HOW TO SAIL THE WHIP

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CHARACTERISTICS

WHIP is new, modern and innovative in every respect. The intent of the WHIP design was to produce a handsome prestige boat capable of sailing at least as fast as the world's best recognized "hot boats".

WHIP's waterline beam is narrow, but she is wide on deck to provide power to keep her on her feet in a breeze. The waterlines forward are virtually straight to minimize her bow wave. Consequently, WHIP eases on to a plane so easily it is difficult to tell when she actually planes. The full length waterline permits WHIP to sail as fast as 17' of length will permit. In the design stages, the waterlines are retrimmed so that through 20 degrees of heel there is no change in the helm. WHIP is finger light on the helm even in heavy winds.

Comments elsewhere have expressed the significance of aspect ratio (how narrow and tall the sail). High aspect ratio sails are vastly more efficient on all points of sailing other than straight down wind. WHIP is 8' on the foot and 24' on the luff. These measurements are productive of a very good aspect ratio. Additionally, the sail is stiffened by four full length battens. This type of batten provides the full draft shape of a sail in light winds when sails without full length battens hang limp. One may also shape the mainsail by judicious tapering of battens. WHIP jib is also a high aspect ratio sail that fully furls on its own luff wire by pulling a below deck furling line. The entry of the leading edge of the jib is clean because there is no forestay -- the jib luff wire and halyard furled serves as the forestay.

Since WHIP is designed as a high-performance sailboat, she notices and appreciates the providing of proper weight placement, sail trim and handling. The difference in boat speed between a properly sailed WHIP and a poorly sailed one is very obvious. The following comments will provide one with the knowledge necessary to sail WHIP at her maximum designed potential.

BATTENS

The battens should be pushed in tight enough to smooth the wrinkles that lie along the batten pockets. Do not jam them in as tight as possible, for then the battens will be difficult to reflex in light air when you tack or jibe. Pushing the battens in really tight will not increase the draft, for only so much draft is cut in the sail and no amount of batten pressure will increase that preset amount. In light airs, it is important to trim hard so that the end compression on the battens will tend to lift the leech and thereby increase the draft by virtue of a tight leech.

THE SAIL

The best indicator of the proper attitude of the sail in relation to the wind is a ribbon punched through the sail with a darning needle, about three feet aft of the mast to a convenient height to view--half the ribbon on each side of the sail. The power in a sail, as developed by the wind, consists of positive pressure on the windward side and a low of less than atmospheric pressure on the lee side--both caused by flow of wind on the sail. The ribbon as blown by the flow of wind is an indication of the nature of the flow on the sail. Ideally, both the windward and leeside should be streaming straight aft. If the ribbon on the lee side is blowing upward or even forward, the sail is at a stall and wind flow is turbulent--the sail must either be paid off with the traveler or the boat pointed higher. The weather side ribbon is not as positive in its indication as the lee side. However, if the weather side is blowing

mostly up or even forward the sail needs to be pulled in or the boat sailed at more of an angle to the wind (lay off the wind more). Since the wind is constantly changing direction there is a constant requirement to alter the direction of the boat to gain smooth flow of the wind as indicated by the ribbon through the sail.

THE REACHER

The reacher is used in place of a spinnaker. It dramatically increases the sail area of the boat and hence its performance. The reacher will not provide any better boat speed straight downwind than the spinnaker (when going straight downwind any sailboat can go only as fast as the wind; if it went faster than the wind, the apparent wind would be coming straight at the boat instead of from behind it, forcing the boat to slow down to a speed at or less than the velocity of the wind). However, when sailing towards a straight downwind mark, the proper technique would be to tack down wind. This reinforces the power of the mainsail with increased flow on the lee side of the mainsail provided by the overlapping reacher, and reinstalls flow on the leeward side of the reacher. The combination of forces acting when tacking downwind, produces better boat speed, more than making-up for the extra distance traveled by tacking.

The reacher may be used on all points of sailing, in winds up to approximately 10 knots. If the wind increases beyond this velocity, the reacher may be used on all points of sailing except going to weather. Since the reacher has a free luff (not attached to a forestay), it sags off to leeward and aft (increasing the draft of the sail) appreciably, making pointing on the wind difficult in increased wind velocities.

Prior to hoisting the reacher the jib should be furled. The reacher may then be launched either to windward or leeward, however, since the reacher is used mostly on reaches, launching to leeward is easier. The reacher sheets go outside of the shrouds and forestay then back to their respective blocks. The tack of the reacher should be secured to the leeward tack line. Take the weather end of the tack line and pull the reacher tack up to the bow fairlead, securing in the weather cam cleat. Attach the leeward halyard to the head of the reacher, making certain the halyard is clear and outside of the jibsheets. Then hoist the reacher by the windward halyard and cleat to the jam cleat on the forward cockpit bulkhead.

