FINS

TUNING

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You could study hydrodynamics and airfoils online or at school, or you can absorb Cribby's quasi science in his latest tuning feature on fins.

Most boards are supplied with fins and the majority of these are perfect for 80% of riders and conditions for that board, but when is it time to change? What do different fins actually do differently? Is spinout ever the fin's fault? These questions and lots more answered and myths busted from our technique guru Cribby.

SIZE AND SHAPE

SHAPE

All fins are basically wings and like every wing whether it's on a jet fighter or a Koi Carp they share some identical characteristics.

1. Rake

A more upright fin creates more lift/earlier planing but in windsurfing is slightly harder to control at top speed.

2. Length

A longer fin creates more lift so is earlier planing but has more drag so is slower, and when it gets over 40cm will even effect your beach starting. Fins' lengths have a lusty relationship with a boards width, hence a fin is almost as related to a board as it is to a sail or your technique. Hence why most fins are 'about right' for the board they're supplied with. Only when your technique is sooo good that you're hitting the upper echelons of the fins performance could you consider changing a fin to further your potential. But I am sorry to say to those of you with a fin collection that challenge your wife's shoe collection, unless you are pretty consistently carve gybing, fin size is only having a 'walk on part' as opposed to the 'lead role' in your windsurfing, and therefore shouldn't feature too dominantly.

Here's INtuition's delusional mathematics for freeriders to establish relative fin size to sail size:

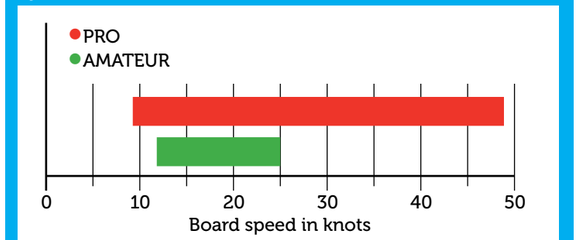
Half your sail size plus 4 is about right. For example half of 8m is 4, plus 4 is a 44cm fin (arguably 4+4=8- I know, not 44), but if you catch my drift it works. So a 7m sail is 35 + 4 = 39cm fin, 4m sail = 24 cm fin and so on. In rough water it's half the sail size plus 2. Unlike most other things in windsurfing, interestingly, this equation has not changed for a couple of decades...

The most common fin incompatibility with sail size is in the intermediate market when someone has bought a 150 ish litre freeride board to develop their skills on with a 6- 7m ish sail. A very typical 'first short board' purchase. Big freeride boards over 140 litres like a JP X-Cite Ride, Starboard Carve, Fanatic Shark, RRD Firemove, Naish GT etc are all supplied with fins over 46cm - designed to be used with sails over 8m but vastly over finned if you're 70 kilos and just getting planing with a 5.7m! FYI they're supplied with such a large fin to try to win the magazine tests that preoccupy the brands so infectiously. It is with this board purchase the intermediate freerider needs to seriously consider buying an extra fin - around 35cm - an adjusted fin size based on sail size and board width.

3. Chord

The chord is the measurement from the leading edge to the trailing edge, (some people wrongly refer to this as width.) More chord can give slightly earlier planing, considerably more control, but is the biggest cause of drag, so not as fast. But, as board speed has so many other contributing factors, will the extra width of your fin actually slow you down? The answer is no - unless you're a professional racer. It is really only the professional windsurfers who reap the benefits of a bag full of fins. And at the highest level where everything counts, fins play a tremendous role as they could offer the extra control or extra speed that the rider needs to win the race, check out Micah Buzianis' fin stash *(below)* I photographed in Maui in March, the former World Champion knows what feels just right when he's hanging on for dear life...

Speed chart



Fin performance has an optimum speed range of about 10 knots, but can be pushed to about 20 knots. After that things start going badly wrong! That's the practical formula from years of experience rather than a scientific formula from a book.

An average windsurfer can control windsurfing from about 12 to 25 knots of board speed. The uber professional windsurfer has controlled windsurfing from about 9 to 48 knots of board speed, thus necessitating the wider range of fin choice.

The average windsurfer has a speed restriction due to a combination of lots of factors, a minuscule one of which is fin size, a massive one of which is technique, a medium one of which is tuning. The average windsurfer therefore simply does not get to challenge their fins' potential. Only when they become uber-advanced, experts or professionals do they become increasingly in need of a larger fin stash.

In fluid dynamics width is so utterly related to the chord of a fin that it is enough to say a narrower fin is going to have less drag but also less lift than a fatter fin, and in the fin market we're talking about millimetres of difference that many will struggle to notice.

4. Shape

In simplest terms there are three very poplar fin shapes (see fins photos) Simplifying this, the straighter the fin the better it is for straight lines (race fin), the more curved the fin the better it is for curves - like wave riding (wave fin) The freeride fin benefits of the straight characteristics of the race fin to get it going and keep a pretty good top speed, combined with the turning character of the wave fin. Sweet! That's why all freeride fins basically sweep progressively back towards the tip. Please note that the more curve there is in a fin, the longer the chord gets, therefore increasing drag.

