Interaction between Genoa and Main

As shown on fig. 28 (upwash), the headsail greatly affects the airflow across the main.

Headsail and main may therefore be viewed as one entire wing - the main's leech being the trim flap.

The overlapping area between genoa and main is called the ***slot***. The width of the slot depends on how you trim the sails in relation to each other.
In light and medium winds you should trim the main in such a way that when heading up into the wind:
The luff of the main backwinds evenly from foot to top at the same time as the genoa is luffing (all windward telltales start to flutter simultaneously).

In stronger winds you may backwind the main near the mast in order to keep the boat in balance. If large parts of the sail backwind ***the slot is too narrow***, restricting flow. To avoid reefing you may try to:

- ☐ Ease the genoa sheet a little.
- ☐ Add twist (traveller to windward and ease sheet).
- ☐ Flatten the main

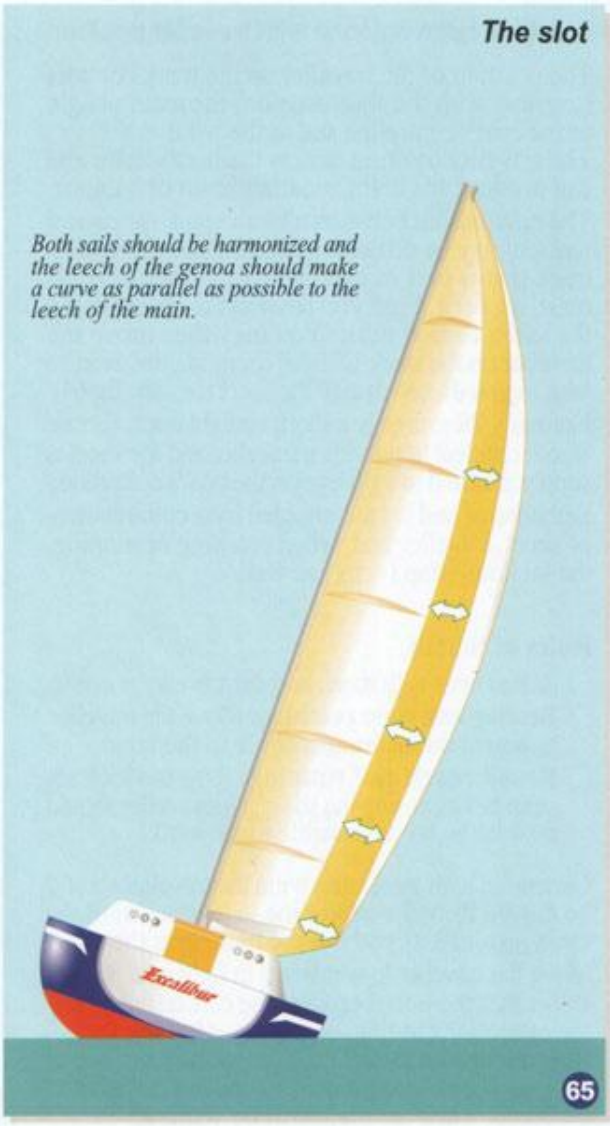
NB! When the main luffs, it may be caused by a closed genoa leech feeding backwind into the main. If this is the case, you may correct the problem by moving the draft of the genoa forward (tighten halyard) and/or tighten the genoa sheet.
If the ***slot is too wide***, the main will lose the extra drive it gets from the interaction between the sails. You may then try to:

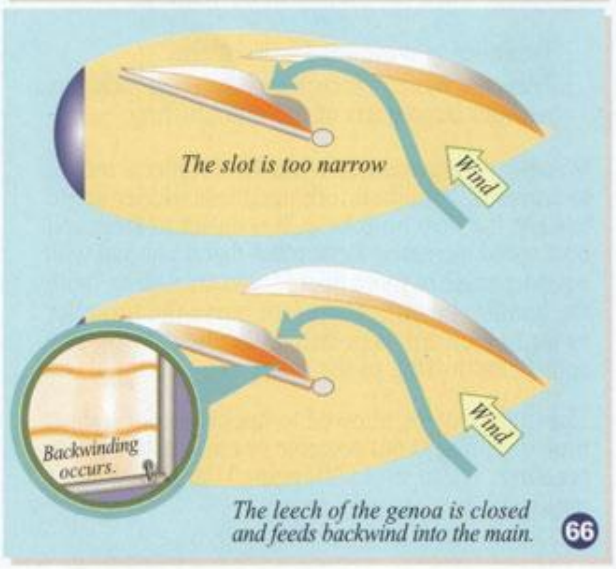
- ☐ Ease the mainsheet (more power and speed).
- ☐ Tighten the genoa sheet (pointing higher).
- ☐ Add depth to the main (more power and speed).

NB! You must of course compare all this to what has been said earlier about genoa and main. It will make it all more complicated, but generally:

- ☐ A sail is most efficient on the verge of collapsing.
- ☐ A sail is more efficient the farther out it can be sheeted.

The width of the slot will be at its optimum just when the first backwind appears in the main.





When the leech flutters

You will sometimes see (and hear) that the leech of your sail is fluttering. If the sail has a ***leech cord*** tighten it until the leech just stops fluttering. Tightening can cause the sail leech to curl or hook to windward. Neither condition will seriously affect performance but the latter is less irritating and will reduce fraying damage.

Large genoas often have foot tightening cords as well as the common leech cords.

- ☐ Tension the leech cord until the fluttering just stops.

The shape of the sails is analogous to an automobile gear box. **Low gearing** is used when you need power to accelerate or sail through waves. When you need power more than pointing ability use full sails with generous twist. Used by racers to accelerate out of a tack. Good for choppy seas and unstable winds.

Low gear or 1st gear

- ☐ Full sails with generous twist and round entries.
- ☐ Wide groove, full power but not pointing high.

2nd gear is used when the wind increases without the sea becoming too choppy. You wish to increase boat speed and at the same time point high. The sails are sheeted harder, flattening the sails, but the entries are still round keeping the groove relatively wide.

Medium gear or 2nd gear

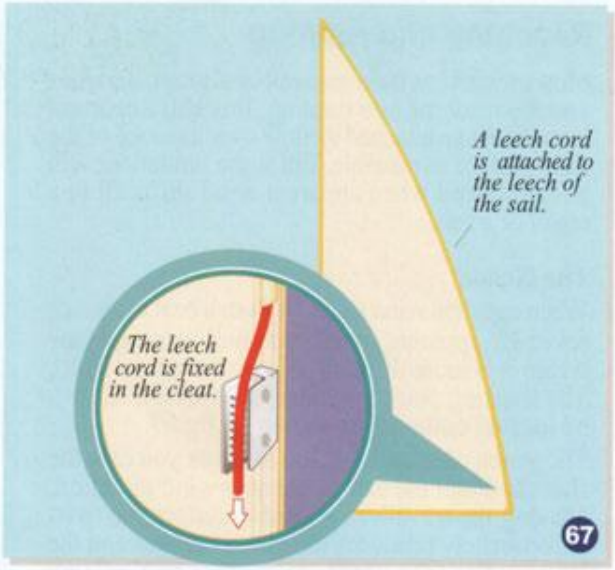
- ☐ Flatter sails sheeted harder but maintaining a rounded entry.
- ☐ Medium power and pointing ability.