BOAT BALANCE

As there is a point on any shaped mass where one could consider all the force to be located - the center of gravity - so is there a point on a sail(s) where all the force of the wind may be considered to be concentrated - the center of effort (CE). In order for any boat to handle properly, the forces applied to the boat should be nearly balanced. So, to balance the force produced at the center of effort, one considers a point on the hull called the center of lateral resistance (CLR), the point at which all sideways pressure may be considered to be located. When the center of effort is directly over the center of lateral resistance, the boat is in perfect balance; (no weather helm or lee helm). However, if the boat is perfectly balanced, the rudder will not provide any sideways force (lift). To allow the rudder to help provide lift, thus decreasing the leeway angle, the center of effort should be slightly behind the center of lateral resistance to provide for a slight (3-5 degrees) rudder displacement to weather. This now allows the rudder to contribute to lift (movement to weather) which will help oppose the forces in the sail that are trying to drive the boat to leeward.) If the center of effort is too far aft of the CLR, one will exper-

ience weather helm (the tendency of the boat to round up to weather) slowing the boat down and perhaps stalling the rudder blade making one potentially unable to steer the boat. The forces may be rebalanced by pivoting the centerboard up several inches. This moves the CLR aft; once again positioning the CE over the CLR.

WEIGHT DISTRIBUTION

a) On the Wind

A rule of thumb on the placement of skipper and crew should be crew against shroud and skipper next to crew. What this accomplishes is the boat assuming a level attitude; the stern just out of the water keeping the force of drag to a minimum. Keeping your weight near the center of bouyancy helps to reduce the tendency for the boat to move up and down (pitch). If your weight is separated, the tendecy for the boat to pitch is amplified by your weight now being added to the ends of the boat. When the boat pitches, the bow and stern of the boat is alternately raised and lowered, at times forcing the bow down in the water and at times dragging the stern through the water. This is how pitching reduces boat speed. If your weight is kept close together, pitching may be kept to a minimum and boat speed to a maximum.

If the wind conditions are heavy and large waves begin to develop, it may be necessary for skipper and crew to move slightly aft to prevent excess amounts of water from being taken on over the bow. The boat should be kept flat at all times to reduce weather helm, except during drifting conditions when some heel will reduce wetted surface, thereby aiding boat speed.

b) Reaching

Reaching in light or medium winds requires the same weight placement as on the wind. As planning conditions develop, it is necessary to move aft (always keeping your skipper and crew weight together) to facilitate planning by allowing the boat to settle on her after-hull sections. Weight movement aft must be continued as the wind increases, to the point in high winds of the skipper next to the transom and crew next to him. The movement of weight aft counterbalances the effect of the sail force depressing the bow into the water. When this force has been properly counterbalanced, the boat once more assumes a level attitude.

c) Running

When running, the skipper and crew should be positioned across from each other and on opposite sides of the boat, forward enough to keep the transom out of the water. Sitting across from one another helps minimize the rolling produced from the wind vortices off the sail.

JIB LEADS

To find the correct placement for the jib lead in average wind conditions, poke two pieces of yarn through the jib much the same as discussed in the section on the main sail. Both pieces of yarn should be about a foot back from the luff of the jib, one yarn several feet up from the deck or foot of the jib, the other four or five feet down from the head of the jib. Go out sailing and keep on one course. Notice the trim of the jib as indicated by the yarn telltales. If the top leeward telltale is dancing

and the bottom leeward one is flowing back (indicating that the bottom sail is properly trimmed) the flow near the top of the jib is stalled while the flow near the bottom of jib is correct. To get the top of the jib at a proper angle of attack, move the jib lead further forward. This will put more tension on the leech of the jib, hence, the top of the jib will be trimmed in slightly and the bottom of the jib will be eased.

Adjust the jib lead to get the setting that will allow both yarn telltales to "read" approximately the same. Keep in mind that if the jib lead is far forward, the leech of the jib is tensioned, hence the bottom of the jib is eased and the top of the jib is trimmed in; if the jib lead is moved aft, the foot of the jib is tensioned and hence, the bottom of the jib is trimmed and the head of the jib is eased.

Once the setting of the jib leader on one side has been determined, just duplicate that setting on the opposite side.

SAILING TO WEATHER

WHIP is sailed to weather the same as any other light, high-performance boat--hunting to weather in the lifts, laying off to drive through seas, and as high on the wind as possible while still maintaining boat speed.

