

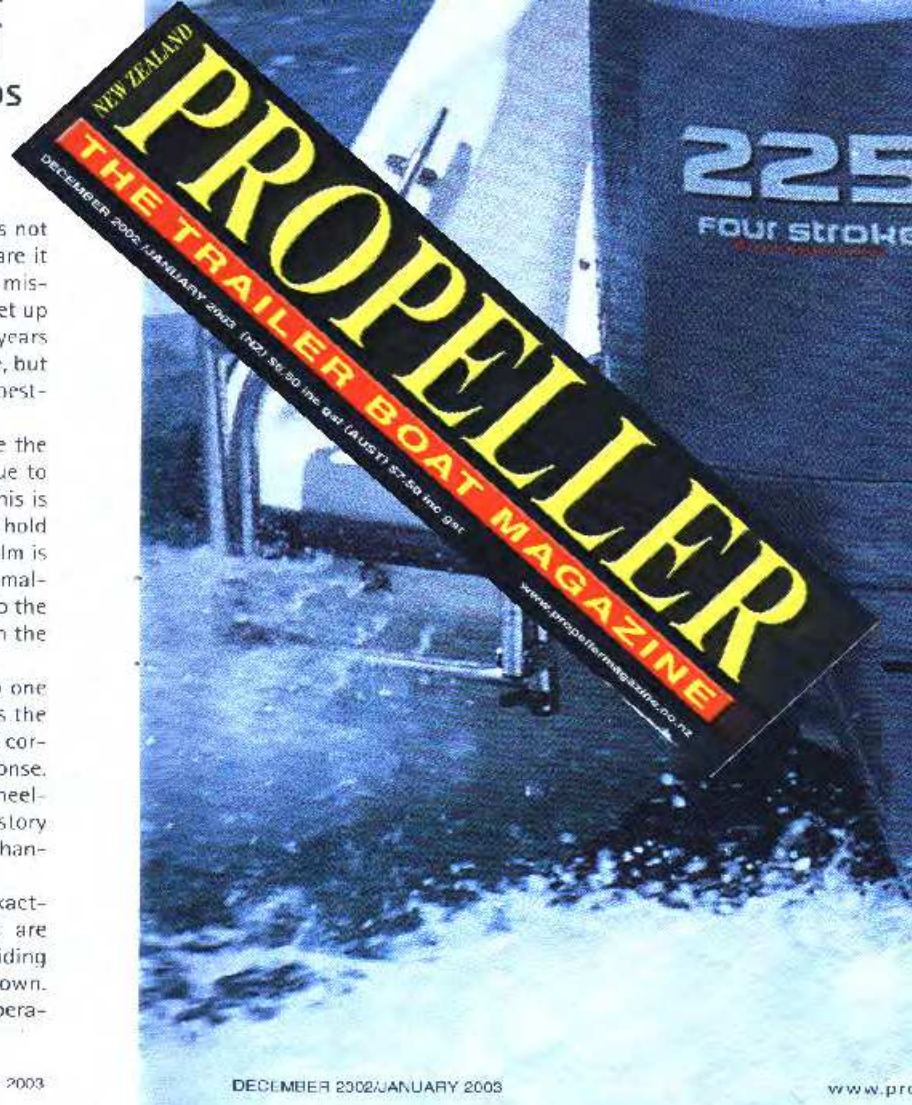
ent answers to the question of adjusting your attitude with tabs that do the thinking for you.

If there is one thing that really upsets me it's a boat that's not trimmed right. If it's not trimmed properly then chances are it isn't giving you and your crew the best possible ride. It's a misconception that boats need trim tabs only if they are not set up correctly in the first place. That may have been the case years ago before deep V and lightweight hulls came on the scene, but today, trim tabs do make a worthwhile difference to even the best-designed hulls.

The boats that perhaps benefit most by the fitting of trim tabs are the larger family production cabin boats of the 5 - 7 m variety that due to the very nature of their topside profile, lean (heel) into the wind. This is because the wind tends to blow any planing boat off course, and to hold course the boat must be steered into the wind. The fact that the helm is turned to keep the boat on course causes any planing hull that normally banks inwards when turning (i.e. all monohulls), to bank (heel) into the wind. Here you are, trying to drive across a short harbour chop with the boat heeling 20 degrees to windward.

As the boat is driven through the water, the tendency to flop onto one chine results in a harder ride that is uncomfortable and also makes the whole rig harder to drive. You spend all your time trying in vain to correct the boat's angle of heel through engine trim and throttle response. Trimming a boat through the outboard or sterndrive will not stop heeling. But when used in a combination with trim tabs, it's a different story and the result is more efficiency, performance and better overall handling.

