



# Bladerider – Trouble Shooting

Last Update - July 1, 2009

## 7.1 Hydrofoils and Adjustments

### 7.1.1 Boat Flies to High above the Water and sometimes crashes down

If the boat is riding too high when sailing (ie more than a comfortable 40cms above the water's surface), then there are a few reasons for the problem:

- You may be sitting too far back in the boat,
- There is not enough lift on the rudder,
- Your sail is too powered up (ie not flat enough downhaul and/or vang),
- The wand is not coming forward far enough or quick enough,
- The push rods are getting stuck or jammed somewhere,
- The flap is not coming up enough when the wand goes forward, or
- There is too much lift (angle of attack) on the front foil flap

You can check how much lift and resistance is in the front foil push rods, by fitting the foils on land and checking the swinging action of the wand against the flap movement. The wand should move freely once all connected, but if there is any friction, you will need to find the cause and attempt to fix this problem.

One problem is that the 2mm screw in the forward section of the push rod going through the hull and connecting up to the wand linkage, is over-tightened and therefore does not allow the wand linkage to move and adjust when the wand is swung forward. However saying that, this 2mm bolt should not be loose as it may come undone when sailing and therefore you will lose all wand and front foil flap control. It is **highly** recommended to check the tightness of this bolt and use Loctite or similar if necessary to stop the bolt from working its way loose.

If there is little or no resistance in the wand linkages, then push the wand as far forward as possible. The wand should be perpendicular (or slightly forward of perpendicular) to the bow of the boat (as per photo below), and the flap should be in the 'fully up' position.



When the wand is pushed back as far as it can go (ie when the flap should be fully down), the wand should line up with the letters 'er' in the signage 'Bladerider' on the side of the hull (or be approximately 60 degrees to the bow as per photo below).



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If the wand cannot be pushed back without force to the letters 'er' on the side of the hull (ie when the boat is sailed with the wand tip just under the waterline position), then there is probably too much lift on the front flap and boat will sail very high out of the water all the time. Therefore you will need screw in the socket joint head until you get the desired push-rod length and hence the correct amount of lift on the front foil flap (as per the photo below).



However if you have screwed in your ball/socket joint head all the way and you cannot thread it on any more, then you will need to remove and cut down the threaded push-rod adjuster by approximately 5mm. It is highly recommended that you do this in a locking vice and find a 5mm (non-nyloc nut) to thread on first before you start cutting, as so you can unwind this after you have made the cut, and it will clean the thread up for you (as seen below).





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Once cut, ensure that the end of the threaded rod is clean as so the ball/socket joint head can screw on easily for adjustment on the water. Finally fit the threaded rod adjuster back onto the end of the cable end slider (exiting the hull in the cockpit), but ensure that you put the 2mm screw (as indicated in the photo below) into the threaded side of the cable end slider first and do it up tight, as this will ensure that if the screw does come loose (they normally do in transportation if you do not use loctite), that it will need to unscrew a long way before it comes totally out.



## **7.1.3 Boat Rides to Low in the Water and is Hard to get Foiling**

If the boat is riding too low in the water or it is not lifting up out of the water as easily as it should, you may have one of the following issues:

- You have too much lift on the rudder
- You are sitting too far forward
- You do have not enough lift on the front foil flap, or
- There is not enough angle of attack (AOA) on the front foil (you will know this if the boat flies very low to the water all the time and requires a lot of effort to get airborne).

The first thing to check is if the wand can be pushed back passed the letters 'er' in the signage 'Bladerider' on the side of the hull (or be past 60 degrees to the bow as per photo below). If this is the case, then when the boat is sailing in displacement mode (low-riding and hoping to fly) with the wand at around 60-45 degrees to the bow, then the front flap is not pushed down enough and consequently does not give you enough lift to take off. Therefore you can fix this on water by simply winding out the ball/socket joint head at least two more turns at a time to give you more lift.





