

## CAMPBELL SAILER PROPELLER

Raphael G. Heron, *Zuben'ubi* Mk X - Bulletin 2009 (p.62-63)

Members may be interested to hear about a very efficient small fixed-blade low drag Canadian propeller that I fitted last winter. Since launching in April 2008 I can report very satisfactory results with a relatively small 16hp engine and 5.5 kts cruising speed. Campbell Sailer Propellers are not new but have been refined over the last thirty years.

The Campbell Sailer Prop from West By North Enterprises in British Columbia, Canada is a unique low drag progressive pitch propeller that is generally smaller by two inches in combined diameter/pitch than a standard fixed propeller. This may be of particular interest to owners who are considering fitting a larger engine for which the correct size prop might otherwise require a larger aperture. The Campbell Sailer propeller is smaller because it loads the engine more with its lipped blade design which gives more 'bite'. "The unique airfoil shape of the Campbell Sailer is the secret to its high-efficiency."

Results with a 14"x 8" three-blade on *Zuben'ubi* are very satisfactory and show considerable overall improvement over my previous Radice two-blade large disc area 15"x 10". Cost in December 2007 was CAD\$ 525, plus CAD\$ 90.52 express international post and it arrived a week after ordering.

*Zuben'ubi* is a MkX fitted with a 1993 Yanmar 2GM20, continuous rating 16 hp/ 11.9kw @ 3,400 rpm and 18hp/ 13.4 kw @ 3,600 rpm. I am not certain of the reduction gear ratios which may likely be 2.62:1 forward and a reverse reduction ratio of 3.06:1. Unfortunately no tachometer is fitted to my engine.

### Performance comparison with previous Radice propeller

#### Radice 15 x 10, K11 large disc area 2-blade:

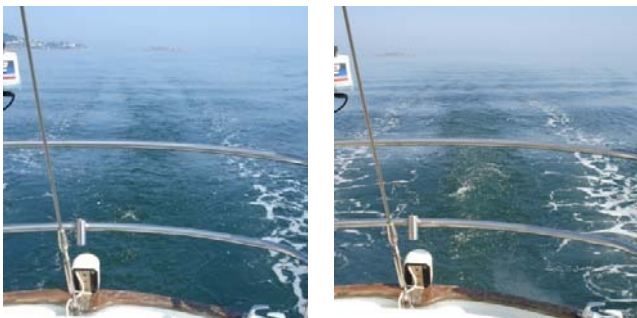
Cruising speed 4.8 knots

Max speed at very high revs 5.7 knots, with engine rpm increasing progressively up to full throttle movement.

#### Campbell Sailer Prop 14 x 8, 3-blade:

Cruising speed 5.5 knots

Max speed at high revs slightly over 6 knots – the engine does not achieve any increase in revs or speed for the last inch or so of throttle movement. To operate at this rpm would really only be for emergency use of short duration.



Two photographs show prop wash underway: at cruising speed of 5.5 kts, possibly around 3,000 rpm and with a slight puff of blue smoke at full speed of just over 6 kts and near maximum rated RPM around 3,500rpm. Unfortunately I do not have a tachometer so RPM figures are approximate and 'guesstimates'. Maximum rpm with the two-blade Radice propeller was higher and with more smoke. The engine compartment is very well sound-proofed with silver polysound insulation from T. Norris Ltd yet a comfortable cruising speed with low decibel levels would be around 5.5 knots. With fairly high rpm however 5.7kts can be easily maintained.

Slow speed operation is very responsive, not over-propped as with the Radice at slow speed and with greater control. Speed with engine running at tick-over 750 rpm approx is slow at around 1 knot and slower than with the Radice. Reverse performance is excellent and with better stopping power. I cannot say that there is any great improvement with prop walk but reversing does seem slightly easier especially going straight astern. Prop-walk while manoeuvring forward appears slightly reduced although I still try and utilize this to advantage if possible while turning with limited space, e.g. a touch of reverse while still moving ahead. Drag in light airs seems less than before with the larger Radice K11 two-blade.

Photographs show the Campbell Sailer prop after fitting last December. For the first time I also fitted a shaft anode and the yellow tape is merely a safety covering for the very sharp rope cutter while ashore.



