

# THE YACHT

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# report

The leading magazine for the design, construction,  
management, ownership & operation of luxury yachts

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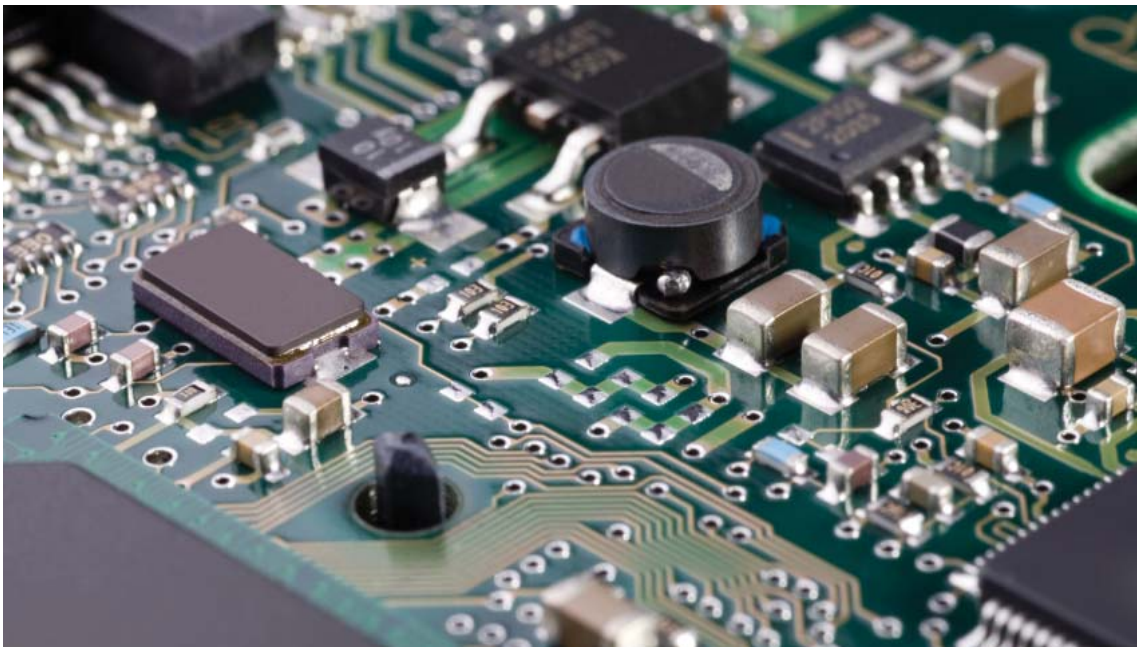
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# Checking in with the Systems

ENGINEERS' COMMENTS



With the complexities of modern yacht equipment and the specialised knowledge needed for electrical and electronic installations on board, maintaining and troubleshooting can be particularly challenging. Heat, poor ventilation, moisture and vibration are the main culprits for equipment failure. It's best if you have time to indulge and be 'over the top' when it comes to installing the kit, making sure all the cables are properly connected, with no breaks and crimped ends where possible. Crimp and heat shrink are better than solder, and each wire should ideally be yellow heat shrink using fine indelible marker pen for labelling. If you're having work done, (especially in the yard), when signing the installation off, make sure that you are part of the commissioning. Gently tug on the wires. You'll be surprised how many aren't fully crimped and pull out. Check whether the installation impinges on other equipment and, most of all, how hot it will get when you close it up. Then when everything works for the owner, and the captain on the bridge, you'll be a legend!

Joe Hodgson

I've worked for a couple of years as ETO on a number of yachts. All of them have had several different owners. I noted already on the first ship that documentation and structure of documentation left a lot to wish for. To be completely honest, it has been a catastrophe. The same thing has occurred as well on the other ships I've been on. When I compare these situations with my previous land-based jobs, it feels like I'm back in the late 1970s. Maybe I have had bad luck on yachts, maybe this is how it works on all yachts or maybe I'm too picky about things. The major problems have been that manuals are spread all over the yacht, if they are not missing; and electrical schematics are either missing or not updated when systems have been upgraded or replaced. Most yachts use AMOS as a maintenance system. The structure in AMOS has been different on all these ships, with lots of things and systems missing as well as not being organised so that it is easy to find things. Instructions on how to do periodic maintenance jobs have been really lousy, for example 'Test the fire system'. Most flag states, such as DNV and IMO, have strict rules on what should be tested in a fire system, and how often with the expected results. Storage for spare parts has been a complete mess on most yachts too, for example the same spare part has been in several different lockers. Markings are usually missing, so it is difficult to find them.

My questions are:

- Do other ETOs recognise what I have described?
- Is this description only accurate for older ships (> 10 years)? How is the situation on newer ships?
- Does the fact there have been several owners on the same yacht with different views on maintenance contribute to the 'messaging up' of the system?
- How does the situation stand on an old yacht owned by the same owner the whole time?
- Is it wrong of me to wish for structure, good order in stores and workshops and proper documentation?

**Bo Johansson**



During the building of these yachts it's important that as many of the crew (that is, electrician/electronic engineer and chief engineer) as possible inspect the build during installation. Get to know the vendor who is responsible very well. Get all the training needed to operate and repair after the yacht is in operation. These are all the computerised systems you need to know:

- Sound and light;
- Audio visual;
- IT computer systems and communication phone systems;
- Monitoring and control system.

Cruise Lines have specialists in every field of these courses; not for yachts. These are complex

systems and without training those who are responsible for the repair and maintenance (engineers), they will stand no chance. The yacht owner and captain will need to fly the vendor in for repair instead, which is very expensive. It is very important to get the service and spare part manuals; get all these drawings and parts also on DVD. Make sure all the equipment involved in the above systems has easy access with correct labelling for fast service and repair that matches the drawings. Make sure you get all the extra spare parts that come with these installations; this should be a certain percentage according to spec.