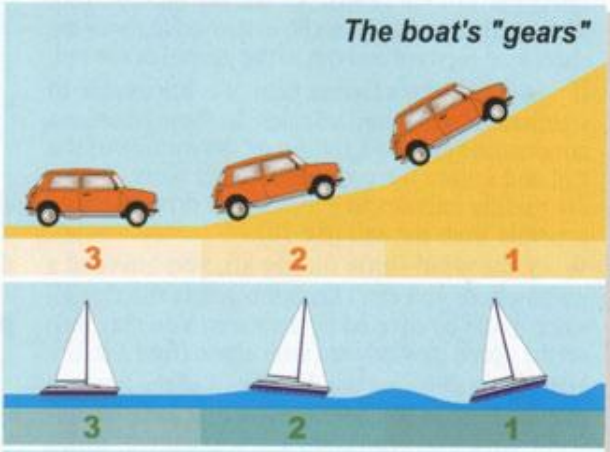
High gear is used in ideal conditions with medium winds and flat sea. This allows maximum pointing ability and still maintains good boat speed. The sails are trimmed flat and sheeted hard for maximum pointing ability. The entry of the genoa is made finer (tight forestay) and the draft is moved aft both on genoa and mainsail.

High gear or 3rd gear

- ☐ Very flat sails , sheeted very hard, with fine entries and draft aft for maximum pointing ability, but less power.

High gear is also used when the wind is very strong and you don't want to reef. You twist the sails more and ease the sheets a little to de-power the sails.





Low gear: *Full sails with round entries and draft forward.*
High gear: *Flat sails with fine entries and draft further aft.*

Fine tuning

By pointing higher or lower "in the groove" you may, by using the windward telltales, fine tune for each of the above gears.

Reaching and running

Most of what has been said earlier also applies when you are reaching and running. It is still important to maintain an attached airflow over as much of the sail's surface as possible. But some limitations will be introduced when apparent wind shifts aft to a reach or a run.

The Genoa

When apparent wind shifts aft from a beat to a reach (over 35° apparent wind), you will enter a sector where it is more difficult to keep the genoa filled. The sheeting point (traveller) should now ideally be located outboard as shown on fig.69.

The genoa usually twists too much as you ease the sheet to adapt the sail to the new wind direction. Moving the traveller forward to reduce the twist unfortunately produces too much curvature in the lower parts of the genoa. A ***"Barber hauler"*** (not often used on cruisers) can be employed to move the sheet lead forward and out to the gunnel or toe rail.

If you don't have a Barber haul, it is impossible to stabilize all windward telltales. In these situations concentrate on good setting of the middle of the sail and ignore the upper and lower parts. Watch the middle telltales to get as much drive force as possible from the sail (fig 70).

When the wind shifts further aft, you arrive at a point where you can't keep the genoa filled at all since it will be covered by the main. You may then set the genoa to windward with a pole (fig.12 & 13).

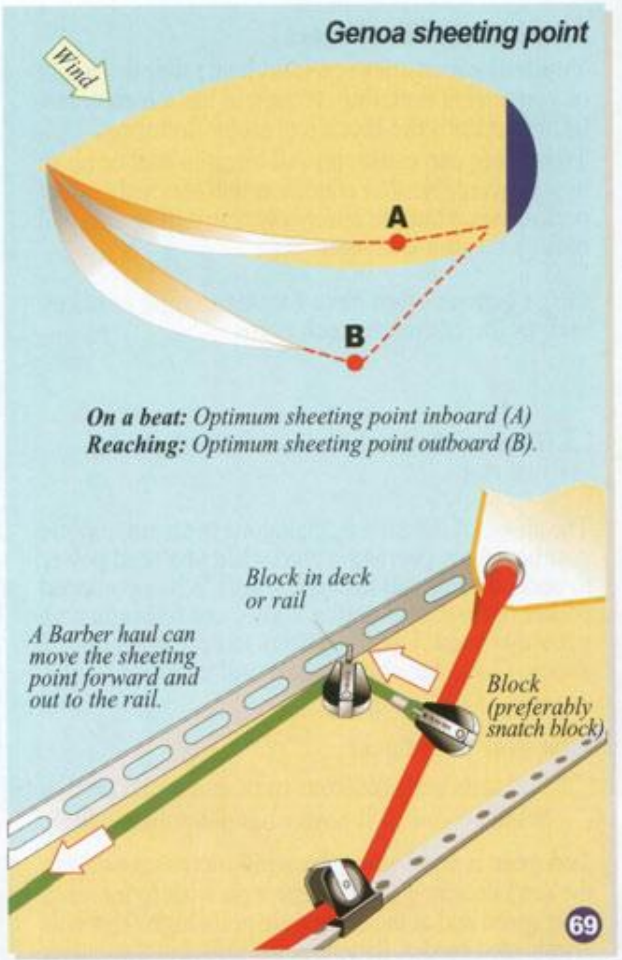
NB! When apparent wind shifts aft of the beam, it may be time to consider the use of special down-wind sails, e.g. gennakers and spinnakers, which are described later.

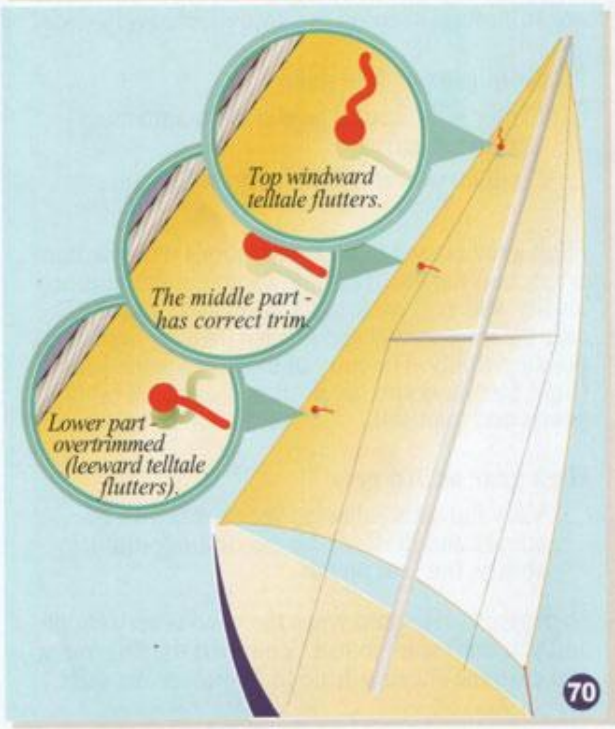
When the wind shifts aft:

- ☐ Move the sheeting point forward and as far out to the rail as possible.
- ☐ Trim the middle part correctly, over trim the lower part and let the top twist too much or try a Barber hauler.

The wind on the quarter:

- ☐ Use a pole if necessary and try the genoa to windward. Bear away if possible.
- ☐ Finally set a spinnaker or gennaker.





The Main

Always keep an eye on the top mainsail telltales when bearing away onto a reach. Try to keep all telltales streaming aft as smoothly as possible.

The main sheet

On a reach and when running the main sheet will not be able to control the sail's twist well. This is because the vertical pull of the sheet reduces as it is "payed out" (fig.64). On a reach or run the main-sheet primarily controls the main's sheeting angle to the boat's centreline. Always ease the sheet until the forward sections of the sail start to luff and then take in slightly on the sheet again.

