

## **THOUGHTS ON DS TUNING: THE JIB**

Dan Duggan, Fleet 2

### *From The Day Sailer, Winter 1991 Number 123*

Everyone who races a Day Sailer probably wonders if his or her boat is tuned as well as it should be and there are probably as many different approaches to tuning as there are competitive boats. Like many others, we have sometimes wondered if we had done everything to tune our boat, the Cherry Bomb, properly. We had a set of experiences over the last year which forced us to stop wondering, confront the question head on, and rethink virtually every adjustment on the boat. We didn't come up with any new breakthroughs, but we did confirm the importance of some old ideas and we were surprised to find how critical a few seemingly unimportant adjustments really were. After retuning the boat we thought it would be useful to present our experiences in two articles, this one on the jib and a later one on the main. We hope that these articles will be useful to other Day Sailers and may also prompt them to write up their tuning ideas for the quarterly.

Our problems came to light when my daughter Barbara and I sailed the 1990 NACs in Marblehead. Barbara's sailing was up to its usual level and we did well, but we were unhappy with the performance of the boat. The jib was too flat, the luff of the main was too full, and the boat was cranky and hard to sail. The jib telltales wouldn't fly properly and we were frequently passed by other boats on the course. The Cherry Bomb simply didn't have its old comfortable and fast feel. Something or some things were definitely wrong.

The problem was a surprise, but it shouldn't have been. In 1989 we had replaced our trusty old E-Section mast with an Epsilon and at the same time we replaced our relatively flat Doyle sails with a fuller set from Norm Cressy. We assumed all was well because Barbara and a college friend had done very well in the one regatta they sailed with the new rig. Because of our busy schedules and because there is no regular Day Sailer racing in Marblehead she and I had not sailed the boat together until the 1990 NACs. We had not made the time to really check out the new rig and retune the boat as necessary. Now we were paying for that omission by sailing the NACs with a very cranky boat.

It would have been easy to blame the sails for the problem but long and sometimes difficult experience had taught us the importance of tuning the entire boat. Epsilon mast or otherwise, to each suit of sails. Only after tuning the rig could we pass judgment on the sails. (After the tuning was completed the sails turned out to be excellent.)

We were both involved in running the 1990 NACs and we did not have the time to meditate on the tuning problem during the regatta. After the regatta was over and the boat was back in its usual spot in the back yard, we spent a long quiet afternoon studying the boat and the rig. Nothing was assumed to be correct even if it had been unchanged for a long time.

We started with the jib. Why was it too flat? We decided to look at every adjustment and attachment, and we started with the halyard. Its sheave was in the right position on the mast and the tension was easily adjustable. Not finding anything suspicious here we moved on to the barber haulers.

Instead of being free flying (and free falling) our barber haulers slide on tracks on the upper back edge of the cuddy. This doesn't trim the jib any better than the free flying setup, but it does keep the blocks from banging on top of the cuddy on windy days. We had been running the barber haulers at the inner end of their tracks for some time and as we looked at them now some words we had once heard from sailmaker Robbie Doyle came to mind: "Never build an adjustment so that it must be run at the end of its range. Leave some room for further tuning." Remembering and heeding, we lengthened the barber hauler tracks to allow the jib clew to be (trimmed inboard of its former setting and bring more fullness into the jib. When the boat was back in the water we found that we did indeed run the barber haulers further inboard than we could previously and this seemed to help the jib shape.

We were satisfied that the change in the barber haulers would give us more fullness in the jib, but the fullness would be in the center and leech. Was there something more we should do to bring more fullness into the luff? We began to look at the jib tack.

Like most Day Sailers our jib tack connected to an adjustable wire downhaul that ran through a hole in the deck, around a block below the deck, and back to a three part tackle and a cleat. At one time our jib had had a wire in the luff which kept the whole front of the jib close to the headstay while the downhaul controlled the tension on the luff. More recently we had bought jibs which did not have a wire in the luff. These jibs relied on the downhaul to provide luff tension and also to keep the jib tack in its proper position relative to the rest of the front of the jib. We began to realize that this arrangement could be a problem when the jib sheet was tightened and the jib downhaul was not pulled right down to the deck. The tension on the jib sheet could cause the jib tack to move aft, away from the stemplate and the headstay. The clips which held the jib to the headstay would pull the rest of the luff forward, effectively removing the designed fullness from the front of the jib. This could be one of our problems. If so, it would take time to create a better downhaul arrangement, but we could temporarily fix it by using a small shackle to connect the jib tack directly to the stemplate as in a stock Day Sailer. This would keep the jib tack in the correct position relative to the rest of the jib, and we could make any critical luff tension adjustments by adjusting the halyard.

