



NECSC

2.4mR Tuning Guide

Brewer Yacht Haven Marina
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Section 2 - Sail Trim

Sail fast and point

Most important for good speed and height upwind is to find the right balance through good trimming and concentrated steering. Right balance is equivalent to the right rudder pressure. You achieve this by trimming the main and backstay and in stronger winds by pointing to reduce the pressure on the sailplane. I often sail with the jib slightly luffing. In flat water a stronger rudder pressure can be allowed as choppy seas require an almost neutral rudder to facilitate easy steering. The rudder easily turns into a brake. Start by sheeting your main to the proper mark then trim the backstay for right balance. If extra power is needed the jib may be trimmed fuller.

Main

The top batten is then parallel to the boom and the top tell tail flies 60-70% of the time.

In very light wind the top tell tail shall be visible as much as possible. The top batten will then point leeward.

If you have an old and soft mast the main may get overbend wrinkles from the clew to the mast when the backstay is pulled very hard. These can be reduced by tightening the cunningham. However, it is better to have a well balanced boat than a good looking main.

Backstay

The backstay is only used to stabilize the headstay in light wind

If you manage to steer more into the wind without losing speed less backstay tension is needed. Consequently, the backstay has to be pulled harder in choppy conditions as more active steering is required then.

Cunningham.

The Cunningham affects the camber position. In light winds the mast is relatively straight and therefore the main has enough draft forward without using cunningham tension. The camber position is moved backwards as soon as the backstay bends the mast and short horizontal wrinkles are seen at the luff. Pull the Cunningham until the wrinkles disappear. I'd rather pull Cunningham too hard than the opposite.

Outhaul

The outhaul should be tensioned according to power need. Maximum when you cannot hold the boat flat.

Jib

The jib Cunningham is pulled harder when the wind increases. To avoid the foot resting too much on the deck in strong winds and to make sure that there is no gap between deck and skirt in light winds the jib is hoisted to different heights

Sheet and barberhauler effect the shape of the jib in a way that it is often necessary to adjust both at the same time

Spreader Reference

The jib is sheeted to 5 units outside the spreader in 0-2 m/s and it is sheeted to 2-3 units outside in 3-5 m/s. It is then gradually opened to be 9-10 units outside in winds above 10 m/s.

The main sails from North have a window allowing you to see the distance between the jib and the spreader having your head on the windward side of the sail. It is always better to sail with a too open jib slot than a too closed one, which can be very stopping.

Foot Camber

The jib is sheeted 2 units outside the rail in 0-2 m/s wind (let us call that -2 units). The foot is sheeted to 3 in 3-6 m/s and in 7 m/s and above it is sheeted to 5.

A fuller jib is needed in choppy conditions a flatter one is better on a flat sea.

Jib Cunningham

The jib Cunningham is always pulled just enough to remove the sag between the luff buttons.

Headstay sag

Headstay sag is set by the backstay and is hard to control without changing the balance of the boat.

However, a very flat jib (too little sag) is often an indication that the backstay should be eased.

Section 3 - Downwind Trim

Mast Rake

The mast shall be pushed as much forward as possible downwind. Let the backstay out and pull the mastbend inducer to keep the mast forward. The headstay will be loose and allow the jib to be spinnaker like. When the apparent wind is 70 degrees from behind or more the backstay is tightened to give 10-15 cm sag.

Main

The main shall have much draft and the chamber position should be close to the centre of the cord. This is achieved by letting cunningham and outhaul loose. The vang is adjusted such that the top batten is parallel to the boom. Let the boom out to 90 degrees with the wind from the stern. With a wind angle sheet such that the top tell tail flies but is slightly irritated.

Jib

The full length of the whisker pole shall be used and cunningham shall be loose to create clear bows between the luff buttons

Sailing angles

In very light conditions a shy wind angle is necessary to make the jib fly. In other conditions angles between 0-20 degrees form a dead run give the same VMG and you can let tactical decisions decide the angle. If you have options chose the one closest to the mark.

Section 4 - How to Point, Foot, and Shift Gears

By Greg Fisher, June 7, 2002

Greg Fisher is a wizard of small-boat speed, and in this column, first published in *SW* 1998, he tells us how to master one of the most difficult facets of sailboat racing.