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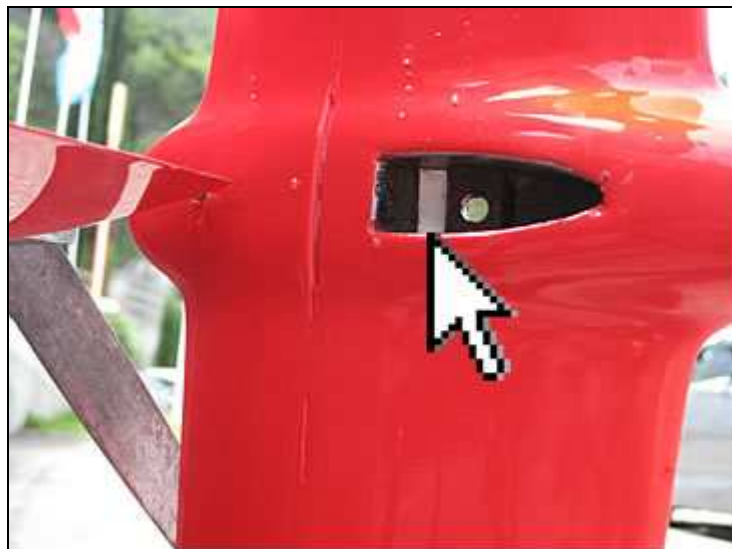
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If this still does not fix the problem, then you will need check to see if the front foil is all the way onto the centerboard, as may not have been hit on hard enough when initially set up. To check this, there should only be a small 2mm gap between the back edge of the foil join and the bottom of the centerboard (as per the photo below). If not, remove the locking screw in the bottom and use a rubber mallet/hammer to hit the foil on further onto the bottom of the centerboard. Ensure that your strikes are directly forward and back of the hole on the bottom as so it works its way on slowly. This should be a very tight fit, so you may need to hit hard.



If the front foil is all the way on and there is still not enough lift to get the boat out of the water easily, then the AOA can easily be increased by removing the front foil (as per the assembly instructions) and adding a 0.7-1mm thick plastic packer in the back section of the front foil (as indicated in photo below). This will add approximately 1-2 degrees of AOA and give you a lot more lift out of the water. However all production Bladerider's should have the correct amount of angle of attack straight out of the box and therefore owners should only make this modification if they are confident with the boat, their skill level and that there is definitely an issue with a low AOA.





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Before putting the front foil back on the centerboard, you may also need to use a flat file and take off a *\*very\** small amount of carbon from the plug on the bottom of the centerboard as this will allow the angle to be changed in the socket on the main foil.

- the top of the front edge (maximum of 0.1mm)
- round the front lower corner (maximum of 0.1mm)
- the bottom of the back edge (maximum of 0.2mm)



## 7.1.4 Boat 'Porpoises' when Foiling (rides high then low constantly, especially downwind)

There are a number of checks to make first, listed below:

1. Check for any friction in the front foil control system. This includes:
  - Wand swivel.
  - Rod through the boat. (The sliders unscrew from the rod for removal)
    - Check rod straightness.
    - Lubricate with synthetic/silicone spray.
  - Bell crank
  - Rod binding at the top of foil due to being pulled offline by bell crank
    - Adjust bell crank link.
  - Rod in vertical foil
    - Check rod straightness.
    - Lubricate with synthetic/silicone spray.
  - Rod binding at bottom of foil due to being pulled offline by flap.
    - Enlarge rod hole near bottom .
2. Check for excessive play in any of the linkages and tighten or replace as necessary.
3. There is not enough travel (or up and down movement) in the front foil flap. Please refer to the supplied PDF that outlines the full flap adjustment positions on the front foil.
4. Finally the push rod sliding tube in the centerboard may be unsupported. You can test this on land by holding the main foil flap in a fixed position and then push down on the bell crank to see if there if the push rod is flexing inside the centerboard. There is no easy repair to fix this and you will need to contact us for further instructions.
5. If after checking and adjusting all the above and you are still having problems, please contact us.



