Buyers Guide - Inboard or Outboard?

By Jonathan Davies (Shrimper *Merriwinds* – 847)

The Cornish shrimper was originally designed to be powered by a small two-stroke outboard motor, commonly 4 or 5hp, located in a well at the stern on the starboard side. This arrangement works well but has a couple of drawbacks, the main being that the thrust from the starboard mounted motor is slightly off-centre, requiring a little more concentration when steering, and reversing is an acquired art. The motor is also located quite close to the cockpit where its noise can be intrusive. There isn't enough space for the motor leg to be raised when not in use, so it either stays in the water or the whole motor has to be lifted out of the well and put into the port aft locker where there it is clamped to a locating block for security and to stop it moving around. The weight of the original 2 stroke motor was about 22 kg, so although awkward, this job was manageable. New two-stroke outboards ceased to be available in 2006, and their four stroke equivalents, although more fuel efficient, are heavier and the power heads bulkier, making lifting them out of the well and storing them in the locker even more difficult. A lighter, lower-powered motor could be used in calm conditions but, with much less than 5hp, in larger waves the lack of thrust means that the quite heavy Shrimper will struggle to make headway.

Eventually in 1986, at sail number 217, Cornish Crabbers produced the first Shrimper with an inboard diesel. They chose the well-proven 9hp Yanmar 1GM10 and shoehorned it into the space at the front of the (now shortened) foot well. The outboard well is filled in to provide a space for the fuel tank and the hull below is smooth hull instead of having a hole for the outboard leg. The skeg is cut back to provide space directly in front of the rudder for the centrally mounted propeller which is deeper in the water than its outboard equivalent. The Yanmar motor weighs 76 kg, about 50kg more than a 5hp outboard (and even more with the weight of the propeller shaft, large starter battery, stainless fuel tank, etc.). The builders say that this is compensated for by reducing the ballast so that the overall boat weight remains the same.

The price of a new inboard Shrimper is about £6000 more than its outboard fitted equivalent, and second-hand inboard boats of comparable age continue to be more expensive, but what are the advantages and disadvantages of the two motor systems?

Performance:

The inboard diesel produces 9hp but is rarely needed to run at full power. A 5hp outboard motor has to run quite hard to give its useful thrust, especially in a choppy sea or strong winds. The boat is designed around a standard shaft length, so the propeller is closer to the surface and can cavitate in big waves. The drag from the hull opening, outboard leg and propeller in can make an outboard boat slightly slower (and noisier) when sailing. The inboard with its two bladed prop in the vertical position (most boats have a dab of paint on the prop shaft to show where this is) can 'hide' the blades behind the skeg therefore reducing the drag. However, the two bladed prop is not particularly efficient, so another, more expensive, solution is a three-bladed self-pitching prop. This gives more thrust but less drag as the blades naturally align to the water flow.

Noise:

The inboard, although on cold start-up sounding as if someone is hitting the bottom of the boat with a hammer, is well soundproofed in its housing and works at a lower RPM than an outboard, producing a reassuring rumbling chug at low speed and, although it progressively gets noisier as it

works harder, never stops conversation in the cockpit. Outboards tend to be noisier as soon as they start working and usually begin to snarl under load. It is generally accepted that for longer passages the inboard is less intrusive and less tiring.

Liveability:

The inboard has the big advantage that it can be started by simply pressing a button. Cord starting a four-stoke outboard is certainly not too difficult, but there are many crews who, in an emergency, would not be able to start the motor.

The absence of an outboard power head at the rear of the cockpit on an inboard boat means that the starboard after deck is clear and you can conveniently stand there to con the boat and put sail covers on, etc. The inboard also has no steering arm to intrude into the cockpit area and gear changing is simpler on due to the controls being conveniently located inside the foot well. However, Mk 1 outboard Shrimpers do have the benefit of a much larger cockpit foot-well with stowage below the floor boards large enough to fit in a small inflatable dinghy. All inboard Shrimpers and most outboard Mk 2 boats have a smaller foot-well because of the engine box at the forward end of the cockpit.

The inboard comes equipped with a large 12v battery charged by an alternator. This provides more than enough power for self-steering, on-board instruments and charging of phones, etc. While it is possible to find an outboard with a charging coil, the output will be far less than the alternator.

Running & Maintenance Cost:

Surprisingly, the bigger diesel uses less fuel than the outboard, so is cheaper to run on a daily basis. However, maintenance for an outboard is much easier as it can be fairly easily removed from the boat and taken home or to a specialist for servicing and storage. The inboard engine has to be serviced in-situ, which is more difficult because of limited access (only through the engine box hatch) and is generally a lot more expensive as there are more parts that need servicing. This should be born in mind when looking at boats with a view to purchase - a tatty second-hand boat bought cheaply with a doubtful outboard can easily be transformed with a new engine, a new 5hp outboard costing around £1100 (or less). The same can't so easily be said for an inboard where an exchange replacement motor is about £3500 plus the cost of removal and re-fitting. The Yanmar inboard option is therefore more expensive overall, although some of the additional cost can be offset by DIY maintenance.

Reliability:

Properly serviced, an outboard should reliably last for well over ten years, especially if not permanently left on the back of the boat; but even when it is getting old and unreliable it can easily be replaced by the owner. The inboard engine, which is not particularly stressed and in a sheltered environment, should, if properly serviced, last far longer than an outboard. However, when things start to get worn or corroded, as in the case of the infamous Yanmar exhaust elbow, then reliability can suffer and repair and replacement can be very expensive. A neglected inboard motor (although in general these are relatively rare) can rapidly become a source of big trouble.

To sum up:

If the overall cost of boating is important then the outboard wins almost every time. Outboard Shrimpers are less expensive, both new and second-hand, so will be cheaper to buy and to maintain. Although inboards use less fuel, new four-stroke outboard motors have reduced even that

advantage. The outboard boat will also be lighter to tow, even if just by the weight of the motor and tank, which can be put in the car. If on-board storage is important, Mk 2 boats have the inboard engine space left empty, which provides an excellent, very large locker in a convenient position at the front of the cockpit.

In the other hand, inboard boats are quieter, easier to start and have a more punch in choppy seas. So if your wife/crew struggles to start the outboard by herself, important should the skipper fall overboard, this might be the better option despite the higher cost.

One possible solution to the starting problem might be an outboard with electric start. The smallest currently available is a 6hp single cylinder motor, but twin cylinder outboards of 8 hp and above are quieter and more reliable, although rather expensive. A few of these larger motors can be shoehorned into the well but unfortunately weight is the big issue here. 8 hp electric start outboards weigh around 40 kg, making them impossible to lift out of the well without assistance.

If you use a cockpit tent and don't want to share it with an outboard motor, the inboard with its full rear decking has the advantage.

Finally, if you use the motor a lot, especially in tidal waters, the quieter, more powerful and less intrusive inboard should certainly be considered.

Cockpit Comparison

Mk 1 outboard on left, Mk 2 inboard on right. Mk 1 inboards have a similar deck layout. Note the space taken up by the outboard and the increased length of the footwell on a Mk 1. Boards lift to expose stowage below. Tiller height is generally greater on an outboard boat as it has to clear the motor hood.