For light wind conditions, the boom should be trimmed approximately to the corner of the transom. The traveler should be near the center of the track with enough tension on the mainsheet to force the ends of the battens into their pockets, producing in the main a full shape. The jib in light going should not be in tight, and the boat should be allowed to drive a few degrees off of going hard to weather. If drifting conditions are prevalent, 10-15 degrees of heel will help the jib or reacher maintain a "full" shape. Overtrimming of the main due to keeping it "full" more than outweighs the slowing effect of overtrimming.

In medium to heavy conditions, the boom should be trimmed to the area between the transom corner and centerline with the mainsheet sheeted in hard. Excessive heeling due to gusts of wind may be remedied by letting out the traveler to "spill" some of the wind. The jib should be continually trimmed tighter (or more flat) as the wind increases. In addition, the jib leads may be moved further aft to flatten the lower sections of the jib, reducing the forces developed at the top. During survival conditions, the jib should be in as tightly as possible with the main traveler let out enough to keep the boat under control. In heavy conditions, downhaul pressure on the main should be increased to keep the draft forward in the sail and in turn, the boat in balance.

Heeling due to the heavy air causes unequal forces on the boat's underwater surfaces, contributing to the boat rounding up to weather (weather helm). Heeling also displaces the CE to leeward of the CLR which will also produce weather helm. The combination of these two forces tend to produce more weather helm than desirable.

To remedy this, merely raise the centerboard until the excessive weather helm has disappeared. Hiking to keep the boat nearly level will equalize forces on the boat's underwater surfaces and once more the boat will have symmetrical underwater areas. The combination of hiking and moving the centerboard back will once again place forces acting upon the boat in balance.

REACHING

On reaches, the sails should be trimmed according to the wind direction as discussed in the section on the sail. One will notice, however, that as planning conditions develop and then hold, the sails must be hauled in closer and closer. This is due to a shift in the apparent wind. (i.e. If one slowly drives a car down a road perpendicular to the wind, the wind may be observed to be blowing directly through one window and out the other on the opposite side of the car. As one speeds the car up to a much faster rate, the wind is now observed to be blowing straight at the car, with no wind being felt coming through the car. The resolution of the two forces of wind; the wind perpendicular to the car and wind from straight ahead due to the car's motion, produces a wind direction of a few degrees from coming straight ahead). The same thing happens to a lesser extent when the WHIP begins to plane. The increase in boat speed causes the apparent wind to shift further ahead. In order to keep the sails properly trimmed, it is then necessary to haul them in until once more in trim (the ribbons flowing back smoothly). Conversely, if the wind lightens or one drops off the plane and the boat speed decreases, expect the apparent wind to move aft; thus requiring the easing of the sails to keep them properly trimmed. When racing on the reaching leg, it is desirable in puffs to fall below the layline to the bouy. This gives one the option, when the wind lightens and moves aft, to head-up and thereby maintain boatspeed.

RUNNING

If you decide to run downwind, instead of tack, vortices of air flowing off the sail will produce a rolling, side-to-side motion. This may be alleviated by crew placement, as earlier discussed, or by holding the jib or reacher out on the side opposite the main. By doing this, the rolling force produced by the jib or reacher somewhat cancels the force produced by the main. Going "wing and wing" as it is called, reduces rolling and hence, provides better boat speed since the boat is now sailing on her designed waterlines.

MANEUVERS

In all light, high-performance boats, weight placement is critical in the achievement of maximum performance. This is not an exception with the WHIP. When tacking, the tiller should be eased over to bring her about, not rammed over, which will stall the rudder and slow the boat down. When the boat is head-to-wind, one's weight should be centered in the middle of the boat. As the boat continues it's tack, weight should be moved to the new weather side. Failure to move one's weight smoothly to the new weather side may result in an unexpected capsize. If one doesn't make a smooth transition from one side of the boat to the other during a tack, and, instead, just decides to jump over at the last moment, a capsize to weather may result. Tacks should be UNRUSHED, SMOOTH AND COORDINATED.

Jibes follow the same concept. In all winds up to heavy, the boom may be guided across the boat by merely grabbing the mainsheet tackle in one hand, allowing the boom to smoothly cross over the boat. In heavy winds, it may be necessary to pull in the mainsheet until the wind wants to fling the sail to the other side. As soon as the wind pressure is felt on the mainsheet, let the sheet run out through your hand. This procedure allows for the boom to come to a controlled stop and eases the total force on the sail through the controlled drag of the mainsheet. If one chose not to pull in the mainsheet and then let it out; but instead just let the sail slam over, a capsize could result with the instant stop of the sail on the opposite side - transferring all the force instantly to the boat; instead of easing the force

over a greater distance when you let the mainsheet run out and transfer your weight to counteract that force.