Subtle gear changing is what truly separates those with just adequate boatspeed from those who always seem to be a click quicker and higher. While most of the fleet starts the race with a similar setup, created with the help of a tuning guide or by following standard principles, the fast boats are constantly making additional adjustments. When conditions suddenly change—a puff hits, or powerboat waves arrive—these sailors shift gears smoothly. Before we dive into the subtleties of their sail adjustments, let's take a look at how you might create a basic pre-race setup.

Step 1:

Set the depth

Try to memorize the depth that feels about right in 10 knots of breeze. Then set your mast bend and headstay sag to replicate that shape, using it as your starting point in other velocities. Another method is to increase mast bend until you just begin to see slight wrinkles (called inversion wrinkles) running from the clew of the mainsail to the lower quarter of the mast. For the jib, decrease headstay sag until you are just able to make the telltales on both sides of the sail fly easily. Any tighter, and the steering groove will become too narrow.

Step 2:

Set the draft position

For most boats, the main draft should be positioned nearly halfway back. Pulling the cunningham tighter pulls the draft forward, while easing it allows the draft to move aft. Use the jib halyard or jib cunningham to position the fullness in the jib. The draft should be slightly farther forward than in the main, usually about 35 percent, or roughly one-third, of the way back.

Step 3:

Set the twist

To set the leech tension for the main, sight from under the boom and set the sheet so that the chord of the top batten is parallel to the boom. For the jib leech, set the sheet so that the last 6 inches of the middle of the leech (a mid-leech batten helps here) are parallel to the centerline of the boat. Easing the sheets allows the outboard end of the battens to fall away, increasing twist. Trimming the sheets does the opposite, decreasing twist.

Step 4:

Set the angle of attack

If you drop the tiller, the boat should continue to track straight, or slowly head up into the wind. Any more helm than that means excessive rudder drag. If the boat has excessive windward helm, ease the traveler to until the helm is balanced. This four-step process for setting your sails is only a starting point. It's still a great idea to line up with someone you know is fast before the race to see if you are "on the money." If you're faster, great! If you're off the pace, just ask your crew, "Are we lacking speed or pointing ability?"

Solving Pointing Problems

An inability to hold a lane or position close to other boats can really destroy a tactical game plan. Pointing problems are not so much indicated by the angle that the boat seems to be sailing relative to the boats around us, but more by the fact that the boat is actually sliding to leeward.

Trying to pinch to maintain height can be the crux of the problem. The old adage, "foot, then point," says a lot. A boat needs to go fast before the underwater foils can develop enough lift to hold their position in the water. To regain pointing ability, ease the sails out, bear off slightly, and get back up to speed. Once up to top speed, re-trim to your starting point trim and reevaluate your pointing problem. If the problem persists, check your sail trim.

When sail trim is the cause of the problem, it's usually the main, not the jib. The upper leech of the main provides most of your pointing ability. Be sure to trim the main so the upper batten is at least parallel to the boom. If you need more pointing ability, try trimming the main tighter. You can hook the upper batten as much as 15 degrees to weather for short periods. Avoid the temptation to overtrim the jib to help pointing ability. Hooking the jib leech will choke the slot between the main and jib, stalling the entire sailplan. The jib should never have less twist than described in the "basic setup."

Only after you've decided to trim the main harder should you try to pinch the boat. In this mode, the weather telltales on the jib will be stalled. In big puffs, the luff of the jib can break as much as 8 inches back. This "super pinch" mode can only be held for short bursts and in flat water. Once the boat starts to slow down, be sure to ease the sails out, regain your speed, then start the process again.

While it may seem natural to let the boat heel more when trying to point, fight the urge. Keeping the boat flat will help maintain a balanced helm and maximize the efficiency of your underwater foils. Still not pointing? Either your rig is too loose, resulting in too much headstay sag (i.e., the jib is too full) and sometimes too much mast bend, which makes the leech too open, or the luff tension on either sail is too tight (the draft is too far forward).

Solving Footing Problems

What if your pointing is fine, but your straight-line speed is lacking? The simplest fix is easing the sails. More open leeches on both sails will help the boat sail lower and faster in a straight line. Sometimes, however, this results in a pointing problem. If so, first check your helm balance. Weather helm can seriously hinder the boat's ability to go fast. Instead of easing sheets, it's often better to find a way to ease helm. First, try to sail the boat more level. If you can't keep the boat flat, induce more mast bend to flatten the main. The next step is to ease the traveler until the helm is balanced. Finally, tighten the outhaul, tension the cunningham/jib halyard to pull the draft forward and open the leeches of both sails.