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## **7.1.5 Rudder/Centerboard Ventilation or Wand Taps on the Hull**

If your wand annoyingly taps on the side of the hull at low speeds or worse still the centerboard or rudder is ventilating/stalling (ie air bubbles and drag on the leeward side of the centerboard or rudder), this is due to the wand not being offset enough from the centerline of the hull.

This is because the air bubbles that the wand creates under water in the centerline, can be sucked down by either the centerboard or rudder which causes the sudden ventilation. Even if the wand is slightly offset, it only takes a small wave or turning to starboard to cause the problem. The problem is also greatly enhanced, the colder the water gets.

If this does happen to you whilst sailing, it is suggested to keep the boat as close to the water as possible and avoid too high speeds until you can get back ashore. Then unscrew the wand and rotate it so that the wand will 'ski' and bend away from the centerline of the hull once under pressure (as per photo below).



If this still does not work, then your wand axle is not perpendicular to the side of the hull, instead the axle is perpendicular to the centerline of the hull and must be fixed asap. Instructions on how to do this can be downloaded from [www.bladerider.com.au/support/wand\\_axle\\_replacement.pdf](http://www.bladerider.com.au/support/wand_axle_replacement.pdf).

If your wand is setup correctly, but your rudder and centerboard are still ventilation, then the problem may be enhanced by sailing in very cold water (below 15 degrees celsius generally). To limit this problem, use some 120-180 grit sand paper to rough up the sides of the centerboard and rudder. This will help keep the water attached to the board.





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### **7.1.6 Front Push Rod Cable Slider comes out too far and bends**



If your cable slider can pull too far out of the hull and on occasions, the slider has bent upwards, then firstly check that the amount of travel or the amount the push rod can slide back and forth is no more than 30mm. If it can travel more than this amount, it means that they can extend too far out of the hull and bend due to the exit hole in the cockpit or near the bow being too short. Therefore you will need to shorten the push rod inside the hull by an amount so that it cannot travel more than 30mm. A replacement hull push rod may not help as it will be same length as the one that you have already, however it is important that you first check that the cable sliders are wound all the way onto the push rod, otherwise if they are wound out, they will make the overall length longer and cause problems.

You should also need to check the exact position of the push rod exit hole compared to the wand axle. It should be 67mm away from the end of the hull push rod exit hole and a minimum of 14 and maximum of 19mm above it. Any variation of these measurements will also not help. A drawing of this position can be downloaded from [www.bladerider.com.au/support/wand\\_positioning.pdf](http://www.bladerider.com.au/support/wand_positioning.pdf).

If your wand position is more than a 2mm from the above drawing, it is recommended that you follow the "Wand Axle Replacement" instructions that can be downloaded from [www.bladerider.com.au/support/wand\\_axle\\_replacement.pdf](http://www.bladerider.com.au/support/wand_axle_replacement.pdf), to move the wand axle into the correct position.

### **7.1.7 Front Foil Stalling**

If the front foil is stalling, it can be either separation of the flow due to a highly polished/painted surface of the foil or the front flap is moving too aggressively.

It is recommended to use up to 400 grit wet & dry sandpaper (with water) to rub back the top surface of the foil. This will help keep the water flow attached and reduce stalling.

If the front foil is stalling when going fast, downwind or over a wave, that generally means you have too much flap travel in your hull push rod or too much gearing. The only way to fix this quickly is to wind in the ball joint socket on the top of your centerboard at least 3 turns.



