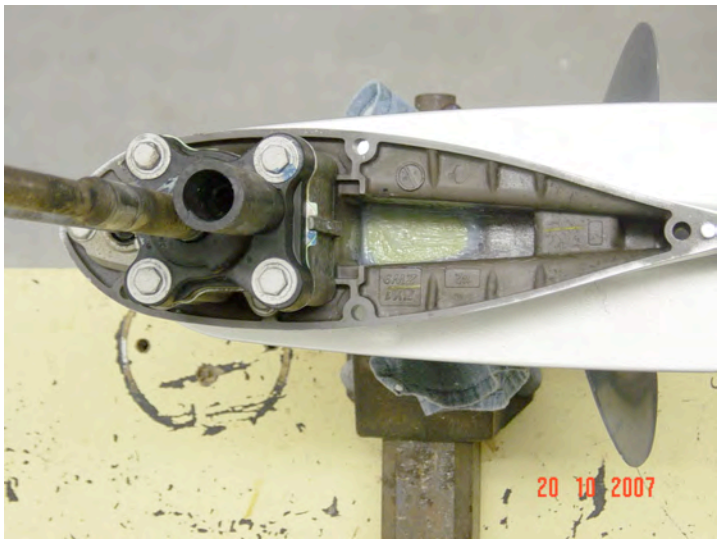
Outboard Motor Modification for Multihulls

Modern outboard motors all have Thru-Prop exhausts. Great on runabouts, and these motors are ideal for small to medium multis in every aspect bar one – they have no effective thrust in reverse, especially when the boat is still gliding forwards, and worse still with a tail wind. All the prop does is suck its own gases back and churn around in a void, losing grip, revving up and making even more gases to increase the problem.

I have a Honda 20 on my recently launched F32. While attempting to enter a marina berth with about 20 to 25 knots of tail wind, I simply could not stop the boat as the windage on top of the forward momentum was too much for the puny reverse thrust. I had to maintain about 2 knot boat speed to keep steerage in the cross wind before turning down into the berth. Fortunately agile crew & spectators prevented some early dings to the boat.

I have now modified the motor to overcome the problem. This is a modification I had previously done to an Evinrude 25 on my previous boat, a 30ft cat with the identical problem. This modification achieved a near perfect result, which served me well for many years. I have no idea why I didn't make the modification to the Honda before first launching, Probably too keen to get sailing.

The modification is to simply totally block the exhaust channel to the prop, and provide an alternate exhaust above the cavitation plate. On the Honda, I also added an extension to the cavitation plate, as I had to put the new exhaust immediately above the cav plate due to the design of the leg. Without the extension, the prop was still sucking some gases back. On the Evinrude, I put the new exhaust higher up and did nothing else.



Step 1 Remove the lower leg by disconnecting the gear change rod and removing the five bolts.
Carve a bit of structural foam to the shape of the exhaust channel, smear it with silicon, and jam it into the hole level with the cav plate. Obviously clean the metal surfaces first. The green Airex is visible in photo. I used Klegecell in the Evinrude, and it was still there after 11 years.

Step 2 Drill 1" holes on each side of the leg above the cav plate. Make sure you are not cutting through any structural webs, only plain wall section. Replace leg.

I could have gone above the upper cav plate, but worried that I may have to put up with extra noise. On the Evinrude, the holes were considerably higher, and occasionally the exhaust would come above the water in waves to make a loud noise. As the Evinrude was nacelle mounted, this did not happen too often. With the transom mounted motor on the F32, I felt it better to keep the exhaust holes lower, and extend the cav plate if necessary.
The two 1" holes provide slightly more cross-sectional area than the exhaust channel.

Step 3 Depending on your brand of outboard, immersion depth, and where it is safe to locate the exhaust holes, test and see if you need a cav plate extension. (Of course, you remembered to make a cardboard template before you relaunched just incase you needed to make the plate.) Don't spend over $100 on a commercial one, as they are designed for a planing situation, sit too far back for this problem, and are too wide so foul your rudder blade – F32 anyway.

I went to the local sheet metal shop, and for $10 got an off-cut of 3mm aluminum plate 370 x 250 (14_" x 10") and got them to bend the outer 35mm (1_") down about 30^{o} to stiffen the plate and to assist with exhaust gas separation. The rest was done with a jig-saw, and bolted on with four stainless bolts.

The local Honda rep gave me dire warnings that I would void my warranty, and lose horsepower due to the loss of the extractive effect of thru-prop exhaust. Tuff luck I replied. A serious collision due to no reverse power would cost me more than the off-chance of a warranty claim; and I would be much happier with 15Hp each way, than 20

one way and bugger-all the other. In reality, I have not noticed any appreciable loss of forward power, but a dramatic increase in stopping power.

The Yamaha 9.9 sail drive does have a reverse thrust prop, with a double hub and blades on the outer hub. In reverse the gases are diverted between the inner and outer hub once the boat is actually moving backwards, or at least stationary. I had one of these Yamahas on my cat for several years. It was marginally better than a plain thru-prop exhaust, but definitely not the answer for a high windage multihull trying to maneuver and stop with a tailwind.

Steering

Steerable power is everything when it comes to maneuverability, virtually as good as and in some ways better than twin motors. It is really imperative that the motor is linked to the steering mechanism. Tiller and transom mount motor on the F32 is dead simple – just a link bar. On my cat, I had wheel steering and led the steering wires through the nacelle. Under one wire I mounted a genoa track & car locked to the wire. When the motor was down, a connection bar was linked to the track car to steer the motor with the rudders. It is not just the ability to turn the boat in its own length without headway, it is also being able to power against a springer line, push or pull, to force the boat towards or away from a dock.

Another totally different problem

Did you know that on the Honda 20, and apparently most new outboards, the gear change does not positively engage or disengage the dog clutches in the gear box. Instead, a spring loaded mechanism pushes on the dog clutch to force it to change, once there is low load. This apparently stops people crunching gear boxes. Seemingly a good idea, BUT if your motor is idling too fast, it won't change gears. Seriously dangerous.

I adjusted up the idle speed, as the mechanic had left it so slow that it sometimes stalled while changing. Next time I went out, I was running late for the start of a race and instead of waiting for the motor to warm up, I started & popped straight into reverse to exit the berth. The automatic choke cut in on top of my faster idle setting, and when I shifted to neutral, the motor remained in reverse, and remained in reverse initially when I moved to forward, then popped into forward. My stunned crew thought I had become dyslexic with my gear change hand. However we repeated the non-changing performance four times in the next 30 seconds, until the motor warmed up & slowed down. Yep – you guessed it – first ding in the paintwork. Local Honda mechanic confirmed that the problem had been caused by the idle speed, and that the change settings were correct.

Trust this is of some use to fellow multihullers.

Cheers

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