Gear Shifting: Puff On!

We've got you going with good speed and good height. Then what happens? The wind velocity changes and it's time to shift gears. First, let's look at some of the automatic trimming change that should happen as soon as a puff hits. 1. Ease the main, and sometimes the jib 2. Steer up to "feather" the boat 3. Re-trim sails.

Since a puff typically lifts you, due to a change in the apparent windspeed, you need to ease sheets and head up as it hits. Be sure to let the boat climb up into the wind and steer toward the upper end of your groove with the jib luff actually breaking. In flat water, all that may be required is a quick ease of the mainsheet. But in chop, it may be necessary to ease the jib as well.

If the puff packs some real velocity, more adjustment may be necessary. If you can't hold the boat down, and there's still too much helm, try the following, one at a time, until the helm is balanced. 1. Ease the traveler 2. Bend the mast (vang

tension, backstay tension, etc.) 3. Tension the cunningham on both main and jib.

Gear Shift: Into a Lull

For the same reason that puffs are lifts, lulls usually appear as headers. In a lull, it's important that you bear off as smoothly as possible. Make sure the boat remains flat and resist the temptation to add heel to maintain "feel" in the helm.

Ease the main so the top batten angles outboard from parallel to the boom. Leave the jib trimmed initially until the bow is pulled down to the lower end of your groove with both telltales streaming aft. At that point, the jib should be eased so the leeward telltale doesn't stall.

Here's how to maintain speed in a lull. 1. Ease the main 2. Allow the boat to heel to weather, creating lee helm, to steer the boat down 3. Ease the jib 4. Level the boat 5. Pull the traveler up (if the boom is below centerline).

If the lull is long-lived, you may need to take additional steps to maintain speed.

1). Straighten the mast and induce luff sag in the jib

2.) Ease main and jib cunninghams to maintain correct draft position.

The smoother you shift gears the faster you'll be, so practice until it's automatic. Heck, manual transmissions went out years ago!

Section 5 – North Sails Tuning Guide



One-Design

Tuning guide 2.4mR

The tuning guide is written by Björn Österberg, North Sails Sweden and Patrik Forsgren, 1993 World Champion.

It is published on the International 2.4mR Class website: www.24metre.org.

Norlin Mark III

- Preparations
- Sail Trim
 - Mainsail
 - Jib
- North Sails addresses

North Sails Tuning guide is written to help you get the best performance from your 2.4mR. We hope the guide will help you to more successful racing and, most of all, more enjoyable sailing.

1 Preparations

Mast Step Position

The forward bolt should be in the 4th hole from the bow.

Mastrake

Mastrake is best measured from the lower edge of the black band in the top of the mast to the aft end of the transom. The backstay should be pulled just enough to remove the sag. Pull the

backstay hard and then release before the measurement is taken, to make sure the forestay is straight. When the mast is raked in this position, mark the position on the forestay. The mark can be made on the forestay at the bow of the boat or on the adjustment line at the cleat.

The distance is 5,50 m for all conditions.

We have tried different mast rakes. A more upright mast is hard to point well with in light and medium conditions but gives less weather helm in heavy weather. In light winds a more raked mast can point better but it also effects speed in a negative way.

Backstay

Adjust the mast rake as described above. Mark the backstay line at the cleat when the backstay is pulled just enough to remove the sag from the headstay. Pull the backstay to the point where the mast bends 95mm at spreader height. Put another mark on the line. Put two more marks on the rope by dividing the distance between the original marks in equal parts. Put a 5th mark with the same spacing from the 95 mm bend mark for very strong winds. The backstay tension is referred to as 1 being at the first mark, 1.5 being half way between mark 1 and 2 etc.

Shroud Tension

The shroud tension does not need adjustment for different wind speeds. With the backstay loose the cap shrouds should be tight and the lowers significantly looser. With the backstay pulled to 4 units, the cap and lower shrouds should have equal tension.

Mast Ram

Mast bend can be induced or restricted by the two ropes at deck level. The numbers we use is 1/2 inches (1 unit on the small North speed decal) for and aft compared with unrestricted mast position.

Main Sheet

Put the small North speed decal just in front of the mainsheet cleat. Mark the mainsheet on a position where the mark is on the middle of the scale in about 8 knots of wind. This is to help you get back to proper trim at the start, in the beginning of a beat or after ducking another boat. This reference is not used as reference for different sailing occasions because only a few millimeters of difference in mainsheet affects the sail shape a lot.

