Tilting winged rudder method

Just a brief description on how and why I installed our tilting rudder.

Starting with the why.
To stop nose diving down wind, especially when the boat is semi out of control and you know that if the wrong wave comes its all over (or at least you will have some swimming to do)
Benefits that seemed to come with the wings was:
The boat seems to be more stable up wind, hobby horsing seems to be reduced check out the GWN video of my boat going upwind in the last heat of Busselton Nationals and if you were there you would have known the waves were reasonable. Im not sure if this stability makes us any faster or not.
As for trying to bury the bow or raise the transom up wind (like the 14s do) it seems the wings give lift in the transom anyway. Hence On my boat we are always further back when using the wings than we would be with out them.
The 14s use asymmetric wings because they are always trying to get lift in the transom or bury the bow. They do the same thing down wind.
As our boat is different shape to the 14s we decided we would not be able to use a asymmetric wing, we need to lift the bow down wind and even in rough sees up wind. So I opted for symmetric wing. And have really found it an advantage down wind. The asymmetric wing would reduce or may even stop the bow from coming up at all.

To make and install this system

1 You need and A frame to hang on the back of the boat.

I got mine made by a SS fabricator the first 1 cost $120 and the second was $150 and only a couple of months apart, anyhow the reason I needed the second one was because I put the first one to low on the transom and instead of cut and start again it was easier to make a new frame angled upwards instead of square of the transom.
I have found someone who is able to make the frames if anyone requires one he will just copy our best one. He hasn't told me how much cost yet but I'm sure he will do a good price.

Now you have a frame

2 The boat needs to be set up level across the boat,
I think the best way is to put the centre board in the boat upside down it should be a tight fit (or you have to fix that to) run a level up both side of the centre board to check it for plum.(If its tapered make both sides the same)
Now you can check the stem for plumb good luck
Then you can check the transom chine to chine
The most important thing is to be plumb with the centreboard and then your mast to be plumb with the centreboard as well.
Now the boat is level, we hope

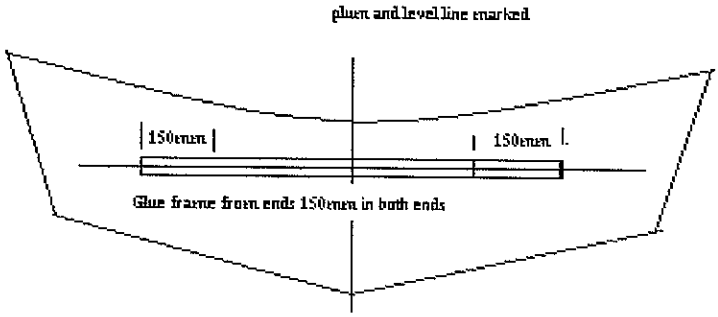
3 Use your level and mark a fine level line across the transom 115mm above the keel this is the bottom dudgeon positions.

4 Sand all the paint of the transom back to glass in the positions were you will be gluing on the frame. I went all the way to the bottom and over the deck by about 50mm.

5 Remark your line because you should have sanded first. Its not a bad idea to have another line offset say 50mm just so you can check if your first line disappears.

6 Hold the frame up to the transom and support it with something that is stable, the frame should have a say 5mm space between the boat and the frame.

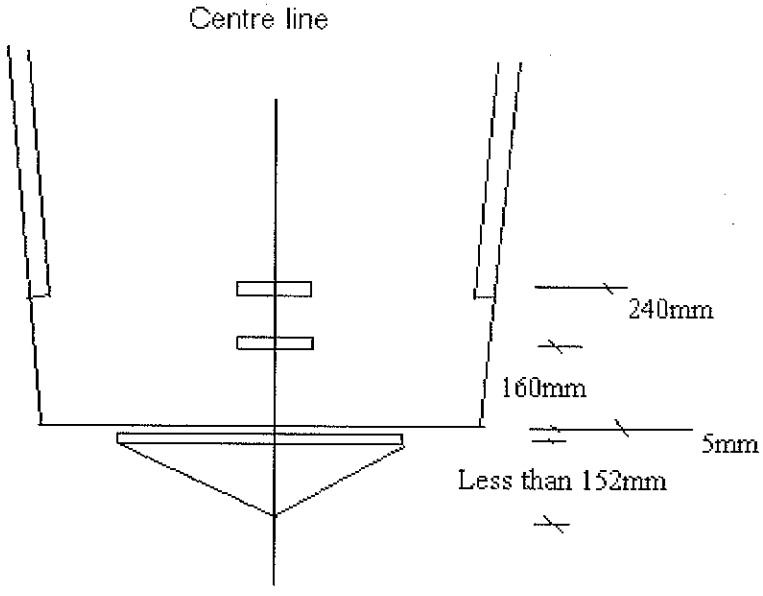
7 Glue the frame on to the back of the boat with Q cells and epoxy or resin the boat is built out of (epoxy is safest). You just need enough glue to hold it there and it should be quite stiff in texture not so it runs of.



8 Next day mix some more bog and fill in to the 150mm give good fillets against transom, when this is dry sand, rasp, file bog making sure to leave good fillet.