Many yachtsmen attach extra telltales in the middle of the sail 25-35" (60-90 cm) from the mast. When these telltales flutter on the leeward side, the sail is stalled. You must then ease the sheet until they stream aft again.

When apparent wind shifts from the beam to the quarter then the telltales will flutter and curl all the time! The main is as far out as possible and will normally be stalled most of the time.

The "Kicker" (Kicking strap or boom vang)

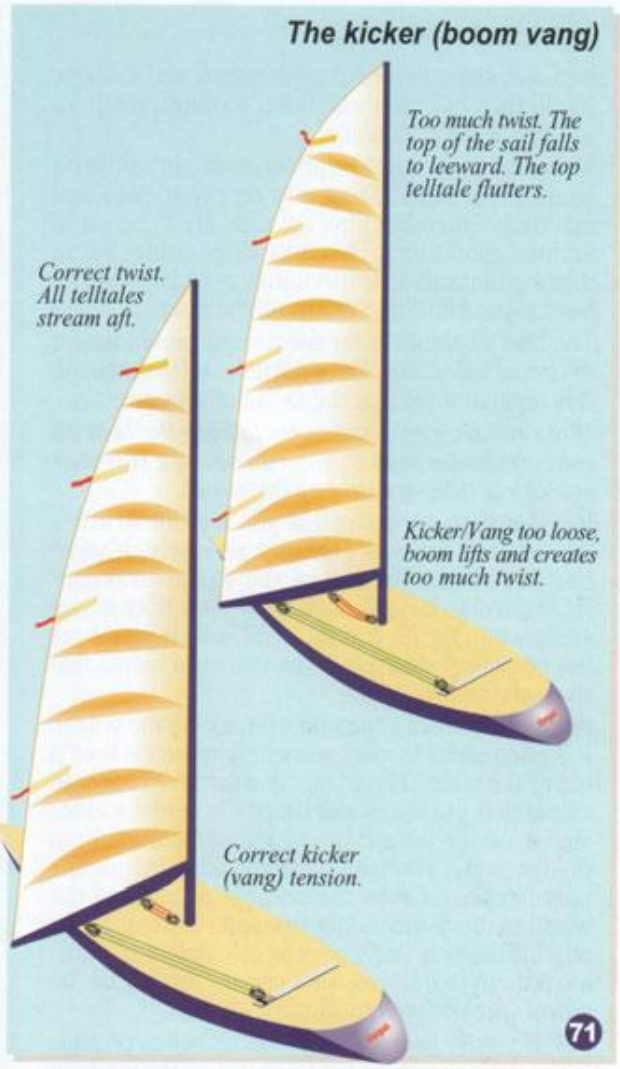
The kicker will control twist on a reach or run. Set twist by tightening the kicker before you let out the main. Check that the telltales (especially the top one) stream aft more than 50% of the time. If this is not the case, re-adjust kicker tension. (You may have to reduce strain by first hauling in the main.)

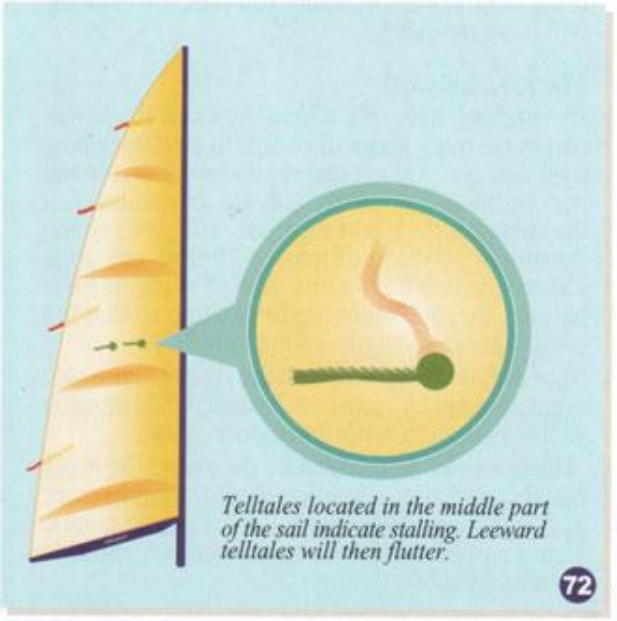
In light airs you should be careful not to tighten the kicker too much. Often the weight of the boom can be too much. When the wind picks up, you should tighten the kicker until the top batten is approx. parallel to the boom (fig.54). This is a good rule of thumb which should correspond (theoretically) with all the telltales streaming aft most of the time.

Sail depth

Ease the outhaul to set deep drafted sails on a reach or run. This will add fullness especially in the lower parts of the sail. Ease the backstay to straighten the upper mast and add fullness to the upper parts of the sail. Finally ease the halyard or Cunningham to move the draft aft.

- ☐ Adjust twist with the kicker (boom vang).
- ☐ Check that the telltale at the top batten streams aft more than 50% of the time.
- ☐ Add depth to the sail by easing the outhaul and straighten the mast.





Marking

It makes sense to record adjustments and settings. It will then be easier and faster to duplicate these settings when necessary.

Many cruising yacht skippers mark very little on board their boats. They rely on experience and that they remember how the sails are to be set in various conditions. This may be possible, but in many situations it is obviously an advantage to have a good coding system on the boat.

The boat's balance is the most important indicator of correct sail setting. But even if the helm is neutral, it is no guarantee that the sails are set correctly.

If the rudder angle necessary to keep the boat on course is larger than 8°, you can be quite sure that sail or rig tuning could be improved.

It is therefore important that you are able to know the status of the boat's balance precisely. If your boat has a tiller, you will be able to see the rudder angle directly. It is still sensible to mark tiller angles as shown in fig.73. It is more difficult if your boat has got wheel steering. Then you need marks that show the rudder angle.

Fig.73 illustrates a method of marking the wheel. It is often easier to mark accurately when the boat is out of the water. Have someone turn the rudder to calculated positions and mark the actual rudder angles on the wheel. If you know the maximum rudder angle, you may mark the wheel while the boat is afloat. Count the number of turns of the wheel to move the rudder from one extreme to the other. Then it is fairly easy to calculate the rudder movement in degrees for a certain turning of the wheel (the spokes are suitable as marks).