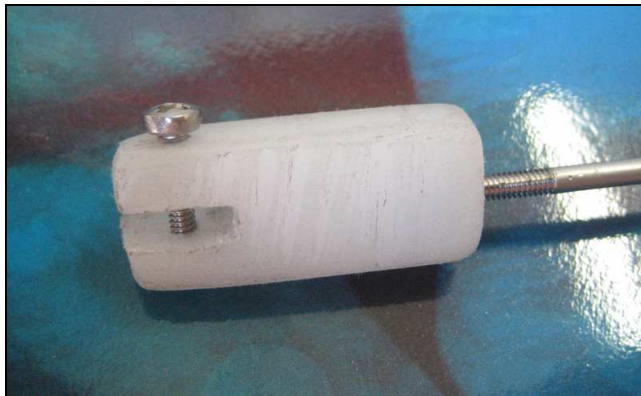
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### **7.1.8 Upper Control Rod Connector is Deforming**



Under a lot of load, the original Bladerider plastic Upper Control Rod Connectors in the centerboard can deform, and give 'spring' in the push rod system. It is important to keep an eye on these, however you can make your own using some nylon 'chopping board' (or Teflon), a hacksaw, a 1.5mm drill bit and a 2mm tap. The idea is to cut a piece of nylon approx 25mm x 10mm x 7mm. Then cut an 8mm slot in the top to form the gate for the Bell Crank Axle. Then drill a 1.5mm straight hole in the top for the 2mm axle bolt, and another hole in the bottom for the push rod. Use a 2mm tap, to make the thread. See some home made examples below.



Alternatively, Bladerider now have stock supplies of a new fitting made from brass. Contact your reseller if you need one of these. All new centerboards from March 2008 will have these fitted as supplied.

### **7.1.9 Broken Centerboard Push Rod**

If the stainless steel push rod is not aligned correctly (either left and right or fore and aft) where it attaches to the bell crank lever arm at the top of the centerboard, then the rod can easily snap off underneath the bell crank connector (brass or plastic).

To prevent this, please ensure that the push rod is lined up perfectly straight to the hole in the back of the bell crank lever arm, and then wind out the bell crank lever arm 1/2 a turn. This means that as the bell crank rotates through its arc and the push rod travels fore and aft slightly in the guide tube,





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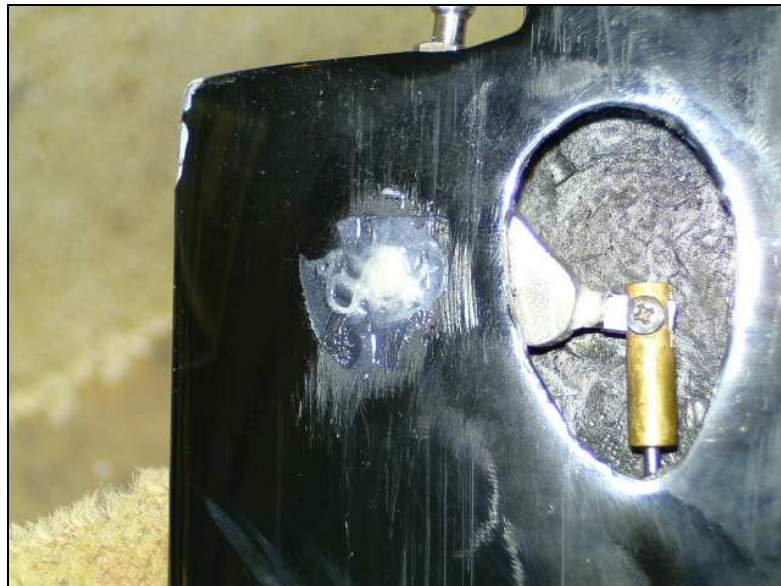
there is no resistance or pressure applied to the side of the push rod, and therefore will not cause it to fracture.

However if your rod has broken at the bottom near the horizontal hydrofoil flap, then please refer to the Barrel Nut Replacement Instructions ([www.bladerider.com.au/support/barrel\\_nut\\_replacement.pdf](http://www.bladerider.com.au/support/barrel_nut_replacement.pdf)).