9 Cut 150mm strips of carbon uni direction of about 300 gms at least 4 for each side. Mix resin and apply carbon strips, from bottom of boat to just over deck.

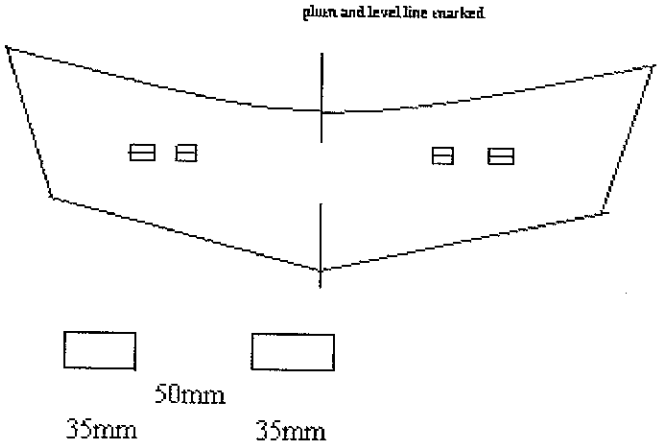
10 While you have not been doing anything, you could have another beer look at it and do the deck blocks. They are finished size 75mm long and ¼ inch SS tube a 3/16 pin fits inside tube. Start with 85mm tube so you can trim up when finished. All these positions are not critical (there are no rules except for the 152mm and that is when your cleats are of, wont be a prob if you use our frame) use at least 3 layers of unis on these deck blocks.



NOTE

It is a good idea to use peel ply over all finished resin jobs it will save a lot of sanding and make for a better job.

11 All glass works is now complete cut the deck blocks with a hack saw (don't use grinder) length is 75mm cut out 12mm in the middle. Cut all the way through the SS tube (these were 5mm up from the deck) then file / rasp the bog so you have a neat gap for fittings. Have another beer wipe the sweat of, and start on the transom frame.



12 Make rudder (if you want a router profile ask, I will give you one

13 Make wing, we found a cheap way was to get a piece of pine straight grain $2.50 and use the rudder routing jig to shape it after shaping cover in 4 layers of Unis and 1 layer of glass, Peel ply get all bubbles out you will know, don't have a beer until you finish, let dry. Wing wood size started as 1 of 140mm x 20mm x 520mmlong, Rudder started as 30mm x 220mm x 1m cedar. Rudder finished 200mm wide +- 3mm Rudder had 1 layer of 6 oz carbon cloth. Or buy some wings my first set cost $350

14 Make Rudder box. I think I went something like this
Wrap carpet around top of blade a little longer than the depth of the finished box hold together with staples or something at trailing edge. Mix up some, little runny bog and coat back side of carpet let dry. The carpet should be able to slide on the rudder, (you could put plastic on rudder first if your scared I think I did) trim trailing edge so cloth goes around. Now I just wrapped the carpet in 4 layers of carbon may have been more but wasn't less, Peel ply to dry If the rudder finishes a little loos you can pack with more carpet and contact.

15 I found all scrap cloth chop strand what ever, mixed some resin and made a block of fibreglass about 10mm thick on plastic wrapped the plastic over the top and clamped it with wood / steel each side. This became Gudgeons for the rudder box top and bottom.

16 Cut the glass block and file to fit front of box, scratch a bit (your body) and then glue them on. I followed the same size top and bottom with foam and bog, shaped it and wrapped carbon unis to hold it all together,

17 Find and old windsurfer mast and use as tiler, glass on.

18 Drill holes in gudgeons and tiller for pin to hold box onto frame, make holes tight.

19 Fit rudder to box to frame and level boat end for end. I did this by picking some concrete hopefully level, and measured up to bow and up to transom, should be same measurement. If not level boat.

20 Front of rudder was plumb. Measure from bottom of transom down 6 to 8 inches, use level and draw line, cut hole in rudder for wing to slide through. Make wing same each side and square of rudder bog in place make good fillet to top and bottom of wing. (Reason for having rudder at that height is to confuse boat into thinking its longer, Wing should be in boats bubble.)

21 Use carbon unis again to hold wing to rudder, I used 4 layers in tapering lengths. My first rudder had only 3 and the top cracked. The first layer of unis went up near the top of the rudder to give strength so the rudder wouldn't break under the box, sand and fill.

22 Prime, Sand, Bog, Prime and Paint

Estimated cost		
Rudder wing	$ 2.50	
Rudder wood	$120.00	
Frame	$120.00	
Carbon Unis 2m x .5 x 300gms	$ 70.00	
Carbon 6 oz twill or cloth 2 meters	$110.00	
Pins	$ 10.00	
Pulleys	$ 70.00	
Cleats / bits 2 off	$ 80.00	Best on rail
Gas strut steel should last 4 years	$ 90.00	SS one cost over $200
Resin 2.5 kilos Q cells	$ 100.00	
Beer	$ 90.00	
Total	$862.50	

I have also tried wings 1200 long they don't seem to be much different to shorter ones. Except for the cost of making it. If you need any more information email me or phone.

Gary Caporn