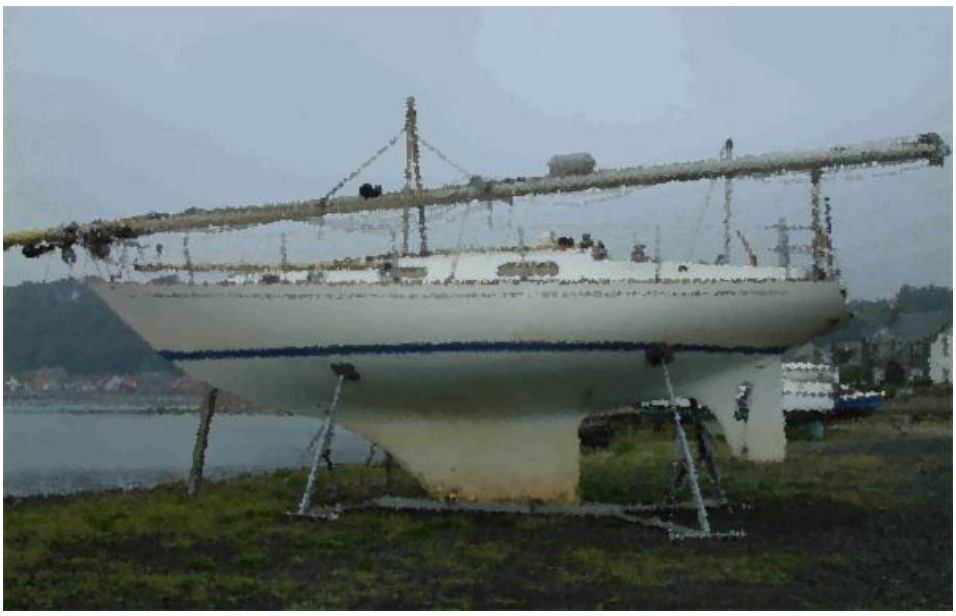

*CONTESSA 32 CLASS ASSOCIATION TECHNICAL PAPER*

# *FINDING AND FIXING VIBRATION NOISE FROM THE ENGINE AND STERNGEAR*




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## DOCUMENT INFORMATION

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## BACKGROUND

About 10 years ago I acquired a CO32 and although it was a delight to sail it was rather noisy under power. After a few years of trying standard fixed propellers I decided to try and correct the problem once and for all. This is an account of how I went about it which may be of help to other owners.

## FINDING AND FIXING THE SOURCE OF VIBRATION NOISE

First of all I had to remount the engine which is a 3 cylinder 20hp Betamarine with 2:1 gearbox. It was originally mounted in a heavy metal cradle onto 2 wooden beds. The cradle had to go and 4 engine brackets were made to suit the beds which had to be stepped to suit the slope of the stern. I fitted the standard Metalastik engine mounts (IRH55).

Unfortunately vibration was still bad & it was still a brave man (or woman) that dared to run it at full throttle.

After what seemed like an age thinking about the problem I decided that the answer lay in the following areas.

1. The fluctuating load of a propeller sitting behind a keel.

Whenever a blade aligns with the skeg the forward thrust disappears. What also disappears at this time is the radial load on the engine so some form of damping is required in both these directions. Unfortunately the engine mounts are designed for a steady thrust only and the flywheel on this 3 cyl. engine is also quite light. The end result is that the tail is wagging the dog.

What was needed was a rubber engine coupling designed for this purpose instead of the present plastic one. It came in the form of a Centaflex M127.

2. Engine alignment.

Engine alignment specifications for the R&D coupling which was originally fitted were approx. 1/3 of a degree vertically and horizontally. Although this was easily obtained vertically, horizontal adjustment was always difficult especially as nothing in the stern of the boat seemed to line up perfectly.

Fortunately the spec. for the new coupling is 3 degrees so alignment is no longer an issue.

3. The small size of the aperture that the 14” propeller sat in.

When CO32’s were originally built they came with 10-12hp engines requiring a prop of only 12 inches according to JR, requiring a designed aperture size of at least 16 inches ( the CO32 aperature size).

Hull to propeller distance = 15%-20% of prop. Diameter

When engines got bigger so did propellers but the aperture stayed the same. The only way to prevent propeller to hull vibration was to make the aperture larger or the propeller smaller and since I don't trust myself with GRP I went looking for a smaller more efficient prop. It came in the form of the Campbell Sailor. The makers claim that a Campbell 12 inch propeller would do the work of a standard 14" one and would have at least half the drag when sailing.

Well, all duly fitted, what would it be like in practice?