Mainsail Tack

The mainsail tack should be fixed in a way to make sure it stays in the same position with different outhaul tension. At the same time it is an advantage if the tack can move an inch or so along the mast. The best way to achieve this is to have a slug slide sewn to the tack of the sail. If the opening in the mast track is extended all the way down to the boom, you can't use a slide. Instead a 5mm rope with low friction is tied through the tack grommet and around the mast. Make sure the tack of the sail is close to the mast to prevent the clew to go beyond the black band when the outhaul is pulled tight.

Main Halyard

The mainsail is always hoisted all the way up to the black band in the top of the mast. One way to make sure the sail is properly hoisted is to wrap woven tape a few times around the measurement band. Ease the backstay and hoist the main all the way. Pull the cunningham and tighten the halyard again.

Spreader Reference for Jib Leech

The sheeting of the jib is described as the distance between the spreader tip and the leech of the jib. The small speed decal (½ inch spacing between numbers) on the spreader helps to judge the distance. The measurements later described is valid for the standard 295 mm spreaders. If you have different length spreaders you have to compensate for the difference.

Footcamber, Jib

The depth of the jib at deck level is described as the distance between the point where the jib hits the deck and the rail. The distance is measured 850 mm back from the forstay. A small speed decal is put at right angle to the edge of the deck with the "0" at the rail.

Sheeting Angle, Jib

The standard angle, 250 mm from the centerline, works well in all wind conditions.

Jib Halyard

The jib is always hoisted to the same point. The twist is adjusted by the barber haulers on the jib sheet. To be able to use a mark on the halyard a shackle must be used to attach the halyard to the sail. Sail in light winds, 2 - 4 knots. Adjust the halyard to get the foot of the sail on the deck about 200 mm aft of the tack. The jib cunningham should be just tight enough to take the slack out between the luff buttons. Mark this halyard position with a mark on the halyard. As it is hard to get a good view of the halyard cleat, it is often better to put the mark at the plate for the bilge pump. Pull the halyard up past the plate. Put one mark on the rope and one on the plate when they line up.

Rudder Angle

It is hard to judge the rudder angle when steering with pedals. Put the rudder straight when the boat is on land. Pull the rudder lines tight and mark the lines at a point where they are visible when sailing. Put marks at ½ inch distances forward and aft of the original mark. When the rudder lines is on one of the ½ inch marks the rudder angle is approximately 4 degrees.

2 Sail Trim

Mainsail

Sheeting

The helmsmans position in the 2,4mR gives her/him a perfect "sailmakers view" of the sailshape. Therefore we use both the angle of the top batten relative to the boom and the leech telltales as references for sheeting. In very light conditions, around 2 knots, the top batten should point a few degrees to leeward to help the wind pass over the sail. When the wind increases to 4 - 8 knots the mainsheet is adjusted to make the top batten parallel to the boom. The telltale at the top batten is then flowing about 60% of the time. At 10 - 14 knots. the mainsheet is kept the same and the leech is opened by pulling the backstay. If the seas are rough the mainsheet can be eased a little. In smooth waters and even wind strength the sheet can be pulled a little tighter to focus on pointing. In winds over 14 knots, when the backstay is pulled to 4 or 5 units, the mainsheet is pulled so that the top of the sail luffs in the bigger waves but the leech of the sail keeps flat without luffing.

Mastbend inducer/restrictor

In very light conditions up to about 4 knots the mast bend inducer is used to make it possible to bend the mast and at the same time keep a relatively loose forestay. Bending the mast gives you a mainsail with less depth and open leech. That way the wind is flowing over the sail with less drag.

When the wind is stronger than 14 knots the mast bend restrictor is used to prevent the mast to bend too much in the lower part. When the mast and the luff curve is the same, at about 4.5 units backstay, slight overbend wrinkles starts to be seen from the middle of the mast to the clew. When the restrictor is set, more backstay tension will twist the mainsail and increase forestay tension without bending the lower part of the mast too much.

Backstay

In up to 4 knots, when the mastbend inducer is set, the backstay primarily defines the headstay sag, see further under jib trim. The right amount of sag, and mastbend, is achieved when the top of the backstay is pulled to about 2 units. When the wind increases the bend inducer is released and the backstay tension is increased. The determining factor for backstay tension is the helm of the boat. It means that the backstay is the most important adjustment when sailing in varying wind strength. As soon as a tack (or other maneuver) is finished, get your hands on the backstay adjuster and keep the boat in balance. Keep an eye on rudder angle!