5. Construction.

Fins that are phlegm coloured/green/dirty yellowy are almost certainly a G10 fin - which is basically a load of layers of fibreglass highly pressured together for the most strength and more importantly, the most durability. The fin is milled from a bigger lump. A kink or scratch on these can be very easily sanded away with no long term drawbacks so they generally last forever.

A composite fin comes out of a mould, a good bit lighter, potentially stiffer if using higher spec fibres like carbon, but if you knock it/ damage it, it is likely to die faster.

MYTH BUSTING

If you struggle with your gybes you could argue that having more rake/ sweep towards the tip will help your control as you enter the turn, but frankly you might as well have a palm tree tied to the back of your board as the fin is not going to help you anywhere near as much as correct downhaul, harness line position or mast track position, let alone a healthy dose of technique development. Spend your money wisely, be warned coaching is far more cost effective than buying fins! But to clarify, yes, more curve in the tip in theory will make gybing easier. Deleting a few files off your desktop also improves performance, but would you notice it?

Very choppy water with lots of air in it - chances of spinning out are very high!

SPIN OUT

Spin out is when it feels like your fin has fallen off your board. It is when air bubbles smother your fin - called cavitation - and it loses all its grip sliding away from you. It's most common in chop or landing jumps, when naturally there's lots of air around the fin. But also quite prolific entering gybes, and this is a good example of what really causes spin out.

Contrary to popular belief, spin out has very little to do with the fin - unless you are waaaay out of the recommended ball park size, it has far more to do with harness line position or outhaul and downhaul (in this order.) Even if your fin is about 4cm off the recommended size it is still not guilty.

Furthermore, contrary to popular belief, spin out is not due to too much sideways pressure into the fin, in fact the more pressure you put against it in theory the better it works - something to do with low pressure, high pressure and laminar flow etc.

Spin out is caused when air hits the fin. This can accidentally happen in choppy water - almost as likely to happen to Antoine Albeau as it is to you. But the most common causes of spin out are these in this order:

1. In first place spin out is caused by the harness lines being too far forward. This causes the back of the sail to open. When the sail opens / sheets out, you reduce mast foot pressure, so the board lifts out of the water, air rushes underneath, hits the fin and you spin out. Positioning the harness lines in the correct place prevent the sail from opening and you radically reduce your chance of spin out - oh, and fatigue.

2. Second place goes to too little outhaul, creating a combination of too much back hand power, thus sheeting out in the gusts, and increased 'vertical lift' literally lifting the board out of the water. Air rushes underneath, hits the fin blah blah blah...

3. In third and almost final place, too little downhaul also causes too much back hand power, especially in the gusts, and this can cause the sail to open, nose to lift blah blah blah.

The reason why people spin out when they think about gybing is because they open the back of the sail, lose mast foot pressure, air gets under the board... the rest is history.

So spin out is due to 'nose lift'/board lift/sudden loss of mast foot pressure, and very very rarely anything to do with the fin.

Spin Out - At speed the sail opens up, mast foot pressure is lost, the nose lifts up, air rushes underneath the board and hits the fin, and voila - spin out!

Please check out previous INtuition Tuning features from this recent series at guycribb.com for more info on harness lines or get a Cribb Sheet and tune everything perfectly every time.

SUMMARY

Bigger fins are better for early planing and smaller fins perform a bit better in choppy water, but do you really need to be thinking about changing your fin size or shape when there is so much else to develop?

You'll note I have not mentioned flex, multi-fin boards, upwind skills to compensate for lack of lift, using your legs to lock the fin, powerbox vs. tuttle box vs. classic box, the disaster of weed fins, leading-edge sharpness, trailing-edge release, kinks, aerofoils, or for you old schoolers 'football' 'fenced' or 'slot' fins etc, but as ever I'm writing this on an aeroplane to an exotic windsurfing location to meet fifteen guests from all over the world for an extraordinary week of high octane windsurfing and intergalactic cultural socials putting the world (and windsurfing) to rights, so all the other fin crap I know about will just have to hang out in my head until next time.

Aloha from the windy Red Sea, or more precisely, 38,000 feet above it.

Guy, May 12th 2013.

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When Guy is not writing features for Windsurf magazine he's galavanting around the world coaching windsurfing. Guy was formally the multi times British windsurfing champion and national coach, but for as long as we can remember he's been delivering his INtuition courses all over the world to an international guest list. Guy hosts about twenty weeks per year only at the worlds very best venues at exactly the right time to ensure the best coaching conditions in Brazil, Hawaii, Australia, Greece, Egypt, Morocco, Ireland and Mauritius.