Motoring recently across the harbour into a force seven in sheltered water (30kts plus as recorded on harbour anemometer) gave fast cruising RPM and four to five knots but any further increase in throttle movement of several inches to max made no difference to RPM. The propeller size as recommended by Norm Ross seems a perfect match for my relatively small engine allowing sufficient RPM in adverse conditions when most power is needed.

The Campbell Sailer prop really does load the engine up more and I also fitted two replacement aft engine mounts from Polyflex in Brisbane.

They handle the extra thrust very well with no engine movement fore and aft as previously experienced with completely worn out Yanmar aft mounts and new Yanmar mounts forward. My elderly Yanmar with direct seawater cooling always ran on the cool side but now it runs a little hotter. It is still in very good condition and has only ever required routine servicing. The Polyflex engine mounts are produced to exact replacement specification for Yanmar, and are made of high strength plastic materials with a base that is easily cut if necessary to fit. They are stiffer than the soft Yanmar mounts so there is a very slight increase in hull vibration at engine tick-over. Polyflex have a warehouse in the UK, Southern Marine Ltd., Downton, Wiltshire SP5 3RB, Tel: 01725 511601 Fax: 01725 511901 cost in December 2007 was £ 70.91 each plus vat and carriage. Total for 2 of £184.26 incl. £15 carriage. <http://www.polyflex.com.au/>

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"The Campbell Sailer propeller is designed and manufactured to be one of the most efficient fixed blade sailboat propellers on the market today. Unique and innovative, it has been granted a Canadian patent."

"Manufactured from high-quality manganese bronze to provide strength, durability and repairability - available in 2 or 3 blade, left and right hand configurations"

"They are individually made to order in Vancouver, each propeller being cast and bored to your shaft size, pitched, balanced, stamped with size/date, finished and spray coated to reduce growth on prop surfaces"

Before 'phoning Norm to discuss my requirements I did a quick Google search to see how other users had found this propeller. On one marine discussion website all were agreed that Norm Ross really knows his propellers and sizing. One user in the U.S. reported that he ordered an inch greater pitch than recommended and he had to send it back for re-pitching as he was over-propped. Pitch specifications may possibly be available in half- inch sizes but I am not certain of this. Norm Ross at North By West is the worldwide agent and has a similar Yanmar to mine in his own 30 footer. His promise of 6kts was accurate and I found him to be very helpful. He allowed 10% discount for sending the propeller 'pilot bored', i.e. to be bored out later to suit my 1:12 shaft taper as the usual taper over there is 1:10. The pilot bored propeller arrived with a longer hub section which had to be reduced equally on either side to fit. It is heavier than my old propeller and appears more robust. It cost Euro 180 locally in Dublin to drill the taper to 1:12 and reduce the fore and aft length of the hub. The fitter told me it required two people for accuracy and his charges have always been very reasonable.

The result was excellent, test running at high revs in the boatyard showed no imbalance or vibration; I have a cooling water lubricated shaft that permits this. In hindsight I would have ordered the prop with the standard 1:10 taper and fitted a new 1:10 shaft from Sillette Sonic in London. It would perhaps be advisable to first check locally available shaft tapers.

Finally, as an example of the extra thrust, I had a brief anxious moment after launching in April until the source of my problem was identified and put right. Immediately after launching I motored over to photograph a friend's boat which was next on the crane, full of enthusiasm with seeing how the new propeller would perform and doing a crash test on stopping capability. Shortly afterwards on the mooring I discovered that cooling water was flowing in at a fast rate at the 'John Crane' shaft seal. The shaft had been fully tightened with the Allen bolts on the coupling but it had evidently been pulled back a couple of inches, moving the three jubilee clips on the seal, and then pushed forward again back into the coupling while leaving a gap at the seal. I de-greased the shaft at the coupling and tightened the coupling bolts again with no further problems. No water had entered through the shaft as there is a fine clearance on my tail shaft bearing. It is the original tail shaft fitting but with the white metal bearing replaced in 2006 by an industrial plastic sleeve, Ertalyte, manufactured by Quadrant.

To sum up, I am very pleased with all aspects of the Campbell Sailer Propeller. Regular crew have remarked that it seems smoother than last season, although in my own opinion the previous two-blade propeller was also free of vibration. Another major plus for me is the extra confidence it gives for motoring up to the mooring in windier conditions than I would previously have felt comfortable with knowing that there is more control. The full power range of the engine is now more usable and available where it is required.