At 10 knots the backstay is at around 3 units, at 14 knots around 4 units. In winds over 18 knots the backstay is pulled to 4.5 to 5 units and if the wind is increasing to over 24 knots the

backstay can be pulled even a little more. In survival conditions: Don't worry about how the sails look but how the boat feels!

Cunningham

Cunningham affects the camber position. In light winds the mast is relatively straight and therefore the main is enough draft forward without using cunningham tension. Short horizontal wrinkles is seen at the luff of the sail. When the backstay is pulled to 3 units the cunningham is set just enough to make the wrinkles disappear. If the wind is puffy, adjust the cunningham for the lighter winds and cleat it. It takes a few seconds for the draft position to move back when cunningham is eased and its easy to get out of rhythm with the puffs if you adjust cunningham too often. In strong winds the cunningham is used to keep draft position forward. The exact amount of cunningham tension varies with the age of the sail. A new sail needs less cunningham than a sail with many sailing hours. The rule of thumb is to keep the camber position at 50% of the cord length. In winds over 18 knots the cunningham should be pulled real tight.

Outhaul

Outhaul adjustment is not as sensitive as cunningham. Up to 4 knots the distance between the boom and the foot of the main is about 50 mm (2 inches). At 8 knots the outhaul is pulled so the slot is closed and at 12 knots the outhaul is pulled to create a wrinkle along the boom. At this point the clew (which is impossible to see) is all the way to the black band at the end of the boom. It is important to have the tack attached to prevent it from moving aft as outhaul tension is increased.

Traveler

The main traveler is always kept in the middle. We have tried to use the traveler to keep the boom on the centerline in light conditions and also to let the traveler down to leeward in heavy winds. Neither has proven faster than keeping the traveler in the middle. (Just two more lines to worry about.)

Jib

Spreader Reference

Up to 14 knots the jib leech should be 1.5 units out from the spreader tip. If you need to point extra high you can sheet the leech all the way in to the spreader a short while if you feel that the speed is sufficient. If the priority is on speed rather than pointing the sheet can be eased to make the distance between sail and spreader to about 3 units. In rough seas the leech can be between 3 and 5 units from the tip. The barberhauler does not normally need adjustment in winds under 14 knots, it is enough to use the jibsheet.

In winds over 15 knots the barber-hauler is gradually eased to increase twist. At 22 knots the jib leech is about 10 units from the spreader tip.

Foot Camber

The foot of the jib should not be too deep. The barber-hauler has the same position in winds up to 14 knots. In light winds the foot of the sail is all the way out to the edge of the deck. At 5 knots the foot is at 3 units on the deck on the foredeck. From 8 knots and up the jib is almost straight at the foot, at 7 units. If you need extra speed, ease the sheet a little to open the leech which will also make the jib a few units deeper at the foot.

North Sails Addresses

North Sails homepage: www.northsails.com

EUROPE
NORTH SAILS ONE DESIGN
Ängshyddevägen 1
181 31 Lidingö
Sweden

Ph. +46-8 765 1530
Fax +46-8 765 1570

Bjorn.Osterberg@northsails.com

NORTH AMERICA
NORTH SAILS ONE DESIGN
484 East Johnstown Road
Gahanna, OH 43230
USA

Ph. +1-614 418 9410
Fax +1-614 418 9411

Greg.Fisher@northsails.com



North makes the best sailors

Section 6 – NEB Sails Tuning Guide



TUNING the 2.4MR

by Rikard Bjurström

The mast

Tuning of the sails always starts by tuning the mast. On a Norlin Mark III you can use the following system, in order to get the mast into the right position.

Start with tightening the top shrouds to a good portion of strain (you do not need lower shrouds at all), when the mast is in vertical position. Use a tape measurer that starts from zero in its very end and hoist it from the main halyard. Secure the halyard as if you had hoisted a mainsail with it. Read the measurement to the intersection of the deck and the bottom in the stern. This measurement should be 560 cm when the backstay has no tension. With maximum backstay strain this measurement should be 542 cm. Mark the lines to find the right positions when racing.

