Technical Pull-Out

Q&A FOR YOUR CATALINA THAT'S BEEN FACTORY APPROVED FOR ACCURACY

Catalina 470

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Beckoning, #76

The Mystery Of Maintenance...

With a decade of C470 ownership behind me plus observations, collaborations, interventions and direct assistance in turning wrenches, splicing wires, bleeding injectors, gluing fixed windows, using a digital multimeter and supplying parts to other boats in various forms of distress the mystery of maintenance is still a mystery!! Preventive? Interruptive? Corrective? Deferred? Don't bother? Live without that system? What about spares? "Make do"? Scrounge around the anchorage for them? Carry at least one of everything aboard? Trust Fedex, your sat-phone and the local Customs brokers to get that part to you before you have to leave? How does or how should an Owner approach the mystery of maintenance on our boats?

The C470 lends itself to Owner-performed maintenance (MX). Indeed, with some exceptions, we generally like to do our own mx to reduce cost, get the job done when it needs to be done and done the way we want it. Schools for Owners such as the excellent Yanmar Diesel Owners 3-day course in Union, NJ provide professional training for amateur mechanics such as our Owner group. Seminars at boat shows, online how-to manuals and the excellent telephone tech services such as RayMarine, Raritan, Fischer-Panda, Xantrex and Catalina are priceless, convenient and of great comfort to those with mx problems. However, the ultimate moment-of-truth occurs when we Owners, with tools at the ready, are in front of the troubled piece of equipment to do battle. What does an Owner bring to that moment, how did he/she arrive at that point and, the most important point of all...what truly IS the problem?

First of all, if you are the guy on board you are going to be elected/designated/ordered, obliquely perhaps but there nonetheless, to "get that damned genset working NOW". That is the way it is. I have seen several women (and one aboard *Beckoning*) who are quite skilled at mechanical things but generally fixing things is the guy's domain. Certainly having the ladies along is terrific; we are glad for the company of those who are soft, smell good and like to dance even though we aren't going to win the next Dance with the Stars competition. We cherish them and don't want the sailing experience to cause them to vacate the boat permanently at the next port of call. So, we guys fix things which break. How?

There truly is one answer to this question: slowly! Being slow generates many advantages. The main one is that you generally get it right the first time. Why? If you take your time the defect will generally show itself in more obvious fashion simply because it has more opportunity to do so and thus you have more chances of finding it. If the water heater is leaking coolant, let it leak!! That is onboard water, not outside-the-hull water so who cares? One would be derelict in allowing a ruptured raw-water line to continue to pour sea water into the boat without quick action but 99% of the on-board failures do not require immediate action. But there's the rub..."it's broken and I have to find out what is wrong now and fix it now" is the mindset of most of us.

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We know that we are going to proceed slowly on a MX problem. Ok, where do we slowly start? Another single answer: with the simple stuff first. Why? That's probably where the problem is! For example, most electrical issues are connection/corrosion issues. An Owner once told me that a professional marine electrician told him that over 90% of electrical issues on a boat are traced to simple connections. Ask the question: has anyone very recently been working on or near where electrical connections or wires to the failed equipment are located? Chances are pretty good that the answer is yes. Chances are also pretty good that a wire or connection was bumped or pulled out causing the failure. A case in point aboard *Beckoning*: The bow thruster failed. In getting to the control head for the thruster my friend unknowingly bumped a control wire leading into the lazarette-mounted air-conditioner. A day later when I wanted to start the AC the control panel would not function properly and presented a wide variety of symptoms. The unit had power, raw water, no leaks and ran properly but not when I wanted it to! A quick check of the wiring where my friend had been in the starboard lazarette and a control wire which had been pulled loose was found. The reader will surely ascertain the result of finding the loose wire. Fuel systems are the same; even a small air leak in a fuel line at the manifold will create havoc when needing the engine. Water systems are even worse and maddingly difficult to find. Excessive water in the bilge requires one quick determination: salt water or fresh? A taste test is appropriate here with the results determining where you start but start with the simple stuff!

Boats break! What kind of MX/parts philosophy should an Owner adopt? On-condition mx is purely reactionary; "progressive" mx where one is constantly attending to various pieces of boat equipment on a scheduled basis and starting again at the end of that evolution is ok but must be strictly adhered to in order to make it work; preventive mx is done on some equipment as part of normal operation to keep it working; deferred mx is just that, put it off until the last moment. Spare parts require some serious thought involving the amount of money available for them, where and how the boat will be used, ages of current components in use, skills and talents of the Owners, redundant systems allowing deferred mx and lastly, the amount of space which will be allotted to the spares. One Owner did all his own mx and carried over 2500 spare parts. His wife had the fewest pairs of shoes aboard a C470 I have ever seen!! *Beckoning* was known as the "fleet oiler" by other Catalina Owners due to her massive spares inventory. The numerous spare parts have served her well in the past decade and saved several trips aboard her plus allowed other Catalina Owners to continue to operate when supplied with parts in the anchorage they were sharing with *Beckoning*. So, what is the answer to the question posed at the top of this paragraph? The answer is: ask other Owners what they carry and then trust your gut feeling. But I have digressed from answering the primary question.

Much research has been done into the art and science of maintenance...any kind of maintenance. The hard fact is that corrective maintenance is inversely proportional to preventive maintenance. Put in algebraic terms (the engineering formula for design reliability) is $R = e^{-\lambda t}$ where R = reliability expressed as a percentage, e(2.718281828459) = the inverse of the natural log, λ = failure rate and t = operating cycles, then we can solve for any of the variables which results in (trumpet plays here):

If your operating interval equals the failure interval (mean time between failure in better terms) then a piece of equipment would, by the formula, be deemed to be reliable only 37% of the time. More simply stated, the more preventive maintenance you do, the better your probability of a piece of equipment has of making it to its desired reliability life span. So, to cut thru the algebra, if a piece if equipment has an MTBF (Mean Time Between Failure) of 100 hours (it will fail at 100 hours of operation if not properly maintained), and a service interval of 100 hours then the chances of it working until it hits the 100 hour mark are only 37%. What do we take away from all this? Preventive mx works!!! My fervent thanks to Charles Harris of *Autumns Choice III*, a C400, for his tutelage in both teaching me how to sail 11 years ago and spending the time these past few days explaining the above formula in terms I understand.

This is my final article as the Catalina 470 Tech Editor. *Beckoning* has been roaming the Atlantic seaboard and the Caribbean for almost 11 years and all has been under my command. It is, however, time to do other things. *Beckoning* has been sold and is in capable hands so you will be seeing her on the East Coast of the USA this summer and for the foreseeable future. It has been a unique pleasure and privilege to serve the C470 fleet over the past 9 years and I thank each and every reader for their patronage of the C470 Tech Section. Those Owners who contributed Tech Articles are specially thanked for their assistance. Lastly, I would like to thank Carl Smeigh for his counsel and guidance during my tenure. He covered for me when I was flying missions in Afghanistan and Iraq, this year when training to do it again and diligently worked with other C470 Owners on their Tech Articles. Thanks, Capt. Smeigh!!! I will continue to be aboard various C470s as a crew member and contribute as needed to the C470 forum on YAHOO!

Note from Catalina Yachts: Special thanks is due to Jim Wohlleber for his thoughtful, dedicated service to the C470 association. It has been my pleasure to work with Jim for the past 11 years on a variety of C470 technical issues, for the benefit of C470 owners. Thanks Jim and best wishes for success in your future endeavours. –Gerry Douglas

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Note from Catalina Mainsheet: Thanks also from the Mainsheet staff. –Jim Holder and Carol VandenBerg

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