Another safe method to use in these conditions, is to sail by the lee, then keep sailing more and more by the lee until the wind catches the back of the mainsail and forces it to the other side of the boat. Now the main will just lie, streaming in the wind; the force being dissipated by the wind blowing across each side of the sail, making it luff.

CAPSIZE

A capsize in any boat can be dangerous, but with a little practice, capsizing a WHIP can be fun; one won't even get wet. The WHIP has a self-bailing cockpit, so as the boat is righted, virtually all water drains out. Once capsized, care should be taken that no one hangs on the rigging. Weight on the deck side of the boat or rigging could cause the boat to turn turtle (a completely upside down capsize with the spar and sails pointing straight down at the bottom of the lake.) To right the boat from this type of capsize, hold on to the top of the centerboard with your hands and place your toes on the rub rail. Pull back with your hands and bounce on the rub rail. As the sail appears and comes to the surface, hop up on the centerboard and right the boat as from a normal capsize (one in which the sails are lying on the surface of the water and the boat is on it's side). Light-weight crew may not be able to right a turtled boat.

To successfully accomplish a righting after a normal capsize, one needs to release the sheets and get out on the centerboard. If your weight is insufficient to bring the boat back to an upright position, move further towards the end of the centerboard and lightly bounce on it's end. As the boat begins to come upright, hop into the center of the boat and remain there until the boat is again stable. This maneuver requires quick execution and timing. However, if the boat is righted in this manner, the only water you'll get on yourself is that which drips off the sail. If this maneuver is not acceptable and you and your crew are in the water after the boat has been righted, climb into the boat from opposite sides, directly across from each other. This prevents the occurence of another capsize if you both were to climb in the boat from the same side. Climbing in from over the stern is also an acceptable alternative, particularly if single handing.

OPERATION OF THE TILLER EXTENSION

The tiller extension is put on the WHIP to allow the skipper adequate mobility and weight transfer over a range of area that otherwise would have been impossible. To smoothly operate the boat with the tiller extension, several ideas may make it's handling considerably easier. When on a tack, the skipper always should sit on the weather side, holdingthe extension on the side of his body that faces aft. On a starboard tack, the extension is held on your left side; on a port tack, it's held on your right side. Grip the extension the same as you would grip another person's hand; just like you are shaking hands with the extension. The combination of these two ideas, allows one to have a maximum amount of comfort and maneuverability. When jibing or tacking, keep the tiller extension aft of yourself. This keeps it out of the way for your transfer to the other side. During the tack or jibe, it may be easiest, as you are going across the center of the boat, to point the extension aft and retreive it from the other side, completing an arc from one side to the aft, then

Operation of the tiller extension continued

to the other side.

Just go out, remember a few of these ideas and practice maneuvers until the tiller extension feels as or more comfortable than the tiller itself.

TRAPEZE

The trapeze is a very functional piece of equipment. It should be used at all times when the boat can't be kept level by "regular" weight placement. The trapeze allows one to produce more righting moment (force exerted a distance from a point); hence, the boat may be sailed harder in winds greater than those which may be sailed without its use. Due to the fact that the trapeze cable (when in use) is positioned at a greater angle to the mast than the side shrouds, compression on the mast is somewhat relieved by the use of the trapeze. So; in heavy air the trapeze not only allows one to sail the boat harder, it also releives some of the forces compressing the mast, reducing the chance of mast failure.

The trapeze belt should be sat in and not positioned just around the back. Sitting in the trapeze belt provides better support to your body; making the use of the trapeze easier and more comfortable than hiking. The opening of the hook on the trapeze belt should be positioned away from you and should be hooked onto the bottom arc of the theta ring.

To move from the boat out to trapeze "position", place your forward foot behind the side shroud. Push yourself out, keeping your after leg slightly bent and your forward leg straight and stiff. This allows your body to "flex" with the action of the boat. Keeping your forward leg stiff helps prevent the tendency of being thrown forward when the boat hits a wave and decelerates.

BAILING

The bailer flap causes an accelerated water flow around it to produce an area of low water pressure directly behind the bailer. When this happens, the water in the cockpit is now free to drain out of the bailer and into the area of low pressure (high pressure trying to equalize low pressure).

(If the boat is not moving and the bailer is opened, no reduction of water pressure occurs because there is no acceleration of water flow under the bailer. Therefore, since the water pressure under the boat is greater than the water pressure in the cockpit (the water under the boat is supporting the boat and is pushing up with a force proportional to the weight of the boat), water flows into the cockpit in an effort to equalize pressures. If the boat is completely underwater, water pressure under the boat is equal to that in the cockpit. Water then ceases to flow into the cockpit.)