The mainsail

Be sure that the sail is fully hoisted. In light air it is enough to fasten the tack as close to the mast as possible. No cunningham is needed. When beating, the boom should be trimmed to the centreline of the boat, but pay attention to that the uppermost batten is parallel to the boom. The foot should be tight (the sail shall be very flat in the lowest third). If the waves are big compared to the windforce you must ease the outhaul with a couple of centimetres (halfway on the boom the foot should be about 5 cm apart from the boom). Keep the backstay taut, without bending the mast. When the wind increases you have to tighten the backstay more and more up to its maximum at 10 m/s windforce. Tighten the cunningham until no wrinkles appear near the mast.

In heavy air the foot should be very tight. A wrinkle from the luff to the clew should occur, at cunningham height. The boom is still kept in the middle and the uppermost batten is still parallel to the boom. This means a very tight sheet. It is quite difficult to sail in heavy air with this kind of trimming, but it is wonder-working, when you find the right pointing.

Downwind you can use two different techniques. The heavier the wind the more I strongly recommend the following: Let the boom as far out as possible (it is lightly touching the shroud). Be sure the foot is strained. Adjust the boomvang to get the top batten twisting ahead of the shroud. Steer the boat with the wind coming in a little from leeward and let the boat heel to windward. - In light winds, and in shifting conditions, luffing is the way to be fast, you may have to luff even up to 30 degrees. Loose the outhaul, but not to much because it makes the sailarea smaller. Make the sail as full as possible and move the mast forward to at least upright position.

Jybe when the wind is shifting in your favour, because it will give you more profit than any adjustment to the sail.

The jib

The jib should be hoisted just till the roach of the foot touches the deck when close-hauled. The Cunningham is used only for flattening the wrinkles, no matter what conditions. In light air the leech should nearly touch the spreader end and the foot should follow the sheerline. In heavy air the leech should be at the same position but the foot is straight. The World Champion Marko Dahlberg does not use barberhaulers at all in heavy air. Going downwind the two former mentioned techniques have to correspond to each other. When running, you have to use a short whiskerpole and sheet the jib quite strongly. The clew should be much more backwards than the tack. The idea is to make the windflow enter the mainsail at the leech and to leave the jib at the leech as well. - When luffing the whiskerpole should be as long as possible and the sail should have a fuller shape. In both cases the jib halyard should be loosened, in order to allow the jib to "fly" away from the mainsail. Remember that loosening the halyard gives you the same effect that shortening the whiskerpole does. This is why luffing at bigger angles needs a tighter halyard.

Finally

The 2.4 Metre is a boat with smooth shape moving easily in the water. Consequently you can sail in a very small angle to the wind when beating. The windward tell-tail can be in an almost vertical position and you are not losing any speed at all. Healing is not critical neither, which means that the 2.4 Metre can be driven with tight sheets even in heavy air. In very light air, with only some puffs now and then, you have to make the sails fuller and ease the sheets, as well as bear off a little. This works also in conditions where the waves are big, compared to the windforce.

The 2.4 Metre is a very good sailor and offers you many options in tuning & trimming. This is why the above mentioned should be regarded as one suggestion of how to sail the boat. In no way it is meant to exclude other techniques to be fast on the course. Happy sailing !

For more information contact Rikard at: nebsails@kolumbus.fi or website: www.kolumbus.fi/~nebsails

Section 7 – Patrik Forsgren Tuning Guide

CONTROL WINDWARD HELM - And Go Fast!!

By Patrik Forsgren (1993 World Champion, two time Swedish Champion and bronze at the 1997 World Championship)

All of us want to go fast. But all of us, even we who sails a lot, have a limited amount of time to spend on speed training. Therefore, it is important to concentrate on those factors which, for the particular type of boat we are sailing, have the most impact on speed. For the 2.4mR, as well as most other boats, the windward helm is definitely one of those factors. The difference between the 2.4mR and other yachts is that it is much more difficult on the 2.4mR to feel when you have the right windward helm, especially if you steer with your feet. It is very easy to go upwind with up to twice as much windward helm as optimal. Therefore it is very important to keep control of the windward helm. You can easily spend many days, speed training with a 2.4mR, trying to find the best adjustment of outhaul, cunningham, or shroud tension, for example without acquiring hardly any extra speed at all. However, you can almost immediately acquire significantly better speed by decreasing your average windward helm from, for example, 8 to about 4 degrees. The ideas presented here have helped me keep the 2.4mR better "in the groove", especially in choppy, puffy and/or windy conditions.