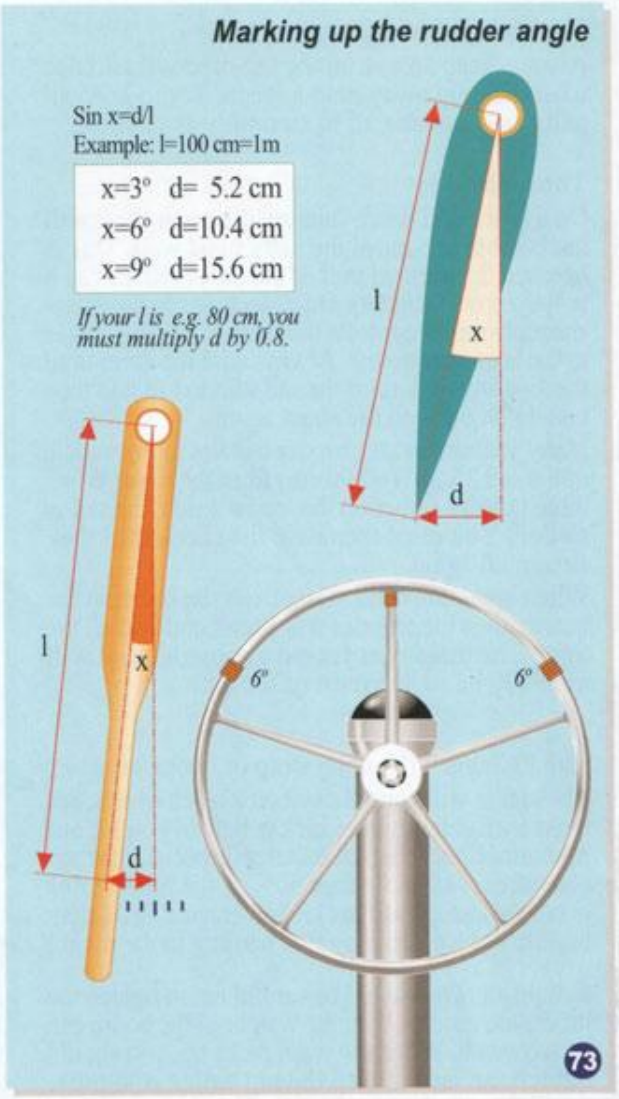
NB! If you try to eliminate as much slack as possible in the steering system before you start, the marking will be more exact.

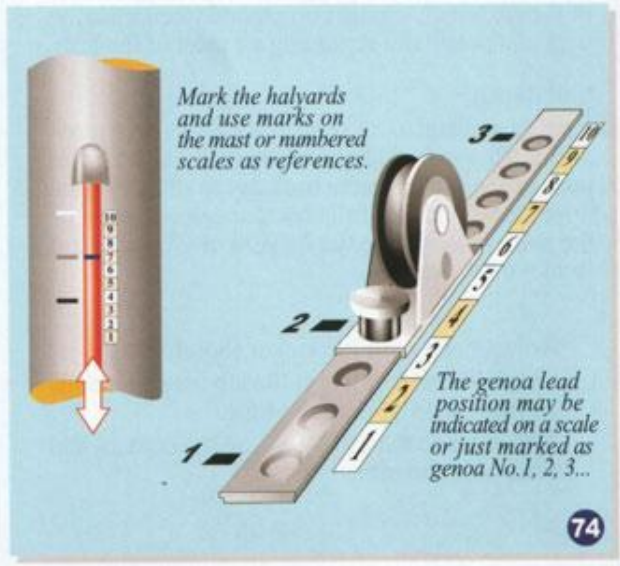
Marking halyards

By marking halyards where they exit the lower part of the mast, you will be able to determine how tight they are. A mark that shows how high the sail may be hoisted before the halyard shackle touches the sheave at the top of the mast, will give you the maximum halyard/luff tension - unless you use a Cunningham. **NB!** It is also wise to mark the main halyard for each reef cringle position so that the correct halyard length is found quickly.

Note the numbered scales on the figures. These are normally used by racing yachtsmen, while cruising yachtsmen often settle for simple marks.

The genoa lead positions for the various headsails may be marked as shown in fig.74. Simply mark 1, 2 and 3 next to the hole for the actual genoa. Using a numbered scale gives you possibilities for a more subtle tuning.





Marking sheets

It is a bit problematic to mark the Genoa sheets, specially when they are attached to the sail by new bowlines every time the headsail is changed. It may be easier to mark the main sheet, but most yachtsmen find it unnecessary to mark the sheets.

The method of indicating the number of fists between the sailcloth and the tip of the spreader as a common measure of genoa sheet tension works only if the sail has an overlap.

You may also use the distance to rigging screws or shrouds. Paint or tape marks on the spreaders 2" (5 cm) apart may make it easier to judge how hard a non-overlapping genoa is sheeted.

Marking the Outhaul

The outhaul can be marked as shown on fig.75. Most cruising yachtsmen only mark the max. outhaul tension, but more detailed marking is advisable.

Marking Backstay tension

This is an important marking. The backstay directly controls forestay tension on a masthead rigged boat. See page 17 and page 64 for descriptions of maximum backstay tensioning for masthead rigs.

NB! A fractional rig is a little more complicated depending on how the rig is set up.

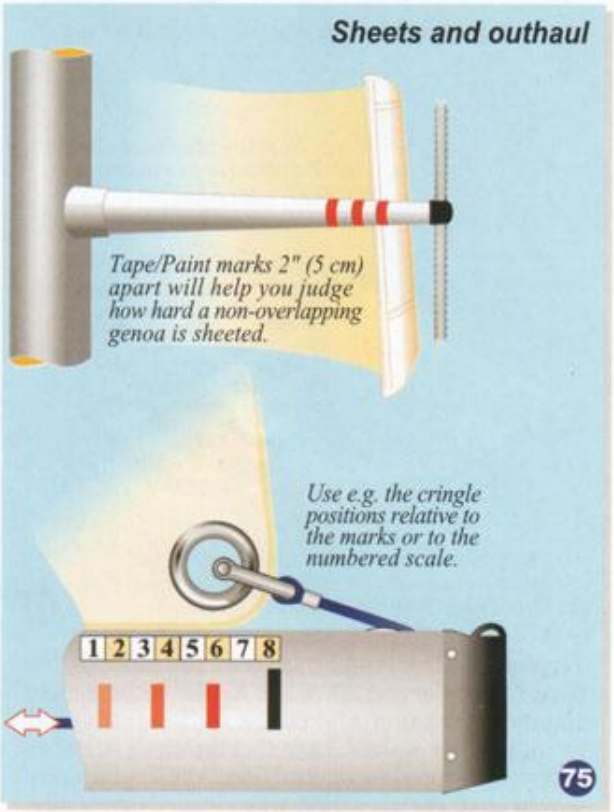
Many cruising yachts have fractional rigs with aft swept spreaders. This is a simple rig where runners are unnecessary. The forestay is here permanently tensioned by the cap shroud tension and not by tensioning the backstay. This is used primarily to bend the mast to flatten the main, but to some degree it works as on a masthead rig. See also page 69-70 for more details on headstay tension.

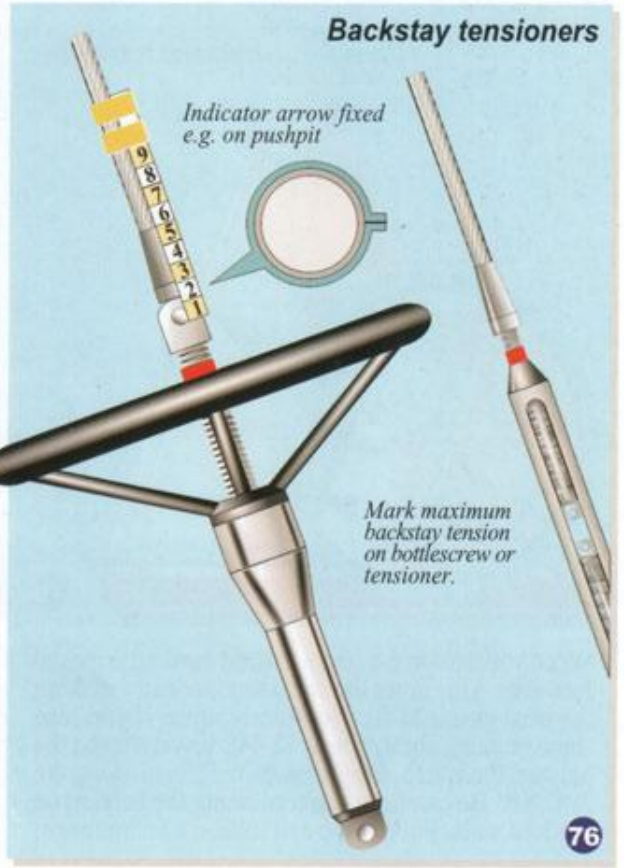
As an indicator of the backstay tension you may quite simply stick a piece of tape on the rigging screw or the backstay tensioner. Figure 76 shows examples of various backstay tensioners. Tensiometers attached directly to the stay are also on the market.

