arrows on the diagrams indicate direction of movement, if necessary.

Upwind In light airs the skipper will usually tend to "lounge" forward across the thwart. In fluctuating puffs the outward and aft movement of the skipper's upper body automatically makes room behind the stay for the crew. In moderate and fresh breezes the skipper should either sit on deck, or hike with thighs on gunwale, choosing which ever position demands the least frequent movement.

Reaching The positions are generally similar. The apparent wind will normally be more variable, calling for more frequent, bigger and faster crew movements. In strong winds and rough water the crew should move aft and share the aft hiking strap with the skipper.

Downwind The mistake most frequently observed is that the crew moves toward the center of the boat. The effect of this is to force the skipper towards the center also (to preserve balance) who then cannot steer properly be- cause he or she is on top of, instead of along- side, the tiller. In strong winds and rough water the crew should move aft of the thwart - to the point of sitting on the aft deck - but must always remain clear of the tiller arc.

d) Centerboard

For running, reaching (and windward planing which we discuss in a later section) i.e. for

all points of sailing except displacement sailing to windward the centerboard should be "half-up with its top just below the vang. It will stay in this position by friction alone, and the boat may be tacked and gybed at will (Fig.l5)

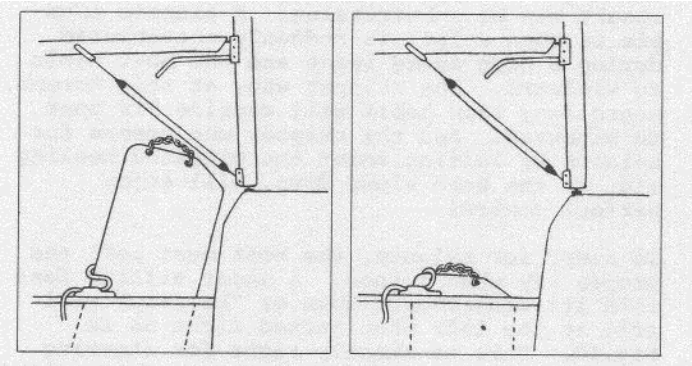


Fig. 15
Centerboard in half-up position

Fig. 16
Centerboard down with hold-down line cleated

For pointing - displacement sailing to windward - the board should be "down", with the leading edge vertical and right forward, and the hold-down line taut over the top (Fig.l6)

The centerboard can be moved easily, regardless of boat speed and wind strength, if the skipper sharply bears away, momentarily, to remove the side load while the board is moved (Fig. 17)

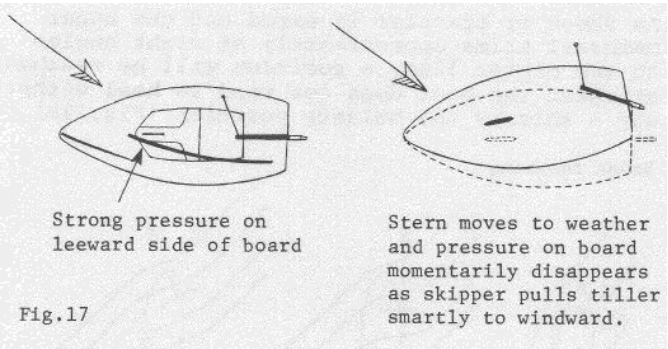


Fig.17

This manoeuvre should be practiced by skipper and crew with the skipper counting one-two three as he pulls the tiller smartly to windward.

e) Rudder

For fastest sailing and the lightest and most responsive "feel", the rudder blade should be fully down - vertical - at all times except when moving away from or approaching shallow water. For fast sailing, the rudder blade should be rigid in the rudder head. Tighten the pivot bolt until the blade is just moveable by hand and, additionally, ensure that the blade is securely locked down before sailing at high speed - if the blade should swing backwards when the boat is moving fast, the tiller forces will increase so rapidly that you may have trouble in controlling the boat.

f) Departing and returning

The Tasar will sail upwind off a lee shore, or back to a weather shore, with no more than a foot of centerboard and rudder blade down, provided it is sailed free and kept moving.

This makes it easy to launch and return without wading deeply, and without scraping the bottom with the foil tips.

When sailing off a beach with the wind blowing onshore, the crew should hold the bow head-towind and the skipper gets into the boat putting down just enough board and rudder so that they do not touch bottom. The crew then gives the boat a starting push, jumps in, and the skipper heads the boat on a reaching course parallel to the shore. As soon as the boat picks up speed it can be slowly headed up into the wind and the board and rudder moved to their full down position (Fig.18)

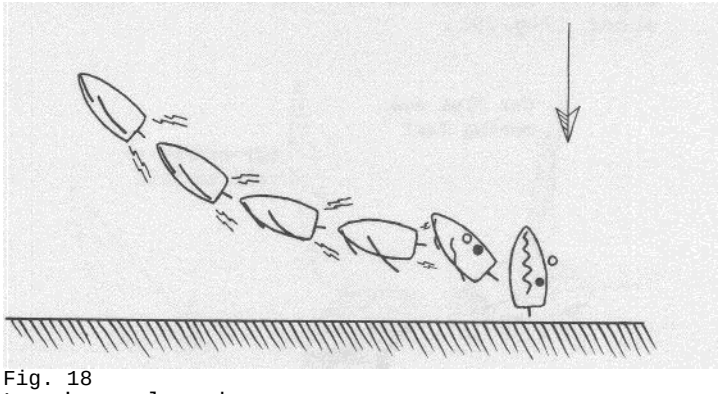


Fig. 18
Leaving a lee shore

When returning to a lee shore in strong winds, it is easiest to make the final approach by turning into the wind and losing speed a little way offshore, lifting the centerboard out of its case, and drifting sideways and partly forwards the last few yards (Fig.l9).