After deciding to make this change we began to pay more attention to how other boats and other classes controlled jib luff tension. Almost without exception we found that boats which had such an adjustment also had some way to prevent the tack from moving aft and out of line with the rest of the jib. Some used a luff wire, some attached the tack to the stemplate and varied the tension on the halyard, and a few had an extra shackle or ring which attached the tack grommet to the headstay, allowing the tack to slide up and down on the headstay while staying close to it. We saw a J-22 with a particularly interesting rig. It used a jib cunningham rigged exactly like the cunningham in the mainsail.

We didn't get a chance to sail the Cherry Bomb with the jib tack shackled directly to the stemplate until the midwinters in March. As soon as we got underway there it was apparent that the jib looked fuller, the telltales flew normally, and the boat handled much better going upwind. Since it worked so well, we sailed the rest of the 1991 season using the shackle to stemplate arrangement instead of the downhaul and made only a few adjustments to the luff tension with the halyard. We will probably make up a new luff adjustment in the future but whatever shape the new adjustment takes, it will not allow the tack to move out of alignment with the rest of the jib. Since we were satisfied that our jib problem was solved, we turned to the main, which we will write up in another article. Subsequent experience however, pointed out another area which should be checked when tuning the jib. We sailed another Day Sailer briefly while we were in Maine for the 1991 NACs. It had sails which seemed identical to ours and the jib tack was in alignment with the rest of the jib, but the jib luff still looked very flat. While we were wondering about this we happened to touch one of the shrouds. It was extremely tight, making the headstay also very tight and just about eliminating any headstay sag. This jib and most others are cut to compensate for a small amount of headstay sag, and when there is none the tight headstay pulls the luff out to a nearly straight line, making the luff itself flat. We also chatted with another DS owner who runs his rig very tight to stiffen his E-Section mast. He had specifically shopped to find a jib which would provide the proper fullness with the lack of headstay sag which this tuning created.

At this point a question might come up. "Just how full should the luff be?" We don't have any exact measurements (it might be interesting to make some while the boat is underway) but we do use these general guidelines:

1. If the jib is too full the boat will not point with the other boats when both sets of telltales are flying.
2. If the jib is too flat the boat will behave as ours did. It will be difficult to keep the telltales flying and get the boat "in the groove" going upwind.
3. The jib luff tension is usually correct when there is just the beginning of a pucker or small wrinkle at each point on the jib where a clip attaches it to the forestay.

Analyzing and fixing our jib problem was interesting and ultimately enjoyable. The flatness in the luff wasn't really related to the new mast and sails. It was a problem which could occur with any rig when the jib tack was allowed to rise above the deck instead of being pulled down tight. It could even come and go as we changed the downhaul adjustment. As stated in the beginning of the article we didn't learn anything totally new, but the critical importance of the tack position and to a lesser extent the headstay sag had been a surprise.

Do you have jib tuning thoughts or experiences to add to this? If so your DS Editor and the rest of the class would like to hear from you. Good Sailing!

## THOUGHTS ON DS TUNING: THE MAIN

Dan Duggan, Fleet 2

### *From The Day Sailer, Spring 1992 Number 124*

In the previous issue of the Day Sailer we described how we had found our Day Sailer, the Cherry Bomb, noticeably out of tune during the 1990 season and how we started to review and evaluate all the adjustments and attachments on the boat to get it back in tune. The previous article covered the work on the jib and how improving the barber haulers and tack attachment solved our problems in that area.

With the work on the jib done we turned to the main. The problems here didn't seem to affect the boat as much as the ones with the jib, but the luff of the main was definitely too full and the leech looked slack. We went back to our point-by-point check. Once again, there were no big breakthroughs but some small adjustments made big differences.

After a careful check, the halyard, gooseneck, cunningham, vang, and mainsheet were pronounced healthy and effective. We could have used an outhaul with a greater mechanical advantage to trim the very full "lens foot" on our main but we could make the existing one work with a very hard tug. That project to create a better outhaul could be deferred to later. Our problems were in the leech and the luff. We needed to look at the traveler and mast bend adjustments.

