

Using the backstay... continued

Mainsail trim

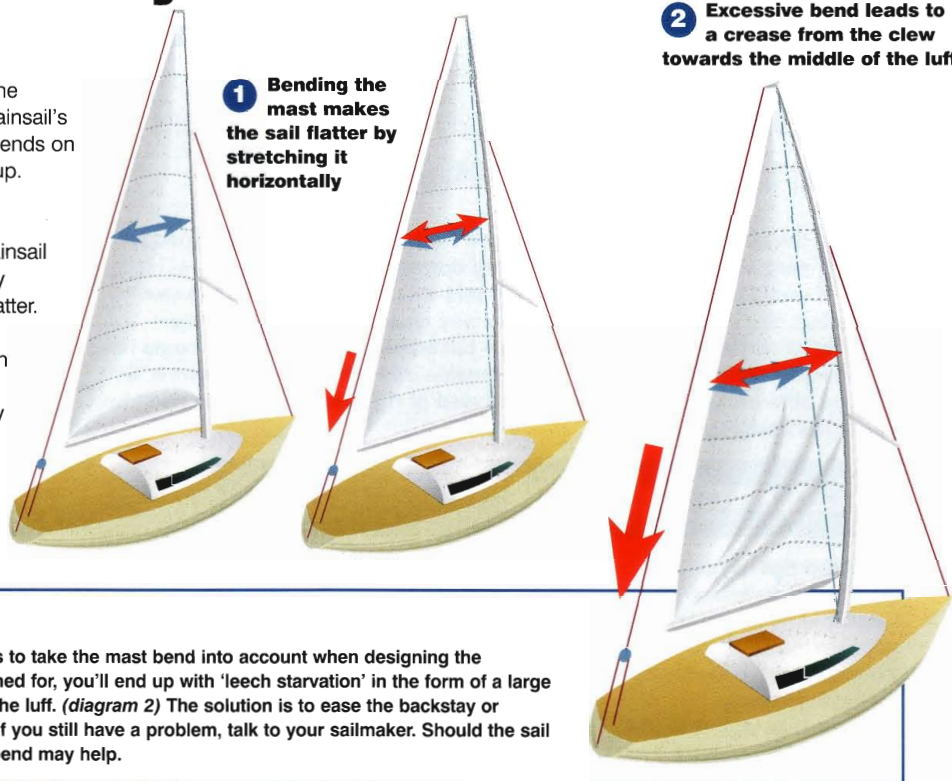
Whether you have a masthead or fractional rig, the principles of using the backstay to control the mainsail's shape are the same. How much effect it has depends on the flexibility of the rig and the way it's been set up.

Mast bend

Bending the mast has the same effect on the mainsail as tightening the forestay has on the headsail: by stretching the sail from luff to leech, it makes it flatter.

(diagram 1)

That's why racing yachts – especially those with fractional rigs – often have powerful cascade purchases of 32:1 or more on the backstay. They can flatten and de-power their mainsails when masthead-rigged boats are forced to reef. Bending the topmast (the section above the forestay) also opens the leech to reduce the heeling force.



1 Bending the mast makes the sail flatter by stretching it horizontally

2 Excessive bend leads to a crease from the clew towards the middle of the luff

Matching the mainsail

Especially with fractional rigs, the sailmaker needs to take the mast bend into account when designing the mainsail. If the mast bends more than he's bargained for, you'll end up with 'leech starvation' in the form of a large crease running from the clew diagonally towards the luff. (diagram 2) The solution is to ease the backstay or tension the lower shrouds to limit the mast bend. If you still have a problem, talk to your sailmaker. Should the sail always be too full, on the other hand, more mast bend may help.

BENDING THE RIGHT WAY

On a **fractionally-rigged** boat with swept-aft spreaders, it's a good idea to put a stop in the backstay tackle to make sure the top of the mast can't move forward of the middle when running downwind in heavy weather. Otherwise, the mast could become unstable in the middle. (Remember, a

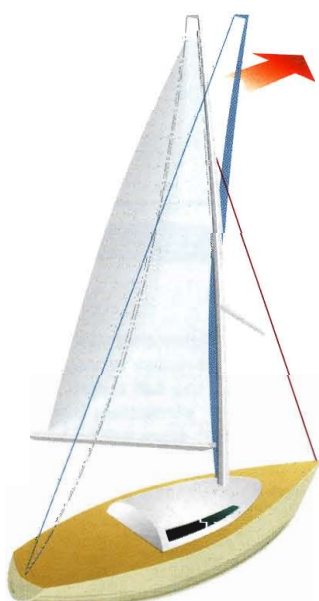
fractional rig usually has no babystay or forward lowers.) (diagram 3)

If the rig has been properly set up, with more tension on the caps than on the lower shrouds to induce a slight forward bow in the middle (known as pre-bend), inversion is highly unlikely – but a

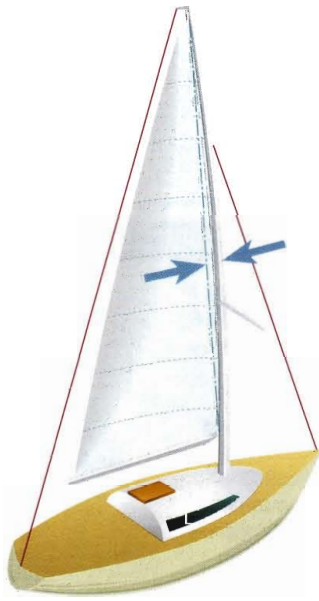
backstay stopper is an extra safeguard. (diagram 4)

Another precaution is to ease the backstay when bearing away if you've pulled it down tight for beating into strong winds. That will help reduce the strain on the mast. **Masthead rigs** also benefit from being set up with little forward bow

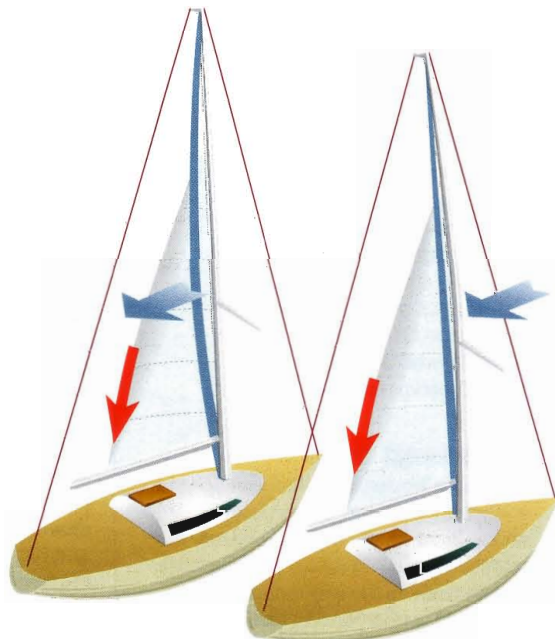
in the middle, largely so that a reefed mainsail won't pull the mast into a reverse bend. A mast that bends the wrong way results in a distorted sail shape and a rig that's less able to withstand the heavy compression loads in strong winds and big seas. (diagram 5)



3 If the mast is too straight with a fractional rig, and the top is allowed to move forward of the middle, it could invert.



4 Most rigs benefit from a little pre-bend – typically about 2in (50mm) on a boat of 25 – 30ft (7.5 – 9m), measured from masthead to gooseneck



5 A reefed mainsail pulls the middle of the mast back – so starting with a little forward bow is a good idea.