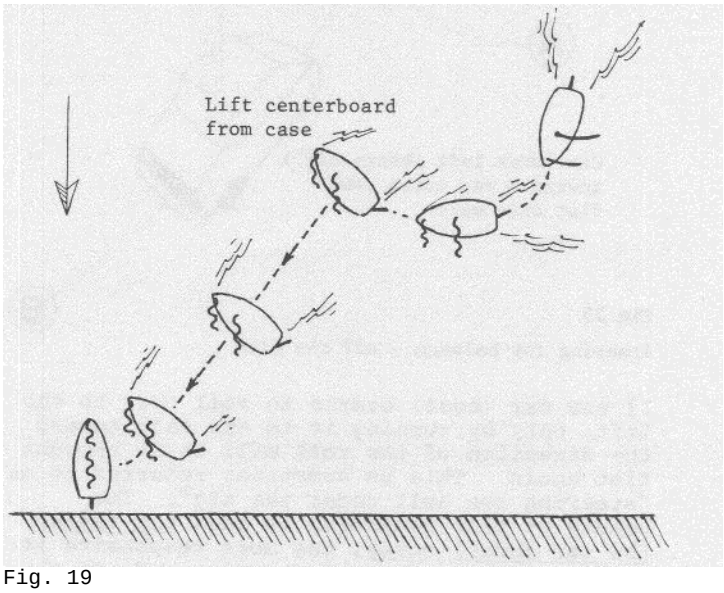


Fig. 19
Approaching a lee shore in a strong wind

3 Learning to steer a planing hull

a) Steering for balance

The technique first learned by all sailors is to respond to heeling to leeward by luffing the boat into the wind and, conversely, to respond to heeling to windward by bearing away. This technique is correct, (provided that luffing or bearing away is done in a smooth, gentle manner) but it must be stressed that it should only be used when sailing to windward close-hauled When a Tasar or any other light sailboat is sailing fast off the wind precisely the opposite technique must be used it must be "steered for balance'.

The technique of steering for balance is exactly the same as driving a car at high speed (Fig.20)..

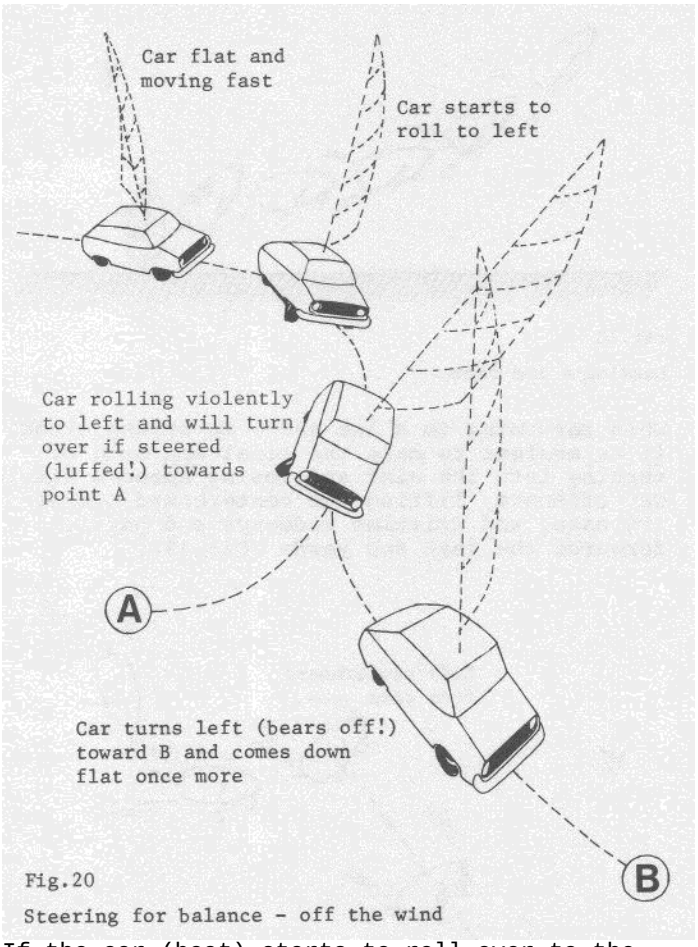


Fig.20

Steering for balance - off the wind

If the car (boat) starts to roll over to the left, only by turning it to the left toward the direction of the roll will it be brought flat again. This is sometimes referred to as "steering the hull under the rig". The beauty of this technique is that the faster the car (boat) moves the more responsive it becomes to this form of steering and, in the case of the Tasar, the steadier and easier to keep upright A number of principles are involved;

Steering for balance is dynamic control and depends upon speed. At low speed it is in-effective. At high speed, its control be-comes dominant. Conversely, if the reverse technique is applied at high speed, the result can be embarrassing. A classic exam- ple is when a lull is suddenly encountered during a high speed reach and the boat heels to windward. The skipper who, at this moment, bears away from habit will capsize his boat to windward. And the skipper who steers for balance by luffing under the windward heeling rig, as the boat slows down, will enjoy perfect control.

To steer for balance, the boat must roll the proper way when turned. A Tasar sailing fast with its centerboard down or "half-up" will roll to the left when turned right as in Fig.20. This is exactly right for steering for balance. But if the centerboard is pulled all the way up, when it is turned right, it will roll right (like a speedboat) in which case, steering for balance won't work. So when reaching or running really fast, never raise the centerboard above half-up.

b) The balance position

When broad reaching or running in any boat in strong winds, the mainsail should never be eased beyond the balance position.

When the mainsail is sheeted closely, the boat will heel to leeward (Fig.2la)

As sheet or traveler is eased and the upper mainsail trims approximately at right angles to the center line, a position will be reached at which the boat does not tend to heel either way - this is the balance position (Fig.21b).