We use a stem traveler that we copied from the 6900 series Day Sailers that Dave Perry rigged and marketed on Lake Webster in the late 1970s. This traveler and variations on it have appeared on a number of Day Sailers since that time. The most important parts of it are two fixed lines. One goes to the port corner of the transom and the other to the starboard corner. The other ends of both lines are tied into the eye of a block. The mainsheet starts at the end of the boom, runs through the sheave of this block, through another block on the boom, then forward along the boom and down to the mainsheet camcleat. The length of these two stem lines is critical. When their length is correct and the mainsheet is pulled in tight, the boom will be over the centerline of the boat. The height of the boom will create just enough leech tension to pull the top batten in so that it is parallel to the boom when you sight up the sail from under the boom.

This traveler provides the same trim in light air as a properly adjusted midboom traveler and there is no need to change it on each tack. For heavier air there is an additional line rigged so that it can pull the whole traveler down, increasing leech tension and allowing the boom to move to leeward. This is similar to letting a midboom traveler go to center or leeward as the wind increases. We like this arrangement even though it is not as easy to use as a midboom in puffy conditions, but at this time it was not doing the job for us.

As we checked the traveler we determined that the two fixed lines were just a bit too long even though the boom seemed to sit higher with the new mast. The long lines were allowing the boom to rise enough to loosen the leech and permit the top batten to fall off so that it was not parallel to the boom. That problem was easy enough. Now what was the situation with the fullness of the luff?

One possibility could have been too much luff tension. If the halyard is too tight or if the cunningham is tensioned in light air the cloth in the luff may be stretched and excess fullness may be pulled into the luff. This was definitely not our problem. We had been careful to keep moderate tension on the halyard and not use the cunningham until it was definitely needed in moderate to heavy air. The luff problem almost had to be in the spreader adjustments.

We had long accepted as an article of faith that most Day Sailers sail best with the spreaders adjusted so that their outer edges are about two inches forward of a straight line from the tangs to the chainplates. This stiffens the center section of the mast slightly and prevents premature flattening of the main in light air. We had used this adjustment on our E-section mast for a number of years and it had provided a near-perfect adjustment for that mast with several different mains. We had carried that adjustment over to the new Epsilon mast even though its spreaders were slightly shorter than the ones on the E-section, indicating that the Epsilon was stiffer as we looked at the Epsilon now we recalled that the main seemed to stay full even as the wind increased to eight or ten knots. We just didn't see any diagonal "speed wrinkles" from the center of the mast to the boom. It was time to look into that. The spreaders were probably set too far forward for the stiffer mast.

Our spreaders have easy-to-change adjustments and they can be reached by standing on the gooseneck (very carefully if you have grey hair). We waited until our trip to the 1991 Midwinters to adjust the spreaders and we carefully loosened them a turn or two before we launched for the first time in Sarasota. When we started to sail there the main looked a little better but as the sea breeze filled in there were still no wrinkles and the luff still looked too full. Rather than change the spreaders on the water we waited until we had the boat back on the trailer at the end of the day. We were about to loosen the spreaders just a bit more when Al Hersey came by with a copy of sailmaker Greg Fisher's Day Sailer Tuning Guide. We read this avidly and we were happy to note that his recommendation that "speed wrinkles" should appear at 8 knots or so was similar to what we were coming to by trial and error. That encouraged us to loosen the spreaders some more and we eventually set them so they were less than a half inch forward of a line from the tangs to the chainplates. When we launched again the main looked good, the speed wrinkles started to appear at the appropriate time and we could concentrate on sailing instead of tuning.

After tuning our main we watched the mast bend on other Day Sailers more carefully. It seemed that many boats with mains that were flatter than ours had a different situation. Some of these boats showed the diagonal speed wrinkles in very light wind conditions. We had to wonder if they would go better, particularly in light air, if they increased the forward pressure of the spreaders to give less mast bend and more fullness in the sail.

This concluded our tuning exercise but we will continue to look for new ideas and insights, hopefully from other articles in the Quarterly. We could summarize our points on the main as follows:

1. The traveler, end-boom or mid-boom, should be set up to provide enough leech tension to keep the top batten parallel to the boom in light to moderate air. In a drifter or heavier air the batten may point out more than the boom. It may be easier to check the top batten occasionally rather than trying to keep a set of leech telltales flying.
2. The spreaders should be adjusted far enough forward so that the main shows no diagonal wrinkles in light air but the wrinkles should start to appear as the wind gets up to 8 to 10 knots.
3. The outhaul must be powerful enough to properly tension the foot. If the sail has the really full "lens foot" you must pull in enough tension to form a hard line from the tack to the outhaul.
4. The halyard should bring the sail all the way up but should not be so tight that it starts to stretch the luff. The cunningham should be used to stretch the luff cloth and pull the fullness forward as the wind increases.