

October 2024 Newsletter – Shaft Coupling Fasteners

Photo Essay: Shaft Coupling Fasteners

The average small vessel may have anywhere from hundreds to several thousand, fasteners aboard, used in everything from joinerwork to engines. All are important, a few are critical. In my view, especially critical fasteners fall into the categories of propulsion, steering and watertight integrity.

Critical fasteners must be made from the correct alloy, corrosion inhibited if necessary, properly torqued, locked and inspected regularly.

The fasteners shown here are used for securing the shaft and transmission couplings; without them, or if they fail, the vessel is dead in the water. They should be grade SAE 8 mild steel (these are identified by 6 hash marks on the head), and some means must be used to prevent them from loosening on their own. Here, incongruously, a stainless-steel lock washer is used under the head of the bolt, while the nut appears to incorporate an embedded Nylon locking ring. The ring, however, is not engaging the bolt's threads because none of them stand proud of the end of the nut; which is necessary for the locking ring to impart resistance on the bolt, and prevent loosening. Interestingly, the lock washer is partly to blame, as it is effectively shortening the bolt.

The rule of thumb for all nuts and bolts, particularly those with locking rings, is to ensure that a minimum of two threads stand proud of the nut.

Ask Steve

Dear Steve,

I was searching for industry experts on Marine fuel tanks and I found your site. I realized my boat is not in the league of boats Steve deals with, but was hoping maybe someone could point me in the right direction.

I finally bought a boat even though it was out of my budget, and followed advice from trusted friends about buying a new boat with a warranty, and extending the warranty of the motor to 8 years so I could just enjoy the time with my kids. I ended up with a 17-foot Skiff for backwater fishing at around \$45,000.

I am sure my boat has a gas tank problem. I have tried to get me dealership to help, and they have contacted the boat manufacturer, who is being very unreasonable. My gas tank is aluminum, and in the hull of the boat. Every trip while we are on the water it seems I hit a submerged object, yet to this day I have not. There is a metallic "thunk" that happens which you can physically feel inside the boat. I can feel and hear the same thing when I open the gas cap, or when I top the boat off with gas.

I am now an Electrical Engineer, but I am still a licensed Journeyman welder (one of my certifications is in aluminum tig welding). I know aluminum cannot handle the stress of what I am hearing. The boat manufacturer is telling me to have the rigging removed, center console pulled, the deck removed, and the gas tank pulled. If they can find a physical defect, then the work will be warrantied, if not then I foot the bill. I can smell gas in my hull and at times when I pull the drain plug, I can see the sheen of gasoline on the surface of the

water coming out. I will no longer take my family on the boat as I don't know if it is safe. Essentially, I have a yard ornament with a warranty which seems to mean nothing.

Best Regards,

Christian Beckman

Dear Christian:

The thinking sound aside, if you purchased the vessel new, and you suspect it is leaking fuel, evidenced by an odor, and a fuel sheen on water drained from the bilge, the dealer should take this very seriously, regardless of whether or not it's under warranty. I'm both surprised and disappointed they are not, as this is a potential fire and explosion hazard.

The legal route should be your very last resort, that will cost significantly more than \$500-\$1000, and there is no guarantee you will prevail. Exhaust all other avenues first.

I would visit the dealer in person, speak with the owner or manager only, and politely insist on bringing the vessel to their shop for an evaluation for a suspected fuel leak. Explain that it is your understanding that gasoline-powered vessels fall under the US Code of Federal Regulations; Title 33 Part 183 subpart J – Fuel Systems, and that gasoline fuel systems must, by federal law, comply with these standards, some of which are explained here. Tell them you want them to confirm there are no leaks (that should not require major disassembly, if there is an odor of fuel, there is a leak), and that the system is compliant with this standard. The tank should be pressure tested.

Finally, you could retain a surveyor to simply confirm what you are experiencing, the sound while underway, the odor and the sheen on bilge water. With that material, you should be able to compel the dealer to investigate the problem. If all else fails, you could call the Coast Guard and State's

Attorney General for assistance.

Dear Steve,

Which is better between the transmission and the propeller shaft, the DriveSaver by Globe Marine or Federal Flexible Coupling?

Thank you, as always.

Rick Schuch

Rick:

In short, none of the above and nothing should go between propeller shaft and transmission couplings. "Flexible" inserts only promote sloppy alignment, and in all the cases I know of, alignment cannot be performed with the insert in place because the surfaces are not square or true, which means the insert needs to be removed, a machined shim installed, alignment performed, and then the flexible insert reinstalled.

Furthermore, I've never been able to discern any meaningful difference in vibration or noise between before and after such an insert has been installed.

Finally, installing such an insert pushes the shaft aft, increasing the overhang between strut and prop, possibly beyond the ideal threshold of one shaft diameter. More overhang actually increases the potential for vibration and shaft damage/failure.

More on couplings [here](#) and more on alignment [here](#).

Hi Steve,

I am currently cruising the islands of Vanuatu in the South

Pacific. Quite challenging sailing between the islands as it is all open sea but some lovely locations upon arrival.

The weather here is warm but generally overcast and being middle of winter with the sun low in the sky I am not getting the charge from solar panels I would normally expect to keep the batteries well charged. Therefore, I am having to run the engine rather more than preferable just to get the batteries up to 75-80% SOC.

Installation comprises...

- 4 x 6V 240 ahr AGM's (5 yrs old), sold by NZ's Enertec sourced from some big battery factory in China
- 140 Amp Large frame Leece Neville alternator – dedicated to charging house battery installation
- Ample Power NS2 regulator, bulk voltage set to 14.2V and absorption to 13.9V per manufacturer's requirements. Obviously no tech support with Ample Power's demise.
- Blue Sea VSM monitor with shunt
- 3 x 110W solar panels with MPPT controllers.
- Mastervolt 2000W/100amp Inverter/Charger
- Output ammeter on the LN alternator
- Current draw ammeter on the supply to switchboard (picks up all consumers except Inverter)
- Engine is a 4JH4 Yanmar, no separate generator.
- Biggest power load is refrigeration, 2 x 12V fridges plus 1 x Engine drive/12V freezer.

When running the motor, charge will initially go to full output but within 5 – 10 minutes will start easing back in the bulk phase. I then see the regulator going to absorption phase around 75% SOC and backing the charge right off (down to 10 -15 amps net into battery bank after 1 hr), even with a deficit of 100Ahr. I appreciate the last 20% of charge takes the longest to complete. The first time I am likely to bring the batteries to full charge, in lieu of a long period of motoring or lots of solar, is on my return to NZ late October

where I can connect to shore power.

I have read a lot about the new Wakespeed WS500 regulator, in particular on the AAC and Panbo sites, and would happily install one in lieu of the NS2 if there is a real benefit to be gained. However, from my reading I cannot get a conclusive answer on this.

Would appreciate your feedback on the Wakespeed and/or any other options to improve my charging capabilities

Cheers,

Alan Sexton

Alan:

Five-year-old AGM's "sourced from some big battery factory in China", on a live aboard vessel; are the batteries telecom batteries, or are they a purpose made deep cycle design? It's entirely possible these batteries are sulfated, and thus their capacity is diminished. The symptoms you describe are consistent with this phenomenon. When possible, I would begin your analysis by carrying out a load test using a conductance tester (these are now available for about \$50). For more on sulfation see this article.

The Next Step 2 regulator was cutting edge in its day; however, it is dated. The WakeSpeed would represent a significant improvement, with battery bank and alternator case temperature monitoring, I recommend it. However, I would not leap to this solution without first testing the batteries.