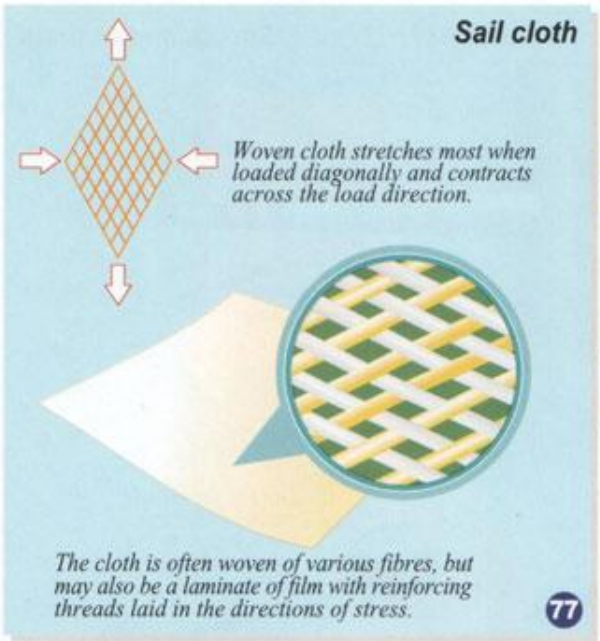
Marking the boat's tuning settings will make your work easier. You will be able to duplicate earlier settings quickly for the same wind and sea conditions, and use these to start fine tuning.

This is very valuable especially when night sailing, in difficult conditions and when changing crew.

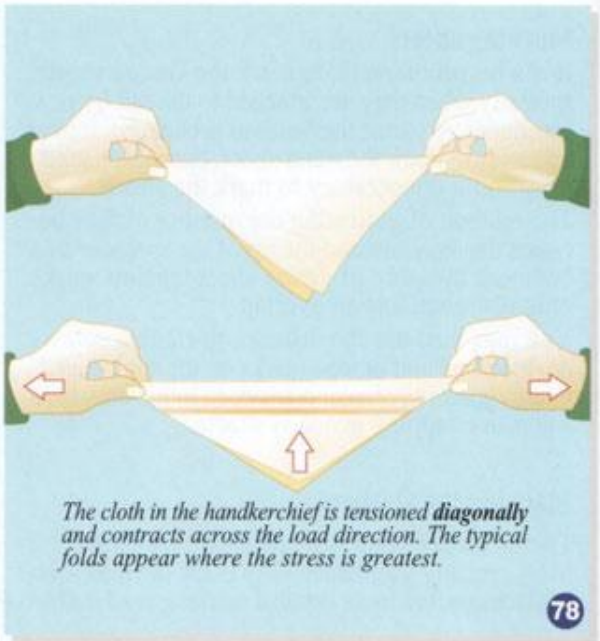
Sail identity markings are important. Use indelible ink. Tack, clew and head and even reef cringles may also be marked to avoid misunderstanding in critical situations.



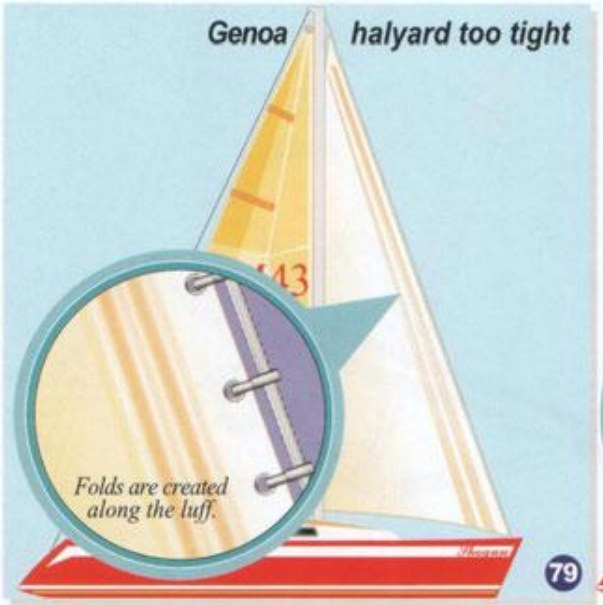




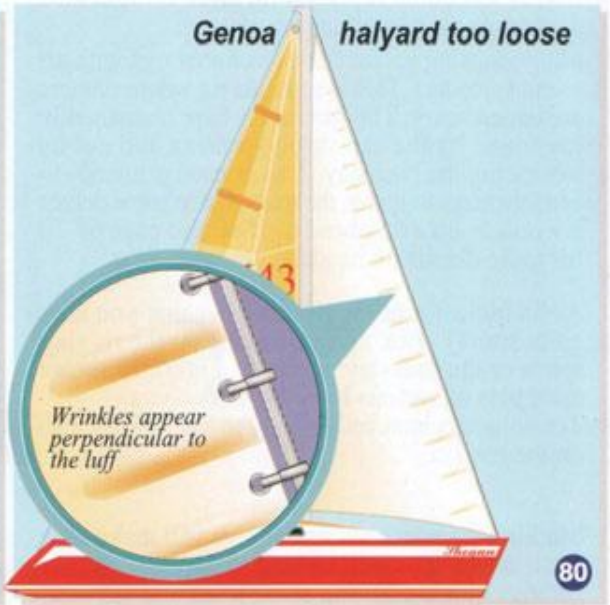
Terylene (Dacron) is the most common sailcloth, but films like ***Mylar*** and fibres like ***Kevlar*** become more and more common. Old cotton sails are still used by quite a few sailors. Note that the cloth stretches differently depending on load direction. Traditionally woven cloth stretches most when loaded diagonally.



Sails are normally composed of various panels in order to cope better with the tension. When the ***woven*** cloth is tensioned diagonally, it will contract across the load direction, e.g. along the sail's luff when you tension the halyard. The cloth and thus the draft moves forwards. Modern sails are becoming more and more ***form stable***!

