

## **LIGHT AND MODERATE AIR RUNNING**

By: Stu Walker

### **PROBLEMS**

Maintain maximum speed made good downwind (toward the leeward mark) by achieving the greatest possible speed over the shortest possible course. A compromise must be made continuously between sailing faster but longer and sailing slower but shorter. This compromise is best achieved by always sailing the jibe which when sailing close to the rhumb line is most headed and/or the jibe which keeps the boat in the strongest streaks of wind.

### **SOLUTIONS**

Vary the course so as to keep the spinnaker full (to the optimal degree), sailing higher whenever the spinnaker sags, and lower whenever it remains full. Jibe whenever this course is so high that the opposite jibe would better approximate the rhumb line at the same sailing angle.

Heel the boat to windward, drop the pole, and ease the sheet so as to shift the spinnaker to windward. Always keep the luff of the spinnaker at an angle of incidence which generates lift (evidenced by the luff lifting above and to windward of the pole end). It is the lift generated by the luff which keeps the spinnaker pulled to windward, full, and exposed to the air flow. Head the boat as high as is necessary to generate this lift. Trim the spinnaker pole as far aft as possible without overly flattening the sail.

### **RESPONSES—BASIC TRIM**

Set both the spinnaker and the mainsail for maximum exposure in the stalled state.

Ease the mainsheet to protect the mainsail within 150 if perpendicular to the apparent wind. Tension the vang so as to minimize twist. Trim the guy (and the spinnaker pole) as far aft as possible without unduly flattening the spinnaker. Heel the boat to windward and lower the spinnaker pole to induce the spinnaker to shift as far to windward as possible. Keep the center seam of the spinnaker vertical so that all the horizontal sections are symmetrical.

Ease the spinnaker sheet repeatedly to keep the luff collapsing. Lead the spinnaker sheet down amidships (under the boom). Set the upper portion of the spinnaker so that the largest possible area is at an appropriate angle of incidence to generate lift from the air flow passing above it. Rake the mast forward maximally. Ease the spinnaker halyard (if there is enough wind to keep the upper portion of the spinnaker horizontal).

Lower the spinnaker - pole so that the spinnaker is symmetrical (which will contribute to keeping its upper sections horizontal and symmetrical). Keep the boat in yawing balance; Rake the mast forward.

Shift the crew weight forward, so as to decrease the wetted surface to the minimum possible, and to windward (heel the boat to windward), so as to counteract the increased weather yawing moment so occasioned.

Drop the jib (unless it is obviously functioning and not interfering with the spinnaker). It may work effectively when lowered halfway with its head full beneath the spinnaker. Keep the mainsail moderately full with its draft aft: Straighten the mast. Ease the outhaul (moderately—avoid decreasing projected area). Ease the Cunningham (completely).

Keep the boat stable: Distribute the crew so as to minimize pitching and rolling. Use a spinnaker with flat edges that do not induce rolling. Flatten the spinnaker sufficiently to negate rolling.

## **MODIFICATIONS**

### **Very Light Air**

As the wind velocity diminishes in order to keep the spinnaker full and maintain the best possible speed made good down wind, the boat will have to be headed higher. In gusts the boat can and should be headed off (with the sails stalled). In lulls it should be headed up to attain aerodynamic lift with the main leech telltales flowing. Because, in very light air, boat speed is compared with wind speed, the apparent wind moves forward, generates lift, and requires that the spinnaker pole be carried close to the jibstay.

Change to a small, light spinnaker. Use the spinnaker that is the smallest, lightest, and driest available. Keep the spinnaker full at all times.

Steer the boat as little as possible, chiefly by shifting crew weight. To adapt to changes in wind direction and velocity, change the spinnaker sheet trim initially, then change the course. Set the main and the spinnaker for a beam reach. Position the pole near the headstay. Elevate the pole to keep the spinnaker sections symmetrical, as the clew starts to lift. Trim the main sheet and vang to assure that all leech telltales are flowing. Trim the spinnaker sheet to the aft lead (at the transom) and over the boom (around the leech). Keep the spinnaker sheet eased and the luff constantly collapsing. If the boat develops a leeward yawing moment, de-rake the mast (shift it aft) and hoist the halyard fully.

## **GUSTS**

Gusts tend to strike the surface and to move downwind along the surface for some distance, if the boat can be sailed, more than its competitors, in such streaks, it will be possible to sail a shorter course more directly downwind, and at a greater speed. As a gust appears, the boat should be headed off and sailed at the stall (in the “Basic Trim” mode). If the initial jibe is taking the boat across and out of the gust, the boat should be jibed (unless the angle is particularly poor). In very light air it pays to go for the gusts, to get the boat up to speed, and to keep it there—even if the boat must be sailed, periodically, at a large angle to the rhumb line.