While there are many varieties of trim tabs, they all essentially do exactly the same job. Moveable plates mounted across the transom are forcibly lowered to deflect the water flow downwards, thereby providing upward lift. The result is that as the stern goes up, the bow goes down. Similarly, when the adjustable plates are set up for independent opera-



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tion, the athwartships trim can be adjusted to favour one side by simply lowering one plate. As the starboard side trim tab is lowered, the starboard side lifts and consequently the port-side drops and vice versa. However, the fore and aft trim component remains even if only one tab is used and so the hull will take on a pronounced diagonal bias to favour one bilge and drop the bow at the same time. By utilising the various tab combinations a hull can be trimmed to best cope with the negative aspects of sea, wind or load conditions. Each hull will require different amounts of tab to produce the best results, but always they should be used with finesse rather than brute ignorance.

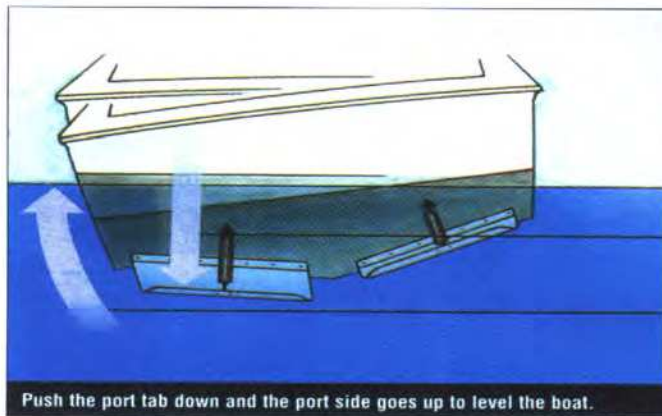
If the tab is lowered too far, its braking effect will be too pronounced, killing speed, sucking horsepower and throwing the hull completely out of balance. Generally the less tab that can be used the better.

Knowing when your boat is trimmed correctly is simply a matter of feel and experience. What works for one doesn't always work for another. Generally, if the horizon ahead is level and the water is peeling off the chines somewhere about

under or just aft of your driving position, then you're reasonably close. If there is a huge bow wave and you're slamming into every wave, then back off and trim out a little - you will be surprised at the different ride you get, particularly with deep V boats.

It is with smaller craft that most gains can be made, mainly because a changing sea, shifting passenger load or lessening fuel load will affect a small hull more than a larger one. Also, on a corresponding level, it is easier to influence a small hull's running characteristics by the use of relatively easily engineered and inexpensive trim tab systems.

For faster, deeper V boats with fixed drives - jets, shafts and surface drives - trim tabs are an



immediate fore and aft trim option, altering a hull's angle of attack to provide easier planing and a smoother ride.

Tab Design

There are two main types of actuator mechanism in use today - electro-mechanical and

electro-hydraulic. The current electro-hydraulic systems are a development of the original hydraulic systems that mostly use a 12 volt reversing motor to drive a small high pressure hydraulic pump and oil reservoir in a self contained unit which mounts on the inside of the transom close to the trim tabs. A short hydraulic line connects the pump to the ram, often through the ram base plate by way of a hole drilled in the transom. This means there are generally no external oil lines to catch or foul.

The direction of the electric motor is controlled from the dash via the trim switches. Solenoids on the motor handle the heavy electrical switching so the wiring to the dash can be relatively light and easy to install.

Electro-mechanical is basically an electric motor coupled to a worm drive and is used by such brands as Lectro Tab and Lenco. They are quick reacting, very positive and don't creep. They will also withstand greater loads than a hydraulic system.

The size of trim tab required depends on your boat, its performance and exactly what you want to achieve. A rule of thumb is that for an average 9-inch (229 mm) long (transom to trailing edge) plate, 1 inch of tab width is needed for every foot of boat length (i.e. the tab width should be about 1/12 of the boat length).

Plates are made from a variety of materials -

cast aluminium alloy, fabricated stainless steel, GRP and even advanced composites. Likewise, ram sizes and the numbers required to activate a trim tab cannot be decided without knowing all the information, so buyers should be guided by a reputable supplier. However, the stresses and strains a trim tab endures are enormous and incorrectly installed or supported plates will more than likely bend or break.

All big tabs should also have preventers on them. These are a wire strop, which limits the downward travel and thus prevents the ram from being over-extended. Most rams are designed to deal with compression rather than tension, so reversing a powerful boat fitted with large trim tabs and no preventers may eventually wreck the seals and the ram itself. For the very same reason you should never allow divers or swimmers to stand on the trim tab plate. Contrary to popular belief, the neutral position for a transom mounted trim tab is not when it is positioned to form a continuation of the planing surface, but when it is raised slightly to align with the flow of the water leaving the transom. As an extension of the planing surface the tab is still generating lift. When the tab is fully raised, air should flow in under the plate. Once this happens the tab ceases to exert any force and the hull is restored to its normal trim.