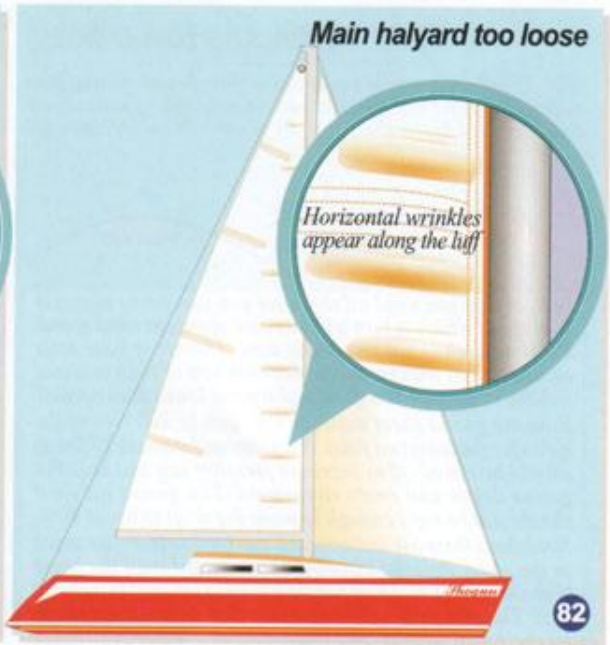


When you tension the genoa halyard the draft is moved forwards. This gives the sail a rounder entry making the boat easier to steer correctly, even if you lose some pointing ability (page 42-44). If you tension the halyard too much, long creases will form along the luff. NB! Be careful when tensioning the halyard on modern sails. Follow the sail maker's instructions!



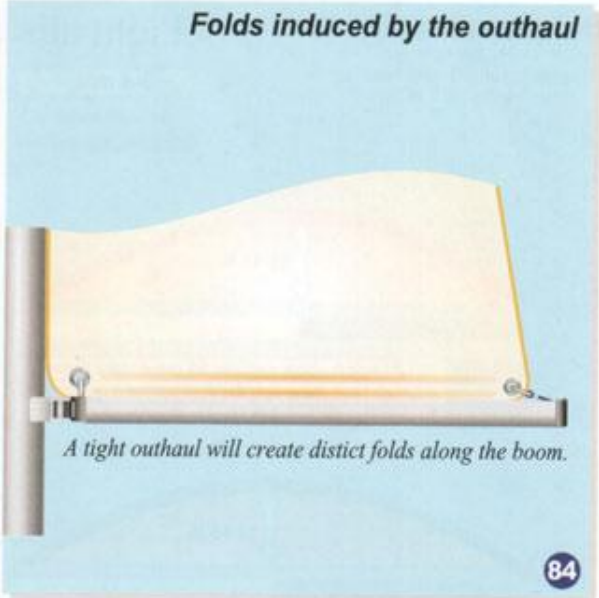
Easing the genoa halyard makes the entry finer and you may point higher, but it becomes more difficult to steer correctly. If you ease the halyard too much, wrinkles perpendicular to the luff will show. This is only desirable in very light airs with choppy seas.

Tension the main halyard (or Cunningham) to move the draft forwards and at the same time flatten the aft part of the main. Do this in heavy airs in order to reduce heeling and weather helm. If you tension the halyard (or the Cunningham) too much, long folds will be created along the luff of the main.



In light and medium winds the halyard should be tensioned until the front part of the main just remains smooth without wrinkles. In very light airs you should ease the halyard (or Cunningham) until small, horizontal wrinkles appear along the luff. The draft will move aft. If you ease off too much, larger wrinkles will appear.

You bend the mast in order to flatten the upper half of the main in increasing winds. On masthead rigged boats it is difficult to bend the mast to any degree. If you bend your mast too much, folds (wrinkles) will radiate from the boom end towards the luff. In fact, it is possible to invert the sail if the mast is over bent!



Tensioning the outhaul flattens the lower part of the main. You do this when the wind picks up and you need to reduce drive force and heeling force. A tight outhaul will create distinct folds along the boom. This is quite normal and will not harm the sail's efficiency.

Trim examples (on a beat)

NB! All values are only examples to give you an idea of how sails are trimmed in various conditions, and of course you don't need to know the depth in your sails in percentage!

In light airs you need all the drive you can get to increase boat speed which in turn will increase ***apparent wind speed****. Pointing high is not important now. Therefore your sails should be full with round entries with lots of twist to avoid stalling in the top. You should also point lower than normal. Ease the genoa sheet until the sailcloth is well free of the spreader (at least two fists). Backstay and runners (if fitted) should be eased off to increase forestay sag and thus the genoa depth and entry roundness. The genoa halyard should just be tight enough to move the draft to about 40%. Straighten the mast and ease the out-haul to increase depth in the main. Pull the traveller to windward until the boom is on the centreline. Move weight (crew) to leeward to increase heel. Then the sails will more easily find their correct shape by their own weight. The hydrodynamic water resistance will normally decrease when the boat is heeled slightly and is trimmed slightly head down.*

Allow the boat time to gather speed. Each unnecessary change increases the probability of early separation and stalled sails.

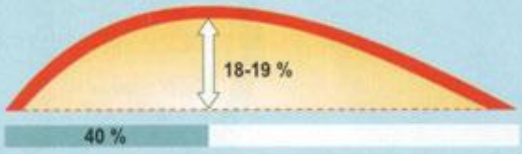
89

Round, full sails that "breathe"

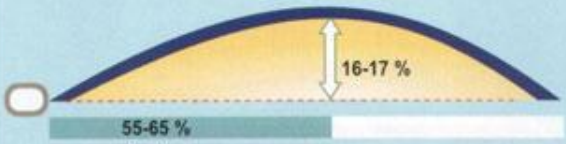
Very light airs

1-3 m/s

Smooth water



Forestay:	*Loose. Much sag increases the depth of the sail.*
Halyard:	*Loose (small wrinkles). Draft position approx. 40%.*
Sheet:	*Relatively loose (sailcloth approx.2 fists from spreader tip).*



Back stay:	*Totally loose. Straight mast increases depth in upper half of sail.*
Halyard:	*Loose (small wrinkles). Draft aft to 55-65%.*
Outhaul:	*Loose.*
Traveller:	*To windward. The boom on the centreline.*
Sheet:	*Moderately loose (much twist).*

NB! Let the boat find its own pace without much changes and use of rudder.

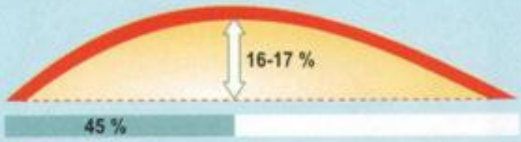
90

Relatively full sails with fine entries create good pointing ability and boat speed in smooth water.

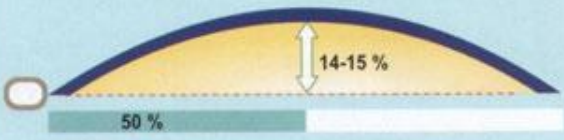
Light airs

3-4 m/s

Smooth water



Forestay:	*40-50% tight to obtain a relative full genoa with a fine entry.*
Halyard:	*Relatively loose, but so tight that draft position is approx. 45%.*
Sheet:	*So tight that the sailcloth touches the spreader tip.*



Backstay:	*40-50% tight. More mast bend flattens upper half of main.*
Halyard:	*Tighten until draft position is approximately 50%.*
Outhaul:	*50% tight for medium depth in lower part of the main.*
Traveller:	*If necess. a bit to windward to obtain right amount of wth. helm.*
Sheet:	*Tighten until top telltale just begins to curl around to leeward.*

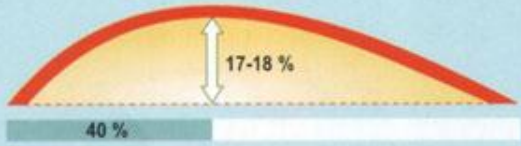
91

Choppy seas demand more drive force and wider groove for easy steering - that means sails with a little more depth and rounder entries than in smooth water.