**Engineer Finn Rudsbraten**

As a yacht engineer I spend more time tinkering with electronic gadgets than I do with the machinery I am trained to operate. The nuts and bolts days are long gone and today's engineers need to keep pace with technology and become proficient with:

Alarm and monitoring systems;

Communication systems, GMDSS, telephones and the PABX;

Lighting control systems;

Sat TV and entertainment systems;

Security and CCTV networks;

V-Sat and computer networks.

Electronic systems consume a significant percentage of the technical equipment budget, and are directly related to owner comfort and satisfaction. The root causes of many technical problems are predominately design layouts with insufficient space and this directly contributes to poor workmanship during installation and on-going technical and trouble-shooting difficulties. Well-designed systems should incorporate the following:

Cable identification markings – colour codes  
– equipment labels;

Connection to VPN (virtual private networks, password protected technical support via V-SAT);

Equipment manuals, boat specific drawings and operation booklets (crew training);

Illumination of the technical space and providing service tool power outlets;

Installation standards – correct fastening of devices, cables and rack slides;

Isolation from sources of electromagnetic, frequency and bandwidth interference etc;

Modular design & consideration for system upgrades;

Power supply stability – UPS (uninterruptible power supply);

Power supply changeable voltage and frequency for equipment racks (DC, 110V, 230V, 50Hz, 60Hz);

Service access to equipment and purpose-built equipment racks;

Software version control and the uploading or downloading of data;

Ventilation and filtration of technical space.

Designers, system integrators, installers and shipyards must coordinate their efforts and produce reliable systems, otherwise sea-going engineers are left to clean up poor installations and troubleshoot systems... owners spend small fortunes on electronic wizards and their gadgets, and are regularly let down when these systems are put into operation.

Seagoing vessels pound, slam, vibrate and travel all over the world and technical systems should be built to withstand the marine environment.

**Chief Engineer Dean Vaughan**

*I have a small piece to add to this month's forum – a top tip really... don't install \$500,000 of AV and computer equipment under the bridge windows of an Italian built yacht! First bit of weather and it was mostly written off! Two of the three windows leaked when the yacht flexed!*

**Mark Critchley, Y3 Engineer**

*The yachts of yesterday are not the same as today's for sure. Technology advances in the industry have come to a point now whereby installation of live video conferencing through digital streamline internet connections means that a yacht owner can run his business from the vessel without having to leave.*

*The captain and engineer can also use the same technology to get audio-visual meetings with their local online MTU dealer to help solve any mechanical or electronic problem on the yacht. Online courses could also be incorporated down the line so that crew could stay on board to complete tickets and modules needed.*

*The future of this new technology is endless and may also mean that down the line more courses may be mandatory for engineers and perhaps even deck crew as these existing systems move forward.*

**Engineer Trentham Jones**

I have some thoughts on a lighting system change we have recently implemented on board. The majority of our interior lighting both in crew areas and in the guest areas is the typical GU10 halogen spotlights. These lights average \$4 a bulb for 30–40W bulbs. They seem to have a relatively short life span, less than six months, due to either the rigours of power fluctuation inherent to small generators or a simple design flaw. Also, as we all know the bulbs are just plain hot – around 95°C. I have found that a room may heat up as much by 7°C when all the halogens are turned on. These all add up to a lot of power and expenses for nothing but lighting. In the last month we have begun switching to Warm White 20W equivalent LED GU10 bulbs. These bulbs fit directly in to the same sockets with no modification. They are slightly dimmer than the 30W halogen bulbs but only use 3W of power. This is a significant power saving on several levels. First the obvious: at 1/10th the power usage every 100 bulbs is 2.7kW off your load. Turmoil has over 400 halogens just in the crew areas. That is nearly 11kW off my load. Second is the lack of heat. An LED produces almost no heat. So that means your AC won't have to work so hard and with most boats AC is the majority of your load. Finally the life of these bulbs is predicted to be nearly 70,000 hours or eight years. I



cannot comment on the legitimacy of this claim as I have only used them for three weeks. If it were true though that would also be a huge advantage over the short life and hot halogens, not to mention a lot less time spent changing bulbs in the day before the guests show up. Now for the downside. As I said, LEDs are a little dimmer but not much. The colour is also different but I prefer the slightly blue colour. I believe the colour difference will prevent the use of LEDs in all guest areas but every owner is different – so give it a try. Finally, the price: I have found that LEDliquidators.com offers LEDs at US\$6.99 a bulb if you buy more than 50. I have had good service from the site and I believe it is a good price. When you add up all the differences at twice the price LEDs are worth every penny, especially if they last half as long as they say they will. The complexity of modern yacht fit-out in regards to lighting, computers,

audio-visual and electronics usually fails in one area of design: cooling & ventilation. So many times I have seen stacks of CPU's crammed into the top shelf of a cabinet with inadequate or zero ventilation, let alone cooled-air intake. The overheating of these units can cause lacklustre performance (or no performance at all) and as an add-on the cooling fans emit considerable noise as they chug away trying to keep their sweating charge from heat exhaustion. This "white noise" is one of the banes of a modern vessel. If you ever had a blackout aboard you realise how loud this white-noise whine is and what a relief it is when it's not drilling into your brain. Rectification of these cooling/venting/ noise problems is usually ad-hoc and difficult because space and ducting were never conceived at the 'right time', that is at the design stage.  
**Chief Engineer Brian Sheridan,  
 M/Y Turmoil**

Photos: istock.com, Caroline Hillier/superyachtart.com and Brooke Shaw/superyachtart.com  
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