The position of the tab, relative to the planing surface and the chine is critical so if you are going to fit them yourself, read the manufacturer's instructions thoroughly. Remember, as almost all outboards and sterndrives now have power trim, the primary reason for fitting trim tabs to boats powered by outboards or sterndrives is to more easily keep the boat from heeling into a cross-wind. Locating the tabs as far apart as possible minimises the amount of uplift force needed to correct for heel into a crosswind, and therefore minimises the downward angle needed on one tab, which in turn minimises the drag force incurred. Hence, the further apart the tabs can be fitted the better. **Doing the Thinking for You**

Now that you have a better understanding of how trim tabs work and the different types there are, we thought we would take a look at two offerings on the market that are intelligent enough to do the trim adjustment for you. The Bennett ATC is highly complex and technically challenging, whereas the Nauticus Smart Tab is raw in its simplicity. In the last issue of NZ Propeller (Oct/Nov 2002) we reported on Bennett's Auto Tab Control (ATC), an automatic trim tabs system that takes away the guesswork and does all the trimming for you. The ATC is easily retrofitted and directly operates the trim tab hydraulic power unit for tab adjustment. Installation is simple with no external or through hull components and the attitude sensor can be mounted anywhere in the boat.



They don't come much simpler than the Smart Tab and it really works.

Here's how the Auto Tab Control (ATC) works. The attitude sensor detects your boat's deviation from the zero point that you stored in memory and sends a continuous signal to the CPU. The CPU is the brains of the system and this determines how the trim tabs should be adjusted, and communicates this corrective information to the ATC module. The module is the interface between the trim tab hydraulic power unit and the ATC system and its job is to energise the trim tab hydraulic power unit for corrective trim tab adjustment.

The auto tab control calculates and analyses attitude readings 650 times per second. The on-board computer learns and stores the characteristics of the boat in its memory and uses this information for precise and efficient trim tab correcting.

The ATC analyses the sensor readings in averages, thereby avoiding unnecessary trim tab movement in rough water. It also features a built-in delay preventing trim tab adjustments during momentary weight shifts or wake.

NZ Propeller has a set fitted to our Buccaneer 635/Yamaha 225 4-stroke company boat and believe me they work great. The ATC is positive and it does the thinking for you. It responds to any move in passenger weight, speed changes and water conditions to give you the best trim possible. The best thing is, if you are not sure and don't like what the CPU is doing you can manually override it. You will need to add \$995.00 for the ATC System to the price of your tabs so it is not an inexpensive option however and certainly not something you would normally choose for a small trailer boat or inflatable.

While the ATC is a highly sophisticated and technically complex system, the recently introduced Smart Tab is a back-to-basics no-brainer that retails for as little as \$399.00. Developed by American company Nauticus, the Smart Tab is an inexpensive trim system that is ideal for smaller boats and very much suited to the Kiwi DIY boatie.

Smart Tabs are designed for powerboats in the 3 m to 6 m range, are totally self-contained and don't come with any of the baggage of hydraulic and electrical systems. Simple self-contained units that attach to the boat's tran-

som, they work with water pressure to adjust the boat's attitude. There are no hydraulic lines or console switches and once installed you just leave them to do their job. Much like the Bennett ATC, but a whole lot simpler!

The tabs use a nitrogen-filled gas actuator, situated between the plate and connection point at the transom, to control trim. Just like a gas-controlled spring that expands to keep the tabs down while at rest or at low speeds, then as the speed and therefore water pressure increases, the plate pushes on the actuator and it retracts upwards. When the boat slows, the actuator extends the tab down again. It's that simple.

The Smart Tab is self-regulating and reacts instantly to water pressure, whereas the ATC reacts to boat trim and balance. Both are designed to do the thinking for you, it's just that they do it very differently and at very different costs.

We took the smallest set of Smart Tabs available and fitted them to an Aquapro 1101. The boat is powered by a Tohatsu 18 and used extensively for towing water toys, inshore fishing and generally having fun.

The first step is obviously installation and this is not a big job. If you are reasonably handy it will take you less than an hour, although it doesn't pay to rush it, so allow a couple to be on the safe side. Setting the tabs on the correct degree is important and once you've got this worked out, the rest is a piece of cake. The supplied installation kit is excellent with step-by-step instructions and everything included, right down to the templates.

So do they work? First thing to do is set the tabs in the right position as there are five different choices and each boat is different. The tabs can be set separately if you find the boat needs a little more lift on one side than the other.

You find the best setting by going for a few runs in the boat and then once set you never need to alter it. We found a noticeable difference in the way the Aquapro rode, particularly the response to the throttle and quickness to plane. From a standing start the Aquapro didn't lift by the bow anywhere near as much and the hull presented itself on a more level attitude right through to maximum speed. It leaps onto the plane and with just one person sitting in the rear feels a whole lot safer to drive at speed. Of special interest was what difference there would be to the boat's riding attitude when towing. Here the Smart Tab scored top marks, with the boat being more level in the turns and it certainly didn't suffer for the weight when towing from a deep water start. Top end speed improved marginally because of the better trim, although to me the improved ride and handling was more important than any speed gain.

Two systems that do a similar job but are aimed at opposing ends of the market. You now have the choice.