The first thing I noticed was the change in pitch of the noise. This was because I was now only listening to the engine. It was also a lot smoother and a glance over the stern revealed that the wash had hardly any bubbles in it. The biggest difference was at full throttle which is now as smooth as any part of the rpm range.

Performance wise it seems on a par with the fixed 14" props which I have tried although I don't have any figures for these. The actual speed at full throttle (3200rpm) on a flat sea with no tide and a clean bottom is 7 knots taken off a GPS speedo.

Propeller drag under sail doesn't appear to have any noticeable effect on performance. When sailing with another CO32 with a feathering prop it's the boat with the newer sails that seems the quickest.

DRAG

After listening to the drag debate over the years I thought I might try and work a figure for prop. drag on a CO32 especially now that I'm running yet another fixed prop.

I decided to try and work it out as if beating into a 20 knot wind. Under power in this condition I would achieve an average speed of approx. 5 knots. This would be at 3200rpm and I would be using all of the 20bhp available.

Force pushing boat forward (Newtons) = Power (Watts) / Velocity (meters per second)

= 15120 / 2.57

= 5883 Newtons or 1323 lbs

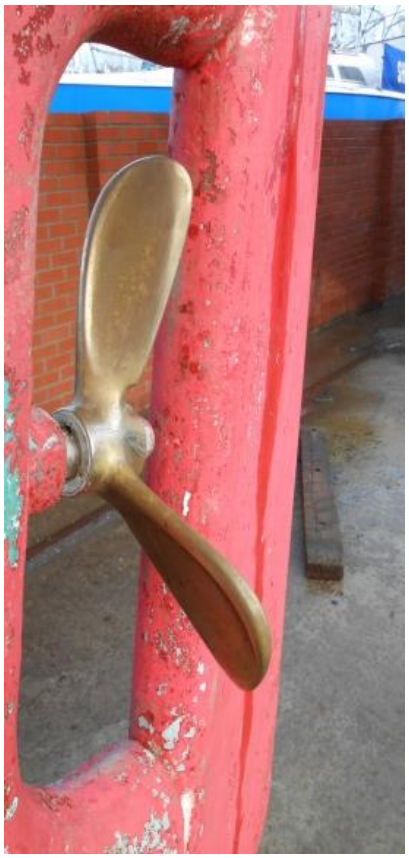
Assuming that it would take a similar force to push the boat under sail :-

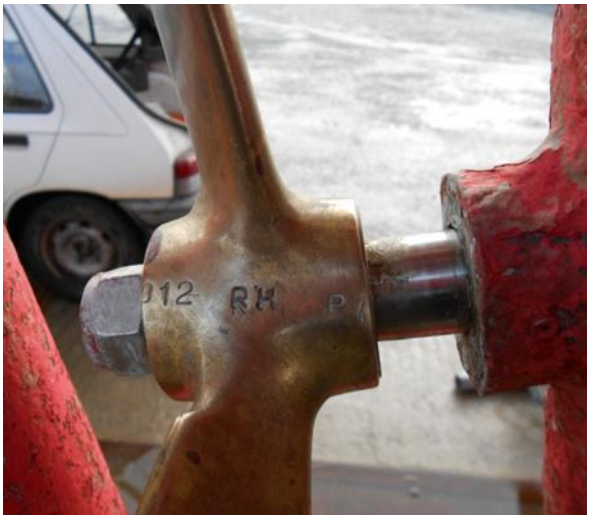
Drag figures for my propeller in free water at this speed are 8lbs spinning and 16lbs fixed. Since the propeller is 'hidden' behind the skeg for approx 1/3 of this time the figures would be 5.33 & 10.67lbs.

Therefore the effect on my speed would be $\frac{5.33 \times 100}{1323} = 0.4 \& 0.8\%$,

