RIG TUNING GUIDELINES

Large books have been written on this subject, but we shall attempt to give you a concise set of basic guidelines. So here goes.....

The aims of RIG TUNING are as follows:

a. Ensure a straight mast athwartships
b. Control sail shape.
c. Achieve proper helm balance in a variety of conditions
d. Spread loads appropriately on spars, rigging and boat.

Different rig configurations require a different rig tuning process:

RIG TUNING - SINGLE SPREADER MASTHEAD RIG

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1. Fore and Aft Tune

1.1 Mast Rake

Mast rake is determined by forestay length. Rake affects helm balance - raking the mast increases weather helm.

As a starting point, use the designed rake on the sailplan (ask the boat designer, not the mastmaker). If no information is available, start at 1:30.(eg 50 cm rake on a 15m mast).

To measure rake, tension the backstay approximately 60%, then check rake with a weight attached to the main halyard. (Boat must be floating level when you do this!). Adjust forestay as necessary to obtain the desired angle.

1.2 Mast Bend

A certain amount of pre-set mast bend is desirable, to stabilise the middle part of the mast and thus minimise rig pump in a seaway.

With a masthead rig, mast bend can be induced by tensioning the forward lowers (if fitted), or babystay (if fitted). See 2.2.3 below.

2. Transverse Tune

2.1 Centering the mast in the boat.

Ensure backstay and upper shrouds are relatively slack (to minimise mast bend).

Use the main halyard to measure from the masthead to the chainplate each side. Adjust upper shrouds to get identical readings each side.

2.2 Setting up the shrouds

2.2.1 - in the dock

Tighten the upper shrouds evenly as tight as you can by hand with a 25cm wrench.The lowers and intermediates (if any) should be fairly slack, or just tight enough to keep the mast straight.

2.2.2 - tension the uppers

Sail to windward in about 15 knots of wind. Tighten the leeward upper shroud (note the number of turns required). Tack back and forth, adjusting each side equally, until the leeward uppers are snug (no excessive slack), with the boat heeled at 20 degrees.

2.2.3 - tension the lowers.

Tension the lowers until the mast appears straight (transversely) in 15kn wind. If the mast has double lowers, the forward lowers will normally be tighter than the aft, as the forward lowers provide most of the lateral support, and may be used to induce a small amount of static mast bend. The aft lowers will limit any excessive bend, and will prevent fore and aft panting in the middle section of the mast.

At the dock, the lowers will be looser than the uppers, and even looser when sailing.

A babystay provides similar support to forward lowers.

RIG TUNING - SINGLE SPREADER FRACTIONAL RIG

(with aft-swept spreaders, permanent backstay(s), no running backstays.)

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1. Fore and Aft Tune

1.1 Mast Rake

* Mast rake is determined by forestay length. Rake affects helm balance - raking the mast increases weather helm.

* As a starting point, use the designed rake on the sailplan (ask the boat designer, not the mastmaker). If no information is available, start at 1:30. (eg 50 cm rake on a 15m mast). To measure rake, tension the backstay approximately 60%, then check rake with a weight attached to the main halyard. (Boat must be floating level when you do this!). Adjust forestay as necessary to obtain the desired angle.

1.2 Mast Bend

* Check that the mast is upright athwartships in the boat. Use the main halyard to measure from the masthead to the chainplate each side. Adjust upper (cap) shrouds to get identical readings each side (but use minimal tension in the shrouds).

* A certain amount of pre-set mast bend is desirable, to stabilise the middle part of the mast and thus minimise rig pump in a seaway.

* Ensure the lower shrouds are slack. Induce the required amount of pre-bend in the mast by tensioning the backstay. (Make a note of the amount of pre-bend by using the main halyard tensioned down to the foot of the mast, and measuring the amount of bend at the spreaders). Tension the cap shrouds equally, a few turns at a time, until the fore and aft bend starts to increase. Check that the mast is still straight athwartships.