Once the boat has enough speed, low pressure develops behind the bailer and now the water in the cockpit exerts a greater force than water under the bailer. Water now flows out the bailer in an attempt to again equalize water pressures. Hence, if the boat hasn't enough speed, the bailers should remain closed until the boat develops enough speed. In drifting condtions, it is not possible while sailing, to obtain enough speed necessary to operate the bailer. If water is taken on board in slow speed conditions, it is necessary to remove it by a sponge or bailing bucket.

Bailing continued

If you suspect water in the inner hull, remove the neoprene plug from the bulkhead in front of the bailer. Open the bailer (if moving at a speed to facilitate bailing) and let the water run into the cockpit. Once agin, if you don't have adequate boat speed for bailing, the water will have to be removed by bucket or sponge.

SAFETY

When rigging the boat and raising the mast, look around and up high to make certain there are no power lines overhead or anywhere nearby that you might accidentally hit while launching the boat. Some power lines have not been adequately maintained and insulation may be non-existent. If a mast bumps into such a wire, or if a shroud wears through the insulation on a wire, electrocution may result to anyone touching the boat, trailer, or car attached to the trailer.

If sailing in a climate where cold winters are prevalent; early spring and late fall sailing deserve special consideration. During these periods of the year, the water temperature is cold. Falling overboard in very cold water can result in death after three to five minutes of exposure. If you are planning to sail in these conditions, wear warm clothing (preferably a wetsuit) and a lifejacket.

In heavy air, lifejackets should be worn at all times because these winds place the greatest strain on boat and person, at times resulting in capsizes, man-overboards, or breakdowns. If one is involved in any of these occurences, the extra support a lifejacket provides while in the water will make the situation at hand much more managable. If sailing in times of storm activity, and there seems to be a forthcoming electrical storm (as heard of the thunder from the lightning), head immediately to shore. A sailboat spar on an open body of water is by far the highest object. Lightning is attracted to such high objects. An electrical discharge to the top of your spar could easily revert yourself and your boat to the basic elements of which they were once composed.

GASKETS

On the bottom of the hull, encompassing the perimeter of the centerboard slot, are the neoprene gaskets. These gaskets close together on and around the centerboard when it is up or down, making a tight seal to keep water from flowing inside the centerboard trunk and cockpit. (When water sloshes up into the centerboard trunk, water strikes the back edge of the trunk then falls forward, forming a movement of water within the trunk. This movement of water causes turbulance along the centerline of the boat.) After a period of use, the gaskets lose their "liveliness" and cease to seal the centerboard trunk slot completely. As a result of this occuring, water sloshes into the centerboard trunk and then into the cockpit, both slowing down the boat and accumulating if the bailers aren't open.

Inspect the gaskets periodically for deterioration and replace if warped or if water comes through them and into the cockpit while sailing.

FLOTATION AND WATERTIGHTNESS

The foamed reserve bouyancy in the WHIP is sufficient to float the boat and its maximum recommended capacity when the inner hull is completely filled with water, providing the people are in the water, hanging onto the boat. This amount of reserve bouyancy exceeds all federal standards by 50%.

Flotation and watertightness continued

An all glass boat will collect some moisture, therefore the reason for the drain plug in the hull. The WHIP is sealed at the deck level, however, age of the boat, prolonged hot weather, or bumps and bangs against the hull, can result in the seal being less than 100% watertight. Another possible source of water could be the rudder fittings on the transom, or a loose fitting drain plug. (The drain plug can be expanded by turning the screw base on the plug).

Periodic checks should be made to maintain the watertight integrity of the hull and the tightness of the bolts on the rudder fittings, to insure maximum bouyancy, even in a prolonged capsize.

The forward and aft hatches are not intended to be watertight. The baskets are placed in the hatch for sail placement, etc. and may be removed if so desired. Because of this, if the boat is capsized in the turtle position, some water will leak through the hatches and into the inner hull. The baskets may be permanently secured and waterproofed if the owner chooses to do so. If not, WHIP will still float in turtle position, the amount of water taken into the inner hull dependent upon the length of time the boat remains turtled. Even if the inner hull fills completely, the foamed reserve bouyancy will support the boat and recommended capacity.

Any water contained in the inner hull may be drained once the boat is underway by pulling the drain plug on the after side of the centerboard trunk. Water will then drain out of the inner hull and into the cockpit. As water is draining from the inner hull to the cockpit, the bailers may be opened to remove the accumulating water in the cockpit.