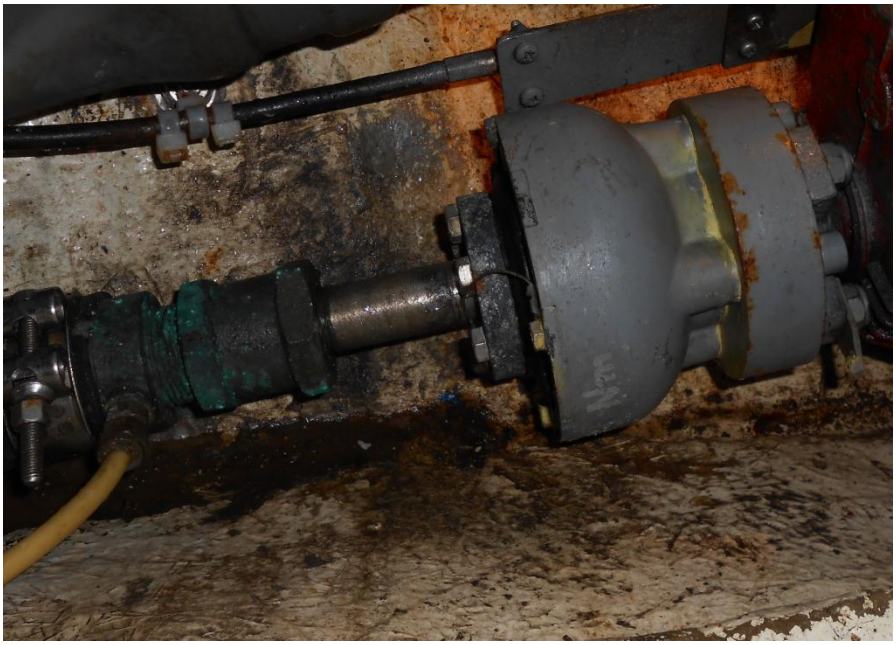
or roughly 2 & 4 minutes on an 8 hour journey. The effect would be less if I was sailing more than 5 knots into a 20 knot wind and consequently more if I was reaching or running. However it serves as a rough guide and I don't think that it will be a worry for me.

## ADDITIONAL PHOTOGRAPHS

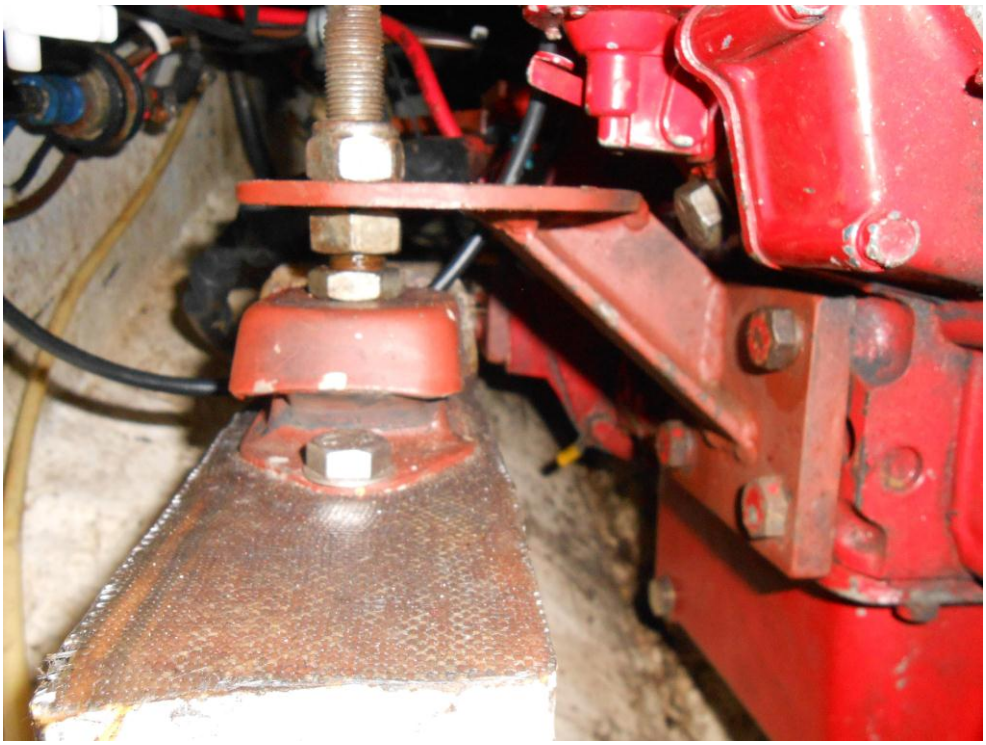





Campbell propeller 12” diameter & 7” pitch



Centaflex M127 with spacer to allow easy removal



Front engine bracket

## SUPPLIERS AND ADDITIONAL INFORMATION

www.westbynorth.com *for Campbell Sailor*

www.tnorrismarine.co.uk *for Centaflex*

If you would like any additional information about how to proceed with upgrades or repairs to your Contessa 32 an excellent forum is available on the Association website where you can post questions and draw on the collective knowledge of many owners.

Contessa 32 owners are in the very lucky position to be able to contact the original and current manufacturer of Contessa yachts, the team at Jeremy Rogers Yachts are extremely helpful and will offer free advice to owners as well as historical information about your particular Contessa. Jeremy Rogers Yachts can provide a range of spare parts and will carry out repairs both small and large, their contact details can be found on the Jeremy Rogers website