Broad reaching

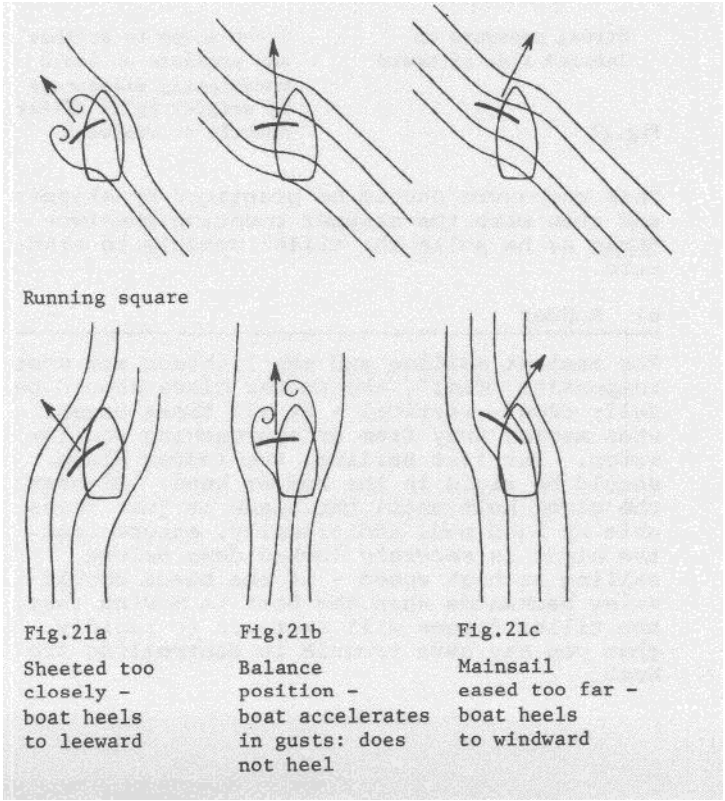


Fig.21a

Sheeted too closely - boat heels to leeward

Fig.21b

Balance position - boat accelerates in gusts: does not heel

Fig.21c

Mainsail eased too far - boat heels to windward

If the mainsail is eased further, the top of the sail will blow forward of the mast (even if the boom is still at right angles to the center line) and the boat will heel strongly to windward (Fig.2lc)

The consequence of this behaviour is that when broad reaching or running in strong winds, normal handling technique must be modified for proper control. A description will make this clear. When a boat is close-hauled or beam reaching, a strong gust will heel it to leeward, and easing the mainsail eases the heeling force and helps bring the boat upright. But when broad reaching or running with an eased mainsail, any further easing of the mainsail can only result in the boat rolling forcefully to windward.

To sum up - when close-hauled or beam reaching in strong winds, the mainsail should be eased in a gust. But when broad reaching or running in strong winds, the mainsail should never be eased in a gust. Instead the balance position should be sought, the mainsail never eased beyond it, and the boat "steered for balance under the rig The stronger the wind and the faster the boat sails, the more certain will be this method of control.

4 Safety

a) Heaving to

If the clew of the jib is sheeted about a foot to windward of the mast with the windward jib sheet, and the main sheeted loosely over the leeward gunwale, and the tiller held fully to leeward, the Tasar will lie still and quiet in the water, even in strong winds. Very restful while awaiting the start, or between races, and safe during brief squalls.

b) Shortening sail

In strong winds the jib can be rolled up and the Tasar sails pleasantly under main alone in winds of 15-20 knots. From 20 knots upwards it can be sailed on jib alone but, when sailing close-hauled with jib alone, rake the tip of the centerboard as far forward as possible, set the jib sheets wide, allow the boat to accelerate before pointing. Tack normally, and ease the jib in severe gusts.

c) Righting after capsize

The Tasar rights easily and with the cockpit dry. The best method is:

1. The crew moves to the bow, and holds the forestay, in effect acting as a "sea anchor', and thus turning the capsized boat approximately head to wind.

2. The skipper rights the boat, and holds one stay.

If the boat has inverted, the skipper should climb onto the hull near the bow (where he or she can get a grip); walk along the inverted gunwale to the centerboard area, and close the bailer (an open bailer can inflict a nasty cut). Light skippers should pull out the centerboard into its full down position. Stand on gunwale and pull back on the board. As the boat starts to come up, climb out on the centerboard for additional leverage and as it comes upright slip into the water and grasp the stay.

If the boat has not inverted, and the skipper is in the water, it is only necessary to grasp the centerboard and pull downwards. It is not essential to climb onto the centerboard.

3. The crew then moves to the opposite stay. By moving quickly to the opposite stay, the crew ensures that if the boat is not exactly head to wind, there is always one person holding down whichever is the windward side, so the boat cannot blow over again.

4. Both climb in. In strong winds, it is safest if the crew member to leeward climbs in first. When the Tasar is righted the cockpit will be almost dry so the boat will be floating quite high in the water. For this reason two sets of hand holds are recessed into the caning on either side of the boat. To find the front one, slide your hand back along the side deck until you feel the cleat for the traveler. The hand hold is directly inboard of this point. If you are too short to reach this far up, slide all the way to the back of the cockpit (which is much closer to the water) and you will find the second hand hold there.

d) Buoyancy

The Tasar's hull and deck are bonded together at the gunwhale and where the cockpit walls meet the cockpit floor. These joints produce a huge, hollow, watertight shell which is unsinkable as long as the hull and deck surfaces are intact. In the case of flooding due to accidental damage, additional positive buoyancy is provided, firstly by the foam in the structure (200 lbs of flotation) and secondly by four additional tough, airtight polyethylene containers (which are loose in the hull and occasionally heard moving around when the boat is turned over). These two sources of reserve buoyancy are enough to float boat and crew in flooded conditions.

a) General care of hull and deck

The Tasar is designed to be a lively boat and is therefore extremely light. Apart from providing exhilarating performance, this lightness also makes the boat very easy to handle on shore but does require the owner to be conscious of the fact that the boat will probably require a little more care than traditionally built fiberglass boats.

The tremendous stiffness of the Tasar hull and deck is obtained by using a sandwich construction made up of a rigid PVC foam core with a very thin layer of fiberglass on each side. On the outside of this sandwich there is also an additional thin layer of colored gelcoat (Fig.A).

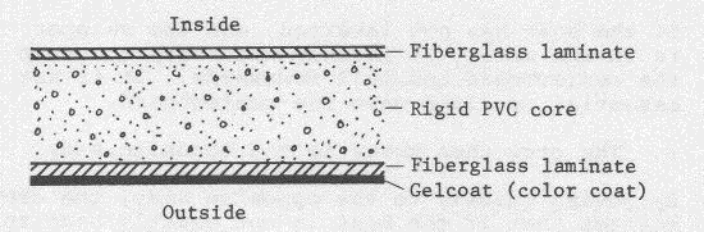


Fig.A Hull and Deck **construction**

The only exceptions to this are the vertical side walls of the cockpit which are not cored and the floor of the cockpit which has an extra thick laminate on the inside plus a color coat mixed with a non-skid compound (Figs.B and C)