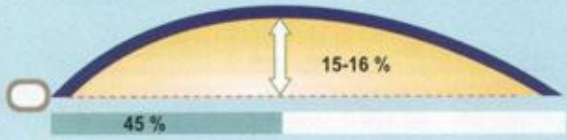
Light airs

3-4 m/s

Choppy sea



Forestay:	*30-40% tight for more depth and rounder entry.*
Halyard:	*Tighten until the draft position is approx. 40%.*
Sheet:	*Relatively loose (sailcloth one fist from the spreader tip).*



Backstay:	*40-50% tight. More mast bend makes upper half of sail flatter.*
Halyard:	*Tighten until draft position is approx. 45%.*
Outhaul:	*40% tight. A little more depth in the lower part of the sail.*
Traveller:	*Move it a little to leeward.*
Sheet:	*Ease sheet a little until all telltales stream aft.*

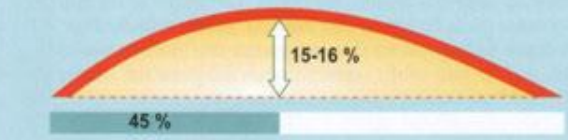
92

Relatively flat sails with fine entries ensure good pointing ability and speed in smooth water.

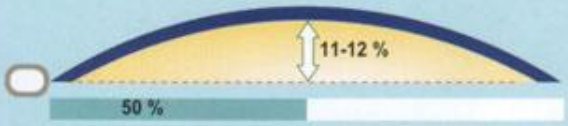
Medium winds

6-10 m/s

Smooth water



Forestay:	*Approx. 90% tight to obtain a relative flat sail with fine entry.*
Halyard:	*Tight - Draft position should be approx. 45%.*
Sheet:	*Tighten until sailcloth nearly touches spreader tip.*



Backstay:	*Approx. 90%. More mastbend makes upper half of sail flatter.*
Halyard:	*Tight - Draft position should be approx. 50%.*
Outhaul:	*80-90 % tight to flatten lower part of sail.*
Traveller:	*On centreline (a little to leeward if excessive weather helm).*
Sheet:	*Tight. Adjust until all telltales stream aft.*

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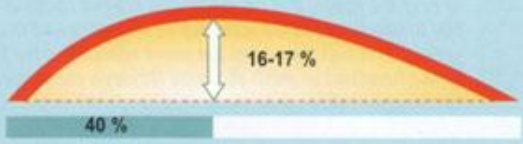
Choppy seas demand more drive force and wider groove for easy steering - that means more depth in sail and rounder entries than in smooth water.

Medium winds

6-10 m/s

Choppy seas



Forestay:	*Eased to 70-80% to obtain more depth and rounder entry.*
Halyard:	*Relatively tight - Draft position should be approx. 40%.*
Sheet:	*Sail 1-2 fists from tip for more depth and more drive force.*

Backstay:	*Ease to 70-80%. Increases depth in sail and thus drive force.*
Halyard:	*Tightened a little until draft position is approx. 45%.*
Outhaul:	*Eased to 70-80%, increasing depth in lower part of main.*
Traveller:	*Move to leeward (the boom 5-10° from centreline).*
Sheet:	*Tight. Adjust until all telltales stream aft.*

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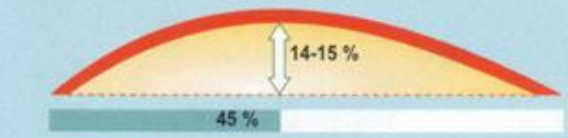
Flat sails with fine entries ensure sufficient drive force with less heeling.

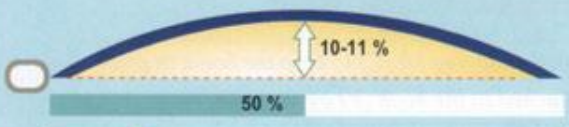
Strong winds

Above 10 m/s

Choppy seas



Forestay:	*100% tight to flatten the genoa max. while keeping a fine entry.*
Halyard:	*Tight. Draft position should be approx. 45%.*
Sheet:	*Relatively loose (sailcloth 2-3 fists from spreader tip).*



Backstay:	*100% tight. Max. mast bend flattens upper half of main max.*
Halyard:	*Tight. Draft position should be approx. 45%.*
Outhaul:	*100% tight to flatten lower part of main max.*
Traveller:	*To leeward until the main backwinds (reduces weather helm).*
Sheet:	*Adjust until all telltales stream aft.*

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Strong winds

Above 10 m/s

Choppy seas

It is nearly always quite choppy when the wind exceeds 20 kts (10 m/s). You then are about to "enter" force 6 (strong breeze), and you will often have problems with excessive weather helm. You must therefore flatten the sails and move the traveller well to leeward. If this does not help, you must change to a smaller headsail or reef the main to get your boat back in balance.
If this still doesn't help, or you for one reason or another will not reduce your sail plan, you may steer the boat according to its ***heeling****:*

First you point higher than normal. The boat will then heel less and the windward telltales in the genoa will flutter and maybe the sail will luff slightly. This doesn't matter because in these conditions you have surplus drive force. When you think that the boat is too upright and losing speed, then bear away again until the speed increases and you have to head up into the wind again to reduce the heeling. Practise steering the boat with desired angle of heel, normally 20-25°. This is a technique often employed by racing yachtsmen when they don't (or can't) reef.

Another technique to avoid reefing is to move the traveller to windward and ease the mainsheet more. The top of the main will then twist more, reducing both drive and heeling forces. The same can be done with the headsail by moving the lead farther aft than normal and thus increasing the twist of the sail.

NB! It is always better to reduce the sail plan at once if you think that the heavy airs will continue. Always remember that your boat speed will be nearly as high with less sail area than optimum, but much lower with more sail area than optimum!

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Reefing the main

If you have made all necessary adjustments and the heeling angle still exceeds 25° or weather helm exceeds 8°, then reduce sail area.

When you reef, you must think "balance" all the time. Normally you change to a smaller genoa before you start to reef the main. But on masthead rigged boats it may pay to take a reef in the main before changing to a smaller genoa. You will then keep the more efficient drive force of the headsail to push the boat through the waves.