## **VARYING WIND VELOCITY**

In light air, a critical angle of incidence exists beyond which the luff of the spinnaker stalls and, without any lift force, the luff will sag and the entire sail collapses into vertical folds. The boat must always be sailed sufficiently high that the luff generates lift, shifts to the windward side of the boat, and holds the remainder of the spinnaker, though most of it is stalled, up, out, full and exposed. However, the boat should be sailed no higher than is necessary to just achieve this effect (maximum lift is achieved just short of the stall).

So long as the spinnaker is obviously full, the ability of the boat to sail lower without collapsing the spinnaker should be constantly tested (lower is shorter). The spinnaker trimmer should ease the sheet until he sees that the luff is collapsing (to demonstrate that he has that leading edge precisely splitting the wind flow) and the helmsman should attempt to bear away until he sees that the luff is stalling and sagging (to see how low he can sail). With each increase in wind velocity the boat should be headed off. The spinnaker trimmer must recognize that this is about to happen and should both bring the pole aft and ease the sheet as it happens. If in light air, the spinnaker stalls, it will be very difficult to fill again. It is best to only bear away when the spinnaker luff is collapsing, that is, to call for a sheet ease and to see the collapse before bearing away. An excellent technique is for the helmsman to hold the guy and, as he bears away, to trim the pole aft. Hike, to heel the boat to windward, to immerse the windward bow, and to cause the boat to bear away may be combined with a trim aft on the guy. Together with the heel, this shifts the spinnaker to windward and prevents it from stalling. In a lull the boat must be brought up higher on the wind, to keep the luff generating sufficient lift to keep the rest of the sail full. The spinnaker will, otherwise, collapse and be difficult to refill both because the lighter air will be less able to remain attached and because, after the boat speed diminishes, the apparent wind will shift aft. Initially, however, the apparent wind will shift forward, causing the spinnaker trimmer to sheet in, to prevent the luff from collapsing excessively in what appears to be a header. This is dangerous, as the uninitiated trimmer may overreact, sheet in excessively, and stall the luff when he should be easing the sheet to accommodate the lull. As soon as the trimmer unfolds the luff, the helm recognizing the lull, should head up and the sheet trimmer should ease the sheet, both actions intended to prevent the stall which will, otherwise, ensue. Once the boat is up, higher on the wind, with its speed preserved, or but minimally diminished, the pole may have to be eased forward and/or elevated and the sheet trimmed in to adapt to the new apparent wind angle.

### **SUMMARY—INITIAL RESPONSES**

Gust: ease the sheet and bear away.

Lull: trim the sheet slightly, then ease it and head up.

### **VARIABLE WIND DIRECTION**

Every boat has an optional downwind sailing angle in a particular strength of apparent wind (just as it has an optimal up wind sailing angle). In general, faster boats will sail at lower sailing angles (for a given wind strength) than slower boats and all boats will sail at their lowest sailing angles when sailing in conditions which result in their greatest speed. A continuum exists for a particular boat which requires that it sail at very high angles (broad jibing angles, 90° or more) in order to generate lift along the luff in very light air (or in a relatively strong, opposing current wind which makes the apparent wind lighter) and permits it to sail at progressively lower angles in increasing winds until its maximum (displacement) hull spread is reached. (Inasmuch as the course is but minimally lengthened by sailing up to 15 from the rhumb line, it is rarely appropriate to sail dead downwind). At some wind strength above maximum (displacement) hull speed, if the

boat is capable of planing, it must be headed up to a planing angle and then, as the wind increases further, born again to a progressively lower course:

In order to keep the boat at the optimum downwind sailing; angle (appropriate to the wind strength), the boat must be headed up in lifts and off in headers without changing the spinnaker pole position. The major advantage of this technique is that it permits, with the aid of a compass, recognition of the time to jibe in wind shifts. If, with the pole fixed, the boat must be headed so high (in order to keep the spinnaker at the proper angle of incidence) that the opposite jibe better approximates the median dead downwind course or the rhumb line, it should be jibed. This technique is essential to sailing in oscillating winds, permitting appropriate jibing in the lifts (lifts beyond the median) analogous to tacking in headers to windward, so as to sail the shortest possible course to the leeward mark. Jibing technique must be perfected so that the boat can be jibed whenever a jibe is indicated (to respond to the appearance of a shift or a streak of increased velocity) without any loss in speed, and without collapsing the spinnaker.