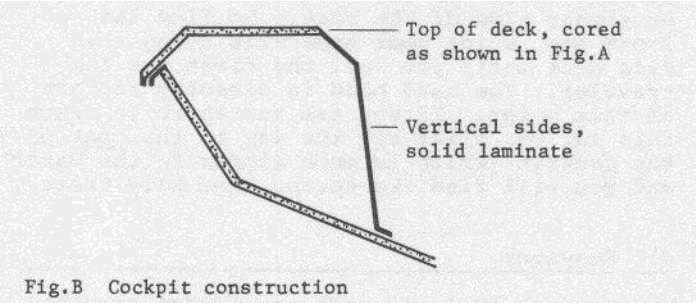


Fig.B Cockpit construction

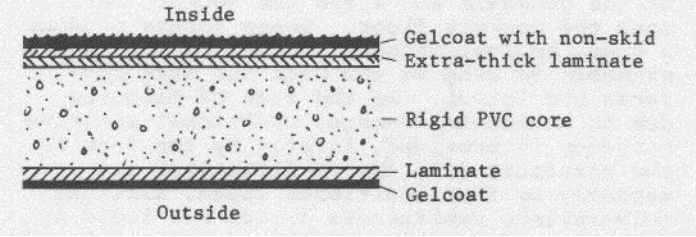


Fig.C Cockpit floor construction

The gelcoat on a Tasar is <u>much thinner</u> than normal because it contributes nothing to the structure of the boat - only color and weight. We have reduced this excess weight considerably but it is still 12-15% of the total weight of the hull and deck glued together but excluding centerboard case, thwart and fittings!

Because of the thin gelcoat, it is almost impossible to have an absolutely mirror-like finish to the hull because the materials of construction underneath the gelcoat undergo a certain amount of shrinkage during the manufacturing process and this results in what the industry calls "print through" which in certain cases will even allow you to discern the weave pattern in the roving underneath.

We have found absolutely no evidence to indicate that this surface is any slower or faster than an optically smooth surface and, in fact, it is now widely accepted that the trueness of a bottom (lack of undulations) is a much more important factor. The trueness of your Tasar hull is something we have worked on very hard and it should remain that way indefinitely because of the unusually thick construction (10-11 mm) which provides a very stiff and stable structure.

It should interest you to know that the thickness of the outside laminate of the hull and deck has actually been made much thicker than is structurally necessary, purely to provide a tougher surface that is less susceptible to puncturing and denting while on shore. Thickening up this layer, however, means adding weight, which in turn makes the boat harder to handle on shore and therefore the final thickness must be a compromise.

In our case we have arrived at a compromise in favor of light weight and ease of handling but this means a little <u>additional thought and care</u> is required on the owner's part.

Fiberglass is a strong and durable material requiring little care, but contrary to popular belief, it is not 'maintenance free". The ultra-violet rays of sunlight, moisture, and the almost inevitable scratches, all can contribute to the deterioration of the gelcoat and abnormal point loads on deck or hull can cause puncturing or denting, while a severe blow from a collision can produce a crack or even a complete break in the laminate.

Most of these problems can be prevented or avoided with a little care and by following a few simple "good sense" guidelines.

1. <u>Use of a rigging board</u> (with some form of additional padding at the transom) is the best, simplest, least expensive and most easily portable method of handling your boat.

2. If a rigging board is not available and you must put the Tasar down on the ground, then make sure the surface is absolutely free of pebbles, stones, nails, etc. The boat will always tilt over onto one side of the bottom or the other and this is when damage is most likely to occur. If for any reason the boat is resting on a poor surface then never, under any circumstances, step into it, as any object underneath is almost sure to dent (or even puncture) the outside skin, particularly in the area directly under your weight. This is annoying more than anything else as it is very unlikely that you would

also puncture the inside skin and, since the foam is a closed cell, the watertight integrity of the boat will not be affected.

3. If you want to work on your boat while on shore, use a rigging board and place it directly under the mast, just at the forward bulkhead as this is the strongest part of the keel. Make sure, also, that the transom is on the grass or something soft (See Fig.D).

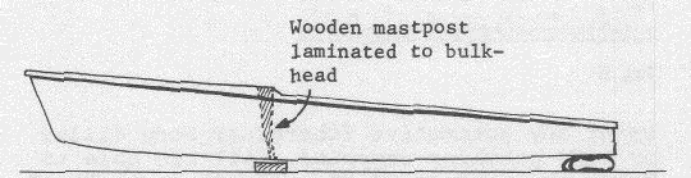


Fig.D Best position for rigging board

4. Store the boat away from direct sunlight, or if this is not possible, a cover is a good investment. Two good coats of wax applied to a perfectly clean hull and deck will also help to inhibit sun fade. In addition to preserving the finish, it also makes subsequent cleaning a very much easier task.

5. Do not leave your boat permanently on any surface which would hold moisture against a large area of the hull, eg sand, grass or a wet piece of carpet.

6. Keep your boat clean. Rinse off sand, dirt and salt. Wash with soap or detergent (do not use an abrasive cleanser!), water and a medium soft bristle brush. For stubborn stains a little xylol or acetone will do the trick. Warning: Do not allow a pool of unevaporated acetone to stay in contact with the gelcoat for more than 30 seconds or so.

b) Fiberglass maintenance

Scratches in the gelcoat surface can often be eliminated by wet sanding and subsequent polishing of the sanded area. Deeper gouges or cracks which leave the fiberglass exposed should be repaired as soon as possible. If you wish to attempt the job yourself, your dealer has small quantities of matching gelcoat and you'll find complete instructions below. The repair of holes or breaks in the laminate can be done by your dealer or a reputable fiberglass repair shop but is also not beyond most people's capability if the instructions included below are followed.

Minor gelcoat repairs

Scratches in the gelcoat surface can often be eliminated by wet sanding. Use 400 followed by 800 grade wet sandpaper wrapped around a wooden block. If a dark-colored tinge begins to appear, stop sanding; you are wearing through the gelcoat and getting too close to the fiberglass laminate underneath. Polish the sanded area with a rubbing compound (available from hardware stores for cleaning and polishing cars).