***Slab reefing** which is described here, is the most common reefing system on today's yachts. Some boats reef their main by furling it around the boom. The shape of the sail becomes quite baggy by this method. Modern **in-mast** or **in-boom** furling systems (becoming more and more common) can reef the sails whilst maintaining an adequate sail shape.*

1	*Ease kicker (boom vang) (A) and sheet (B) and tension the topping lift (C) to keep the boom in place.*
2	*Ease halyard (D) until the reef cringle (E) may be attached to the hook (F) by the mast.*
3	*Tighten halyard again. The halyard should be quite tight because the wind will be fairly strong now.*
4	*Tighten the reef line (G) until the aft reef cringle is almost down to the boom. Ensure that the boom may lift freely so the leech will not be ripped apart (sheet and kicker must be eased off).*
5	*Ease the topping lift (if you forget this the sail will acquire too much twist).*
6	*Tighten kicker (boom vang) and sheet. You may now sail on with reduced sail plan.*
7	*Tie up surplus sailcloth on the boom with reef lanyards (H) led through small grommets in the sail.*

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Problem		Proposed solutions
The problem is ...	*The cause may be ...*	*What may be done...*
BEATING		
Too much weather helm		
Rudder angles larger than 8° are necessary to keep the boat on course. The boat is heavy on the helm.	Sails are too full	Flatten main (and genoa) by tensioning backstay and out-haul. *
	The leech of the main is closed	Increase twist by easing the main sheet.
	The main is sheeted too tight	Move the traveller more to leeward.
	Headsail too small relative to the main	Change to a larger genoa or reef the main.
	Sailplan too large (excessive heeling)	Change to a smaller genoa or reef the main.
	Too much mast rake/Mast too far aft	Reduce rake or move entire mast forward if possible (see p. 63).
Too much lee helm		
The boat bears away all the time and must be steered up into the wind to keep its course.	The sails are too flat	Increase depth of main (and genoa) by easing backstay and out-haul.*
	The leech of the main too open	Reduce twist by easing the backstay and tighten main sheet.
	The main sheeted too far out	Sheet in or move traveller to windward to maintain same twist.
	The main too small relative to the headsail	Change to a smaller genoa or take out a reef in the main.
	Mast too far forward/Too little mast rake	Move entire mast aft and/or increase mast rake (see page 63).
Bad pointing ability		
You are not able to point as high as other boats of the same type.	Headstay too loose - Genoa entry too round	Tighten backstay. Fractional rig: Tighten cap shrouds/runners. Smooth water: Ease genoa halyard to move draft more aft.
	Genoa sheeted too far out	Take in on sheet. Move genoa lead inwards with Barber hauler.
	The leech of main too open (too much twist)	Take in on the main sheet (Light wind: Tension leech chord a bit).
	The main sheeted too far out	Sheet in or move traveller to windward to maintain same twist.
	Mainsail too full	Tension backstay and outhaul to flatten the sail.
	Too little mast rake	Increase mast rake (see page 63).
Low boat speed		
Point as high and normal weather helm, but less boat speed than other boats of same type.	Genoa too flat with too fine entry	Ease sheet and backstay. Ease halyard to move draft further aft.*
	Main too flat	Ease backstay and outhaul to increase depth in the sail.
	Main sheeted too much in	Move traveller to leeward until the main luffs slightly in front.
Reaching/Running		
Too much weatherhelm		
The boat has an extremely heavy weather helm. You are losing control.	Genoa sheeted too hard	The genoa feeds backwind into main which is oversheeted. Ease sheet (Move genoa lead outward with Barber hauler).
	The main sheeted too far in	Ease sheet or move traveller to leeward to maintain same twist.
	Main has got too little twist	Ease kicker (boom vang) and/or main sheet to increase twist.
Low boat speed		
Less boat speed than other boats of the same type.	Main has incorrect twist	Adjust kicker (boom vang) to correct twist.
	Main too flat	Ease backstay (runners) and outhaul to increase depth.
The genoa will not stay filled		
Wind from abaft the beam makes it difficult to keep the genoa filled.	Correct sheeting point impossible	Use a pole to obtain a more efficient sheeting point.
	Genoa covered by main	Spread genoa to windward with pole. Bear away if necessary.

** Fractional rigged boats have to use runners or cap shroud tension to adjust forestay tension (genoa depth and entry).*

Summing up

How do you begin to trim the sails?

One simple method is to start sheeting the main where you think it should be for the apparent wind direction. (When sailing to windward the main is sheeted much closer to the centreline than on a reach or a run with the wind more aft.)

Do the same with the genoa. Now check and adjust the twist of the sail (lead position) and sheeting angle using the telltales as shown on page 15-16. Then adjust depth and draft position as shown on p.17-18.

Now turn back to the main and start fine tuning the sheeting angle, sail depth, draft position and twist as shown on page 24-26.

Check the balance of the boat. Too much weather helm? This will often be the case. Try first to adjust the sails to get the boat in balance (see p. 21 and 27). You must give the leech of the main special attention.

Still too much weather helm? Maybe you are carrying too much sail (a correctly tuned rig is assumed)? If so, change headsail or reef.

Get back to the genoa and restart the process. Repeat until you have optimized the sail settings.

A cruising yachtsman may normally only give the sails a tolerably correct trim, but will benefit from knowing how to get the most out of the sails.

One common fault is to sail with too much weather helm. This is equivalent to sailing "with the handbrake on" and the boat becomes difficult to steer, especially when the wind picks up. A little weather helm is desirable. (A rudder angle of 3° is considered ideal).

The aim of the trimming is to increase driving force, reduce heeling force and at the same time balance all the forces acting upon the rig and hull (especially the underwater hull).

The genoa is trimmed to give the max. driving force, and then the main must be adjusted and adapted to the headsail in such a way that the optimum interaction between the sails is achieved. Headsail and main may be considered as one entire wing profile from the luff of the headsail to the leech of the main. We may say as a generalisation that we trim the ***headsail entry*** and the ***mainsail's leech***.

Trimming the Genoa

Concentrate primarily on the sail's entry near the luff. Use telltales to check if the genoa has got:

- ☐ Correct sheeting angle
- ☐ Correct lead position
- ☐ Correct twist

Sail depth and draft position are primarily adjusted with halyard tension and to some degree with sheet tension.

Trimming the main

- ☐ Ease the sheet until the sail just starts to backwind close to the mast. The slot will then be most efficient.
- ☐ Check and adjust the twist with the sheet and traveller until the top batten is parallel to the boom.
- ☐ Check and adjust sail depth with outhaul and mast bend.
- ☐ Check and adjust draft position with halyard or Cunningham.

The leech is what you should focus on now. (In contrast to the genoa where the entry is the most important).

A **closed leech** (tight leech) leads to:

- ☐ Large heeling force
- ☐ More weather helm
- ☐ Better pointing ability, but less boat speed

An **open leech** (loose leech) leads to:

- ☐ Less heeling force
- ☐ Less weather helm
- ☐ Higher boat speed, but lower pointing

The boat's balance will tell you if the leech is open or closed. If there is too much weather helm, you must either flatten the sail more, move the draft forwards, or increase the twist. Try to get the telltales in the leech to stream aft more than 50% of the time. If you don't have telltales in the leech, the top batten parallel to the boom will be a good indicator of correct twist. A little weather helm is, as mentioned before, desirable.

Note that most often it is better to sail with too much twist than too little. The traveller should therefore nearly always be moved to windward in light and medium winds, even if many cruising yachtsmen prefer to have it on the centreline.

When the wind freshens, the traveller must be moved to leeward. One exception is in strong wind when you can't or you don't wish to reef. Then it may pay to pull the traveller to windward and ease the sheet more. The main will then twist more than normal and reduce the heeling force.

You have now been introduced to a number of rules of thumb on how to trim your sails, but so many variables affect the sails and the boat's performance that you often have to compromise. Your own experiences (and others having the same type of boat) will show you how best to trim your craft. It is therefore worthwhile to mark and record the settings and compare the effect. In this way you will more easily discover what makes your boat balance well and sail faster.