## **7.1.10 Bell Crank Axle is Loose in Centerboard**

If the stainless steel axle at the top of the centerboard for the Bell Crank is unwinding itself when sailing or is loose inside the hole, then you will urgently need to glue in the axle on both sides to the centerboard, using ONLY epoxy glue with filler additive (only use 5 minute epoxy in emergencies).

Once the glue is set hard (after 24 hours), you will need to file/sand off any excess glue that will prevent the centerboard from being inserted into the centerboard case. There should no need to remove this axle in the future once your setup is correct, however it will be possible to cut it out if necessary.



## **7.2 Sailing Trim**

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### **7.2.1 Boat is Sailing with 'Bow-Up Attitude' Upwind**

If sailing upwind and you feel as though the bow is riding too high up in the air for maximum speed or lift, then there are some things that you can try (in order of importance):

- Check the angle of attack on the front foil (see above to check the angle of attack).
- Check to see that the front foil flap has enough lift (flap down) - When the wand is back in starting position, and that the flap is neutral when the wand is in the neutral upwind position.
- Check to see where you are sitting on the wing frame - Try moving your weight forward to see if this helps.
- Check your rear foil lift – Try winding the tiller extension around to lift the transom and push bow down to help reduce the angle of attack on the main foil (hence reduce drag), which should help increase speed. In doing so, you might have to move your weight backwards a bit to reduce the weight on the front foil.



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When sailing upwind in light/moderate conditions, the bow should only be angled about 1-3 degrees up and the wand should be angled approximately 30 degrees perpendicular to the bow so that the front foil flap is neutral for the best efficiency.

In high winds, the hull should virtually be parallel to the water surface, and in order to do this, you may have to add lift onto the rudder foil to push the bow down and move forward to see the boat accelerate.

## **7.3 Speed**

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### **7.3.1 I Do Not have Height or Speed To Windward**

Use more vang and downhaul to flatten the sail once foiling. It will help to heel the boat to windward as well as hiking as hard and as flat as possible.

However it may also be that there is not enough luff round in the top third of the sail. The amount of luff round in the top section of the mast is critical and it may only be a few millimeters to make a dramatic difference to how much the top section of the sail 'lays off'. With the importance of such a finely tuned race boat, it is difficult to make every mast and sail 100% identical to the ideal, and therefore the owner may wish to add a very small amount of luff round into the top section of the sail if they feel that the head is too loose for maximum height and speed upwind.



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## **7.4 Rigging**

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### **7.4.1 My Mast Base is rubbing on the Mast Stump Plug and wearing the front edge away**

You can avoid this problem by winding out the steel pin on the bottom of the mast 3 full turns so that the whole mast sits higher up off the mast stump plug, and therefore also makes it easier to rotate. You may wish to also glue in the mast pin as so that it does not wind its way back up inside the mast base.



### **7.4.2 The Small Vang Shackle on the Starboard Side is always coming loose**

This happens because the shackle pin was not tight enough to begin with. To tighten it up, you need a good narrow head flat head screw driver and slide it in sideways to the pin slot. Then push hard against the shackle to make really tight.





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## **7.5 Maneuvers**

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### **7.5.1 I Cannot Complete a Gybe Airborne Without Crashing**

This takes a lot of skill and practice, but it is most important to keep the boat as flat as possible throughout the whole gybe (or lean into the gybe if anything, but do not keep your weight on the old windward side) and it might help to keep your weight back in the cockpit a bit to help keep the bow up as the boat slows down. The rest is just practice.

(For more information on foiling tacks, refer to the High Performance Racing Manual.)

### **7.5.2 I Cannot Tack**

You need good speed to tack the boat through the eye of the wind as the boat is so light that it has no momentum to push you through.

You may also have too much vang on, so you may have to let some off before you tack. It will also help to heel the boat to windward as soon as the sail battens have flipped.

If you are really struggling to tack in high winds, you may have too much rake in your boat.