Deeper gouges and dents require filling with gelcoat. Done properly, these repairs are quick, simple and inexpensive, but please read these instructions carefully and completely before attempting any repairs

Tools and materials required:

Chisel Dry sandpaper, grade 60 or 80 Clean rags Paper cup or other non-metallic disposable container Gelcoat, available from your dealer Catalyst (hardener), sold at hardware stores (MEK Peroxide - 60%) Wooden spatula or coffee sticks Transparent tape, preferably one inch or wider Wet sandpaper, grade 400, 800 and 1000 (600 if 800 and 1000 not available) Sanding block - wood or hard rubber Bucket of water Polishing compound (any good automotive finish polishing compound)

1. Eliminate all loose gelcoat with chisel; only take off loose material then scrape the gelcoat on either side of the damaged area to form as long a bevel as possible in un- damaged gelcoat (See Fig.E).

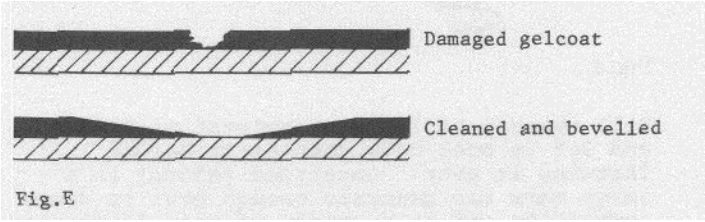


Fig.E

2. Sand area with dry sandpaper to provide rough surface, including the scraped, un- damaged gelcoat all around.

3. Clean area thoroughly of dust and loose particles.

4. Put sufficient gelcoat in a paper cup and add 2 parts catalyst to 100 parts gelcoat. That's about a quarter of a teaspoon to two fluid ounces. Mix thoroughly with the wooden coffee stick for at least two minutes. The catalyst sets off a chemical reaction which will progressively harden the gelcoat. If any part of the gelcoat has not come in con- tact with catalyst it will never harden The time required will vary with the ambient temperature and humidity, and the amount of catalyst in the gelcoat. The warmer it is, the faster the reaction. (Under 10°C (50°F) reaction may be very slow and additional catalyst needed.) Let gelcoat sit in cup for about 5 minutes to start reaction going. Warning Avoid catalyst contamination with other materials. Avoid catalyst contact with skin and clothing. Should this accidentally happen, flush with plenty of water. If eyes are affected seek medical attention as soon as possible after immediate and prolonged flushing with water.

5. Apply gelcoat with wooden spatula or coffee stick until the area is evenly covered.

On horizontal surfaces: smooth out to a slightly raised surface over the entire area (See Fig.F)

On sloping or vertical surfaces: To keep the gelcoat from dripping, cover small patches with transparent tape or, for larger areas, add a little talcum or baby powder to the

consistency. This will lighten the color of the gelcoat slightly but makes the application much easier.

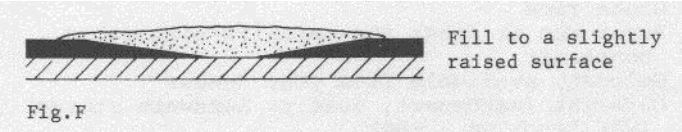


Fig.F

On lower edge of the gunwale: Put a strip of transparent tape below the patch first, then apply gelcoat and bend tape over patch (See Fig.G). Let gelcoat harden for 30 to 45 minutes.

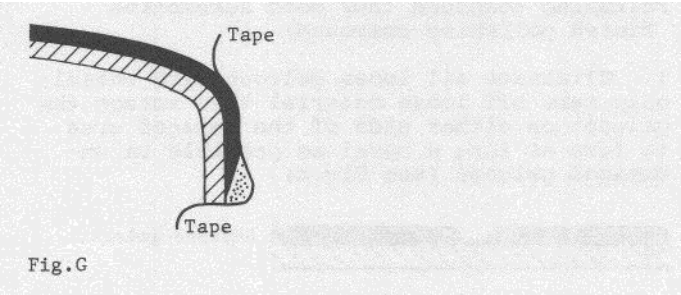
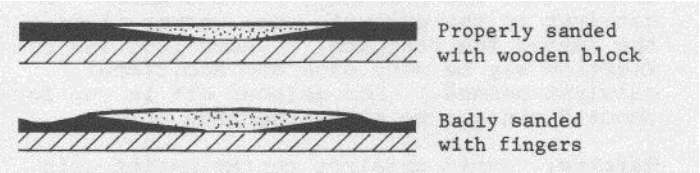


Fig.G

Fill the cup of leftover gelcoat with water and let it cool down completely before throwing it away. Catalyzed gelcoat in a large mass can generate enough heat to cause combustion and is a source of many "fiberglass fires.

6 Remove all the tape. If not covered with tape, a thin layer which is only on the surface of the patch will still be tacky as gel- coat does not cure in the presence of air. The rest should now be hard. Scrape off any tacky gelcoat with the chisel and start san- ding with the 400 grade wet sandpaper dipped frequently in water; continue with 800 grade and finally 1000. If only 600 grade is available, use it with lots of water -- you will have to polish with compound a little longer to obtain a perfect finish. Wrap the sandpaper around a small wooden block when fairing the patch into the hull or you will almost certainly sand a dent into the area all around the patch!



Check the patch constantly while sanding, if a dark-colored tinge appears, stop sanding. You are wearing through the gelcoat and getting too close to the fiberglass laminate underneath!

7 Polish the area with polishing compound and a clean rag.

Laminate repairs in the sandwich areas

For holes smaller than a 5-cent piece it is not necessary to re-fiberglass the hole. Cut away the broken glass and chisel away any loose or crushed foam as in Fig.H and grind back gelcoat and laminate in a long bevel.

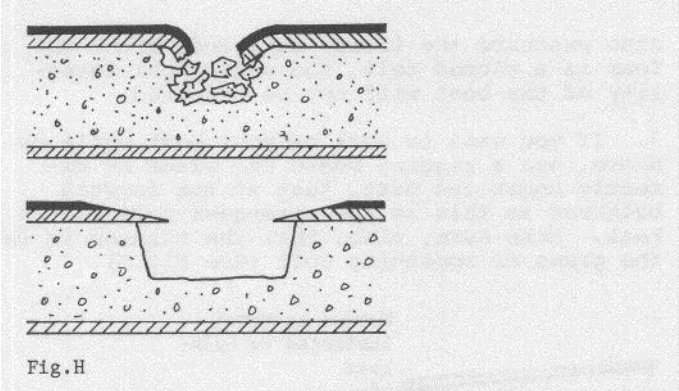


Fig.H

Using any automotive fiberglass body filler or body patching compound, fill the hole to below the surface of the gelcoat as in Fig.I.