* Now tighten the lowers in the same manner as the caps, until the fore and aft bend starts to decrease. At this stage the caps should be tighter than the lowers.

* Release the tension in the backstay, check that you are happy with fore and aft and sideways deflections.

* (Once the rig is set up as described here, tensioning the backstay whilst sailing will affect the curve in the upper part of the mast only, as the area around the spreaders is fixed by the opposing forces of the shrouds).

2. Transverse Tune

* Go sailing! Set full sail to windward in smooth water in light winds (10-15 degrees heel to windward).

* Tension the backstay just sufficiently to straighten the forestay.

* If the leeward shrouds are slack, tighten them, but NO MORE THAN TWO TURNS AT A TIME. Go on the opposite tack and do likewise, then tack again and check if the lee shrouds are still slack. If so, repeat the operation. DO NOT OVERTIGHTEN the lee shrouds, as you may bend the boat or break the mast when you tack!

* Back at the dock, check that the mast is still straight athwartships.

RIG TUNING - DOUBLE SPREADER FRACTIONAL RIG

(with aft-swept spreaders, permanent backstay(s), no running backstays.)

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1. Fore and Aft Tune

1.1 Mast Rake

* Mast rake is determined by forestay length. Rake affects helm balance - raking the mast increases weather helm.

* As a starting point, use the designed rake on the sailplan (ask the boat designer, not the mastmaker). If no information is available, start at 1:30. (eg 50 cm rake on a 15m mast). To measure rake, tension the backstay approximately 60%, then check rake with a weight attached to the main halyard. (Boat must be floating level when you do this!). Adjust forestay as necessary to obtain the desired angle.

1.2 Mast Bend

* Check that the mast is upright athwartships in the boat. Use the main halyard to measure from the masthead to the chainplate each side. Adjust upper (cap) shrouds to get identical readings each side (but use minimal tension in the shrouds).

* A certain amount of pre-set mast bend is desirable, to stabilise the middle part of the mast and thus minimise rig pump in a seaway.

* Ensure the lower shrouds are slack. Induce the required amount of pre-bend in the mast by tensioning the backstay. (Make a note of the amount of pre-bend by using the main halyard tensioned down to the foot of the mast, and measuring the amount of bend at the spreaders). Tension the cap shrouds equally, a few turns at a time, until the fore and aft bend starts to increase. Check that the mast is still straight athwartships.

* Now tighten the lowers in the same manner as the caps, until the fore and aft bend starts to decrease. At this stage the caps should be tighter than the lowers.

* The procedure so far has been the same as for a single spreader rig, but now we tension the Intermediates:

Take the slack out of the intermediate shrouds, but do not tension. Re-check for athwartships straightness; straighten by tensioning one intermediate.

* Now tighten the intermediates equally, a few turns at a time, until lightly tensioned (ie pre bend is not reduced - Intermediates are the most lightly tensioned span in this rig).

* Release the tension on the backstay (and inner forestay, if fitted); check that you are happy with the fore and aft and sideways bend (there should of course be none of the latter).

2. Transverse Tune

* Go sailing! Set full sail to windward in smooth water in light winds (10-15 degrees heel to windward).

* Tension the backstay just sufficiently to straighten the forestay.

* Check the leeward rigging tensions, which should be as follows:

Cap shrouds and lower shrouds: fairly tight.

Intermediates: just going slack.

Tighten if necessary, no more than two turns at a time. Go on the opposite tack and tension an identical amount. Tack again and recheck leeward shrouds... Continue until correct tension is achieved. DO NOT OVERTIGHTEN the lee shrouds, as you may bend the boat or break the mast when you tack!

* Back at the dock, check that the mast is still straight athwartships.

Double Spreader Masthead Rig Advice Coming Soon

US Spars, Inc provides tuning advice for guidance only and on the understanding that it is the owner's responsibility to set up his rig in a secure and seamanlike fashion.

WE REGRET THAT WE ARE UNABLE TO RESPOND TO QUESTIONS ABOUT RIG TUNING.