How to Get Ready for Going Fast

In order to always know how much windward helm you have, prepare your boat as follows, on shore:

- 1 Set the rudder in the centreline of the boat. Then make a mark at each steering line in a place where you can see at least one of the marks, all the time.
- 2 Then straighten the steering ropes, and put fixed marks on the inside of the hull or on the inner module, exactly at the marks on the steering ropes.
- 3 Measure in centimetres, from the top of the rudder, the horizontal distance from the rudder axis to the stern-end of the rudder, and multiply this distance by 0.07. For example, if the length of the rudder is 20 cm, you get: $20 \times 0.07 = 1.4$. Let's call this product x.
- 4 Finally, turn the rudder to the right until its stern-end is x centimetres from the centreline of the boat. Straighten the steering ropes, and, using another colour, put new marks on the hull, exactly at this new position of the marks on the steering ropes. Then turn the rudder to the left, and repeat the procedure.

On each side, you now have one visible mark on the steering rope and three marks on the boat. When sailing with the mark on the steering rope just by the middle one of the fixed marks, your boat has no helm at all. And when the mark on the rope is just by one of the other marks, your boat has about 4 degrees of windward (or leeward) helm.

How to Go Fast

For most yachts, about 3-5 degrees of windward helm gives the best windward performance, in most conditions. I therefore continuously keep an eye on these marks to try to sail the boat with about that helm.

A lot of things can be done to increase or decrease the windward helm, but in medium and heavy air, the most efficient way to keep the helm under control is to continuously adjust the backstay. As soon as more than 4 degrees rudder is needed to keep the boat on course, immediately depower your main by tightening the backstay, and vice versa. In light winds you will probably find it difficult to get as much helm as you want. For this reason, under this condition, I always sit on the leeward side. By doing so, the boat heels, at least a little, and gets a little more windward helm.

Patrik Forsgren

Section 8 – Björndahl Tuning Guide

TRIMMING THE 2.4 METRE

By Tom Björndahl (5xFinnish Champion, 2xEuropean Champion, 2x W.C. second), builder of the Norlin MkIII.

Before you launch your boat, make sure that the hull has no damages. If there are damaged spots in the gelcoat these must be repaired, the reparation sanded and the spot (or the entire boat) waxed. Be sure you do not use wax containing silicon!

A) MAST TRIM

I have a general rule for stepping the mast: the distance between the front edge of the floor plate and the aft pin for the mast foot should be 16.5 cm. The next step is tensioning the shrouds. Take out all the slack in the upper shrouds as a rough trim. Then fine tune one side at a time until the shrouds are as tense as the thick string in a guitar. Many people are sailing without lower shrouds. My opinion is that this kind of boat should have the lower shrouds but this is only my opinion. World Champion 1997, Marko Dahlberg, is sailing with main shrouds only and is going fast, especially in strong winds. The lower shrouds (if you use any) are tightened so that they are a bit slack to allow the mast to bend forward. The rake of the mast is very important for the balance of the boat. The rake is checked by attaching a ruler to the main hoist shackle and measuring the distance between the mainsail mark on the top of the mast to the stern of the boat. I started with 555 cm for my present sails but have more recently changed it to 562 cm. Both the main and jib have to be hoisted when doing the check!

B) SAIL TRIM

The first thing to do is to check the balance of the boat in the wind. Take your feet off the pedals (or hands off the tiller) and let the boat luff up into wind. If the the boat luffs very rapidly, change the rake forwards, adjusting the rake until the weather helm is moderate. If the boat tends to bear away, change the rake more aft accordingly. My way of trimming the boat speed upwind is as follows. In light to moderate winds I pull the back stay a little until the luff of the jib is straight with a minimum of sag. The middle part of the mainsail will be flattened by this procedure. If there are "old sea" or crossing waves I pull the mast backwards at the deck level to make the main more powerful. In stronger winds the main is flattened by tensioning the cunningham and outhaul and by using the vang and back stay. The forestay should be kept as straight as possible except in light winds and "old sea" when you need power to go through the waves. In light and moderate winds the leach of the jib is kept fairly tight and as the wind increases, ease the barberhaulers to loosen it. I hoist the jib so that the foot just early touches the deck. The jib cunningham is more important than many sailors believe. By pulling it too hard you will get a jib that is too flat with the draft too much forward.

And now the only thing remaining is to start at full speed and be ahead of the crowd at all times.