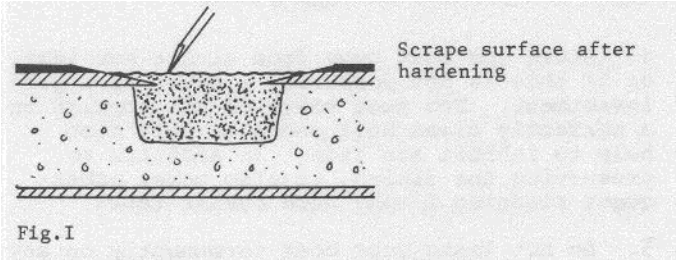


Fig.I

When the filler is hard scrape and roughen the entire area as the filler may have some wax on its surface which must be removed.

Proceed as in the previous section to apply a final gelcoat patch.

For larger holes it is desirable to replace the laminate; for a break or tear longer than 2" or a hole or crushed area bigger than a silver dollar it is essential.

First grind away and feather the laminate as in Fig.H (a circular disc on a drill is perfect) and remove all loose foam. Then carefully remove any remaining foam until you expose the laminate underneath (be careful not to cut it! (See Fig.J) Undercut the edges if possible, then fill with body patch up to and slightly over the laminate (see Fig.J).

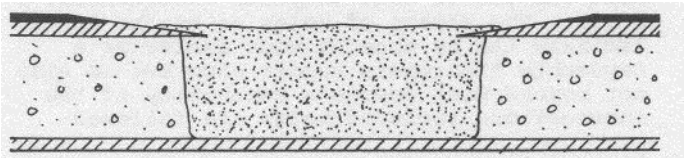


Fig.J

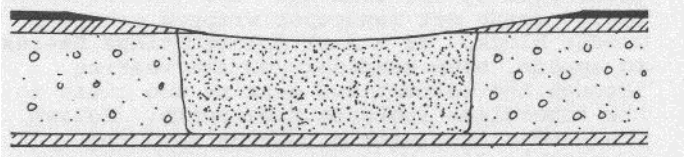


Fig.K

Once the patch is hard regrind it to expose all the laminate as in Fig.K. Then cut two pieces of one-ounce mat to a shape just smaller than the hole (Fig.L).

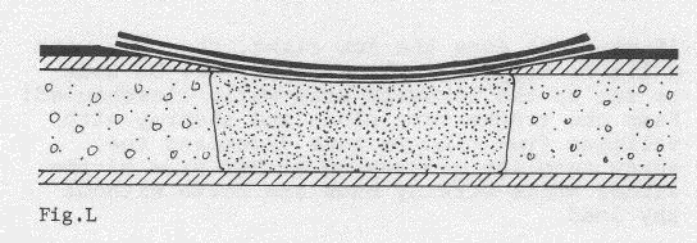


Fig.L

Saturate the mat with fiberglass resin (polyester resin) which has been catalyzed with hardener (same as used for gelcoat) in the proportion of % or about 10 drops to 2 fluid ounces.

(Both the mat and the resin should be available at local hardware or automotive supply stores or from your dealer. In the event that the mat cannot be found, substitute a 9-oz cloth. Don't be confused by the large difference in numbers - cloth and woven materials are quoted by the square yard, mats by the square foot! We recommend mat because it is easier to grind and feather in the final steps and also bonds better than the cloth.)

When hardened, grind the edges until the gelcoat is just exposed and try not to grind back down to the original laminate. Then sand the surface of the new fiberglass with rough sandpaper to remove the thin layer of wax that will have formed on it (See Fig.M).

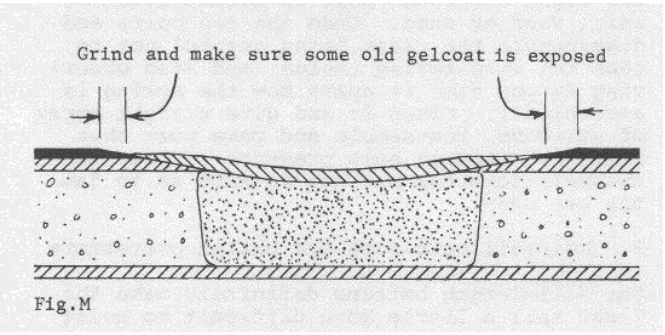


Fig.M

Finish off the job with gelcoat as previously explained.

c) Centerboard and rudder

The Tasar's centerboard and rudder are manufactured from high-density self-skinning polyurethane foam reinforced by a carefully constructed pattern of high-tensile steel wires. This material is similar to wood in weight and properties, but completely uniform and without grain.

The surface can be bruised or scratched in much the same way as wood while excessive strain or impact will cause it to crack. However, cracks or scratches will not result in deterioration of the polyurethane, as unlike wood or fiberglass, the material will not absorb water.

The polyurethane is table t temperatures between -40 C and 80 C (-40 F and 175 F) At lower temperatures it becomes more brittle and at high temperatures it will begin to soften and may warp. For this reason boards and rudders must never be left exposed to extreme heat while under any stress (in the trunk of a car or in direct sun) as they may take on a permanent set.

Centerboard and rudder should be stored flat without any weight on them or better still, hang them from the wall to save space.

Centerboard and rudder blade repairs

The Tasar's polyurethane centerboard and rudder can be worked with normal woodworking tools. You should be aware however, that steel wire reinforcement runs the length of the components on each side and this reinforcement is only 1/32' (1 mm) below the surface. If damage occurs it should be treated as follows:

Dents - Rub down the damaged area with sandpaper or steel wool, ensuring that the surface of the dented area is completely clean, without any gloss, before attempting to place the filler. Any proprietory polyester filler of any type used for auto bodywork may be used. Once filled and sanded smooth the area can be painted as outlined below.

Scratches - Generally, scratches will be treated similarly to dents. However, if the scratches are deep enough to expose the steel reinforcement, careful examination should be made to see if rusting has occurred. If this is the case, cut back the polyurethane locally to expose the rusted area and clean off thoroughly with steel wool or emery cloth before applying the filler as above.

Breakages - Breaks will not extend appreciably into the reinforced area but will be limited to the leading and trailing edges. Cracks should be filled with an epoxy glue and when this is set the surfaces can be restored as above.

If the breakage results in a piece becoming detached, this may be glued back into place with epoxy glue, or, if lost and large, may be replaced with a piece of wood. If small the area can be filled with polyester filler. The area can then be planed and sanded to the original contours.

Blisters - There is a remote chance that a few centerboards could blister up to several months after manufacture. If this occurs, the affected area should be planed flush, filled if you break through the bubble, and repainted as above.

Painting - After repairs have been carried out, the repair should be lightly rubbed down with sandpaper or steel wool to provide a key for the paint. Polyurethane based paints should be used, giving at least one coat of primer undercoat and one coat of gloss.

A final rubbing down with fine cutting paste of the type sold for auto body finishing will blend the new paint into the surrounding area and render the repair almost imperceptible.

d Maintenance of mechanical parts

The best possible advice for keeping things working well is to keep them clean If you are sailing in salt water, try and always rinse the boat well after sailing. A few hints follow on specific items.

1. Jib furler swivels

Lubrication should not be necessary but if you sail in salt water a really thorough rinse in warm fresh water every now and then will ensure smooth operation.

2. Mast heel and pivot post

The plastic washer is sufficiently friction free but it is worth checking the heel plug in the area of the pivot hole to make sure the aluminum has not been damaged by placing on the ground. If so, sand smooth and give a light spray with silicone to facilitate tacking the mast.

3. Mast sleeve joint

It is very important to keep this area clean and in particular to rinse out any salt which remains after capsizing. All parts have been anodized after fabrication to reduce corrosion, however, repeated sliding between the surfaces can wear away the anodizing. To help the situation, clean frequently and cover with a thin film of oil from an oily rag.

4. Diamond adjusters

A detail drawing of the adjusters is shown in the rigging section. To remove the diamonds, first loosen the bolt at the top of the diamond wires. This bolt is put together with a light adhesive and may require holding the heads of the fasteners with vice-grips (mole grips). Once the pin is removed, the heel plug can be tapped out (it is held in by friction and diamond tension only) and the large nut inside can be lubricated with a little light oil. At the same time clean out the recesses in the heel plug and lightly oil the flat surfaces.

5. Stay adjusters

You will find that there are many occasions while sailing when you will want to pull back the stay slides after having released them (covered in detail in the following sections) and the ability to do this depends on how well they slide when under tension. It is possible to have them almost friction-free but since this is a function of how much time you are prepared to spend on them we do not undertake it at the plant.

We strongly recommend obtaining some grinding compound (auto valve grinding compound is excellent and is already mixed with oil), removing the stops from the ends of the tracks, coating the groove in the slider with the compound and then working the slide back and forth while pulling up hard on it (a small piece of rope through the strap) at the same angle as the shroud. Repeat this several times with fresh compound, cleaning between each application to check your progress.

Finally, try and find some very fine paste to finish off the job such as silver rouge or even toothpaste in a pinch! Then clean the area thoroughly. We recommend alcohol (rubbing, denatured, methyl hydrate, etc) which is available at every druggist or hardware store. Finally spray with a thin layer of silicone and reassemble.

If you have done the job right, the crew with a little help from the skipper will be able to set up the windward stay while closehauled! Keep the tracks very clean and respray with silicone from time to time directing the spray into the grooves on either side of the slider while working back and forth without any load.

6. Traveler car

The traveler car bearings are self-lubricating on their pins but the flat surfaces of the small wheels are often in contact with the wide vertical surface of the track. spray a rag with silicone until damp and then wipe this surface occasionally. It's a little harder to do the front surface because of the narrow gap between track and thwart but it can be done

7. Blocks

Do not ever try to lubricate your ball bearing blocks. Simply rinse them with fresh water. They are self-cleaning and self-lubricating and any lubricant will only serve to eventually attract dust and grime and reduce the blocks' efficiency.

8. Mainsheet swivel cam

This can sometimes stay wedged open due to too tight a through bolt or accumulation of salt, sand or dust. Undo the two bolts and disassemble the cleat being careful not to lose the wire spring inside (and also observing as you take it apart how the spring is assembled!). Clean it and give a light spray of silicone, reassemble arid make sure that there is adequate bolt pressure to keep the assembly together but not so much as to jam the cam open.

9. Mainsail bolt rope and batten protectors

The full-length battens definitely make the Tasar sail a little more difficult to hoist than a conventional leech-battened main. The problem can be greatly alleviated by spraying the sail on both sides in the area where it joins the bolt rope and for the full length of the luff. A dry silicone spray is best because it will not "wet" the sail and then accumulate dirt. Paraffin will work but, on a warm day it will literally "melt" into the fabric and from then on accumulate grit. In addition to spraying the sail, spray a rag with silicone and wipe the back of the mast track in the area where the batten protectors touch the mast. If the mast is not absolutely in line with the sail while hoisting, these protectors will bind.

One of the most difficult portions of the luff rope to get into the track is the last 6 to 8 inches because of the additional layer placed around the rope. This layer was added to reduce the possibility of the bolt rope being pulled out of the track by a tight outhaul. This extra layer has proved to be unnecessary and if it is causing a problem, it can be removed by your local sailmaker.

In order to make the sail more easy to hoist we moved the batten protectors farther away from the bolt rope but, in very light air the

batten's weight will rotate the protector up against the mast and wrinkles will result as in Fig.N. The fix is to move the protector as close to the mast as you can while still being able to raise the sail.

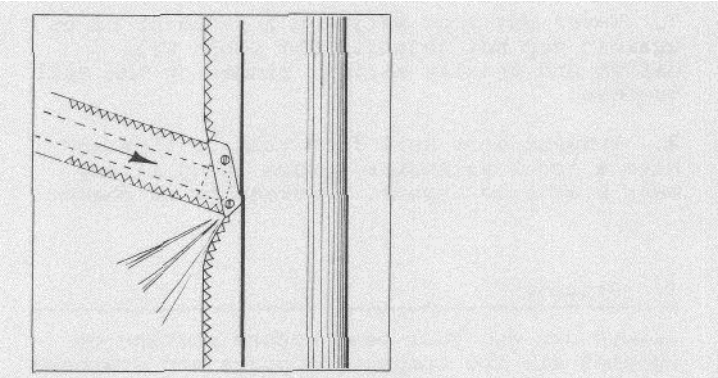


Fig.N

We have found that it can be placed so that the forward edge is on the line of straight stitching just behind the bolt rope.

10. Clew outhaul sail slide

Spray with silicone occasionally when there is no pressure on the slide so that the lubricant can be worked into the underside of the bolt rope track.

11. Rudderhead

The rudder should be tight in the head yet still able to move to the up position if it hits an obstruction or when beaching the boat. If you are unable to tighten the bolt sufficiently undo it and remove the plastic bushing which is in two halves. Gently file the end where contact takes place between the two halves and check the thickness until you can tighten the bolt and apply the proper pressure to the blade.

This is an area that must be constantly cleaned if you are sailing off a beach as sand is guaranteed to find its way between rudder and head The best form of lubrication is water and a well-sanded rudder

12. Rotation lever

If you are having difficulty keeping your lever up, here are three fixes:

1) Disassemble the nut, check for any gouged metal in the contact area on either the lever or on the ears of the mast fitting and if necessary polish the area with emery cloth. Spray with a lubricant and reassemble. You can now tighten the nut very firmly and still have easy movement of the lever. Furthermore add a second " nut and tighten down firmly on the first while preventing the first from tightening further.

2) A small 0-ring and shackle is available from your dealer and when assembled as shown in Fig.0 will hold the lever firmly in position. When lowering the sail, slide the 0-ring forward of the bolt and the lever can be lowered.

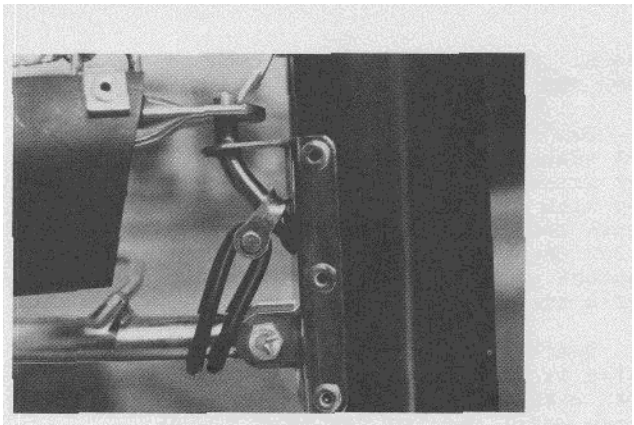


Fig.O

3) Same as method 2 but use a very thick rubber band without the shackle as in Fig.

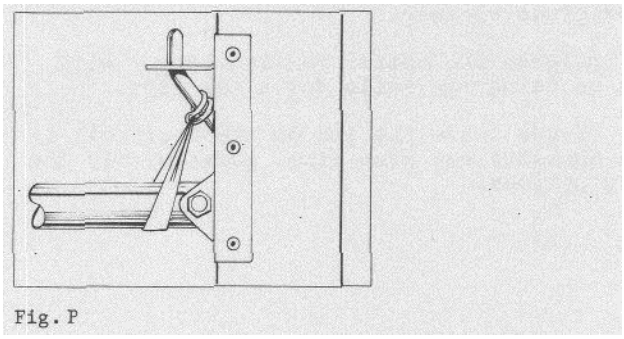


Fig. P

4) Cut a piece of softish rubber (tire inner tube) and fold it until you have a thickness which can just be wedged in between the lever and the mast fitting and still allow reassembly of the nut (see Fig.Q)

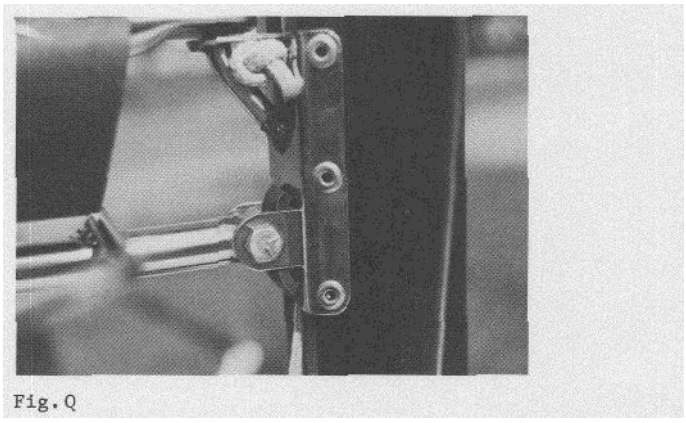


Fig. Q

e) Sails

The sails are the engine of your Tasar and they are the best engine we could produce commercially. Made from the best quality materials available, cut by computer and built to rigid standards of accuracy and quality they will last you a long time if you give them proper care. The following are a few do's and don't's.

1. Don't wad the sail into a tight bundle or stuff it hand-over-fist into its bag. Follow the instructions in the rigging manual and fold them properly. Don't let the jib flutter in the wind at the dock or on the

beach. This weakens the stitching and breaks down the resin coating.

2. Don't wash the sail in hot water or in the washing machine. Don't try and iron out any wrinkles, it will destroy the cloth. If you wish to wash it, use a mild soap, a soft brush and a two-hour soak in a tub. Don't allow chemicals, oil, tar or paint to come in contact with the sail. There is no known cure for a stained sail.

3. Don't store the sail for long periods while it is wet. A weekend won't matter, even with salt on, but try and rinse with fresh water and let dry once a week.

4. Avoid scratching and creasing the mylar window. However, windows which have become scratched or clouded can be restored to a certain extent by using a soft damp cloth and plexiglass cleaner.

5. Release the batten tension if you will not be using the sails for a few days.

6. If you leave the jib on the boat roll it the opposite way each time, particularly for long periods

If you have access to a sewing machine make a long bag that you can button around the furled jib and hoist up on the main halyard. It will prevent ultra-violet degradation of the cloth.

7. Never put your sails on a radiator or up against any hot object. The cloth will deform and usually shrink, rendering the sail useless.

8. Inspect your sail from time to time and have a local sailmaker spruce it up if any wear starts to appear. Prevention is cheap.

f) Storage

Always dry out your boat before storing by opening all the inspection ports and drainage holes. This is particularly important if you live in cold climates because water left in the hull will freeze, expand and often cause damage. Also, do not leave it outside on the ground under the snow; a light boat like the Tasar will be crushed by the melting snow in the spring.